HEART CENTER
of Greater Waterbury

RECEIVED

2008 JUL -8 P 3:05

CONNECTICUT OFFICE OF HEALTH CARE ACCESS

VIA HAND DELIVERY
Cristine A. Vogel, Commissioner
Office of Health Care Access
410 Capitol Avenue
MS# 13HCA
P.O. Box 340308
Hartford, CT 06134-0308

July 8, 2008

RE: **Letter of Intent**

The Waterbury Hospital and Saint Mary's Hospital Corporation, d/b/a/ Heart Center of Greater Waterbury and University of Connecticut Health Center/John Dempsey Hospital

Dear Commissioner Vogel:

Enclosed please find an original and three (3) copies of our Letter of Intent Form 2030 for your consideration. The Applicants seek to continue to serve the greater Waterbury community with advanced cardiac services through the CON process. Your attention to this is greatly appreciated.

Should you require additional information or have any questions concerning this matter please contact:

Loraine C. Shea, Executive Director
Heart Center of Greater Waterbury
PO Box 2153
Waterbury, CT 06722
(P) 203-575-5571
(F) 203-575-5575

Sincerely,

Saint Mary's Hospital

William Casey,
President and CEO

The Waterbury Hospital

Steven Schneider, MD
Vice President of Medical Affairs

John Dempsey Hospital

Ellen M. Leone, RN MSN
Associate VP of Operations and Director of Nursing

State of Connecticut
Office of Health Care Access
Letter of Intent Form
Form 2030

RECEIVED
2008 JUL -8 P 3:05
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

All Applicants involved with the proposal must be listed for identification purposes. A proposal's Letter of Intent (LOI) form must be submitted prior to a Certificate of Need application submission to OHCA by the Applicant(s), pursuant to Sections 19a-638 and 19a-639 of the Connecticut General Statutes and Section 19a-643-79 of OHCA's Regulations. Please complete and submit Form 2030 to the Commissioner of the Office of Health Care Access, 410 Capitol Avenue, MS# 13HCA, P.O. Box 340308, Hartford, Connecticut 06134-0308.

SECTION I. APPLICANT INFORMATION

If this proposal has more than two Applicants, please attach a separate sheet, supplying the same information for each additional Applicant in the format presented in the following table.

	Applicant One	Applicant Two
Full legal name	The Waterbury Hospital (WH)	Saint Mary's Hospital, Inc. (SMH)
Doing Business As	Heart Center of Greater Waterbury (HCGW)	Heart Center of Greater Waterbury (HCGW)
Name of Parent Corporation	Greater Waterbury Health Network	Saint Mary's Health System, Inc.
Applicant's Mailing Address, if Post Office (PO) Box, include a street mailing address for Certified Mail (Zip Code Required)	64 Robbins St. Waterbury, CT 06721	56 Franklin St. Waterbury, CT 06706
Identify Applicant Status: P for Profit or NP for Nonprofit	NP	NP
Does the Applicant have Tax Exempt Status?	Yes	Yes
Contact Person, including Title/Position: This Individual will be the Applicant Designee to receive all correspondence in this matter.	Loraine Shea, Executive Director HCGW	Loraine Shea, Executive Director HCGW
Contact Person's Mailing Address, if PO Box, include a street mailing address for Certified Mail (Zip Code Required)	PO Box 2153 Waterbury, CT 06722 OR 1075 Chase Pkwy Waterbury, CT 06708	PO Box 2153 Waterbury, CT 06722 OR 1075 Chase Pkwy Waterbury, CT 06708
Contact Person Telephone Number	(203) 575-5571	(203) 575-5571
Contact Person Fax Number Contact Person Email address	(203) 575-5575 lshea@hcogw.org	(203) 575-5575 lshea@hcogw.org

	Applicant Three	
Full legal name	John Dempsey Hospital (JDH)	
Doing Business As		
Name of Parent Corporation	State of Connecticut University of Connecticut Health Center	
Applicant's Mailing Address, if Post Office (PO) Box, include a street mailing address for Certified Mail (Zip Code Required)	263 Farmington Ave Farmington, CT 06030	
Identify Applicant Status: P for Profit or NP for Nonprofit	NP	
Does the Applicant have Tax Exempt Status?	Yes	
Contact Person, including Title/Position: This Individual will be the Applicant Designee to receive all correspondence in this matter.	Loraine Shea, Executive Director HCGW	
Contact Person's Mailing Address, if PO Box, include a street mailing address for Certified Mail (Zip Code Required)	PO Box 2153 Waterbury, CT 06722 OR 1075 Chase Pkwy Waterbury, CT 06708	
Contact Person Telephone Number	(203) 575-5571	
Contact Person Fax Number	(203) 575-5575	
Contact Person e-mail Address	lshea@hcogw.org	

SECTION II. GENERAL APPLICATION INFORMATION

a. Project Title:

Response: Advanced Cardiac Services Program

b. Project Proposal:

Response: Provision of Elective and Primary Angioplasty and Open Heart Surgery

c. Type of Project/Proposal, please check all that apply:

Inpatient Service(s):

☐ Medical/Surgical ☒ Cardiac ☐ Pediatric ☐ Maternity
☐ Trauma Center ☐ Transplantation Programs
☐ Rehabilitation *(specify type)* _____
☐ Behavioral Health (Psychiatric and/or Substance Abuse Services)
☐ Other Inpatient *(specify)* _____

Outpatient Service(s):

☐ Ambulatory Surgery Center ☐ Primary Care ☐ Oncology
☐ New Hospital Satellite Facility ☐ Emergency ☐ Urgent Care
☐ Rehabilitation *(specify type)* _____ ☐ Central Services Facility
☐ Behavioral Health (Psychiatric and/or Substance Abuse Services)
☐ Other Outpatient *(specify)* _____

Imaging:

☐ MRI ☐ CT Scanner ☐ PET Scanner
☐ CT Simulator ☐ PET/CT Scanner ☐ Linear Accelerator
☐ Cineangiography Equipment ☐ New Technology: _____

Non-Clinical:

☐ Facility Development ☐ Non-Medical Equipment ☐ Renovations
☐ Change in Ownership or Control ☐ Land and/or Building Acquisitions
☐ Organizational Structure (Mergers, Acquisitions, & Affiliations)
☐ Other Non-Clinical: _____

d. Does the proposal include a Change in Facility (F), Service (S)/Function (Fnc) pursuant to Section 19a-638, C.G.S.?

☒ Yes ☐ No

If you checked "Yes" above, please check the appropriate box below:

☐ New (F, S, Fnc) ☐ Additional (F, S, Fnc) ☒ **Replacement**

☐ Expansion (F, S, Fnc) ☐ Relocation ☐ Termination of Service

☐ Reduction ☐ Change in Ownership/Control

e. Will the Capital Expenditure/Cost of the proposal exceed $3,000,000, pursuant to Section 19a-639, C.G.S.?

☐ Yes ☒ No

If you checked "Yes" above, please check the boxes below, as appropriate:

☐ New equipment acquisition and operation

☐ Replacement equipment with disposal of existing equipment

☐ Major medical equipment

☐ Change in ownership or control

f. Location of proposal, identifying Street Address, Town and Zip Code:

Response: 64 Robbins Street Waterbury, CT 06721 and 56 Franklin Street Waterbury, CT 06708

g. List each town this project is intended to serve:

Response: The Primary service area of Saint Mary's Hospital and Waterbury Hospital has traditionally included Beacon Falls, Bethlehem, Cheshire, Middlebury, Naugatuck, Prospect, Southbury, Thomaston, Waterbury, Watertown, Wolcott, and Woodbury.

h. Estimated starting date for the project:

Response: Immediately so as to have no interruption in services currently being provided to ensure patient access and safety.

i. If the proposal includes change in the number of beds provide the following information:

Type	Existing Staffed	Existing Licensed	Proposed Increase or (Decrease)	Proposed Total Licensed

Response: Not Applicable

SECTION III. ESTIMATED CAPITAL EXPENDITURE/COST INFORMATION

a. Estimated Total Project Expenditure/Cost:

Response: All necessary renovations and major medical equipment purchases occurred under previously authorized CON. (Docket # 03-30167-CON) No additional costs are associated with this project.

b. Please provide the following tentative capital expenditure/costs related to the proposal:

Major Medical Equipment Purchases*	
Medical Equipment Purchases*	
Non-Medical Equipment Purchases*	
Land/Building Purchases	
Construction/Renovation	
Other (Non-Construction) Specify:_____	
Total Capital Expenditure	
Major Medical Equipment – Fair Market Value of Leases Medical	
Equipment – Fair Market Value of Leases	
Non-Medical Equipment – Fair Market Value of Leases*	
Fair Market Value of Space – Capital Leases Only	
Total Capital Cost	
Total Project Cost	
Capitalized Financing Costs (Informational Purpose Only)	

* Provide an itemized list of all medical and non-medical equipment to be purchased and leased.

Response: Not Applicable

c. If the proposal has a total capital expenditure/cost exceeding $20,000,000 or if the proposal is for major medical equipment exceeding $3,000,000, you may request a Waiver of Public Hearing pursuant to Section 19a-643-45 of OHCA's Regulations? Please check your preference.

☐ Yes ☒ No

Response: Not Applicable

1. If you checked "Yes" above: please check the appropriate box below indicating the basis of the projects eligibility for a waiver of hearing

☐ Energy Conservation ☐ Health, Fire, Building and Life Safety Code

☐ Non Substantive

2. Provide supporting documentation from elected town officials (i.e. letter from Mayor's Office)

Response: See Appendix I

d. Major Medical and/or Imaging Equipment Acquisition:

Equipment Type	Name	Model	Number of Units	Cost per unit

Note: Provide a copy of the vendor contract or quotation for each major medical/imaging equipment.

Response: Not Applicable

e. Type of financing or funding source (more than one can be checked):

☐ Applicant's Equity ☐ Capital Lease ☐ Conventional Loan

☐ Charitable Contributions ☐ Operating Lease ☐ CHEFA Financing

☐ Funded Depreciation ☐ Grant Funding

☐ Other *(specify)* _____

Response: Not Applicable

SECTION IV. PROJECT DESCRIPTION

In paragraph format, please provide a description of the proposed project, highlighting each of its important aspects, on at least one, but not more than two separate 8.5" X 11" sheets of paper. At a minimum each of the following items need to be addressed, if applicable.

Response: SEE PAGE 7

1. List the types of services are currently being provided. If applicable, provide a copy of each Department of Public Health (DPH) license held by the Applicant.

2. List the types of services being proposed and what DPH licensure categories will be sought, if applicable.

3. Identify the current population served and the target population to be served.

4. Identify any unmet need and describe how this project will fulfill that need.

5. Are there any similar existing service providers in the proposed geographic area?

6. Describe the anticipated effect of this proposal on the health care delivery system in the State of Connecticut.

7. Who will be responsible for providing the service?

8. Who are the current payers of this service and identify any anticipated payer changes when the proposed project becomes operational?

Section IV. PROGRAM DESCRIPTION

1. List the types of services that are currently being provided. If applicable, provide a copy of each Department of Public Health (DPH) license held by the Applicant.

Response: The Heart Center of Greater Waterbury (HCGW) has a longstanding history of providing cardiac services to patients of the greater Waterbury area. Since July 18, 2005, the HCGW in conjunction with John Dempsey Hospital has substantially improved the quality of medicine and in particular, cardiac care by successfully providing advanced cardiac services including open heart surgery and angioplasty services (Program) as a compliment to other vital cardiac services such as pacemaker clinics, cardiac rehabilitation, inpatient critical care and emergency room care. The greater Waterbury area relies on the HCGW, Saint Mary's Hospital and Waterbury Hospital to continue to provide these lifesaving services close to home. As will be demonstrated in the formal Certificate of Need application, over 2,400 residents have experienced and come to rely upon a higher level of quality and comprehensive cardiac care. (See Appendix II for copies of acute care hospital licenses)

2. List the types of services being proposed and what DPH licensure categories will be sought, if applicable.

Response: The applicants are proposing to replace the existing services previously approved as a demonstration project with an advanced cardiac services program under the direction of a new CON. These services are currently provided under the hospitals' current acute care hospital licenses.

3. Identify the current population served and the target population to be served.

Response: The Program currently serves and seeks to continue to serve the adult population in the greater Waterbury area. The Program's primary service area consists of twelve surrounding towns and is noted on page 4. Coronary artery disease is the number one cause of death in the nation and in Connecticut. The growth in total population in the primary service area from 2000 to 2006 was 5.0%. It is expected to grow by an additional 3.0% to 281,800 by 2011. The population over 45 years of age in 2006 was 40.5% of the total population. This is expected to increase through 2011 to 43.6% of the total population. (Claritas Inc.) The female portion of the population over 45 years of age in 2006 was 54.4% of the total. The female portion of the population over 45 years of age is expected to remain at this level through 2011. This is critical in the consideration of future cardiac care needs because it has been shown that coronary artery disease in the female population has been under diagnosed in the past and women have a longer life expectancy than men. Current data for the Program demonstrate the majority of patients treated for open heart surgery since July, 2005 have been over the age of 65 years and have several cardiac risk factors such as diabetes, hypertension and hyperlipidemia. As recognized in the public hearing transcripts in Docket # 03-30167-CON, patients and their families found it very difficult to travel away from their greater Waterbury communities for advanced, lifesaving services prior to July 18, 2005. Having such advanced cardiac services offered locally through the HCGW has not only eliminated these difficulties, but greatly improved their quality of care and their quality of life.

4. Identify any unmet need and describe how this project will fulfill that need.

Response: Since July 18, 2005, the demonstration project has met the cardiac needs of the greater Waterbury area. Over the initial three years, the Program's market share for angioplasty procedures has grown to 78%. For Coronary Artery Bypass Graph (CABG) Surgery and Cardiac Valve Surgery respectively market share has grown to 76% and 57% respectively. On an average, at least 100 ST-Elevation Myocardial Infarction (STEMI) patients received acute angioplasty each year. The program is demonstrating that it is able to revascularize these patients in an average of 66 minutes. In addition, 88% of the STEMI patients are being revascularized in less than 90 minutes, far exceeding the national benchmark of 75%. The program has consistently demonstrated excellent outcomes and exceptional service for its patients and families. This replacement Program under the direction of a new CON will continue to meet the immediate needs of the cardiac patients in a quality and cost efficient manner

5. Are there any similar existing service providers in the proposed geographic area?

Response: The Heart Center of Greater Waterbury is currently the sole provider of advanced cardiac services in the greater Waterbury area. The addition of these services in 2005 has allowed over 2,400 community members and their families the ability to be cared for locally in their community hospital and by local physicians with excellent quality outcomes, in an environment with which they are comfortable and by providers in whom they have tremendous confidence.

6. Describe the anticipated effect of this proposal on the health care delivery system in the State of Connecticut.

Response: This replacement Program under the direction of a new CON will continue to have significant impact on the health care delivery system and the residents in the greater Waterbury area and thus the State of Connecticut. It will continue to provide the benefit of accessibility to advanced cardiac services to which the greater Waterbury area has become accustomed and to which it has responded with considerable confidence. It will continue to provide necessary lifesaving and life changing services to greater Waterbury residents at a time when they need it most. This Program should not have a negative impact on the advanced cardiac programs throughout the state as current Program data shows that 90% of its patients originate from the 12 surrounding towns in the primary service area.

In addition, community outreach and education, a significant benefit of this Program, will continue to extend to the general public the knowledge necessary to modify risk factors and therefore to prevent heart disease. The function of community outreach and education is highly regarded and often requested by the surrounding communities. Through this service, free blood pressure, glucose and cholesterol screenings have been provided as well as educational series on signs and symptoms of heart disease and diabetes. Several hundred sessions for community groups, church groups, schools and businesses have been provided over the Program's three year existence servicing thousands of local community members.

7. Who will be responsible for providing the service?

Response: The greater Waterbury area is currently served by 18 local cardiologists. Interventional cardiologists include Stephen Widman, MD, Ehsan Ansari, MD, Raghuraman Vidhun, MD, Kevin Kett, MD and Suphichaya Muangman, MD. Connecticut Cardiothoracic Surgical Associates, a group of four cardiothoracic surgeons who also practice at Hartford Hospital and John Dempsey Hospital will continue to provide open heart surgery services. They include Paul Preissler, MD, Jonathan Hammond, MD, David Underhill, MD and Daniel Fusco, MD. Cardiac anesthesia is provided by Milford Anesthesia Associates which services the Program with four physicians including Paul Langevin, MD, David Heimbinder, MD, Ronald Burt, MD and Ricardo Cardenas, MD. Perfusion services are provided by John Dempsey Hospital. Saint Mary's Hospital and Waterbury Hospital currently employ all operating room nurses and technicians, catheterization lab nurses and technicians, cardiovascular unit nurses and ancillary staff. All staffing is currently in place.

8. Who are the current payers of this service and identify any anticipated payer changes when the proposed project becomes operational?

Response: The current payers for this service include commercial insurance companies as well as Medicare and Medicaid. There is no anticipated change in payer mix with the initiation of this replacement Program. All patients receive care regardless of their ability to pay.

AFFIDAVIT

To be completed by each Applicant

Applicant: Saint Mary's Hospital

Project Title: Joint Cardiac Services Program

I, William Casey, Interim President and CEO, of Saint Mary's Hospital being duly
(Name) (Position – CEO or CFO)

sworn depose and state that the information provided in this CON Letter of Intent (Form 2030)

is true and accurate to the best of my knowledge, and that Saint Mary's Hospital complies with the
(Facility Name)

appropriate and applicable criteria as set forth in the Sections 19a-630, 19a-637, 19a-638,

19a-639, 19a-486 and/or 4-181 of the Connecticut General Statutes.

William Casey 7/8/08
Signature Date

Subscribed and sworn to before me on July 8, 2008

Victoria Cipriano
Notary Public/~~Commissioner of Superior Court~~

VICTORIA CIPRIANO
NOTARY PUBLIC
MY COMMISSION EXPIRES FEB. 28, 2012

My commission expires:

AFFIDAVIT

I, Steven Schneider, MD, Vice President of Medical Affairs
(Name) (Position – CEO or CFO)

of The Waterbury Hospital being duly sworn, depose and state that the

information provided in this CON Letter of Intent (Form 2030) is true and accurate to

the best of my knowledge, and that The Waterbury Hospital complies with the appropriate and
(Facility Name)

applicable criteria as set forth in the Sections 19a-630, 19a-637, 19a-638, 19a-639, 19a-486

and/or 4-181 of the Connecticut General Statutes.

Signature _____ Date 7/7/08

Subscribed and sworn to before me on July 7, 2008

Kristin Connors / Kristin Connors
Notary Public/Commissioner of Superior Court

~~My commission expires:~~ _____

AFFIDAVIT

I, Ellen M. Leone, RN, MSN, Associate VP of Operations and Director of Nursing FOR JAMES THURSTON, HOSPITAL DIRECTOR
(Name) (Position – CEO or CFO)

of John Dempsey Hospital being duly sworn, depose and state that the information provided in this

CON Letter of Intent (Form 2030) is true and accurate to the best of my knowledge, and that John
(Facility Name)

Dempsey Hospital complies with the appropriate and applicable criteria as set forth in the Sections 19a-

19a- 630, 19a-637, 19a-638, 19a-639, 19a-486 and/or 4-181 of the Connecticut General Statutes.

Ellen M. Leone, RN, MSN 7-7-08
Signature Date

Subscribed and sworn to before me on July 7, 2008

Marilyn H. Glenn
Notary Public/Commissioner of Superior Court

MARILYN H. GLENN
NOTARY PUBLIC
MY COMMISSION EXPIRES OCT. 31, 2008

My commission expires: _____

APPENDIX I

Letters of Support

State of Connecticut
HOUSE OF REPRESENTATIVES
STATE CAPITOL
HARTFORD, CONNECTICUT 06106-1591

REPRESENTATIVE ARTHUR J. O'NEILL
SIXTY-NINTH ASSEMBLY DISTRICT

LEGISLATIVE OFFICE BUILDING
ROOM 4200
HARTFORD, CT 06106-1591
HOME: (203) 264-3951
CAPITOL: (860) 240-8700
TOLL FREE: 1-800-842-1423
E-MAIL: Arthur.ONeill@housegop.ct.gov

RANKING MEMBER
JUDICIARY COMMITTEE

MEMBER
APPROPRIATIONS COMMITTEE
BANKS COMMITTEE
REGULATIONS REVIEW COMMITTEE

July 2008

Commissioner Cristine A. Vogel
Office of Health Care Access
410 Capitol Ave
P.O. Box 340308
Hartford, CT 06134

Dear Commissioner Vogel:

I am writing in strong support of the Heart Center of Greater Waterbury which is seeking a new Certificate of Need (CON) Order. This new CON is necessary because despite the overwhelming success of the Program, some of the target volume numbers have not met the specific criteria in the original CON.

Since July, 2005, the Heart Center of Greater Waterbury has successfully provided life saving cardiac procedures such as angioplasty and open heart surgery to residents of Waterbury and its surrounding communities. Many of the residents in my district depend upon this Center for critical procedures. The Center's unique approach to treating patients starts with education followed by diagnosis, treatment and finally rehabilitation. The physicians at the Center keep their patients informed during each step of the way and make every effort to treat any patient like a friend—not just a sick person. The presence of this facility in my area ensures that patients can receive quality care in a familiar setting, close to their home.

Thank you for your attention to this matter and please feel free to contact me with any questions.

Sincerely,

Arthur O'Neill
State Representative

Town of BEACON FALLS
Connecticut

Naugatuck River Valley All-America City 2000

SUSAN A. CABLE
First Selectman

July 2, 2008

Commissioner Christine A. Vogel
Office of Health Care Access
410 Capitol Avenue
P.O. Box 340308
Hartford, CT 06134

Commissioner Christine A. Vogel:

Since July 2005, the Heart Center of Greater Waterbury has successfully provided life saving cardiac procedures such as open-heart surgery and angioplasty to residents of Waterbury and its surrounding communities, with the Town of Beacon Falls being one of those communities.

This program was approved by the Office of Health Care Access as a demonstration project with an expiration date of July 2008.

Despite the overwhelming success of the Program, some of the target numbers have not met the specific criteria in the Certificate of Need (CON) Order. Therefore, it is necessary for the Program to seek a new CON to assure that the greater Waterbury community continues to have access to these services locally. The Heart Center Board of Directors is working to finalize the strategy for the CON application.

As the First Selectman of the Town of Beacon Falls, I am urging you to consider a new Certificate of Need so that our residents have access to the services provided by the Heart Center of Greater Waterbury.

Thank you for your consideration

Sincerely,

Susan A. Cable

Susan A. Cable
First Selectman

Cc: Heart center of Greater Waterbury

10 Maple Avenue • Beacon Falls, CT 06403-1198 • Telephone: (203) 729-4340 • Fax (203) 729-8452

State of Connecticut
HOUSE OF REPRESENTATIVES
STATE CAPITOL
HARTFORD, CONNECTICUT 06106-1591

REPRESENTATIVE VICKIE O. NARDELLO
EIGHTY NINTH ASSEMBLY DISTRICT

LEGISLATIVE OFFICE BUILDING
ROOM 4040
HARTFORD, CT 06106-1591
HOME/FAX: (203) 758-4219
CAPITOL: (860) 240-8512
TOLL FREE: 1-800-842-1902
E-MAIL: Vickie.Nardello@cga.ct.gov

DEPUTY MAJORITY WHIP

VICE CHAIRMAN
ENERGY AND TECHNOLOGY COMMITTEE

MEMBER
PUBLIC HEALTH COMMITTEE
INSURANCE AND REAL ESTATE COMMITTEE

Commissioner Cristine A. Vogel
Office of Health Care Access
410 Capitol Avenue
P.O. Box 340308
Hartford, CT 06134

Dear Commissioner Vogel:

I am writing in support of the Heart Center of Greater Waterbury's request for a new Certificate of Need (CON) Order. Since July of 2005 the Heart Center has successfully provided life saving cardiac procedures such as angioplasty and open heart surgery to residents of Waterbury and its surrounding communities. Despite the success of this program, some of the target volume numbers have not met the specific criteria in the CON order, it is my understanding they are working on a strategy for the new CON application. Please consider their application favorably.

Sincerely,

Vickie Nardello
State Representative.

State of Connecticut
HOUSE REPUBLICAN OFFICE
STATE CAPITOL
HARTFORD, CONN. 06106

July 1, 2008

Cristine Vogel, Commissioner
Office of Health Care Access
410 Capitol Avenue
Hartford, CT 06106

Dear Commissioner Vogel,

We are writing this letter in enthusiastic support of the Heart Center of Greater Waterbury's Certificate of Need (CON) order.

The program has provided Greater Waterbury residents with access to emergency cardiac care in a timely, efficient and competent manner which has saved lives. Both community hospitals have invested significant capital expenditures for equipment and structural renovations to ensure state of the art facilities for heart care. The Heart Center has successfully provided life saving cardiac procedures and open heart surgery to the residents of Waterbury and the surrounding communities. We believe the services that the Heart Center provides are vital to the health and well being of the residents in this region.

We respectfully request that you will continue your support of this vital program, and the opportunity it provides the Greater Waterbury population to access its lifesaving services locally.

Sincerely,

Anthony D'Amelio
Anthony D'Amelio
State Representative, 71st District

Sean Williams
State Representative, 68th District

Dave
David Labriola
State Representative, 131st District

Leonard Green
State Representative, 105th District

Printed on recycled paper

State of Connecticut
HOUSE OF REPRESENTATIVES
STATE CAPITOL
HARTFORD, CONNECTICUT 06106-1591

REPRESENTATIVE SELIM G. NOUJAIM
SEVENTY FOURTH ASSEMBLY DISTRICT

104 DINATAU DRIVE
WATERBURY, CT 06705
HOME: (203) 591-9190
OFFICE: 1 (800) 842-1423
E-MAIL: Selim.Noujaim@housegop.ct.gov

ASSISTANT MINORITY LEADER

MEMBER
COMMERCE COMMITTEE
HIGHER EDUCATION AND EMPLOYMENT ADVANCEMENT COMMITTEE
TRANSPORTATION COMMITTEE

June 30, 2008

Honorable Cristine A. Vogel
Office of Health Care Access
410 Capitol Avenue
P O Box 340348
Hartford, CT 06134

Reference: Heart Center of Greater Waterbury

Dear Commissioner:

Over the past three years I have witnessed first hand the success that was generated by the Heart Center subsequent to receiving a Certificate of Need from the State of Connecticut. Patients of Greater Waterbury and their families were served without the agony and expense of traveling out of town to receive medical attention.

Although the program failed to meet some of the criteria and conditions as stated in the original CON, I am a firm believer that the heart center is an asset to our community and that it fulfills a function that is desperately needed. Therefore, I am privileged to request your support for a new CON to ensure that those services performed by the Heart Center continue without interruption. Your consideration is very much appreciated.

Sincerely,

Selim G. Noujaim

Selim G. Noujaim

Thank you.

State of Connecticut
HOUSE OF REPRESENTATIVES
STATE CAPITOL
HARTFORD, CONNECTICUT 06106-1591

REPRESENTATIVE KEVIN M. DELGOBBO
SEVENTIETH DISTRICT

69 NORTH HOADLEY ST.
NAUGATUCK, CONNECTICUT 06770

HOME: 203-720-7503
TOLL FREE: 1-800-842-1423
EMAIL: Kevin.DelGobbo@cga.ct.gov

June 30, 2008

Commissioner Cristine Vogel
Office of Health Care Access
410 Capitol Avenue
Hartford, CT 06106

Dear Commissioner Vogel:

I write today in unequivocal support of the Heart Center of Greater Waterbury's Certificate of Need (CON) order.

Simply put, the rationale for the CON, which I believe was undeniably demonstrated in 2005, remains the same. The Heart Center and the services it provides are absolutely vital to the health, safety and welfare of the residents of this region. Not only is the Center an essential lifeline to critical cardiac procedures in the Greater Waterbury area, but in my opinion, vital to the viability of its broader healthcare delivery system.

I am sure your office recognizes the great success of the program, the significant capital expenditures both community hospitals invested to ensure state of the art facilities to support it, and that over 2,400 local community residents have already benefited from its interventional procedures to date. I hope you will continue your support of this outstanding program, and the opportunity it provides the Greater Waterbury population to access its lifesaving services locally.

Please look to me if I can offer any further information, or assist in any way, as you review their new application.

Sincerely,

Kevin M. DelGobbo

Kevin DelGobbo
State Representative, 70th District

APPENDIX II

Acute Care Hospital Licenses

STATE OF CONNECTICUT

Department of Public Health

LICENSE

License No. 0055

General Hospital

In accordance with the provisions of the General Statutes of Connecticut Section 19a-493:

Saint Mary's Hospital, Inc. of Waterbury, CT, d/b/a Saint Mary's Hospital, Inc. is hereby licensed to maintain and operate a General Hospital.

Saint Mary's Hospital, Inc. is located at 56 Franklin Street, Waterbury, CT 06702

The maximum number of beds shall not exceed at any time:

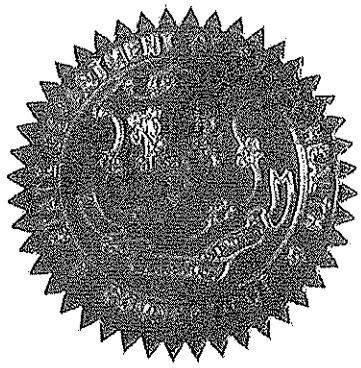
32 Bassinets
347 General Hospital beds

This license expires **December 31, 2008** and may be revoked for cause at any time.

Dated at Hartford, Connecticut, January 1, 2007.

Satellites

St. Mary's Dept. of Behavioral Health Care Services, 100 Jefferson Square, Waterbury, CT



J Robert Galvin M.D., M.P.H.

J. Robert Galvin, M.D., M.P.H.,
Commissioner

STATE OF CONNECTICUT

Department of Public Health

LICENSE

License No. 0065

General Hospital

In accordance with the provisions of the General Statutes of Connecticut Section 19a-493:

University of Connecticut Health Center-John Dempsey Hospital of Farmington, CT, d/b/a John Dempsey Hospital of the University of Connecticut Health Center is hereby licensed to maintain and operate a General Hospital.

John Dempsey Hospital of the University of Connecticut Health Center is located at 263 Farmington Avenue, Farmington, CT 06032

The maximum number of beds shall not exceed at any time:
20 Bassinets
204 General Hospital beds

This license expires **December 31, 2008** and may be revoked for cause at any time.

Dated at Hartford, Connecticut, January 1, 2007. RENEWAL.

Satellites
10 Talcott Notch, 10 Talcott Notch, Farmington, CT

J. Robert Galvin M.D., M.P.H.

J. Robert Galvin, M.D., M.P.H.,
Commissioner

STATE OF CONNECTICUT

Department of Public Health

LICENSE

License No. 0060

General Hospital

In accordance with the provisions of the General Statutes of Connecticut Section 19a-493:

Waterbury Hospital of Waterbury, CT, d/b/a Waterbury Hospital is hereby licensed to maintain and operate a General Hospital.

Waterbury Hospital is located at 64 Robbins Street, Waterbury, CT 06721

The maximum number of beds shall not exceed at any time:

357 General Hospital beds
36 Bassinets

This license expires **September 30, 2009** and may be revoked for cause at any time.

Dated at Hartford, Connecticut, October 1, 2007. RENEWAL.

J. Robert Galvin M.D., M.P.H.

J. Robert Galvin, M.D., M.P.H.,
Commissioner

HEART
CENTER
of Greater Waterbury

RECEIVED
2008 JUL -9 P 4:28
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

VIA HAND DELIVERY
Cristine A. Vogel, Commissioner
Office of Health Care Access
410 Capitol Avenue
MS# 13HCA
P.O. Box 340308
Hartford, CT 06134-0308

July 9, 2008

RE: **Letter of Intent**

The Waterbury Hospital and Saint Mary's Hospital Corporation, d/b/a/ Heart Center of Greater Waterbury and University of Connecticut Health Center/John Dempsey Hospital

Dear Commissioner Vogel:

Enclosed please find an addtional three (3) copies of our Letter of Intent Form 2030 originally submitted on July 8, 2008. Should you require additional information or have any questions concerning this matter please contact:

Loraine C. Shea, Executive Director
Heart Center of Greater Waterbury
PO Box 2153
Waterbury, CT 06722
(P) 203-575-5571
(F) 203-575-5575

Sincerely,

Loraine C. Shea
Executive Director, HCGW

WATERBURY HOSPITAL Saint Mary's HOSPITAL UConn Health Center

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

July 18, 2008

Ms. Loraine Shea
Executive Director
Heart Center of Greater Waterbury
1075 Chase Pkwy.
Waterbury, CT 06708

Re: Letter of Intent, Docket Number 08-31202
Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital
Establish a Primary and Elective Angioplasty and Open Heart Surgery Program at Waterbury Hospital and Saint Mary's Hospital
Notice of Letter of Intent

Dear Ms. Shea:

On July 8, 2008, the Office of Health Care Access ("OHCA") received the Letter of Intent ("LOI") Form of Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital ("Applicants") to Establish a Primary and Elective Angioplasty and Open Heart Surgery Program at Waterbury Hospital and Saint Mary's Hospital.

A notice to the public regarding OHCA's receipt of a LOI was published in the *Waterbury Republican American* pursuant to Section 19a-638 of the Connecticut General Statutes. Enclosed for your information is a copy of the notice to the public.

Sincerely,

Kimberly R. Martone BD

Kimberly R. Martone
Certificate of Need Supervisor

KRM:AF:bko

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

July 18, 2008

Requisition # HCA09-014
Fax: (203) 754-0644

Waterbury Republican American
389 Meadow Street
Box 2090
Waterbury, CT 06722-2090

Gentlemen/Ladies:

Please make an insertion of the attached copy, in a single column space, set solid under legal notices, in the issue of your newspaper by no later than Tuesday, July 22, 2008

Please fax evidence that the legal notice was published by the date requested above to (860) 418-7053. In addition, please send the original legal notice (full tear sheet is required) with the invoice.

If there are any questions regarding this legal notice, please contact Alexis Fedorjaczenko at (860) 418-7001.

KINDLY RENDER BILL IN DUPLICATE ATTACHED TO THE TEAR SHEET.

Sincerely,

Kimberly R. Martone BO

Kimberly R. Martone
Certificate of Need Supervisor
Attachment

KRM:AF:bko

c: Sandy Salus, OHCA

Waterbury Republican American
Docket Number 08-31202

Letter of Intent
July 18, 2008

PLEASE INSERT THE FOLLOWING:

Statute Reference:	19a-638
Applicants:	Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital
Town:	Waterbury
Docket Number:	08-31202-LOI
Proposal:	Establish a Primary and Elective Angioplasty and Open Heart Surgery Program at Waterbury Hospital and Saint Mary's Hospital
Total Capital Expenditure:	$0

The Applicant may file its Certificate of Need application between September 6, 2008 and November 5, 2008. Interested persons are invited to submit written comments to Cristine A. Vogel, Commissioner Office of Health Care Access, 410 Capitol Avenue, MS13HCA P.O. Box 340308 Hartford, CT 06134-0308.

The Letter of Intent is available for inspection at OHCA. A copy of the Letter of Intent or a copy of Certificate of Need Application, when filed, may be obtained from OHCA at the standard charge. The Certificate of Need application will be made available for inspection at OHCA, when it is submitted by the Applicant.

RepublicanAmerican

389 Meadow Street • Waterbury, CT 06702 • 1-800-992-3232

Cash Receipt

Account Number: R18404
Order Number: RA0238987

Salesperson: Virginia | **Printed on:** 7/18/2008
Telephone: (203) 5743636 Ext: 1165 | **Fax:** 203-754-0644

KIMBERLY MARTONE
HEALTH CARE ACCESS
410 CAPITOL AVE
MS13HCA
PO BOX 340308
HARTFORD, CT 06134-0308
(860) 418-7001

Title: Republican-American | **Class:** L-Legal -Public Notice 019
Start date: 7/20/2008 | **Stop date:** 7/20/2008 |
Insertions: 1 | **Lines:** 40 ag

Title: Rep-Am.com | **Class:** L-Legal -Public Notice 019
Start date: 7/20/2008 | **Stop date:** 7/20/2008 |
Insertions: 1 | **Lines:** 40 ag

Statute Reference:
19a-638

Applicant: Waterbury Hospital and St. Mary's Hospital (d/b/a/ Heart Center of Greater Waterbury) and John Dempsey Hospital
Town: Waterbury
Docket Number: 08-31202-LOI
Proposal: Establish a Primary and Elective Angioplasty and Open Heart Surgery Program at Waterbury Hospital and Saint Mary's Hospital
Capital Expenditure: $0

The Applicant may file its Certificate of Need application between September 6, 2008 and November 5, 2008. Interested persons are invited to submit written comments to Cristine A. Vogel, Commissioner Office of Health Care Access, 410 Capitol Avenue, MS13HCA P.O. Box 340308 Hartford, CT 06134-0308.

The Letter of Intent is available for inspection at OHCA. A copy of the Letter of Intent or a copy of Certificate of Need Application, when filed, may be obtained from OHCA at the standard charge. The Certificate of Need application will be made available for inspection at OHCA, when it is submitted by the Applicant.
R-A July 20, 2008

Payment Information

Total Order Price: $90.40
Payment Type: | **Exp:**

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

July 24, 2008

Loraine Shea
Exectuive Director
Heart Center of Greater Waterbury
1075 Chase Parkway
Waterbury, CT 06708

RE: Certificate of Need Application Forms, Docket Number 08-31202-CON
The Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital
Establish a Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and St. Mary's Hospital

Dear Ms. Shea:

Enclosed are the application forms for The Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital's Certificate of Need ("CON") proposal for the Establishment of Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and St. Mary's Hospital with no associated capital expenditure. According to the parameters stated in Section 19a-638 of the Connecticut General Statutes the CON application may be filed between September 6, 2008, and November 5, 2008.

When submitting your CON application and any subsequent application information to this agency, you are obligated to observe the following procedural requirements. **Failure to observe these requirements will require follow-up work on your part to correct the filing.**

- Number and date each page, including cover letter and all attachments. Information filed after the initial CON application submission (i.e. completeness response letter, prefile testimony, late file submissions and the like) must be numbered sequentially from the Applicant's document immediately preceding it. For example, if the application concludes with page 100, your completeness response letter would begin with page 101.
- Submit one (1) original and eight (8) hard copies of each submission in **3-ring binders**.

- Submit a scanned copy of each submission in its entirety, including all attachments on CD, preferably in Adobe (.pdf) format.
- Submit an electronic copy of the documents in MS Word format with financial attachments and other data as appropriate in MS Excel format.

The analysts assigned to the CON application are Steven Lazarus and Alexis Fedorjaczenko. Please contact then at (860) 418-7001 if you have questions.

Sincerely,

Kimberly Martone
Certificate of Need Supervisor

Enclosures

Copy: William Casey, Interim President and CEO, Saint Mary's Hospital
John Tobin, President and CEO, The Waterbury Hospital
James H. Thornton, Hospital Director, John Dempsey Hospital

HOSPITAL AFFIDAVIT

Applicant: _____

Project Title: _____

I, _____, _____
(Name) (Position – CEO or CFO)

of _____ being duly sworn, depose and state that the (Hospital Name) information submitted in this Certificate of Need application is accurate and correct to the best of my knowledge. With respect to the financial impact related to this CON application, I hereby affirm that:

1. The proposal will have a capital expenditure in excess of $15,000,000.

   ☐ Yes ☐ No

2. The combined total expenses for the proposal's first three years of operation will exceed one percent of the actual operating expenses of the Hospital for the most recently completed fiscal year as filed with the Office of Health Care Access.

   ☐ Yes ☐ No

_____ _____
Signature Date

Subscribed and sworn to before me on_____

_____

Notary Public/Commissioner of Superior Court

My commission expires: _____

State of Connecticut
Office of Health Care Access
Certificate of Need Application

Please complete all questions. If any question is not relevant to your project, Not Applicable will be an acceptable response. Your Certificate of Need application will be eligible for submission no earlier than September 6, 2008 and may be submitted no later than November 5, 2008. The Analysts assigned to your application are Steven W. Lazarus and Alexis G. Fedorjaczenko and they may be reached at the Office of Health Care Access at (860) 418-7012 and (860) 418-7067, respectively.

Docket Number: 08-31202-CON

Applicants Names: The Waterbury Hospital, St. Mary's Hospital and John Dempsey Hospital

Contact Person: Loraine Shea
Contact Title: Executive Director
Heart Center of Greater Waterbury
Contact Address: 1075 Chase Parkway
Waterbury, CT 06708

Project Location: Waterbury

Project Name: Establish Primary and Elective Angioplasty and Heart Surgery Surgery programs at The Waterbury Hospital and St. Mary's Hospital

Type proposal: Section 19a-638, C.G.S.

Est. Capital Expenditure: -0-

1. Contact Information

OHCA requires each Applicant to provide a separate contact person. Please complete the following "Contact Person" information for **each** Applicant:

Contact Information Required	*The Waterbury Hospital*	*St. Mary's Hospital*	*John Dempsey Hospital*
Name			
Title			
Phone & Fax Number			
Email Address			
Mailing Address			

2. Expansion of Existing or New Service

What services are currently offered at St. Mary's Hospital ("SMH") and The Waterbury Hospital ("TWH") that the proposed Elective and Primary Angioplasty and Open Heart Surgery services will augment or replace? Include any cardiovascular disease prevention and health promotion programs.

Augment: _____

_____

Replace: _____

_____

3. State Health Plan

No questions at this time.

4. Applicants' Long Range Plans

Is this application consistent with your long-range plan?

Yes ☐ No

If "No" is checked, please provide an explanation.

5. Clear Public Need

i. The record in this docket will include, in addition to other materials, the American College of Cardiology/American Heart Association (ACC/AHA) practice guidelines.

a. The Applicants may submit any comments in response to this evidence, which they deem appropriate.

b. Please discuss The Waterbury Hospital ("TWH") and St. Mary's Hospital ("SMH") d/b/a Heart Center of Greater Waterbury's ("HCGW") historical institutional and operator volumes (Elective and Primary Angioplasty and Open Heart Surgery) in relation to the ACC/AHA recommended volume guidelines.

ii. Explain how it was determined there was a need for the proposed interventional cardiac services at SMH and TWH.

iii. Provide the following information for **each** Applicant:

a) Primary and secondary service area towns specific to the proposed interventional cardiac services. Provide the methodology used to delineate the service areas.

b) Cardiovascular health statistics and risk factors in the service area. Provide evidence.

c) Please complete the following table for each of the Applicants' historical volume related to elective and primary angioplasty and open heart service ("OHS"), including John Dempsey Hospital ("JDH") since the operation of HCWG:

Table 1: *Historical* Volume for each Applicant (Institutional)

	FY 2005				FY 2006				FY 2007			
	A	B	C	D	A	B	C	D	A	B	C	D
TWH												
SMH												
HCGW Total												
JDH												

A: Primary Angioplasty. B: Elective Angioplasty, C: Open Heart Service & D: Cardiac Catheterizations
Please identify the procedure codes utilized for A, B, C & D.
Be sure that the volumes provided reconcile with the volumes listed in OHCA Hospital Reporting System, Schedule 450, the CT Office of Health Care Access's Inpatient Discharge Database and the CT Office of Health Care Access Cardiac Registry

d) Provide all assumptions and calculations utilized to project institutional volumes in Table I.

e) Please provide year-to-date volumes for FY 2008 by Applicant and Service as provided in Table 1. Be sure to include all assumption and calculations.

f) In the following table, provide the last three years of historical volume at HCGW for each Applicant by service and zip code:

Table 2: *Historical* Volume for each Applicant By Service and Zip Code

Applicant	Cardiac Service (i.e. A, B, C)	FY 2007 (# of Patients)	Zip Code	FY 2006 (# of Patients)	Zip Code	FY 2005 (# of Patients)	Zip Code
TWH	A						
	B						
	C						
SMH	A						
	B						
	C						
JDH	A						
	B						
	C						

Note: A: Primary Angioplasty. B: Elective Angioplasty, & C: Open Heart Service

g) In a table format, please provide last three years of cardiac catheterization volume (by facility) by inpatient and outpatient and by zip code.

Table 3: *Historical* Cardiac Cath Volume for each Applicant by Service and Zip Code

Applicant	FY 2007 (Total # of Patients)	I/P	O/P	Zip Code	FY 2006 (Total # of Patients)	I/P	O/P	Zip Code	FY 2005 (Total # of Patients)	I/P	O/P	Zip Code
TWH												
SMH												
JDH												

Key: Inpatient= I/P, Outpatient= O/P
Be sure that the volumes provided reconcile with the volumes listed in OHCA Hospital Reporting System, Schedule 450, the CT Office of Health Care Access's Inpatient Discharge Database and the CT Office of Health Care Access Cardiac Registry

iv. Please provide year-to-date volumes for FY 2008 by Applicant and Service as provided in Tables 2 & 3. Be sure to include all assumption and calculations.

v. In the following table provide the number of patients that were transferred between the Applicants during FYs 2005, 2006, 2007, and year-to-date FY 2008 related to interventional cardiac services. Be sure to cite the reasons as well.

Table 4: *Historical* Patient Transfer between the Applicants

FY	FY 2008 (Y-T-D)	FY 2007	FY 2006	FY 2005	List reasons for transfer
JDH to SMH					
JDH to TWH					
SMH to JDH					
TWH to JDH					
SMH to TWH					
TWH to SMH					

vi. Provide the following for the projected utilization of the proposed service for each Applicant:

Table 5: *Projected* Volume for each Applicant (Institutional)

	FY 2009				FY 2010				FY 2011			
	A	B	C	D	A	B	C	D	A	B	C	D
TWH												
SMH												
HCGW Total												
JDH												

A: Primary Angioplasty. B: Elective Angioplasty, C: Open Heart Service & D: Cardiac Catheterizations
Please identify the procedure codes utilized for A, B, C & D.

h) Provide all assumptions and calculations utilized to project institutional volumes in Table 5.

i) In the following table format, please provide the projected first three years of cardiac catheterization volume (by facility) by inpatient and outpatient:

Table 6: *Projected* Cardiac Cath. Volume for Each Applicant

Applicant	FY 2009 (# of Patients)	I/P	O/P	FY 2010 (# of Patients)	I/P	O/P	FY 2011 (# of Patients)	I/P	O/P
TWH									
SMH									
JDH									

Key: Inpatient= I/P, Outpatient= O/P

j) Provide all assumptions and calculations utilized to project institutional volumes in Table 6.

k) Provide the historical operator volume by unique physician identifier currently providing services at each Applicant's facility as follows:

Table 7: *Historical* Operator Volume for each Applicant

Physician	By Facility	FY 2007				FY 2006				FY 2005			
		A	B	C	D	A	B	C	D	A	B	C	D
Physician A	TWH												
	SMH												
	JDH												
Physician B	TWH												
	SMH												
	JDH												

A: Primary Angioplasty. B: Elective Angioplasty, C: Open Heart Service & D: Cardiac Catheterizations
Please identify the procedure codes utilized for A, B, C & D.

l) Please provide year-to-date volumes for FY 2008 by Operator and by Facility and Service as provided in Table 7. Be sure to include all assumption and calculations

m) Provide the projected operator volume by unique physician identifier currently providing services at each Applicants' facility as follows:

Table 8: *Projected* Operator Volume for each Applicant

Physician	By Facility	FY 2009				FY 2010				FY 2011			
		A	B	C	D	A	B	C	D	A	B	C	D

A: Primary Angioplasty. B: Elective Angioplasty, C: Open Heart Service & D: Cardiac Catheterizations
Please identify the procedure codes utilized for A, B, C & D.
Be sure to provide 3 full years of projections.

n) Provide all assumptions and calculations utilized to project operator volumes in Table 8.

o) In the following table format, please provide last three years of cardiac catheterization volume by inpatient and outpatient, by operator and facility.

Table 9: *Projected* Cardiac Cath. Volume by Operator

Physician	Facility	FY 2009 (# of Patients)	I/P	O/P	FY 2010 (# of Patients)	I/P	O/P	FY 2011 (# of Patients)	I/P	O/P

Key: Inpatient= I/P, Outpatient= O/P

p) Provide all assumptions and calculations utilized to project operator volume by facility in Table 9.

B. Please address the following questions regarding the existing providers:

a. Identify the existing providers of interventional cardiac services that will be affected by this proposal.

b. Please explain how these aforementioned providers of interventional cardiac services will be affected by your proposal (i.e. patient volume, quality of care, etc.).

c. Discuss in detail the impact HCGW has had on these providers (i.e. volume, quality of care, etc.) over the past three years HCGW has been in operation.

C. Will your proposal remedy any of the following barriers to access? Please provide an explanation.

☐ Cultural ☐ Transportation

☐ Geographic ☐ Economic

☐ None of the above ☐ Other (Identify) _____

If you checked other than None of the above, please provide an explanation.

D. Have the Applicants conducted a Needs Assessment and a Market Share Analysis for the proposed cardiac services?

a. If the response is No, please explain in detail why not and what did the Applicants utilize to assess the need for this proposal?

b. If yes, explain in detail what Needs Assessment and Market Share Analysis were conducted, the process and the results.

c. Provide a copy of the Needs Assessment and the Market Share Analysis conducted by the Applicants.

E. Provide copies of any of the following plans, studies or reports related to your proposal:

☐ Epidemiological studies ☐ Public information reports

☐ Other (Identify) _____

6. Quality Measures

A. Check off all the Standard of Practice Guidelines that will be utilized by the Applicants for the proposed services. Please submit the most recent copy of each report related to the proposal:

☐ American College of Cardiology	☐ National Committee for Quality Assurance	☐ Public Health Code & Federal Corollary
☐ National Association of Child Bearing Centers	☐ American College of Obstetricians & Gynecologists	☐ American College of Surgeons
☐ Report of the Inter-Council for Radiation Oncology	☐ American College of Radiology	☐ Other: Specify _____

B. Explain how the Applicants plan to meet the American College of Cardiology/American Heart Association practice guidelines related to this proposal. If the Applicants do not expect the proposed interventional cardiac program to meet these guidelines and protocols, please explain how quality of the interventional cardiac programs will be maintained in relation to the ACC/AHA guidelines.

C. Submit a list of all key professional and administrative personnel, including the Chief Executive Officer (CEO) and Chief Financial Officer (CFO), Medical Director of Interventional Cardiac Program, Cardiac Surgeons, Interventional Cardiologists, etc. related to the proposal and a copy of their Curriculum Vitae.

Note: For physicians, please provide a list of hospitals where the physicians have admitting privileges.

D. Provide a copy of the most recent inspection reports and/or certificate for each facility:

☐ DPH	☐ JCAHO
☐ Fire Marshall Report	☐ AAAHC
☐ AAAASF	☐ Other: _____

Note: Above referenced acronyms are defined below. [1]

[1] DPH – Department of Public Health; JCAHO – Joint Commission on Accreditation of Hospitals Organization; AAAHC – Accreditation Association for Ambulatory Health Care, AAAASF – American Association for Ambulatory Surgery Facilities, Inc.

E. Provide a copy of the following (as applicable):

☐ A copy of the related Quality Assurance plan

☐ Protocols for service

☐ Patient Selection Criteria/Intake form

7. Improvements to Productivity and Containment of Costs

In the past year have your facilities undertaken any of the following activities to improve productivity and contain costs?

☐ Energy conservation ☐ Group purchasing

☐ Reengineering ☐ None of the above

☐ Application of technology (e.g., computer systems, robotics, telecommunication systems, etc.)

☐ Other (identify)_____

8. Miscellaneous

A. Will this proposal result in new (or a change to) your teaching or research responsibilities?

☐ Yes ☐ No

If you checked "Yes," please provide an explanation.

B. Are there any characteristics of your patient/physician mix that makes your proposal unique?

☐ Yes ☐ No

If you checked "Yes," please provide an explanation.

9. Affiliation

a. Provide a copy of the agreement TWH and SMH have drafted or signed with JDH to act as a tertiary care hospital to the proposed cardiac services.

b. Provide a copy of any and all agreements between the Applicants, including a signed collaboration agreement, related to the proposal. The collaboration agreement should include at a minimum a description of each Applicant's responsibilities, patient selection guidelines, provision of emergency transfers, joint quality assurance reviews and joint training.

c. Provide a detailed discussion on what role has JDH played in HCGW operation beyond the initial training of the staff and establishment of the protocols.

d. Discuss in detail the responsibilities of JDH in the establishment of the proposed services at TWH and SMH and the operation of HCGW.

e. Provide Board of Directors or governing body resolutions from **each** Applicant approving the proposal.

10. Financial Information

a. Type of ownership: (Please check off all that apply)

☐	Corporation (Inc.)	☐	Limited Liability Company (LLC)
☐	Partnership	☐	Professional Corporation (PC)
☐	Joint Venture	☐	Other (Specify): _____

b. Provide the following financial information:

i) Please confirm that each of the Applicants involved in this proposal has filed its FY 2007, audited financial statements with OHCA, as required pursuant to Section 19a-644, C.G.S.

ii) Provide the cash equivalent balance of each Applicant at the date of submission of this application.

iii) Provide a copy of the most recently completed internal monthly financial statement for each Applicant.

11. Revenue, Expense and Volume Projections

a. Payer Mix Projection

Please provide both the current payer mix and the projected payer mix with the CON proposal for the Total Facility based on Gross Patient Revenue in the following reporting format for **SMH**, **TWH**, **HCGW** and **JDH**, separately:

Total Facility Description	Current Payer Mix	FY 2009 Projected Payer Mix	FY 2010 Projected Payer Mix	FY 2011 Projected Payer Mix
Medicare*				
Medicaid* (includes other medical assistance)				
TriCare (CHAMPUS)				
Total Government Payers				
Commercial Insurers*				
Self-Pay				
Workers Compensation				
Total Non-Government Payers				
Uncompensated Care				
Total Payer Mix	100.0%	100.0%	100.0%	100.0%

*Includes managed care activity.

b. Provide the following for **SMH**, **TWH**, **HCGW** , **JDH** and the **parent corporations**, regarding the financial projections:

i) A summary of revenue, expense and volume statistics, with the CON project, without the CON project and incremental to the CON project. **See attached.**

ii) As an addendum to your completed financial attachments as provided in 11b(1), for **each** Applicant (by facility and total system) provide a break out of the financial expenses and revenues by service (i.e. Primary Angioplasty, Elective Angioplasty and Open Heart Surgery).

iii) The assumptions utilized in developing the projections (e.g., FTE's, volume statistics, other expenses, revenue and expense % increases, project implementation date, etc.).

iv) Provide a description of the additional staff, equipment, and supplies (including drug-eluting stents) required to provide the proposed services. Include a description of the availability of cardiac interventionalists, cardiac surgeons, nurses and anesthesiologists.

v) An explanation for any incremental losses (Historical and Projected) by service (i.e. Primary Angioplasty, Elective Angioplasty and Open Heart Service).

vi) Please complete the enclosed, OHCA's **Financial Attachment II,** for SMH, TWH, and JDH.

13.C(x). Please provide three years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description	CT Services
Type of Unit Description:	CT Scan
# of Months in Operation	3

Year 1 **FY Projected Incremental** Total Incremental Expenses:	(1) **$53,513**	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Total Facility by Payer Category:										
Medicare		$1,000	42	$42,000	$28,467	$0	$0	$13,533	$17,838	($4,305)
Medicaid		$1,000	3	$3,000	$1,963	$0	$0	$1,037	$1,274	($237)
CHAMPUS/TriCare		$1,000	0	$0	$0	$0	$0	$0	$0	$0
Total Governmental		$1,000	45	$45,000	$30,430	$0	$0	$14,570	$19,112	($4,542)
Commericial Insurers		$1,000	79	$79,000	$42,229	$2,000	$0	$34,771	$33,552	$1,219
Uninsured		$1,000	2	$2,000	$900	$1,050	$0	$50	$849	($799)
Total NonGovenrment		$1,000	81	$81,000	$43,129	$3,050	$0	$34,821	$34,401	$420
Total All Payers		$1,000	126	$126,000	$73,559	$3,050	$0	$49,391	$53,513	***($4,122)***

St. Mary's Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description _____
Type of Unit Description: _____
# of Months in Operation _____

FY _____ **FY Projected Incremental** Total Incremental Expenses: _____	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Total Facility by Payer Category:										
Medicare				$0				$0	$0	$0
Medicaid		$0		$0				$0	$0	$0
CHAMPUS/TriCare		$0		$0				$0	$0	$0
Total Governmental			0	$0	$0	$0	$0	$0	$0	$0
Commericial Insurers		$0	5	$0				$0	$0	$0
Uninsured		$0	2	$0				$0	$0	$0
Total NonGovernment		$0	7	$0	$0	$0	$0	$0	$0	$0
Total All Payers		$0	7	$0	$0	$0	$0	$0	$0	$0

The Waterbury Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description _____
Type of Unit Description: _____
# of Months in Operation _____

FY _____ **FY Projected Incremental** Total Incremental Expenses: _____	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Total Facility by Payer Category:										
Medicare				$0				$0	$0	$0
Medicaid		$0		$0				$0	$0	$0
CHAMPUS/TriCare		$0		$0				$0	$0	$0
Total Governmental			0	$0	$0	$0	$0	$0	$0	$0
Commericial Insurers		$0	5	$0				$0	$0	$0
Uninsured		$0	2	$0				$0	$0	$0
Total NonGovernment		$0	7	$0	$0	$0	$0	$0	$0	$0
Total All Payers		$0	7	$0	$0	$0	$0	$0	$0	$0

John Dempsey Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description _____
Type of Unit Description: _____
# of Months in Operation _____

FY _____ **FY Projected Incremental** Total Incremental Expenses: _____ **Total Facility by Payer Category:**	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Medicare				$0				$0	$0	$0
Medicaid		$0		$0				$0	$0	$0
CHAMPUS/TriCare		$0		$0				$0	$0	$0
Total Governmental			0	$0	$0	$0	$0	$0	$0	$0
Commericial Insurers		$0	5	$0				$0	$0	$0
Uninsured		$0	2	$0				$0	$0	$0
Total NonGovernment		$0	7	$0	$0	$0	$0	$0	$0	$0
Total All Payers		$0	7	$0	$0	$0	$0	$0	$0	$0

Office of Health Care Access

Heart Center of Greater Waterbury

1. C (i). Please provide one year of actual results and three years of ***Total Hospital Health System*** projections of revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

otal Facility: / escription	FY 2008 Actual Annualized	FY 2007 Historical W/out HCGW	FY 2007 Historical Incremental	FY 2007 Historical With HCGW	FY 2006 Historical W/out HCGW	FY 2006 Historical Incremental	FY 2006 Historical With HCGW	FY 2005 Historical W/out HCGW	FY 2005 Historical Incremental	FY 2005 Historical With HCGW	FY 2004 Historical W/out HCGW	FY 2004 Historical Incremental	FY 2004 Historical With HCGW
ET PATIENT REVENUE													
on-Government				$0			$0			$0			$0
ledicare				$0			$0			$0			$0
ledicaid and Other Medical Assistance				$0			$0			$0			$0
ther Government				$0			$0			$0			$0
otal Net Patient Patient Revenue	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ther Operating Revenue													
evenue from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PERATING EXPENSES													
alaries and Fringe Benefits				$0			$0			$0			$0
rofessional / Contracted Services				$0			$0			$0			$0
upplies and Drugs				$0			$0			$0			$0
ad Debts				$0			$0			$0			$0
ther Operating Expense				$0			$0			$0			$0
ubtotal	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
epreciation/Amortization				$0			$0			$0			$0
terest Expense				$0			$0			$0			$0
ease Expense				$0			$0			$0			$0
otal Operating Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ain/(Loss) from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
lus: Non-Operating Revenue				$0			$0			$0			$0
evenue Over/(Under) Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TEs							0					0	

ote: The "Incremental" should include revenues and expenses from the operation of the Heart Center of Greater Waterbury ("HCGW")

/olume Statistics:
rovide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

St. Mary's Hospital

1. B (i). Please provide FY 2008 (Annualized) and four years of historical actual results of **Total Facility** revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

otal Facility:	FY 2008	FY 2007	FY 2007	FY 2007	FY 2006	FY 2006	FY 2006	FY 2005	FY 2005	FY 2005	FY 2004	FY 2004	FY 2004
	Actual	Historical	Historical	Historical	Historical	Historical	Historical	Historical	Historical	Historical	Historical	Historical	Historical
escription	Annualized	W/out HCC	Increment	With HCGW	W/out HCC	Increment	With HCGW	W/out HCC	Increment	With HCGW	W/out HCC	Increment	With HCGW
ET PATIENT REVENUE													
on-Government				$0			$0			$0			$0
ledicare				$0			$0			$0			$0
ledicaid and Other Medical Assistance				$0			$0			$0			$0
ther Government				$0			$0			$0			$0
otal Net Patient Patient Revenue	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ther Operating Revenue													
evenue from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PERATING EXPENSES													
alaries and Fringe Benefits				$0			$0			$0			$0
rofessional / Contracted Services				$0			$0			$0			$0
upplies and Drugs				$0			$0			$0			$0
ad Debts				$0			$0			$0			$0
ther Operating Expense				$0			$0			$0			$0
ubtotal	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
epreciation/Amortization				$0			$0			$0			$0
terest Expense				$0			$0			$0			$0
ease Expense				$0			$0			$0			$0
otal Operating Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ain/(Loss) from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
lus: Non-Operating Revenue				$0			$0			$0			$0
evenue Over/(Under) Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TEs							0				0		

ote: The "Incremental" should include revenues and expenses from the operation of the Heart Center of Greater Waterbury ("HCGW")

olume Statistics:
ovide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

Office of Health Care Access

The Waterbury Hospital

1. B (i). Please provide FY 2008 (Annualized) and four years of historical actual results of **Total Facility** revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

otal Facility: / escription	FY 2008 Actual Annualized	FY 2007 Historical W/out HC(	FY 2007 Historical Increment	FY 2007 Historical With HCGW	FY 2006 Historical W/out HC(	FY 2006 Historical Increment	FY 2006 Historical With HCGW	FY 2005 Historical W/out HC(	FY 2005 Historical Increment	FY 2005 Historical With HCGW	FY 2004 Historical W/out HC(	FY 2004 Historical Increment	FY 2004 Historical With HCGW
ET PATIENT REVENUE													
on-Government				$0			$0			$0			$0
iedicare				$0			$0			$0			$0
edicaid and Other Medical Assistance				$0			$0			$0			$0
ther Government				$0			$0			$0			$0
otal Net Patient Patient Revenue	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ther Operating Revenue													
evenue from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PERATING EXPENSES													
alaries and Fringe Benefits				$0			$0			$0			$0
rofessional / Contracted Services				$0			$0			$0			$0
upplies and Drugs				$0			$0			$0			$0
ad Debts				$0			$0			$0			$0
ther Operating Expense				$0			$0			$0			$0
ubtotal	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
epreciation/Amortization				$0			$0			$0			$0
terest Expense				$0			$0			$0			$0
ease Expense				$0			$0			$0			$0
otal Operating Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ain/(Loss) from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
lus: Non-Operating Revenue				$0			$0			$0			$0
evenue Over/(Under) Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TEs							0				0		

ote: The "Incremental" should include revenues and expenses from the operation of the Heart Center of Greater Waterbury ("HCGW")

olume Statistics:
ovide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

Office of Health Care Access

John Dempsey Hospital

1. B (i). Please provide FY 2008 (Annualized) and four years of historical actual results of **Total Facility** revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

otal Facility:	FY 2008 Actual	FY 2007 Historical	FY 2007 Historical	FY 2007 Historical	FY 2006 Historical	FY 2006 Historical	FY 2006 Historical	FY 2005 Historical	FY 2005 Historical	FY 2005 Historical	FY 2004 Historical	FY 2004 Historical	FY 2004 Historical
escription	Annualized	W/out HC(	Increment	With HCGW	W/out HC(	Increment	With HCGW	W/out HC(	Increment	With HCGW	W/out HC(	Increment	With HCGW
ET PATIENT REVENUE													
on-Government				$0			$0			$0			$0
ledicare				$0			$0			$0			$0
ledicaid and Other Medical Assistance				$0			$0			$0			$0
ther Government				$0			$0			$0			$0
otal Net Patient Patient Revenue	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ther Operating Revenue													
evenue from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PERATING EXPENSES													
alaries and Fringe Benefits				$0			$0			$0			$0
rofessional / Contracted Services				$0			$0			$0			$0
upplies and Drugs				$0			$0			$0			$0
ad Debts				$0			$0			$0			$0
ther Operating Expense				$0			$0			$0			$0
ubtotal	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
epreciation/Amortization				$0			$0			$0			$0
terest Expense				$0			$0			$0			$0
ease Expense				$0			$0			$0			$0
otal Operating Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ain/(Loss) from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
lus: Non-Operating Revenue				$0			$0			$0			$0
evenue Over/(Under) Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TEs							0				0		

ote: The "Incremental" should include revenues and expenses from the operation of the Heart Center of Greater Waterbury ("HCGW")

/olume Statistics:
rovide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

Office of Health Care Access

Saint Mary's Health System, Inc.

1. C (i). Please provide one year of actual results and three years of ***Total Hospital Health System*** projections of revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

otal Facility: / escription	FY 2008 Actual Annualized	FY 2007 Historical W/out HCG	FY 2007 Historical Increment	FY 2007 Historical With HCGW	FY 2006 Historical W/out HCG	FY 2006 Historical Increment	FY 2006 Historical With HCGW	FY 2005 Historical W/out HCG	FY 2005 Historical Increment	FY 2005 Historical With HCGW	FY 2004 Historical W/out HCG	FY 2004 Historical Increment	FY 2004 Historical With HCGW
ET PATIENT REVENUE													
on-Government				$0			$0			$0			$0
ledicare				$0			$0			$0			$0
ledicaid and Other Medical Assistance				$0			$0			$0			$0
ther Government				$0			$0			$0			$0
otal Net Patient Patient Revenue	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ther Operating Revenue													
evenue from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PERATING EXPENSES													
alaries and Fringe Benefits				$0			$0			$0			$0
rofessional / Contracted Services				$0			$0			$0			$0
upplies and Drugs				$0			$0			$0			$0
ad Debts				$0			$0			$0			$0
ther Operating Expense				$0			$0			$0			$0
ubtotal	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
epreciation/Amortization				$0			$0			$0			$0
terest Expense				$0			$0			$0			$0
ease Expense				$0			$0			$0			$0
otal Operating Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ain/(Loss) from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
lus: Non-Operating Revenue				$0			$0			$0			$0
evenue Over/(Under) Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TEs							0				0		

ote: The "Incremental" should include revenues and expenses from the operation of the Heart Center of Greater Waterbury ("HCGW")

/olume Statistics:
rovide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

Greaer Waterbury Health Network

1. C (i). Please provide one year of actual results and three years of ***Total Hospital Health System*** projections of revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

otal Facility: / escription	FY 2008 Actual Annualized	FY 2007 Historical W/out HC(	FY 2007 Historical Increment	FY 2007 Historical With HCGW	FY 2006 Historical W/out HC(	FY 2006 Historical Increment	FY 2006 Historical With HCGW	FY 2005 Historical W/out HC(	FY 2005 Historical Increment	FY 2005 Historical With HCGW	FY 2004 Historical W/out HC(	FY 2004 Historical Increment	FY 2004 Historical With HCGW
IET PATIENT REVENUE													
lon-Government				$0			$0			$0			$0
ledicare				$0			$0			$0			$0
ledicaid and Other Medical Assistance				$0			$0			$0			$0
ither Government				$0			$0			$0			$0
otal Net Patient Patient Revenue	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ther Operating Revenue													
evenue from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PERATING EXPENSES													
alaries and Fringe Benefits				$0			$0			$0			$0
rofessional / Contracted Services				$0			$0			$0			$0
upplies and Drugs				$0			$0			$0			$0
ad Debts				$0			$0			$0			$0
ither Operating Expense				$0			$0			$0			$0
ubtotal	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
epreciation/Amortization				$0			$0			$0			$0
terest Expense				$0			$0			$0			$0
ease Expense				$0			$0			$0			$0
otal Operating Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ain/(Loss) from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
lus: Non-Operating Revenue				$0			$0			$0			$0
evenue Over/(Under) Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TEs							0				0		

ote: The "Incremental" should include revenues and expenses from the operation of the Heart Center of Greater Waterbury ("HCGW")

/olume Statistics:
rovide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

St. Mary's Hospital

11. B (i). Please provide three years of projections of Total Facility revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Facility:	FY 2009 Projected	FY 2010 Projected	FY 2011 Projected	FY 2009 Projected	FY 2010 Projected	FY 2011 Projected	FY 2009 Projected	FY 2010 Projected	FY 2011 Projected
Description	W/out COI	Increment	With CON	W/out COI	Increment	With CON	W/out COI	Increment	With CON
NET PATIENT REVENUE									
Non-Government			$0			$0			$0
Medicare			$0			$0			$0
Medicaid and Other Medical Assistance			$0			$0			$0
Other Government			$0			$0			$0
Total Net Patient Patient Revenue	$0	$0	$0	$0	$0	$0	$0	$0	$0
Other Operating Revenue									
Revenue from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0
OPERATING EXPENSES									
Salaries and Fringe Benefits			$0			$0			$0
Professional / Contracted Services			$0			$0			$0
Supplies and Drugs			$0			$0			$0
Bad Debts			$0			$0			$0
Other Operating Expense			$0			$0			$0
Subtotal	$0	$0	$0	$0	$0	$0	$0	$0	$0
Depreciation/Amortization			$0			$0			$0
Interest Expense			$0			$0			$0
Lease Expense			$0			$0			$0
Total Operating Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0
Gain/(Loss) from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0
Plus: Non-Operating Revenue			$0			$0			$0
Revenue Over/(Under) Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0
FTEs			0			0			0

*Volume Statistics:
Provide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

Office of Health Care Access

The Waterbury Hospital

1. B (i). Please provide three years of projections of **Total Facility** revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

otal Facility:	FY 2009 Projected	FY 2010 Projected	FY 2011 Projected	FY 2009 Projected	FY 2010 Projected	FY 2011 Projected	FY 2009 Projected	FY 2010 Projected	FY 2011 Projected
escription	W/out COI	Increment	With CON	W/out COI	Increment	With CON	W/out COI	Increment	With CON
ET PATIENT REVENUE									
on-Government			$0			$0			$0
edicare			$0			$0			$0
edicaid and Other Medical Assistance			$0			$0			$0
ther Government			$0			$0			$0
otal Net Patient Patient Revenue	$0	$0	$0	$0	$0	$0	$0	$0	$0
ther Operating Revenue									
evenue from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0
PERATING EXPENSES									
alaries and Fringe Benefits			$0			$0			$0
rofessional / Contracted Services			$0			$0			$0
upplies and Drugs			$0			$0			$0
ad Debts			$0			$0			$0
ther Operating Expense			$0			$0			$0
ubtotal	$0	$0	$0	$0	$0	$0	$0	$0	$0
epreciation/Amortization			$0			$0			$0
terest Expense			$0			$0			$0
ease Expense			$0			$0			$0
otal Operating Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0
ain/(Loss) from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0
us: Non-Operating Revenue			$0			$0			$0
evenue Over/(Under) Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0
TEs			0			0			0

olume Statistics:
ovide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

Office of Health Care Access

John Dempsey Hospital

1. B (i). Please provide three years of projections of **Total Facility** revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

otal Facility:	FY 2009 Projected	FY 2010 Projected	FY 2011 Projected	FY 2009 Projected	FY 2010 Projected	FY 2011 Projected	FY 2009 Projected	FY 2010 Projected	FY 2011 Projected
escription	W/out COI	Increment	With CON	W/out COI	Increment	With CON	W/out COI	Increment	With CON
ET PATIENT REVENUE									
on-Government			$0			$0			$0
ledicare			$0			$0			$0
ledicaid and Other Medical Assistance			$0			$0			$0
ther Government			$0			$0			$0
otal Net Patient Patient Revenue	$0	$0	$0	$0	$0	$0	$0	$0	$0
ther Operating Revenue									
evenue from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0
PERATING EXPENSES									
alaries and Fringe Benefits			$0			$0			$0
rofessional / Contracted Services			$0			$0			$0
upplies and Drugs			$0			$0			$0
ad Debts			$0			$0			$0
ther Operating Expense			$0			$0			$0
ubtotal	$0	$0	$0	$0	$0	$0	$0	$0	$0
epreciation/Amortization			$0			$0			$0
nterest Expense			$0			$0			$0
ease Expense			$0			$0			$0
otal Operating Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0
ain/(Loss) from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0
lus: Non-Operating Revenue			$0			$0			$0
evenue Over/(Under) Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0
TEs			0			0			0

/olume Statistics:
rovide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

Office of Health Care Access

Saint Mary's Health System, Inc

1. C (i). Please provide one year of actual results and three years of ***Total Hospital Health System*** projections of revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

otal Hospital Health System:	FY 2009 Projected	FY 2010 Projected	FY 2011 Projected	FY 2009 Projected	FY 2010 Projected	FY 2011 Projected	FY 2009 Projected	FY 2010 Projected	FY 2011 Projected
escription	**W/out COI**	**Increment**	**With CON**	**W/out COI**	**Increment**	**With CON**	**W/out COI**	**Increment**	**With CON**
ET PATIENT REVENUE									
on-Government			$0			$0			$0
ledicare			$0			$0			$0
ledicaid and Other Medical Assistance			$0			$0			$0
ther Government			$0			$0			$0
otal Net Patient Patient Revenu	$0	$0	$0	$0	$0	$0	$0	$0	$0
ther Operating Revenue									
evenue from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0
PERATING EXPENSES									
alaries and Fringe Benefits			$0			$0			$0
rofessional / Contracted Services			$0			$0			$0
upplies and Drugs			$0			$0			$0
ad Debts			$0			$0			$0
ther Operating Expense			$0			$0			$0
ubtotal	$0	$0	$0	$0	$0	$0	$0	$0	$0
epreciation/Amortization			$0			$0			$0
iterest Expense			$0			$0			$0
ease Expense			$0			$0			$0
otal Operating Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0
ain/(Loss) from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0
lus: Non-Operating Revenue			$0			$0			$0
evenue Over/(Under) Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0
TEs				0			0		0

/olume Statistics:
rovide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

Office of Health Care Access

Greater Waterbury Health Network

1. C (i). Please provide one year of actual results and three years of ***Total Hospital Health System*** projections of revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

otal Hospital Health System:	FY 2009 Projected	FY 2010 Projected	FY 2011 Projected	FY 2009 Projected	FY 2010 Projected	FY 2011 Projected	FY 2009 Projected	FY 2010 Projected	FY 2011 Projected
escription	W/out COI	Increment	With CON	W/out COI	Increment	With CON	W/out COI	Increment	With CON
IET PATIENT REVENUE									
lon-Government			$0			$0			$0
ledicare			$0			$0			$0
ledicaid and Other Medical Assistance			$0			$0			$0
ther Government			$0			$0			$0
otal Net Patient Patient Revenu	$0	$0	$0	$0	$0	$0	$0	$0	$0
ther Operating Revenue									
evenue from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0
PERATING EXPENSES									
alaries and Fringe Benefits			$0			$0			$0
rofessional / Contracted Services			$0			$0			$0
upplies and Drugs			$0			$0			$0
ad Debts			$0			$0			$0
ther Operating Expense			$0			$0			$0
ubtotal	$0	$0	$0	$0	$0	$0	$0	$0	$0
epreciation/Amortization			$0			$0			$0
terest Expense			$0			$0			$0
ease Expense			$0			$0			$0
otal Operating Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0
ain/(Loss) from Operations	$0	$0	$0	$0	$0	$0	$0	$0	$0
lus: Non-Operating Revenue			$0			$0			$0
evenue Over/(Under) Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0
TEs				0			0		0

/olume Statistics:
rovide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

Lazarus, Steven

From: Lazarus, Steven
Sent: Wednesday, July 30, 2008 11:53 AM
To: 'Loraine Shea (HCGW)'
Subject: RE: Docket No.: 08-31202, CON Application Forms

Loraine,

I mistyped, I do meant the Table 9, should be "Projected" Cardiac Cath. Volume by Operator as titled on the table itself. The question leading to is misstated (question "o") and should ask for three years projected.

Hopefully that answers your question.

-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

RECEIVED
2008 JUL 30 A 11: 56
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

From: Loraine Shea (HCGW) [mailto:lshea@hcogw.org]
Sent: Wednesday, July 30, 2008 11:45 AM
To: Lazarus, Steven
Subject: RE: Docket No.: 08-31202, CON Application Forms

Steven,
I was inquiring about table 9 (below) and these answers refer to table 8. could you review again?

From: Lazarus, Steven [mailto:Steven.Lazarus@ct.gov]
Sent: Wednesday, July 30, 2008 11:41 AM
To: Loraine Shea (HCGW)
Cc: Martone, Kim; Fedorjaczenko, Alexis; Durdy, Barbara
Subject: RE: Docket No.: 08-31202, CON Application Forms

Hi Loraine,

I reviewed our CON Application forms that were sent out and in Questions vi) m, Table 8, OHCA is requesting the "Projected Operator Volume for each Facility." The wording in the written question m should state "projected" not "historical." In the question and the table prior this question (vi)k, we are requesting the "Historical" Operator volume for each Applicant.

So to clarify the Table 8 is correct and the question leading to Table 8 should have requested "projected" volume not "historical" volume.

Please let me know you have require any further clarification and sorry for the confusion.

-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

From: Loraine Shea (HCGW) [mailto:lshea@hcogw.org]
Sent: Wednesday, July 30, 2008 11:10 AM
To: Lazarus, Steven
Subject: RE: Docket No.: 08-31202, CON Application Forms

Steven,
Thank you for forwarding these documents. In reveiw of the application I have one question.

Page 6 or 12 of the application: (at the bottom) It appears to ask for historical volume however the table is referring to projected volume. Could you clarify that for me? (I have cut and pasted from the application)

o) In the following table format, please provide last three years of cardiac catheterization volume by inpatient and outpatient, by operator and facility.

Table 9: *Projected* Cardiac Cath. Volume by Operator

Physician	Facility	FY 2009 (# of Patients)	I/P	O/P	FY 2010 (# of Patients)	I/P	O/P	FY 2011 (# of Patients)	I/P	O/P

Key: Inpatient= I/P, Outpatient= O/P

thanks very much

Loraine Shea
Executive Director HCGW

From: Lazarus, Steven [mailto:Steven.Lazarus@ct.gov]
Sent: Friday, July 25, 2008 8:36 AM
To: Loraine Shea (HCGW)
Cc: Fedorjaczenko, Alexis; Durdy, Barbara; Martone, Kim
Subject: Re: Docket No.: 08-31202, CON Application Forms

Good Morning Ms. Shea,

Attached you will find the CON Application forms for St. Mary's Hospital, The Waterbury Hospital and John Dempsey Hospital's proposal filed with OHCA under CON Docket No.: 08-31202-CON. Please feel free to contact Alexis Fedorjaczenko at (860) 418-7067 or me if you have any questions. The hard copies were mailed out to your attention yesterday.

-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

HOSPITAL AFFIDAVIT

Applicant: The Waterbury Hospital, St. Mary's Hospital and John Dempsey Hospital

Project Title: Replace Primary and Elective Angioplasty and Heart Surgery programs at The Waterbury Hospital and St. Mary's Hospital

I, Colleen Scott (Name), CFO (Position – CEO or CFO)

of The Waterbury Hospital being duly sworn, depose and state that the (Hospital Name) information submitted in this Certificate of Need application is accurate and correct to the best of my knowledge. With respect to the financial impact related to this CON application, I hereby affirm that:

1. The proposal will have a capital expenditure in excess of $15,000,000.

   ☐ Yes ☒ No

2. The combined total expenses for the proposal's first three years of operation will exceed one percent of the actual operating expenses of the Hospital for the most recently completed fiscal year as filed with the Office of Health Care Access.

   ☒ Yes ☐ No

Signature

9/11/08
Date

RECEIVED
2008 SEP 15 A 9:23
CONNECTICUT OFFICE OF HEALTH CARE ACCESS

Subscribed and sworn to before me on September 11, 2008

Kelly L. Keating
Notary Public/Commissioner of Superior Court

My commission expires: 8/31/2009

HOSPITAL AFFIDAVIT

Applicant: The Waterbury Hospital, St. Mary's Hospital and John Dempsey Hospital

Project Title: Replace Primary and Elective Angioplasty and Heart Surgery programs at The Waterbury Hospital and St. Mary's Hospital

I, William Casey , Interim CEO and President
(Name) (Position – CEO or CFO)

of Saint Mary's Hospital being duly sworn, depose and state that the (Hospital Name) information submitted in this Certificate of Need application is accurate and correct to the best of my knowledge. With respect to the financial impact related to this CON application, I hereby affirm that:

1. The proposal will have a capital expenditure in excess of $15,000,000.

   ☐ Yes ☒ No

2. The combined total expenses for the proposal's first three years of operation will exceed one percent of the actual operating expenses of the Hospital for the most recently completed fiscal year as filed with the Office of Health Care Access.

   ☒ Yes ☐ No

William Casey
Signature

9/10/08
Date

Subscribed and sworn to before me on September 10, 2008

Victoria Cipriano

Notary Public/~~Commissioner of Superior Court~~

My commission expires: VICTORIA CIPRIANO NOTARY PUBLIC MY COMMISSION EXPIRES FEB. 28, 2012

RECEIVED
2008 SEP 15 A 9:23
CONNECTICUT OFFICE OF HEALTH CARE ACCESS

Hospital Affidavit
Revised 7/02

0003
09/15/08

HOSPITAL AFFIDAVIT

Applicant: The Waterbury Hospital, St. Mary's Hospital and John Dempsey Hospital

Project Title: Replace Primary and Elective Angioplasty and Heart Surgery programs at The Waterbury Hospital and St. Mary's Hospital

I, James H. Thornton , Hospital Director
(Name) (Position – CEO or CFO)

of John Dempsey Hospital being duly sworn, depose and state that the (Hospital Name) information submitted in this Certificate of Need application is accurate and correct to the best of my knowledge. With respect to the financial impact related to this CON application, I hereby affirm that:

1. The proposal will have a capital expenditure in excess of $15,000,000.

   ☐ Yes ☒ No

2. The combined total expenses for the proposal's first three years of operation will exceed one percent of the actual operating expenses of the Hospital for the most recently completed fiscal year as filed with the Office of Health Care Access.

   ☒ Yes ☐ No

RECEIVED
2008 SEP 15 A 9:23
CONNECTICUT OFFICE OF HEALTH CARE ACCESS

Signature

Date 9/11/08

Subscribed and sworn to before me on 9/11/08

Notary Public/Commissioner of Superior Court

My commission expires:

MARILYN H. GLENN
NOTARY PUBLIC
MY COMMISSION EXPIRES OCT. 31, 2008

OFFICE OF HEALTH CARE ACCESS

REQUEST FOR NEW CERTIFICATE OF NEED

FILING FEE COMPUTATION SCHEDULE

APPLICANT: TWH, SMH and JDH PROJECT TITLE: Replace demonstration project of Elective and Primary Angioplasty and Open Heart Service with permanent Elective and Primary Angioplasty and Open Heart Service Program DATE: September 15, 2008	FOR OHCA USE ONLY: 1. Check logged (Front desk) DATE _____ INITIAL _____ 2. Check rec'd (Clerical/Cert.) _____ _____ 3. Check correct (Superv.) _____ _____ 4. Check logged (Clerical/Cert).) _____ _____

SECTION A – NEW CERTIFICATE OF NEED APPLICATION	
1. Check statute reference as applicable to CON application (see statute for detail): __X___ 19a-638.Additional function or service, change of ownership, service termination. **No Fee Required.** _____ 19a-639 Capital expenditure exceeding $3,000,000 or capital expenditure exceeding $3,000,000 for major medical equipment, CT scanner, PET scanner, PET/CT scanner, MRI scanner, cineangiography equipment or linear accelerator. **Fee Required.** _____ 19a-638 and 19a-639. **Fee Required.** 2. Enter $0 on "Total Fee Due" line (SECTION B) if application is required pursuant to Section 19a-638 only, otherwise go on to line 3 of this section. 3. Enter $400 on "Total Fee Due" line (SECTION B) if application is for capital expenditure for major medical equipment, imaging equipment or linear accelerator less than $3,000,000 4. Section 19a-639 fee calculation (applicable if section 19a-639 capital expenditure for major medical equipment, imaging equipment or linear accelerator exceeding $3,000,000 or other capital expenditure exceeding $3,000,000 is checked above **OR** if both 19a-638 and 19a-639 are checked): a. Base fee: _____ b. Additional Fee: (Capital Expenditure Assessment)_____ (To calculate: Total requested Capital Expenditure/Cost excluding capitalized financing costs multiplied times .0005 and round to nearest dollar.) ($_____ x .0005) c. Sum of base fee plus additional fee: (Lines A4a + A4b)_____ d. Enter the amount shown on line A4c. on "Total Fee Due" line (SECTION B).	$ _____-.00 $ _____.00 $ _____.00
SECTION B TOTAL FEE DUE:_____	$ _____.00

ATTACH HERE CERTIFIED OR CASHIER'S CHECK ONLY (Payable to: Treasurer, State of Connecticut)

State of Connecticut
Office of Health Care Access
Certificate of Need Application

Please complete all questions. If any question is not relevant to your project, Not Applicable will be an acceptable response. Your Certificate of Need application will be eligible for submission no earlier than September 6, 2008 and may be submitted no later than November 5, 2008. The Analysts assigned to your application are Steven W. Lazarus and Alexis G. Fedorjaczenko and they may be reached at the Office of Health Care Access at (860) 418-7012 and (860) 418-7067, respectively.

Docket Number: 08-31202-CON

Applicants Names: The Waterbury Hospital, Saint Mary's Hospital and John Dempsey Hospital

Contact Person: Loraine Shea
Contact Title: Executive Director
Heart Center of Greater Waterbury
Contact Address: 1075 Chase Parkway
Waterbury, CT 06708

Project Location: Waterbury

Project Name: Replace Demonstration Primary and Elective Angioplasty and Open Heart Surgery Program at The Waterbury Hospital and Saint Mary's Hospital with a Permanent Primary and Elective Angioplasty and Open Heart Surgery Program at The Waterbury Hospital and Saint Mary's Hospital

Type proposal: Section 19a-638, C.G.S.

Est. Capital Expenditure: -0-

Executive Summary

Our case for the Office of Health Care Access's granting of permanent status to the Heart Center of Greater Waterbury, as it is currently configured, rests on four pillars:

I. Community access to life-saving services for a large population.
II. A program configuration that provides a practical, working solution for the Greater Waterbury community at this time while optimizing the use of institutional resources and respecting patient choice.
III. Proven success of the demonstration project.
IV. The current, and still evolving, standard of care for patients with heart disease.

Access to life-saving services:

The Heart Center of Greater Waterbury has had an extraordinary impact on our community by correcting what was once a flawed delivery system for cardiac care. The Office of Health Care Access took an affirmative step when it granted approval for the original demonstration project. No longer does the Waterbury area suffer from being the only major region in Connecticut without a full service, comprehensive cardiac program.

Because the direct connection between rapid intervention and subsequent outcome is incontrovertible, it is no longer morally acceptable that such a large population concentration be deprived of rapid and consistent access to these life-saving interventions. There is ample evidence that a return to the pre-demonstration project "drip and ship" process would certainly result in deaths and disability due to heart muscle damage that could have been prevented. Local availability of full cardiac services also benefits patients by keeping them close to the support of family and friends as well as other professional caregivers. It is also clear that the success of the Heart Center of Greater Waterbury has irrevocably changed the standard of heart disease care in our region to such an extent that loss of the program would precipitate the unraveling of an entire system of care on which thousands of area residents depend.

A configuration that works:

The two Waterbury hospitals are proud of their history of collaboration on complex clinical services. Ours is a working relationship that can serve as a model for other Connecticut communities. The two hospitals continue to work toward bringing that collaboration to its logical conclusion: a full merger.

Each of our collaborations – the Harold Leever Regional Cancer Center, the Heart Center of Greater Waterbury, and, most recently, the consolidation of inpatient pediatrics in partnership with the Connecticut Children's Medical Center- - has been configured differently, depending on community needs, available

capital and facilities resources, hospital utilization patterns (particularly Emergency Department use patterns), transportation patterns, and so forth. The advanced cardiac program ensures quality outcomes through its completely common elements: patient care protocols developed with John Dempsey Hospital; the surgical team (surgeons, perfusionists) also provided under contract with John Dempsey Hospital; cardiac anesthesiologists; interventional and medical cardiologists; participation in national quality of care databases and a quality oversight program with participation from John Dempsey Hospital. According to the latest literature, individual surgeon's volume is the key quality variable for open heart surgery, and our surgeons and interventional cardiologists are among the busiest in Connecticut.

The demographics and economic vitality of the core towns of our region are matters of great concern to us, and it is no secret that both hospitals are financially stressed. Access to capital for equipment and facilities is a particularly difficult issue. Our hospitals are constantly challenged to find creative and pragmatic solutions to our diverse community's health care needs. We believe that The Heart Center of Greater Waterbury represents just such a practical solution that has been demonstrably successful, not only in saving lives, but in achieving high quality outcomes.

In considering our application, we hope that the Office of Health Care Access will give appropriate weight to the work of those who know and understand the unique characteristics of our community and the patient population we serve. We also firmly believe that the Office of Health Care Access should not attempt to force further consolidation of this program—with the attendant disruptions and capital costs – unnecessary costs that neither financially distressed Waterbury hospital can afford. Any further consolidation should occur only within the context of a broader institutional integration plan.

A successful demonstration project:

By a host of measures, the Heart Center of Greater Waterbury has met or exceeded expectations.

- Angioplasty volumes that exceeded demonstration project volume targets by 50%
- Exemplary door-to-balloon times that boast a time-to-treatment that is better than the national benchmark
- Excellent angioplasty and open heart surgery outcomes, as measured by our participation in national databases
- Open heart surgery services provided by one of Connecticut's busiest cardiothoracic surgical practices, at volume levels that have proven quality performance can and does exist at the community hospital level
- Outstanding patient satisfaction in the cardiovascular intensive care units
- Robust community programs providing free health education to residents

We believe that the Waterbury program was, in fact, held to a much higher standard than that applied to both established programs and other recently approved programs. We hope that the standard of judgment for the approval of a permanent program will be based on the realities of the greater Waterbury region, and thoughtfully applied.

Standard of care:

In an urban area such as greater Waterbury, with a large population of poor and elderly citizens who are often medically fragile, and who cannot travel easily to other cities for acute care, the lack of a full service cardiac program is simply no longer acceptable. Interventional cardiac services – angioplasty and open-heart surgery – are the centerpiece of an entire system of care that includes preventive medicine and medical therapies as well as these more invasive, acute forms of care, and thus benefits thousands of greater Waterbury residents, not just the acutely ill. We also expect that the best treatments for the various manifestations of heart disease will continue to evolve. The continuation of a full service program in Waterbury ensures that all current treatment options are at the disposal of our local caregivers and available to our citizens, and, at the same time, will enable our program to evolve along with changing technologies.

In conclusion, while we believe that community access to life-saving services is the critical issue in this case, not hospital finances, it is also clear that the positive financial impact on the two Waterbury hospitals has been significant and is an important consideration in the potential merger of the two organizations. As the Office of Health Care Access evaluates our application, we hope that the agency will take the above factors into account, each on its own merits, but also recognize that these elements are completely intertwined. The question of "sufficient utilization" should be analyzed and evaluated in terms of the overall community impact, taking into account all the procedures provided by the overall program, not merely open heart surgery procedures.

Together we have the opportunity to ensure that the appropriate standard of health care is accessible to the residents of greater Waterbury. It is our mandate as health care professionals to provide essential life saving services where the need is so clearly warranted

1. Contact Information

OHCA requires each Applicant to provide a separate contact person. Please complete the following "Contact Person" information for **each** Applicant:

Contact Information Required	*The Waterbury Hospital*	*Saint Mary's Hospital*	*John Dempsey Hospital*
Name	Colleen Scott	Chad W. Wable	Monte Giannini
Title	Chief Financial Officer	Executive VP, Strategy Development and System Operations	Planning Analyst
Phone & Fax Number	(P)203-573-7280 (F)203-573-7325	(P)203-709-3368 (F)203-709-3238	(P)860-679-3707 (F)860-679-4515
Email Address	cscott@wtbyhosp.org	cwable@stmh.org	Giannini@nso.uchc.edu
Mailing Address	64 Robbins Street Waterbury, CT 06708	56 Franklin Street Waterbury, CT 06706	263 Farmington Ave Farmington, CT 06030

Contact Information Required	*Heart Center of Greater Waterbury*
Name	Loraine Shea
Title	Executive Director
Phone & Fax Number	(P)203-575-5571 (F)203-575-5575
Email Address	lshea@hcogw.org
Mailing Address	PO Box 2153 Waterbury, CT 06722 Or 1075 Chase Parkway Waterbury, CT 06708

2. Expansion of Existing or New Service

What services are currently offered at St. Mary's Hospital ("SMH") and The Waterbury Hospital ("TWH") that the proposed Elective and Primary Angioplasty and Open Heart Surgery services will augment or replace? Include any cardiovascular disease prevention and health promotion programs.

Response:

Replace: Saint Mary's Hospital (SMH) and The Waterbury Hospital (TWH) d/b/a the Heart Center of Greater Waterbury (HCGW) have a longstanding history of providing cardiac services to patients of the greater Waterbury area. These services include inpatient and outpatient cardiology and medical services as well as timely emergency room care. Over the last three years the HCGW has had a proficient and active angioplasty and open heart surgery demonstration project that has been available for over 270,000 people in the Waterbury region, and directly serviced more than 2,400 patients, all while maintaining excellent outcomes.

Non-Invasive Cardiology:

- EKG testing with extensive database of historic EKG tests
- Holter monitor testing
- Echocardiography including Trans Esophageal Echocardiography with extensive database of historic tests
- Stress Testing (treadmill, pharmacologic)
- Cardiology dedicated dual head nuclear cameras

Invasive Cardiology:

- Diagnostic Cardiac Catheterizations
- Single room with Biplane imaging
- Intra-aortic balloon pump placement
- Implants Pacemaker
- Implants Defibrillators

Cardiology Clinics:

- Pacemaker Clinic

Cardiac Rehab:

- Phase I
- Phase II
- Phase III

Peripheral Vascular:

- Interventional and diagnostic procedures
- Minimally Invasive Abdominal Aneurysm Endovascular procedures
- CT/MRI angiography
- Endovascular and traditional open vascular surgery
- Peripheral angioplasty

Critical Care Units:

- Critical care units directed by Board Certified Intensivists
- Cardiovascular unit--one stop post operative model for interventional cardiology patients
- Ongoing nursing education in collaboration with Advanced Practice Nurses
- High percentage of RN with CCRN certification
- Telemetry and hemodynamic units available
- 24 hour physician unit, coverage provided by on-site surgical and medical residency program

Emergency Department:

- Cardiac care protocols in place
- Cardiac monitors available in treatment rooms

Other:

- CT calcium scoring
- Computerized tomography angiography

Advanced Cardiac Services:

- Elective angioplasty
- Primary angioplasty
- Open heart surgery

In addition, HCGW offers an extensive community outreach and education program which is provided to the greater Waterbury community as a free service. Community outreach activities include heart health education on the signs and symptoms of heart disease, risk factors and prevention, a cardiac support group, free screenings for blood pressure and cholesterol and smoking cessation classes provided in collaboration with the American Lung Association. Over the last three years thousands of greater Waterbury residents have benefited from the ongoing education and outreach provided by the Program's Advanced Practice Registered Nurse and physicians (See Appendix 2).

SMH and TWH have an active and attending medical staff of 325 and 432, respectively. In a community with two hospitals there is overlap of medical staff; however both hospitals have an excellent physician base representing all major specialty areas. Of those, there are 17 cardiologists including 5 interventional cardiologists, 4 cardiothoracic surgeons and 4 cardiac anesthesiologists actively practicing at both hospitals. HCGW patients benefit from the same team of physicians regardless of which campus they choose for care.

Program Physicians

Cardiologists	Board Certification
Ehsan Ansari, MD	Cardiovascular Disease, Internal Medicine, Interventional Cardiology
Robert Anthony, MD, FACC	Cardiovascular Disease, Internal Medicine
George Antonopoulos, MD	Cardiovascular Disease, Internal Medicine
Paul Bellofiore, MD	Cardiovascular Disease, Internal Medicine
Henry Borkowski, Jr., MD	Cardiovascular Disease, Internal Medicine
Dennis Dobkin, MD	Cardiovascular Disease, Internal Medicine
Paul Kelly, MD, FACC	Cardiovascular Disease, Internal Medicine
Kevin Kett, MD, FACC	Cardiovascular Disease, Internal Medicine, Interventional Cardiology, Cardiovascular Nuclear Medicine, Echocardiology
Michael Malinics, DO, FACC	Cardiovascular Disease, Internal Medicine
Joseph Morley, MD, FACC	Cardiovascular Disease, Internal Medicine
Suphichaya Muangman, MD	Cardiovascular Disease, Internal Medicine, Interventional Cardiology
David Reis, MD	Cardiovascular Disease, Internal Medicine
Mark Rosenberg, MD, FACC	Cardiovascular Disease, Internal Medicine
Mark Ruggiero, MD	Cardiovascular Disease, Internal Medicine, Cardiovascular Nuclear Medicine, Echocardiology
Joel Sherman, MD, FACC	Cardiovascular Disease, Internal Medicine
Stephen Widman, MD, FACC	Cardiovascular Disease, Internal Medicine, Interventional Cardiology
Ragurahman Vidhun, MD	Cardiovascular Disease, Internal Medicine, Interventional Cardiology (Board Eligible)
Cardiothoracic Surgeons	Board Certification
Jonathan Hammond, Jr., MD	Surgery, Thoracic Surgery
Daniel Fusco, MD	Surgery, Thoracic Surgery
Paul Preissler, MD	Surgery, Thoracic Surgery
David Underhill, MD	Surgery, Thoracic Surgery
Cardiac Anesthesiologists	Board Certification
Ronald Burt, MD	Anesthesia
Ricardo Cardenas, MD	Anesthesia
David Heimbinder, MD	Anesthesia
Paul Langevin, MD	Anesthesia

It is the intention of the Applicants to replace the highly successful advanced cardiac services noted above with a permanent Program offering continued high quality and service excellence under the direction of this new Certificate of Need (CON). The greater Waterbury area is relying on HCGW, in conjunction with John Dempsey Hospital (JDH), to continue to provide these lifesaving services close to home.

Since July 18, 2005, the HCGW, in conjunction with JDH, has substantially improved the quality of medicine and, in particular, cardiac care by successfully providing advanced cardiac services. Thousands of residents have experienced and come to rely upon the current standard of care for comprehensive cardiac services, over 2,400 of which have received

interventional care. A permanent cardiac Program will provide a comprehensive chain of care that begins with diagnosis, continues through all levels of necessary treatment and completes itself with rehabilitation, community education and prevention that will serve to augment existing vital cardiac services. The chain must not be broken by removing the "treatment" link.

3. State Health Plan

No questions at this time.

4. Applicants' Long Range Plans

Is this application consistent with your long-range plan?

Yes ☒ ☐ No

If "No" is checked, please provide an explanation.

Response:

The long range plans of SMH and TWH include a shared vision to build upon a history of successful collaboration to create a health care delivery system that will ensure sustainable access to quality health care for our community. The Board of Directors and executive management teams at each hospital see the continuation of the HCGW on a permanent basis as imperative to achieving this vision. The HCGW is just one example of successful collaborations between the institutions. The hospitals also enjoy shared endeavors in oncology, PET/CT imaging, inpatient pediatrics and the Waterbury Health Access Program (WHAP). In fact, the collaborative relationship between SMH and TWH is a model that other Connecticut cities with two hospitals should seek to emulate.

As stated above, the Applicant's proposal is consistent with their vision and plans for the future. However, one must also look at history and what greater Waterbury has achieved in terms of advanced cardiac care for its citizens. Just a few years ago SMH and TWH embarked on what was then a strategic plan to correct a flawed delivery system for cardiac care in the greater Waterbury area. The result has been to provide greater Waterbury residents with access to emergency and elective cardiac services in a timely, efficient and competent manner. It is well known to the Office of Health Care Access that SMH and TWH are financially distressed hospitals operating in a challenging environment. When the Program was designed, it was done in a way that made the most cost effective use possible of the two existing campuses. Where new infrastructure needed to be developed it was done so with the philosophy of being One Program. The hospitals initially invested approximately $7 million. Today this single Program has identical catheterization labs, operating room suites and cardiovascular intensive care unit models. It also has identical care-giving teams of cardiologists, interventional cardiologists, cardiothoracic surgeons, cardiac anesthesiologists and perfusionists. The Program works exceedingly well in the context of our existing health care delivery system including, most importantly, hospital use patterns. It is a model that should not be modified simply because it is different from other programs in Connecticut. Residents of other Connecticut urban areas have two hospitals with separate and distinct advanced cardiac Program offerings. How fortunate for the residents of greater Waterbury, the fourth largest urban area in the State, that their hospitals had the foresight to be collaborative in the development of one advanced cardiac care Program. A Program that not only has saved lives, but has provided continuity of care regardless of which side of the Naugatuck River one chooses to receive treatment. What was once a long range plan for advance cardiac services has been successfully implemented and should be allowed to continue on a permanent basis.

As mentioned above, when the Program was designed it was done in a way that made the most effective use possible of the two existing hospital campuses. A great deal of thought and consideration went into the original design of the Program. If the Applicants were asked if the same infrastructure and design choices would be made again, and if we knew then what we know now, the answer would be a resounding "yes". In the development of the Program, serious consideration was given to alternatives that were evaluated against various criteria including the community uniqueness, long range plans and collective experience. As a point of reference, the Program alternatives explored are outlined below.

- Primary angioplasty (only) in Waterbury
- Full service advanced cardiac care in Waterbury – jointly managed, one campus
- Full service advanced cardiac care in Waterbury – jointly managed, two campuses

Primary angioplasty (only) in Waterbury:

While a primary angioplasty only (PAMI-only) program may be solution for other communities, it is not so for the fourth largest urban region in the State. PAMI-only programs offer services to only a small segment of the total population requiring immediate emergency interventional cardiac care. Given the volume of patients seen in Waterbury, the Program would find itself in an untenable situation whereby a patient could present with STEMI (ST- Elevation Myocardial Infarction) and be treated with primary angioplasty intervention, while, simultaneously, another patient presents with unstable coronary syndrome, undergoes a cardiac catheterization which identifies the need for coronary intervention, and must subsequently be transferred to another location for definitive therapy. The cardiologist and clinical staff involved in this scenario could have treated both patients in one locale, providing the most efficacious treatment, while saving time and dollars. Moreover, under a PAMI-only program, current caregivers, having provided a full range of life-saving angioplasty services over the last three years during the demonstration project, would find themselves in the untenable situation of not being able to practice what they have demonstrated an ability to do exceedingly well. A step backward in the standard of care would be an unfortunate and devastating result.

Furthermore, PAMI-only programs often produce a financial loss. Although some hospitals are able to absorb this loss, the case is quite different with SMH and TWH. The financial burden for physician coverage and staffing could not be offset by the other cardiac services. This additional financial burden that would be incurred would further distress the overall status of both SMH and TWH, and impact the ability of each campus to operate other unprofitable medical, surgical and psychiatric clinics that are so desperately needed by the poor and uninsured in this region.

Full service advanced cardiac care in Waterbury – jointly managed, one campus:

Patients receiving care at either of the Program's campuses benefit from the care of established, experienced interventional cardiologists, cardiothoracic surgeons and clinicians. Patients suffering chest pain, or other symptoms associated with a heart attack, are well advised to go to the nearest emergency department for expert evaluation. While such symptoms may or may not be due to a heart attack, patients who think they may be having a

heart attack would choose the emergency department in Waterbury where both coronary intervention and open heart surgery capabilities exist. Likewise, patients seeking diagnostic treatment and in need of a cardiac catheterization would choose the location where therapeutic care is co-located and open heart surgery is available if needed. According to the Connecticut Hospital Association's *Patient Census Report*, the combined total of emergency department visits at both of the Waterbury hospitals was almost 122,400 in fiscal year 2007. The emergency departments, catheterization labs, cardiovascular intensive care units and telemetry units at SMH or TWH campuses could not accommodate such a shift in demand. To consolidate services to a single campus would cost more, in terms of capital investment, than the two campus model, because one institution's facilities would have to be expanded in order to meet forecasted demand, while the other institutions facilities would suffer from diminished use—resulting in an unnecessary waste of existing resources.

Full service advanced cardiac care in Waterbury – jointly managed, two campuses:

Having carefully considered other options, we are convinced that the Program as currently designed, with care provided at both campuses, is the most practical and cost effective way to provide advanced, comprehensive cardiac care services to the citizens of greater Waterbury. Our proposal takes advantage of existing facilities and medical expertise, and meets or exceeds all of the quality standards of regulatory and professional bodies. The local affiliation is greatly enhanced by an innovative partnership with JDH, opening new opportunities for medical education, research and further regional collaboration.

SMH and TWH, are in the best position to determine what will work best for the hospitals, medical community and residents of greater Waterbury.

Consolidation scenario after a potential merger:

It is important to address the effect of a potential merger of SMH and TWH on the provision of advanced cardiac services. It is well known that the demand for patient care is such that both hospital campuses would need to be fully utilized for several years post merger. A newly built hospital, while ideal, may not be financially possible for many years and it may not be the best approach in the foreseeable future. As such, the first step would be to launch the planning for numerous integration and transition tasks, while maintaining operations. Complex services or services that are already producing positive results such as advanced cardiac care may not be restructured for several years. Reference: Implementation timeline excerpt from the March 2008 presentation by SMH and TWH to Commissioners of State agencies (Appendix 4). The cardiac program would, by necessity, likely continue to operate in its current two campus formation for several years after the signing of final merger documents.

It is in the public record that the leadership of SMH and TWH are working towards a full asset merger of their hospitals for the benefit of health care in the region. There is full commitment from all parties to make it happen in the near future.

Future leadership will most certainly review the provision of advanced cardiac services to consider if a re-configuration of these services would bring definitive value to the citizenry, cardiologists, surgeons and institution. The analysis will be quite complex as the impact of

such a consolidation of services would impact emergency, trauma, laboratory and blood bank services, physical space such as dedicated operating rooms, cardiac catheterization laboratories, inpatient telemetry and cardiovascular unit beds, cardiac rehabilitation services and numerous other areas.

However, if restructuring the provision of advanced cardiac services would bring significant benefit to the merged institution and render benefit to the public, and if there is adequate capital available to fund such a large restructuring of facilities; the merged hospital would take steps to bring that benefit to the region in due course.

5. Clear Public Need

i. The record in this docket will include, in addition to other materials, the American College of Cardiology/American Heart Association (ACC/AHA) practice guidelines.

a. The Applicants may submit any comments in response to this evidence, which they deem appropriate.

Response:
American College of Cardiology/American Heart Association (ACC/AHA):

The Applicants submit the following comments regarding the ACC/AHA practice guidelines. The ACC/AHA has produced volumes of guidelines, clinical competence statements and practice guidelines. For the purpose of this discussion, several documents from ACC/AHA are referenced with their title and date. The ACC/AHA published a revised Guideline Update for Coronary Artery Bypass Graph Surgery (CABG) in 2004. The revised guidelines were approved by the American College of Cardiology Foundation Board of Trustees in March 2004 and by the American Heart Association Science Advisory and Coordinating Committee in June 2004 and published for the first time on August 31, 2004 in *Circulation Journal of the American Heart Association*. These guidelines are not the same guidelines considered when the Program's demonstration project was approved in July 2004 and, therefore, serious consideration should be given to the revisions. *Section 7 Institutional and Operator Competence, 7.1 Volume Considerations* (Appendix 5.i.a) provides an extensive review of relevant literature that the Applicants request OHCA to consider. The studies found that a wide variation in mortality rates exists and that some low volume programs maintained excellent outcomes which call into question the use of volume as a sole proxy for quality. The conclusion reached is as follows:

> ...In summary, studies suggest that survival after CABG is negatively affected when carried out in institutions that perform less than a threshold number of cases annually. Similar conclusions have been drawn regarding individual surgeon volumes. In states where reporting of outcomes is an accepted practice (e.g., New York State), the relationship between low volumes at either an institutional or individual level seems to have diminished over time. This observation strengthens the argument for outcome tracking and supports a posture of close monitoring of institutions or individuals that perform less than 100 cases annually. It must be remembered that these same studies also found a wide variation in risk-adjusted mortality rates in low volume situations; i.e. some institutions and practitioners maintained excellent outcomes despite relatively low volumes. Therefore, credentialing policies based on conclusions drawn from these data must be made with caution....

The above referenced Guideline Update for CABG Surgery continues to support the argument for monitoring clinical outcomes in those programs that perform less than 100 surgical cases annually. The guidelines certainly do not support the position that an existing quality program with an institutional volume of less than 100 surgical cases not

be allowed to operate. As a Program, HCGW has always performed above 100 cases and, as demonstrated later in the application, is projected to do so in the future. These guidelines refer to surgeon volume as well which, in the case of this Program, is an important factor as seen in the response to question 5.i.b.

As the ACC/AHA guidelines refer to the provision of primary and elective angioplasty services, the Applicants have continuously reviewed the ACCF/AHA/SCAI 2007 Update of The Clinical Competence Statement on Cardiac Interventional Procedures, an update of the 1998 Clinical Competence Statement, published June 25, 2007 in *Circulation* (Appendix 5.i.a).

The Program has met and adhered to the Clinical Competence Statement as it applies to institutional system requirements and will continue to do so. The guideline states:

> ...The interventional laboratory must have an extensive support system of specifically trained laboratory personnel. Cardiothoracic surgical, respiratory, and anesthesia services should be available to respond to emergency situations in order to minimize detrimental outcomes. The institution should have systems for credentialing, governance, data gathering, and quality assessment. Prospective, unbiased collection of key data elements on consecutive patients and consistent feedback of results to providers brings important quality control to the entire interventional program. The ACC/AHA/SCAI 2005 Guideline Update for angioplasty recommends that each interventional program performing elective angioplasty should have in-house surgical support. Institutions that do not have in-house surgical support and are performing primary open surgery only for STEMI, should have an established, well-organized system for emergency transfer to surgery at another institution....

This updated Clinical Competence Statement also speaks to the operator volume issue and although the recommended volumes have not changed from 75 procedures per operator, it is critical to this process to understand the scientific review behind the recommendations. The Clinical Competence Statement states:

> ...it is also important to underscore that there are significant limitations to the simplistic interpretation of procedure volume statistics as a measure of competence and quality. First, it is uncertain whether this relationship is a result of the "practice makes perfect" principle, or the fact that patients are more frequently referred to high-quality operators. Second, it remains unclear where the "cut-off" number should be set. Third, studies have shown significant variability in the volume–outcome relationship within the same registry, with some low volume operators having better than expected outcomes, and a few high volume operators having worse-than-expected outcomes. Furthermore, at present, few or no data exist linking operator volume to case selection, appropriateness of procedures, peri-procedural MI, long-term clinical outcome, or cost effectiveness, each of which measures a component of quality of care....

Additionally:

> ...The development of national, regional, and State registries for outcome assessment is also promoting a shift of the paradigm surrounding quality of angioplasty from a mere collection of procedure volume to objective assessment of clinical outcomes...and as more registry data become available, procedure volume will likely no longer be used as a replacement or a surrogate for quality assessment....

And:

> ...Independent of procedure volume, all operators should participate in a regional or national program for outcome assessment and quality improvement....

In addition to a regular internal review of outcome data, the Program chose from the very start to engage an outside organization to provide peer review as well. As the Program wanted to ensure quality services, outside peer review has been conducted as part of the quality review process.

The Program has also actively participated in two major databases for provision of risk adjusted data comparisons to national and regional programs: the American College of Cardiology-National Cardiac Registry Database (ACC-NCDR) and the Society of Thoracic Surgeons (STS) Database. The Program utilized these comparisons as intended, to evaluate processes and to make improvements if necessary.

The Clinical Competence Statement makes recommendations related to clinical infrastructure including the skill of support staff and the quality of the facilities. During the planning and implementation of the demonstration project, both facilities with the assistance of JDH assured that catheterization labs were upgraded, clinical processes were put into place to ensure excellent care, and a sophisticated data collection system was established. These guidelines have been met and will continue to be met to ensure a quality angioplasty program.

> ...Requirement for Institutional Resources and Support: A high-quality angioplasty program requires appropriately trained, experienced, and skilled physician operators. However, the operator does not work in a vacuum. An operator needs a well-maintained high-quality cardiac catheterization facility to practice effectively. In addition, the operator depends on a multidisciplinary institutional infrastructure for support and response to emergencies. Thus, to provide quality angioplasty services, the institution must ensure that its catheterization facility is properly equipped and managed, and that all of its necessary support services, including data collection, are of high quality and are readily available....

Society of Thoracic Surgeons:

The Society of Thoracic Surgeons (STS) is the nationally recognized professional organization for cardiothoracic surgeons. The STS established a Quality Measurement Task Force to develop a methodology for the comprehensive assessment of adult cardiac surgery quality of care, including both individual measures and an overall composite quality score. The report of the STS Quality Measure Task force entitled, "*Quality Measurement in Adult Cardiac Surgery: Part 1—Conceptual Framework and Measure Selection*" (Appendix 5.i.a.) was published in 2007 and recommends the use of National Quality Forum measures of quality in program evaluation. The STS does not endorse threshold volume for cardiac surgeons or open heart surgical programs (Appendix 5.i.a.). The 2007 report states the following regarding the use of volume as a proxy for quality for CABG procedures:

> ...Structure: Structural measures refer to inherent characteristics of the provider that are believed to be associated with higher quality. These may include, for example, the volume of a particular type of procedure performed annually, advanced information technology such as electronic health records or computerized order entry, participation in an outcomes database registry, sophisticated radiographic imaging capabilities, number of approved residencies, and nurse staffing ratios. For many such measures, the strength of their relationship with desired health care outcomes is not well defined.
>
> Without question, volume is the most extensively studied structural measure of quality in all of medicine and surgery. Whether this reflects "practice makes perfect" or "selective referral" to institutions perceived to be of higher quality is uncertain. The strength of the volume outcome relationship varies widely. For complex procedures such as esophagectomy or pancreatectomy that are performed relatively infrequently even at high volume institutions, the volume-outcome association is strong. For some frequently performed, relatively standardized and mature complex procedures such as CABG, where annual hospital volumes may range from 100 to more than 1000 cases, the volume-outcome relationship is weak.
>
> Structural measures may be useful proxies for outcomes when the latter data are unavailable. Conversely, their relative utility diminishes when reliable outcomes data are accessible. Furthermore, structural measures are often not readily actionable by providers, and this diminishes their usefulness as quality improvement tools....

The leading organization for cardiothoracic surgeons has voiced strong opinions on the matter of volume targets for OHCA to consider in this matter.

American College of Surgeons:

Although this application does not specify other guidelines that will be used in the consideration of this CON, the Applicants submit that The Guidelines for Standards in

Cardiac Surgery (Appendix 5.i.a.) set forth by the American College of Surgeons (ACS) in 1996 are significantly outdated. The 1996 Guidelines state that "current standards of practice form the basis of the report" however, the standards state that the volume guidelines are based on data from 1975. In 1975, cardiac surgery was in its infancy. In 1975 the practice of cardiothoracic surgery did not have the benefit of subsequent years of the additional science and technology that have shaped the practice today.

In 2008, over thirty years later, it is important to consider and review the current status of the medical literature that speaks to cardiac surgery volume and outcomes.

Appendix 5.i.a. provides the most current medical literature to date related to cardiac surgery and the volume-outcome connection. A summary of the literature is also provided below. OHCA defines "utilization" as patterns or rates of use of a single service or type of service; e.g., hospital care, physician visits, prescription drugs (OHCA Glossary of Terms). With regard to evaluation of advanced cardiac services, utilization should be analyzed and evaluated in terms of the overall community serviced and all the procedures provided by the overall Program, not merely one particular interventional procedure. If OHCA intends to continue to define acceptable utilization standards, it is of utmost importance that all factors, literature and current "recommendations" be considered in this process.

Summary of Recent Medical Literature related to Volume and Outcome:

The following is a summary of nine studies and their conclusions. These studies were published subsequent to the approval of the Program in 2004. They demonstrate that there is no clear relationship between volume and outcome, that volume is a poor predictor of quality and that the prior studies that found an association between volume and outcome did not address the effects of surgeon-specific volume. The following more relevant and recent medical literature must be taken into consideration in evaluating any advanced cardiac care Program in the greater Waterbury area.

Ricciardi R., Virnig B. A., Ogilvie J. W., Dahlberg P. S., Selker H. P. & Baxter N.N. (2008). Volume-outcome relationship for coronary artery bypass grafting in an era of decreasing volume. *Archives of Surgery*, 143(4), 338-44.

This study was conducted over a period of 16 years. Study leaders hypothesized that the decrease in hospital procedure volume for CAGB would relate to an increase in the in-hospital mortality rate. It used hospital discharge data from the National Inpatient Sample from January 1, 1988 to December 31, 2003. A 20% random sample of all patients who underwent CABG or angioplasty was used. The study had four different aims including: 1) to determine trends in coronary revascularization techniques performed surgically or by angioplasty; 2) to define trends in valve replacement and repair; 3) to record mortality by year and by CAGB volume to evaluate the effect of declining CABG volume on the volume-outcome relationship, and 4) to quantify the difference in mortality between high and low volume hospitals.

During this period, the rate of CABG increased from 7.2 cases per 1,000 discharges in 1988 to 12.2 cases per 1,000 in 1997 and then declined to 9.7 cases in 2003. During this same period the volume of angioplasty procedures tripled. For CABG, the proportion of high volume hospitals increased to a peak of 32.5%, but then decreased to 15.5% in 2003. During this same time frame, low volume hospitals (12-149 CABG/year) decreased from 49.6% in 1988 to 35.5% in 1997, but then increased to 52.4% in 2003. The numbers of individuals undergoing CABG procedures in low volume hospitals peaked in 2003 at 24.6%. In this 16 year time frame CABG mortality rate declined from 5.4% to 3.3% and in every category of hospital defined by volume, there was a statistically significant decrease in mortality. Hospitals performing the lowest volume of CABG experienced the largest decrease of in-hospital mortality. The study concludes that these results should, "challenge the setting of any arbitrary volume cut point: positive effects on patient outcome are multi-factorial and are inadequately described by procedure volume."

Yuh, D. D. (2008). Volume-outcome relationship for coronary artery bypass grafting in an era of decreasing volume-invited critique. *Archives of Surgery*, 143(4), 344.

In this invited critique the author notes that findings of above study suggest that traditional volume-outcome tenets may be overly simplistic and inaccurate in assessing current CABG practices. The critique notes that there is growing experiential evidence that hospital-based quality control, monitoring and best-practice programs may have a more significant effect on outcomes than volume, particularly in generally routine surgical procedures such as CABG.

Marcin, J. P., Li, Z., Kravitz, R. L., Dai, J. J., Rocke, D. M., & Romano P. S. (2008, February). The CABG surgery volume-outcome relationship: Temporal Trends and Selection Effects in California, 1998-2004. *Health Research & Educational Trust*, 43(1). Retrieved from http://www3.interscience.wiley.com/cgi-bin/fulltext/119390760/PDFSTART

This recently published study examines patient-level clinical data collected from the California CABG Mortality Reporting Program; a voluntary reporting program from 1998 to 2002 involving between 68 and 81 hospitals. In addition, for the years from 2003 to 2004, patient-level clinical data was examined from the California CABG Reporting Program which is a mandatory reporting program in the State of California. This study took place during a transition from the voluntary to the mandatory reporting of CABG outcomes. In this study the patient was the primary unit of study and in-hospital mortality was the primary outcome measured. The study acknowledged previous research in the area of volume and outcomes. It also noted that several recent studies with vigorous statistical methods and the use of risk adjusted data found limited or insignificant relationships between volume and outcome. The data elements collected included patient-level data defined by the STS in addition to data elements defined by other state programs including Massachusetts, New York, New Jersey and Pennsylvania. For this group of multiple hospitals in California it was determined that there was a "consistent but small" volume-outcome relationship for CABG surgery during the years 1998 to

2002, however this relationship disappeared in 2003 and 2004. The study demonstrated, as other more recent studies, that CABG volume may no longer be the quality metric to use to determine Program value. Several reasons were hypothesized for this result including the use of patient specific clinical and risk adjusted data rather than administrative data as well as the advances in surgical practice that have increased overall quality of care to the patient.

Welke K. F., Barnett M. J., Sarrazin M. S. & Rosenthal G. E. (2005). Limitations of hospital volume as a measure of quality of care for coronary artery bypass graft surgery. *Annals of Thoracic Surgery*, 80(6), 2114-9.

This study reviewed over 900,000 Medicare patients for the purpose of quantifying the strength of hospital volume as a predictor of mortality following CABG surgery. Through examination of six years worth of data, the study demonstrated that although on average higher volume hospitals had lower CABG mortality rates than lower volume hospitals, a wide variation in risk-adjusted mortality rates existed among hospitals within similar volume categories and the discrimination of volume as a predictor of mortality was only "slightly better than a coin flip". It concluded that while there are many factors that contribute to the mortality risk of a patient undergoing CABG, hospital volume is a relatively weak predictor.

Khuri S. F. & Henderson W.G. (2005). The case against volume as a measure of quality of surgical care. *World Journal of Surgery*, 29(10), 1222-9.

The purpose of this study was to evaluate the use of volume criteria in setting standards of quality of surgical care. The conclusion of this study was that the use of risk-adjusted outcomes is more appropriate for setting such standards. The author notes that allowing standards based on volume means accepting the premise that low volume hospitals deliver substandard care and high volume hospitals always deliver good care. The author, Dr. Shukri Khuri, has been actively involved in the Veterans Administration National Surgical Quality Improvement Program (NSQIP), the first national, validated, outcome-based and peer controlled program for measuring and enhancing quality surgical care. In contrast to many research studies which have reviewed administrative databases to look at the volume-outcome relationship, NSQIP utilizes a trained nurse to collect prospective clinical data on all major surgical operations in the V.A. This allows for the ability to adequately adjust for patient severity of illness. Work by the NSQIP indicates that volume of surgical workload is unrelated to quality of care and attempts at setting volume as a standard are flawed. NSQIP has found no direct relationship between volumes and outcomes and has demonstrated that the systems of care have more impact on overall outcomes than does volume. Dr. Khuri notes that any threshold volume below which quality is likely to be compromised is illusive at best.

Zacharias A., Schwann T. A., Riordan C. J., Durham S. J., Shah A., Papadimos T. J., Engoren M. & Habib R.H. (2005). Is hospital procedure volume a *reliable* marker of quality for coronary artery bypass surgery? A comparison of risk and propensity adjusted operative and midterm outcomes. *Annals of Thoracic Surgery*, 79(6), 1961-9.

This study reviews the type of system currently in place within the Program [i.e. same surgical team providing services at what are considered Low Volume Hospitals (LVH) and High Volume Hospitals (HVH)]. Zacharias et al. reviewed the results of several recent studies looking at the association between hospital volume and outcome, including a study by Peterson, et al. described below. In these studies, the authors concur that hospital volume-outcome effects are confounded by a significant independent surgeon volume effect. The purpose of this study was to better define whether the procedure volume effects are surgeon or institutional in origin. The study examined 30-day and 3-year mortality for two different institutions served by the same surgical team over a two-year period. The same perfusion team provided bypass services at the two hospitals. Results showed that the two hospitals exhibited multiple demographic and risk factor differences. However, unadjusted operative mortality was similar for the LVH and the HVH (2.38% vs. 2.98%), with nearly identical observed to expected ratios, irrespective of preoperative risk category. Hospital volume did not predict operative mortality. The study concluded that when served by the same high volume surgeons, similar operative and mid-term outcomes may be achieved in LVH and HVH and surgeon experience rather than institutional volume may be the more critical factor. In addition, cardiac surgeons who apply similar patient care standards and pathways and emphasize a team approach to cardiac surgery care can and do achieve similar outcomes at independent low volume and high volume programs.

Peterson E.D., Coombs L.P., DeLong E. R., Haan C. K. & Ferguson T. B. (2004). Procedural volume as a marker of quality for CABG surgery. *JAMA*, 291(2), 195-201.

This study did an observational analysis of 267,089 CABG procedures performed at 439 U.S. hospitals and reported through the STS National Cardiac Data Base. Overall, operative mortality for CABG surgery was 2.66%. After adjusting for patient risk, the rates of operative mortality decreased with increasing CABG volume; however, this association was not observed in patients under the age of 65 or for those with low preoperative risk. Hospital volume generally had poor predictive accuracy as a means of identifying hospitals with significantly better or worse CABG mortality rates. The study indicates, however, that in contemporary practice, hospital procedure volume is only modestly associated with CABG risk adjusted outcomes, and therefore is not an adequate quality metric for CABG surgery. The use of risk adjusted outcomes through national clinical databases should be supported as a measure of quality. The results of this study indicating that the volume-outcome effect is not significant in patients under 65 years of age and in those with low pre-operative risk, imply that prior studies performed exclusively in Medicare patients and without risk stratification would have inflated the volume-outcome effect. The conclusion was that "the closure of up to 100 of the lowest

volume centers (i.e. those performing less than or equal to 150 CABG procedures) would avert fewer than 50 of the 7,110 (less than 1%) of CABG related deaths."

Papadimos T. J., Habib R. H., Zacharias A., Schwann T. A., Riordan C. J., Durham S. J. & Shah A. (2005, May). Early efficacy of CABG care delivery in a low procedure-volume community hospital: operative and midterm results. *BMC Surgery*, 5,10. Retrieved from http://www.pubmedcentral.nih.gov/picrender.fcgi?artid=1131908&blobtype=pdf

The authors note that the studies related to the volume-outcome connection have had varying and sometimes conflicting results. This study reviews the experience with a recently initiated small community hospital cardiac surgery program modeled after a similar high volume program in the same region. The newer program had cardiac surgery services provided by the same surgeons who performed services at an HVH. The authors looked at isolated CABG morbidity and mortality outcomes at the LVH (new program) and compared them to the national data as reported by the STS National Cardiac Data Base over the period of time from February 1, 2001 to December 31, 2003. All CABG procedures at the LVH were performed by the same high volume surgeons who performed CABG procedures at the HVH. The LVH operative mortality did not statistically differ from the STS benchmark. This study paradigm, involving a group of high volume surgeons from a high volume facility establishing a new lower volume program at another facility is similar to the structure of the HCGW Program and demonstrates that high quality CABG care with good outcomes can be achieved at a new lower volume program provided that it is served by high volume cardiac surgeons and backed up by a highly trained dedicated support team.

Kalant N. & Shrier I. (2004). Volume and outcome of coronary artery bypass graft surgery: Are more and less the same? *Canadian journal of cardiology*, 20(1), 81-6.

This research looked at and compared many previously quoted studies relating procedure volume to outcomes. Although in early studies there seemed to be a relationship between volume and procedure outcome, the relationship has diminished over time virtually to zero. The findings of this study, along with the other recent studies, suggest that the evolution of CABG surgery has reduced the importance of the earlier evidence linking volume and outcome. Individual studies may still show a small effect of volume on outcome, but the overall pattern of results does not. Consequently, the combined evidence does not provide support for a policy of regionalization of CABG surgery.

b. Please discuss The Waterbury Hospital ("TWH") and St. Mary's Hospital ("SMH") d/b/a Heart Center of Greater Waterbury's ("HCGW") historical institutional and operator volumes (Elective and Primary Angioplasty and Open Heart Surgery) in relation to the ACC/AHA recommended volume guidelines.

Response:
Related to ACC/AHA **recommended volume** guidelines, the Applicants have met the guidelines in all areas.

As to angioplasty: Individual operator volume for each interventional cardiologist has exceeded the recommended volume number of 75 per year (see Table 7). As to open heart surgery: The ACC/AHA guidelines do not provide a recommended institutional or operator volume. However, the guidelines provide that monitoring should occur for "hospitals or individuals performing less than 100 cases annually." The Program does detailed monitoring of the Program's individual components and as a whole. As indicated in Table 7, the Program's cardiothoracic surgeons have each exceeded 100 cases annually as individual practitioners for the last three years. Three of the four cardiac surgeons at HCGW have practiced for decades. In addition, both campuses have exceeded or been very close to 100 cases each year of the demonstration project. As already noted above, the Program continuously monitors the outcomes and quality of services and, therefore, is in compliance with the recommendations of the ACC/AHA.

As is also noted, the Program participates in the STS National Cardiac database and will continue to do so for the purpose of monitoring National Quality Forum measures and all applicable outcomes.

The HCGW is one Program with two physical locations. All Program cardiologists, cardiac surgeons, cardiac anesthesiologists and perfusion teams practice at both hospital campuses, utilizing the same processes and maintaining the same practices at both campuses. HCGW is one Program with two campuses and its volume as a whole far exceeds any suggested guidelines.

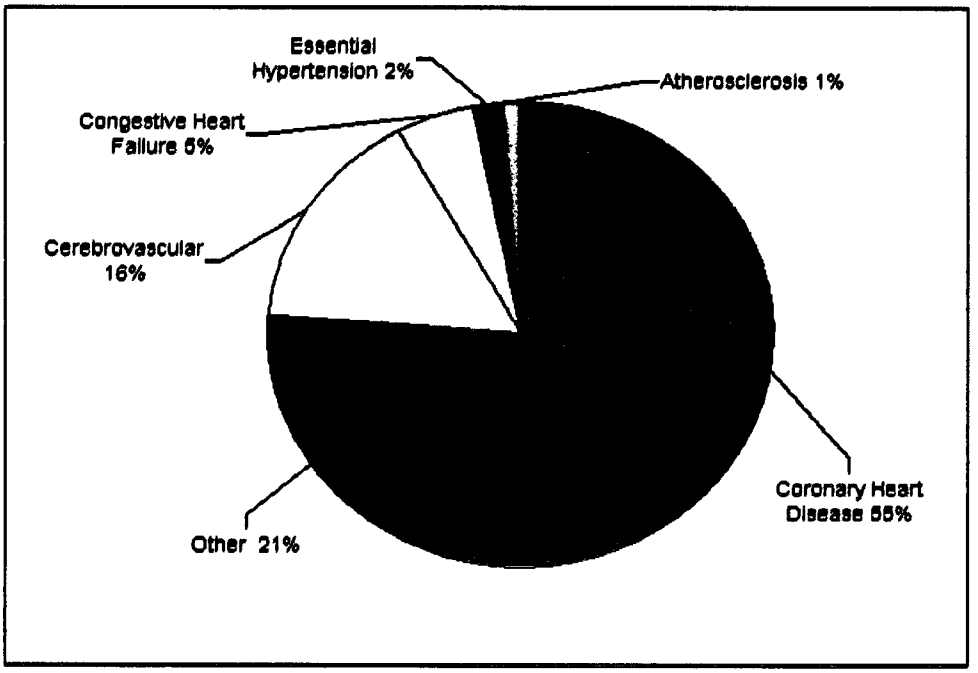
ii. Explain how it was determined there was a need for the proposed interventional cardiac services at SMH and TWH.

Response:
Need for the Program is not hypothetical, estimated or projected. The need for this Program has been demonstrated by the more than 2,400 patients in the three years of operation who have benefitted from the excellent, advanced cardiac services available. Contrast this demonstrated real need from a typical CON that uses statistics, assumptions and estimates to calculate need. This Program has absolute verified data: actual patients served.

Clearly the analysis of the need for this Program must be evaluated in the context of the present Program. That is, in this application OHCA is not faced with the addition of a potential new Program that may change the way services are rendered to a community, but rather with taking away an existing excellent Program. This is unique for OHCA and must be an important factor in any determination of the permanence of this Program. Real lives have been saved by the Program and will be saved in the future.

Coronary artery disease is the number one cause of death in the nation and in Connecticut. As the fourth largest metropolitan area in Connecticut, unfortunately greater Waterbury is not immune from this disease. See Figure 1.

Figure 1. Cardiovascular Disease Deaths, Connecticut Residents - 2002



Source: Connecticut Department of Public Health, Vital Records Mortality Files, 2005

Population:

Detailed population data is provided in the response to question 5.iii.b. However, in summary, as a population ages, the demand for cardiac services significantly increases.

- The growth in total population in the primary service area from 2002 to 2006 was 3%. It is expected to grow by an additional 3% to 281,800 by 2011.

- The population over 45 years of age in 2006 was approximately 40% of the total primary service area population. This is expected to increase through 2011 to 44% of the total population.

- The female portion of the population over 45 years of age in 2006 was 55% of the total. The female portion of the population over 45 years of age is expected to remain at this level through 2011 (source: Claritas Inc.). This is critical in the consideration of present and future cardiac care needs because it has been shown that coronary artery disease in the female population has been under-diagnosed in the past and women have a longer life expectancy than men. CT Women's Health, a 2001 Connecticut Department of Public Health publication (Appendix 5.ii) states that cardiovascular disease is the number one cause of death for Connecticut women. The report notes the sex specific differences in risk factors such as diabetes mellitus and postmenopausal loss of estrogen.

The Connecticut Department of Public Health report on Cardiovascular Disease Issue Brief #2002-1 from February 2002 (Appendix 5.ii) concurs that cardiovascular disease is the leading cause of death for Connecticut's women. It notes that normal estrogen levels in pre-menopausal women provide some protection against heart disease. With the onset of menopause this benefit diminishes and suggests the demand for cardiovascular services may grow at a faster rate for postmenopausal women than for the population as a whole.

Cardiovascular health statistics and risk factors are discussed in the response to question 5.iii.b.

Angioplasty:

Of the over 2,400 patients who have had procedures performed, 1,800 have received angioplasty. Of these, approximately 300 patients have received lifesaving primary angioplasty for ST-Elevation Myocardial Infarction (STEMI).

For those patients suffering from STEMI, research and current medical literature confirm that the time to treatment is critical to survival. The current recommendation to clinicians from the ACC is to treat a STEMI patient within 90 minutes of arrival at an emergency department (Appendix 5.ii). This "door to balloon time" (D2B) measures the time of arrival at the emergency department to the time of initial balloon inflation to open a blocked artery. The faster an artery is opened the less heart muscle is damaged.

Program data (through July 2008) related to treatment of STEMI patients demonstrates that 88% of the patients requiring acute angioplasty are treated in less than 90 minutes. This far exceeds the ACC goal of having 75% of the patients treated in 90 minutes or less. In addition, the Program's average D2B time is 67 minutes. The need to continue with this level of care for the greater Waterbury residents could not be more evident. (See also response to question 6.E.)

Termination of a service that provides excellent time to treatment will increase disability due to time lost and will most certainly cost lives. In the greater Waterbury area an average of 100 citizens per year are treated for STEMI with emergency angioplasty. The need for continuation of life saving services exists because citizens of greater Waterbury are at risk of dying without it. This Program exists because the population of greater Waterbury is at significant risk of preventable death if advanced cardiac services are not available in a timely and quality manner.

The current standard of practice in Connecticut and the recommendation from the ACC/AHA is that hospitals with elective angioplasty have on site open heart surgical back up. Program volumes for angioplasty justify the need for this at both Waterbury campuses. Waterbury, the fourth largest metropolitan area in Connecticut needs a full service cardiac program including elective and primary angioplasty and open heart surgical services.

The Connecticut Hospital Association's CHIME data has shown a statewide decline of 9% in angioplasty volumes from fiscal year 2003 to fiscal year 2008 (annualized through first six months). Despite these trends, utilization of these services at HCGW has exceeded the benchmarks set for the demonstration project. Again, the Applicants submit that statewide trends absolutely do not subvert the need for quality advanced cardiac services provided locally.

Open Heart Surgery:

Three years of recent historical data demonstrate that the need for interventional cardiac services currently exists in greater Waterbury. Over 2,400 patients have utilized the Program for lifesaving and life changing services including over 600 patients who were treated with elective, urgent and emergent open heart surgery.

The Advisory Board Company is an independent "think tank" that provides best practice research and analysis to members of the health care industry. Its Cardiovascular Roundtable, which was the first Advisory Board research group targeted to a particular clinical specialty, conducts research that focuses on best practices and factors that influence practice. With medical advances including new medications and the advent of drug-eluting stents, the Cardiovascular Round Table has documented a decline nation-wide in CABG Surgery (Appendix 5.ii). This has also proven true in Connecticut based on Connecticut Hospital Association data. The Cardiovascular Round Table predicts that some decline will continue through the end of the decade. With recent news reports questioning the safety and long term efficacy of drug-eluting stents, however, this is still open for debate and in fact HCGW physicians purport that the decline will slow and level out. **Conversely**, the demand for valve surgery will increase by 15% through the first decade of the century per the Cardiovascular Roundtable (Appendix 5.ii). Connecticut data mirrors these projections.

CHIME data has shown a statewide decline as predicted in CABG surgery discharges. From fiscal year 2003 to fiscal year 2008 (annualized through first six months) CABG surgery discharges declined 33%. Valve surgery statewide discharges have increased 6% from fiscal year 2003 to fiscal year 2008 (annualized through first six months).

Despite this statewide data, Program data indicates growth of 12% from Program year 1 to Program year 3 for total open heart surgery volume which does not support termination of services. Again, the Applicants submit that statewide trends absolutely do not subvert the need for quality advanced cardiac services provided locally.

iii. Provide the following information for **each** Applicant:

a) Primary and secondary service area towns specific to the proposed interventional cardiac services. Provide the methodology used to delineate the service areas.

Response:
Defining Primary and Secondary Service Area:

Towns comprising the Program's primary service area (PSA) and the secondary service area (SSA) are listed in Table A. HCGW Program data between the years of 2005 and 2008 was analyzed to determine the Program's primary and secondary service areas. The towns analyzed also happen to represent the residency of patients receiving care at both hospitals for the full range of circulatory system disorders. For the purposes of this application, the focus is on advanced cardiac services.

The Connecticut Hospital Association's CHIME data for open heart surgery and angioplasty was utilized in the creation of Table A. In 2007, 92% of angioplasty and open heart surgery patients lived in the 13 towns that make up the PSA. Just over 4% of Program patients lived in the SSA. Future volume projections in the application have been be calculated utilizing data from the Program's PSA. See Table A.

Table A **Saint Mary's Hospital and The Waterbury Hospital**
Combined Cardiovascular Inpatient Patient Origin – Discharges
2005 to 2008 YTD

Town	2005	2006	2007	2008 YTD
	% of Total	% of Total	% of Total	% of Total
Beacon Falls	0.65%	0.25%	1.28%	1.31%
Bethlehem	1.94%	1.64%	1.66%	2.10%
Cheshire	1.94%	2.64%	2.04%	1.31%
Middlebury	3.23%	2.77%	2.68%	2.89%
Naugatuck	11.61%	12.70%	11.86%	12.34%
Oakville	4.52%	3.52%	4.97%	5.25%
Prospect	2.58%	4.40%	2.81%	3.41%
Southbury	3.87%	4.15%	3.95%	3.94%
Thomaston	2.58%	3.65%	3.19%	3.15%
Waterbury	44.52%	41.26%	42.73%	40.42%
Watertown	6.45%	5.41%	5.74%	5.77%
Wolcott	5.16%	7.17%	5.74%	4.20%
Woodbury	4.52%	3.52%	3.44%	3.67%
PSA Total	93.55%	93.08%	92.09%	89.76%
Morris	0.00%	0.13%	0.13%	0.00%
Oxford	0.00%	0.88%	0.38%	0.26%
Plantsville	0.00%	0.00%	0.89%	0.00%
Plymouth	0.00%	0.25%	0.64%	0.00%
Seymour	0.00%	0.50%	0.13%	0.79%
Southington	0.00%	0.25%	0.77%	0.79%
Terryville	0.65%	0.50%	0.89%	0.79%
Torrington	0.65%	0.25%	0.51%	2.10%
SSA Total	1.29%	2.77%	4.34%	4.72%
Total Service Area	94.84%	95.85%	96.43%	94.49%
Other	5.16%	4.15%	3.57%	5.51%

Source Data: CHIME Decision Support Tool
Data Includes Patient Origin of patients admitted to SMH and TWH for the following: Valve Surgeries: DRGs 104 and 105; Open Heart Surgeries: DRGs, 106, 547, 548, 549 and 550; Angioplasties: DRGs 518, 555, 556, 557 and 558
Fiscal Year 2008 YTD data represents October 2007 – March 2008

b) Cardiovascular health statistics and risk factors in the service area. Provide evidence

Response:
Several health statistics and risk factors have bearing on the need for a full service cardiac program. They include population data, age distribution, gender data and risk factor prevalence.

Population:

Table B outlines population statistics at the time the original Program planning commenced in 2002 and at the intervals of 2006 and 2011. The population of the PSA continues to grow and supports the need to establish a permanent

cardiovascular program in the Waterbury area. Census data predicts an overall 3% increase in population from 2006 to 2011 (273,163 to 281,800).

Table B **Cardiovascular Primary Service Area Population 2002 to 2011**

Town	2002	2006	2011	2006-2011 % Change
Beacon Falls	5,371	5,582	5,887	5.46%
Bethlehem	3,495	3,648	3,832	5.04%
Cheshire	28,733	29,635	30,566	3.14%
Middlebury	6,910	7,220	7,635	5.75%
Naugatuck	31,110	32,198	33,129	2.89%
Oakville	8,383	8,447	8,681	2.77%
Prospect	8,822	9,280	9,791	5.51%
Southbury	18,974	19,938	21,052	5.59%
Thomaston	7,604	8,121	8,512	4.81%
Waterbury	107,447	108,684	110,314	1.50%
Watertown	13,494	14,076	14,536	3.27%
Wolcott	15,467	16,466	17,458	6.02%
Woodbury	9,328	9,868	10,407	5.46%
PSA Total	265,138	273,163	281,800	3.16%

Source: Claritas, Inc.

Age Distribution:

Age is the most predictive factor for estimating utilization of angioplasty, open heart surgery and cardiac diagnostic services. An aging population will have a higher incidence of cardiovascular and coronary artery disease and a greater need for cardiac diagnostics and therapeutic procedures. The Program's PSA has historically had a higher proportion of older individuals than the State and the nation and data indicates this trend will continue.

Table C **Cardiovascular Primary Service Area Population**
2011 Age Demographics

2011	45 years and over	65 years and over
National	40.0%	13.6%
Connecticut	44.0%	14.9%
HCGW PSA	43.56%	15.36%

Source: Claritas, Inc.

The following shows a significant 11.3% increase in the age 45+ population for the Program's PSA between 2006 and 2011. As stated above, this growth in the aging population signifies a projected increase in demand for care and anticipated increases in the utilization of cardiovascular services.

Table D **Cardiovascular Primary Service Area Age 45+ Population**
2002 to 2011

Town	2002	2006	2011	2006-2011 % Change
Beacon Falls	1,853	2,147	2,526	17.65%
Bethlehem	1,563	1,797	2,042	13.63%
Cheshire	11,068	12,344	13,576	9.98%
Middlebury	3,242	3,572	3,975	11.28%
Naugatuck	10,485	11,806	13,316	12.79%
Oakville	3,177	3,447	3,879	12.53%
Prospect	3,573	4,084	4,661	14.13%
Southbury	9,870	10,770	11,872	10.23%
Thomaston	2,779	3,309	3,871	16.98%
Waterbury	38,311	39,686	42,785	7.81%
Watertown	5,582	6,310	7,032	11.44%
Wolcott	5,899	6,818	7,908	15.99%
Woodbury	4,057	4,191	5,319	26.91%
PSA Total	101,459	110,281	122,762	11.32%

Source: Claritas, Inc.

Gender:

In addition to the age and general statistics, the female age distribution was analyzed. This information is important since as reported by the Connecticut Department of Public Health, the market demand for cardiovascular services is predicted to grow at a faster rate for postmenopausal women. Additionally, women are living longer than men (Reference Appendix 5.ii). This segment of the population has been inadequately served throughout the United States. Women have been targeted by many hospitals for education regarding the availability of services and are a responsive audience for information.

Census data indicates that the 45+ female segment of the population will increase 10.7% in the Program's PSA between 2006 and 2011. Again, we see indications of an overall increase in cardiovascular demand for the PSA.

Table E Cardiovascular Primary Service Area Age 45+ Female Population 2002 to 2011

Town	2002	2006	2011	2006-2011 % Change
Beacon Falls	959	1,100	1,303	18.45%
Bethlehem	819	938	1,072	14.29%
Cheshire	5,906	6,440	7,230	12.27%
Middlebury	1,710	1,912	2,136	11.72%
Naugatuck	5,709	6,397	7,172	12.12%
Oakville	1,693	1,849	2,070	11.95%
Prospect	1,884	2,155	2,472	14.71%
Southbury	5,620	6,063	6,655	9.76%
Thomaston	1,466	1,737	2,021	16.35%
Waterbury	21,610	22,101	23,646	6.99%
Watertown	2,991	3,370	3,775	12.02%
Wolcott	3,171	3,640	4,211	15.69%
Woodbury	2,157	2,467	2,859	15.89%
PSA Total	55,695	60,169	66,622	10.72%

Source: Claritas, Inc.

Risk Factors:

According to the "*The Burden of Cardiovascular Disease in Connecticut: 2006 Surveillance Report", a Connecticut Department of Public Health Report* (Appendix 5.iii.b.), the most prevalent modifiable risk factors for cardiovascular diseases include high blood pressure, high cholesterol, smoking, diabetes, obesity and physical inactivity. Additional key risk factors are increasing age and lower socioeconomic position. All of these risk factors are present and prevalent in the greater Waterbury area and support the need for provision of advanced cardiac services on a local level.

The Center for Disease Control's (CDC) Behavioral Risk Factor Surveillance System (BRFSS) tracks health conditions and risk behaviors in the United States every year. The March 2007 *Community Health Data Scan for Connecticut*, (Appendix 5.iii.b) commissioned by the Connecticut Health Foundation, utilized the BRFSS data in combination with other data sources to identify the risk factors and health status of Connecticut residents. Waterbury, Connecticut is included in the "Manufacturing Center" health reference group (HRG) in this 2007 report. The report identifies the 3 Urban and 10 Manufacturing Centers (including Waterbury) as needing the greatest health-promoting investments. Within these communities, Black/African American and Hispanic residents are in greatest need. These individuals often yield higher rates of risk factors and poor health statistics. This is of particular concern for Waterbury, as these race/ethnic groups comprise approximately half of the total Waterbury population according to www.census.gov (Appendix 5.iii.b).

Cardiovascular risk factor and health statistics for the overall Manufacturing Center HRG are typically higher and more prevalent than Connecticut State averages and are further defined in the sections that follow.

High Blood Pressure:

High blood pressure leads to an added burden on the heart, which results in abnormal heart functioning. Although the rate of high blood pressure is consistent with the State average, as the population continues to age, high blood pressure will also continue to increase and statistics reported through the CDC's BRFSS prevalence data for the State of Connecticut identify that the rate of hypertension among Connecticut residents continues to increase over time.

High Cholesterol:

High cholesterol has a major impact on the increased risk of coronary artery disease. The rate of individuals with high cholesterol in Waterbury is equal to or lower than the State averages, between 24% and 27%. However, even at this percentage rate, the presence of high cholesterol combined with other prevalent risk factors remains of high importance in assessing need for advanced cardiac care.

Smoking:

According to the American Heart Association, a smoker's risk of developing coronary artery disease is two to four times that of a nonsmoker. Additionally, smokers have about twice the risk of nonsmokers for sudden cardiac death for those with coronary heart disease. Cigarette smoking also acts with other risk factors to increase the risk for coronary heart disease. The rate of smoking in Waterbury is higher than average, approximately 23% for all race and ethnicities compared to a State average of 20%.

Percentage Currently Smoking

	All Race and Ethnicity, Crude Percentage		All Race and Ethnicity, Age-Adjusted Percentage		White, Not Hispanic		Black, Not Hispanic		Hispanic		Asian, Not Hispanic	
Area	%	Margin of error	%	Margin of error	%	Margin of error	%	Margin of error	%	Margin of error	%	Margin of error
Bridgeport	25.7	3.7	25.1	3.5	30.1	6.3	26.1	7.1	19.9	5.7		
Hartford	24.6	3.5	24.1	3.5	26.8	6.5	21.5	6.1	21.7	5.5		
New Haven	19.2	3.1	19.0	2.9	19.5	4.1	25.2	6.3	15.9	7.4		
HRG 1 (3)-UC	23.0	2.0	22.5	2.0	24.4	3.1	24.0	3.7	19.1	3.3		
HRG 2 (10)-MC	23.3	1.8	23.3	1.6	25.0	1.8	20.0	4.3	22.4	5.3	7.6	3.1
HRG 3 (15)-DS	21.8	1.6	22.3	1.6	23.4	1.8	17.0	5.7	23.7	8.4		
HRG 4 (27)-WS	14.3	1.8	16.6	2.2	16.1	2.0			19.3	8.8		
HRG 5 (39)-MT	22.0	1.4	22.9	1.4	23.2	1.6	17.8	7.8	21.2	7.8	7.3	3.9
HRG 6 (75)-RT	18.0	1.4	18.9	1.6	19.1	1.6			11.3	5.7		
Connecticut	20.4	0.6	20.9	0.6	21.3	0.8	20.9	2.5	20.6	2.7	7.4	2.5

Source: Community Health Data Scan for Connecticut

Diabetes:

Cardiovascular disease is the primary cause of death for persons with diabetes, accounting for about 65% of the mortality. Diabetic persons are two to four times more likely to develop coronary artery disease than the rest of the population and are

at much greater risk of having a stroke. People with diabetes often have high blood pressure and high cholesterol and are overweight, further increasing their risk for cardiovascular disease (*The Burden of Cardiovascular Disease in Connecticut: 2006 Surveillance Report* Appendix 5.iii.b).

The prevalence of diabetes in Connecticut is comparable to the nation and will increase over time due to the aging population. According to the Connecticut Diabetes Prevention and Control Plan 2007-2012 a recent Connecticut Department of Public Health Publication (Appendix 5.iii.b):

> ...An estimated 163,000 Connecticut adults 18 years and older, have diagnosed diabetes (2003-2005 data). The Centers for Disease Control and Prevention (CDC) estimates that about 30% of all diabetes cases are undiagnosed, partly because symptoms develop gradually and severe symptoms may only occur after several years. An additional 70,000 Connecticut adults are estimated to have undiagnosed diabetes. Thus, a total of 233,000 Connecticut residents are estimated to have either diagnosed or undiagnosed diabetes....

According to the results of the Community Health Data Scan, the rate of diabetic individuals in Waterbury is higher than the State averages for all races and ethnicities, with an average of approximately 6%. It should be noted that the "Black, Not Hispanic" and "Hispanic" groups have almost double the rate of diabetes than the rest of the population.

Statistics reported through the CDC's BRFSS prevalence data for the State of Connecticut identify that the rate of diabetes among Connecticut residents continues to increase over time. Similarly, the Connecticut Diabetes Prevention and Control Plan 2007-2012 concludes that,

> ...the prevalence of diabetes in Connecticut and the United States is likely to increase for a few reasons. First, large segments of both populations are aging. Second, the fastest-growing segment of the U.S. and Connecticut populations include Hispanic Americans and other minority groups, who are considered at higher risk for diabetes nationwide. Finally, Americans are increasingly overweight and sedentary. According to recent estimates, the prevalence of diabetes in the United States is predicted to reach 8.9% of the population by 2025....

Percentage Told They Have Diabetes

Area	All Race and Ethnicity, Crude Percentage		All Race and Ethnicity, Age-Adjusted Percentage		White, Not Hispanic		Black, Not Hispanic		Hispanic		Asian, Not Hispanic	
	%	Margin of error	%	Margin of error	%	Margin of error	%	Margin of error	%	Margin of error	%	Margin of error
Bridgeport	8.7	2.2	9.9	2.4	10.1	3.5	8.8	4.1	9.8	5.1		
Hartford	7.6	2.0	8.7	2.2	7.6	3.1	10.4	4.9	8.4	4.1		
New Haven	7.2	1.8	8.5	2.0	4.8	1.8	16.3	5.1	10.5	7.4		
HRG 1 (3)-UC	7.8	1.2	9	1.2	7.2	1.6	12.2	2.9	9.1	2.9	6.4	4.7
HRG 2 (10)-MC	5.8	0.8	6	0.8	5.3	0.8	10.3	3.3	9.5	3.5		
HRG 3 (15)-DS	5.8	0.8	5.5	0.8	5.5	0.8	4.6	3.5	4.9	3.5		
HRG 4 (27)-WS	3.3	0.6	2.8	0.6	2.7	0.6	8.1	4.1	2.4	2.5	4.7	4.9
HRG 5 (39)-MT	5.8	0.8	5.4	0.6	5.4	0.6			4.9	4.3		
HRG 6 (75)-RT	4.6	0.6	4.4	0.6	4.2	0.6			11.5	10.2		
Connecticut	5.4	0.4	5.2	0.4	4.7	0.4	9.8	1.8	7.5	1.8	5.3	3.5

Source: Community Health Data Scan for Connecticut

Obesity and Physical Inactivity:

Excess body weight makes the heart work harder and also places individuals at higher risk for high blood pressure, high cholesterol, diabetes, heart disease, and stroke. According to the BRFSS, overweight individuals account for approximately 56% of the Waterbury population, compared to the State average of 53%. The CDC's BRFSS prevalence data for the State of Connecticut shows the rate of obesity increasing over time; however the rate of overweight individuals is declining slightly. This combination of trends could indicate that more individuals categorized as overweight are moving into the obese category. The AHA advises individuals to engage in regular exercise or other physical activity, which helps prevent heart and blood vessel disease. Physical activity can help control blood cholesterol, diabetes and obesity and may help lower blood pressure in some people. The percentage of individuals with no physical activity in Waterbury is higher than the state average at nearly 30%.

Percentage with No Physical Activity

Area	All Race and Ethnicity, Crude Percentage		All Race and Ethnicity, Age-Adjusted Percentage		White, Not Hispanic		Black, Not Hispanic		Hispanic		Asian, Not Hispanic	
	%	Margin of error	%	Margin of error	%	Margin of error	%	Margin of error	%	Margin of error	%	Margin of error
Bridgeport	37.4	4.3	37.8	4.3	30.8	6.1	35.6	8.4	46.1	9.0		
Hartford	37.5	4.3	36.9	4.3	23.6	6.9	38.8	7.6	48.7	8.8		
New Haven	27.5	3.9	27.7	3.7	19.8	4.5	31.8	7.8	45.3	11.2		
HRG 1 (3)-UC	34	2.4	34	2.4	24	3.3	36.2	4.7	46.9	5.7	24.6	6.5
HRG 2 (10)-MC	29.6	1.8	29.8	1.8	24.1	2.0	39	6.1	44.6	5.9		
HRG 3 (15)-DS	23.2	1.6	22.9	1.6	21.4	1.8	32	7.1	28.4	8.2		
HRG 4 (27)-WS	15.2	1.4	14.6	1.6	14.1	1.6	26.8	8.0	24.1	10.2	27.1	9.4
HRG 5 (39)-MT	24.4	1.4	23.7	1.4	22.7	1.6			37.1	10.0		
HRG 6 (75)-RT	19.6	1.4	19.2	1.4	18.4	1.4			36.6	11.6		
Connecticut	23.8	0.6	23.6	0.6	20.3	0.8	34.9	3.1	40.6	3.3	28.3	7.1

Source: Community Health Data Scan for Connecticut

Age:

Although not a modifiable risk factor, increased age is directly linked with a greater risk for cardiovascular disease. As previously noted, approximately 44% of the HCGW primary service area is expected to be over the age of 45 by 2011 which is up from 40% in 2006.

Low Socioeconomic Position:

Persons of lower socioeconomic position reportedly have a higher risk of cardiovascular disease morbidity and mortality, which can be explained by some behavioral risk factors (smoking, hypertension and obesity) that are more prevalent among these persons. It is believed that low-income neighborhood environments may contribute to this increased risk and poorer health outcomes because of such factors as poor air quality, fewer healthy food choices, and lower quality and/or lack of public services. These individuals also tend to be less likely to utilize preventive health services that are important to early detection and treatment. Those with lower income are at higher risk of diabetes those with higher income (*The Burden of Cardiovascular Disease in Connecticut: 2006 Surveillance Report*, Connecticut Department of Public Health. December 2006). (Appendix 5.iii.b.)

With the prevalence of the above risk factors and the overall impact they have on the development of cardiovascular disease as well as other factors including age and socioeconomic statistics of greater Waterbury, it is clear there is a need for advanced cardiac care and community outreach related to prevention activities in this area. Public need for access to advanced cardiac services could not be more convincingly stated.

c) Please complete the following table for each of the Applicants' historical volume related to elective and primary angioplasty and open heart service ("OHS"), including John Dempsey Hospital ("JDH") since the operation of HCGW:

The following statements apply to Questions 5 iii c, d, e, f, g, 5 iv, 5 v and 5 vi:

The fiscal year for SMH and TWH is from October 1 through September 30. All fiscal year 2008 to date items represent data from October 1, 2007 through July 31, 2008. The fiscal year for JDH is from July 1 through June 30 therefore all fiscal year data is for a complete year.

In the tables to follow, volume may be shown as either procedures or discharges. It is understood by OHCA and hospitals that a procedure count can be higher than a count of discharges. Discharges are based on Diagnostic Related Groupings (DRGs) and encompass every procedure that occurs during a single patient hospital stay, while procedure counts involve actual number of cases in the catheterization lab or in the cardiovascular operating room and are reflected by ICD-9-CM codes. (See response to question 5.iii.d.)

In several areas relating to Applicants-only, procedure volume will be shown as it provides a more accurate portrayal of volume and is consistent with internal data collection. The Applicants will indicate the nature of the volume being reported (either procedure or discharge) in the table and/or response.

Response:

Table 1: *Historical* Volume for each Applicant (Institutional) – Procedures

	FY 2005				FY 2006				FY 2007				FY 2008 YTD			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
TWH	8	59	23	147	50	331	118	632	60	341	120	593	42	241	112	512
SMH	5	58	20	117	49	260	70	485	46	211	108	512	29	186	70	398
HCGW Total	13	117	43	264	99	591	188	1,117	106	552	228	1,105	71	427	182	910
JDH	**	540	160	561	**	419	123	469	**	356	74	459	**	391	79	487

Cardiac Service Legend: A Primary Angioplasty B Elective Angioplasty C Open Heart Service D Cardiac Catheterizations
**JDH is unable to separate out Primary and Elective Angioplasty
Be sure that the volumes provided reconcile with the volumes listed in OHCA Hospital Reporting System, Schedule 450, the CT Office of Health Care Access' Inpatient Discharge Database and the CT Office of Health Care Access Cardiac Registry.

d) Provide all assumptions and calculations utilized to project institutional volumes in Table I.

Response:
Information from the Applicant's internal databases was utilized to complete the table. HCGW maintains one database of all procedures offered on both campuses including angioplasty, open heart surgery and catheterization services. All data is collected based on procedure and procedure date. Examples include:

- A patient has two angioplasties in one hospital stay, both procedures are accounted for in the volume numbers
- If a patient has an angioplasty and during the same admission has CABG surgery, this is counted as one angioplasty and one open heart surgery
- Exception: if a patient has one visit to the catheterization lab and during that visit receives a cardiac catheterization and an angioplasty, this is counted in the procedure count as angioplasty only. The catheterization volumes noted below are for cardiac catheterizations (without accompanying angioplasty).

HCGW utilizes the ACC definitions for all procedures in the catheterization lab and the STS definitions of all open heart surgery procedures. All data is collected at each campus and verified monthly, quarterly and annually for submission to the various

registries including the ACC-NCDR, STS and the CT OHCA cardiac registry. HCGW database is compared against hospital specific statistics periodically which are based on ICD-9 coding and are typically reported based on discharge date. Similarly, JDH maintains an internal database of all procedures including angioplasty, open heart surgery and cardiac catheterization services. JDH has accounted for their volume in the same way as HCGW and utilizes the ACC and STS procedure definitions.

For all Applicants Angioplasty cases are based on the following ICD-9-CM codes: 00.40, 00.45, 00.66, 36.01, 36.02, 36.03, 36.04, 36.05, 36.06, and 36.07.

OHS cases are based on the following ICD-9-CM codes: 35.10 to 35.28, and 36.10 to 36.19.

Cardiac catheterizations are based on the following ICD-9-CM codes: 37.21, 37.22, and 37.23

e) Please provide year-to-date volumes for FY 2008 by Applicant and Service as provided in Table 1. Be sure to include all assumption and calculations.

Response:
Fiscal year-to-date 2008 procedure volumes for all Applicants are provided in Table 1. Assumptions and calculation methodology are outlined in the response to question 5.iii.d.

f) In the following table, provide the last three years of historical volume at HCGW for each Applicant by service and zip code:

Response:
Table 2: Historical Volume for each Applicant by Service and Zip Code is found on the following pages.

Table 2: *Historical* Volume for each Applicant by Service and Zip Code - Procedures

Cardiac Service Legend: A Primary Angioplasty B Elective Angioplasty C Open Heart Service

Fiscal Year to Date 2008: HCGW October 1 - July 31 and JDH July 1 - June 30

Applicant	Cardiac Service	FY2005 # of Procedures	Zip Code	FY2006 # of Procedures	Zip Code	FY2007 # of Procedures	Zip Code	FY2008 # of Procedures	Zip Code
		Primary Angioplasty - Primary Service Area							
TWH	A	1	06403	3	06488	2	06403	3	06403
		1	06704	4	06704	1	06410	4	06488
		1	06708	3	06705	2	06488	1	06702
		1	06751	1	06706	1	06702	6	06704
		3	06770	8	06708	4	06704	3	06705
		1	06798	3	06710	3	06705	1	06706
				1	06712	1	06706	7	06708
				3	06716	13	06708	2	06712
				2	06751	1	06710	2	06716
				3	06762	1	06712	1	06762
				5	06770	2	06716	2	06770
				3	06779	2	06762	2	06779
				3	06787	9	06770	1	06787
				2	06795	6	06779	3	06795
				1	06798	3	06787	1	06798
						2	06795		
						2	06798		
		8		45		55		39	
		Primary Angioplasty - Secondary Service Area							
TWH	A			1	06478	1	06478	1	06489
						2	06489		
						1	06791		
		0		1		4		1	
		Primary Angioplasty - Other Service Area							
TWH	A			1	06010	1	45356	1	03909
				1	06750			1	06524
				1	06786				
				1	20043				
		0		4		1		2	
Total TWH A		*8*		*50*		*60*		*42*	

Table 2: *Historical* Volume for each Applicant by Service and Zip Code - Procedures

Cardiac Service Legend: A Primary Angioplasty B Elective Angioplasty C Open Heart Service

Fiscal Year to Date 2008: HCGW October 1 - July 31 and JDH July 1 - June 30

Applicant	Cardiac Service	FY2005 # of Procedures	Zip Code	FY2006 # of Procedures	Zip Code	FY2007 # of Procedures	Zip Code	FY2008 # of Procedures	Zip Code
		Elective Angioplasty - Primary Service Area							
TWH	B	5	06488	3	06410	5	06403	1	06403
		1	06702	16	06488	2	06410	4	06410
		5	06704	3	06702	13	06488	14	06488
		4	06705	27	06704	5	06702	6	06702
		1	06706	23	06705	35	06704	11	06704
		9	06708	12	06706	17	06705	19	06705
		1	06710	41	06708	15	06706	10	06706
		3	06712	7	06710	50	06708	40	06708
		1	06716	18	06712	7	06710	5	06710
		2	06751	16	06716	9	06712	6	06712
		5	06762	1	06721	18	06716	9	06716
		5	06770	6	06751	10	06751	1	06720
		3	06779	10	06762	11	06762	6	06751
		5	06795	44	06770	29	06770	4	06762
		6	06798	3	06778	2	06778	26	06770
				18	06779	27	06779	1	06778
				17	06787	6	06787	19	06779
				20	06795	29	06795	7	06787
				19	06798	18	06798	19	06795
								7	06798
		56		304		308		215	
		Elective Angioplasty - Secondary Service Area							
TWH	B			4	06478	2	06478	1	06478
				3	06483	2	06489	1	06483
				1	06489	1	06763	1	06489
				1	06790	3	06790	2	06790
				2	06791	1	06791	3	06791
		0		11		9		8	

Table 2: *Historical* Volume for each Applicant by Service and Zip Code - Procedures

Cardiac Service Legend: A Primary Angioplasty B Elective Angioplasty C Open Heart Service

Fiscal Year to Date 2008: HCGW October 1 - July 31 and JDH July 1 - June 30

Applicant	Cardiac Service	FY2005 # of Procedures	Zip Code	FY2006 # of Procedures	Zip Code	FY2007 # of Procedures	Zip Code	FY2008 # of Procedures	Zip Code
					Elective Angioplasty - Other Service Area				
TWH	B	1	05862	1	06032	1	03246	1	06010
		1	06010	2	06401	2	06010	1	06052
		1	06786	1	06418	2	06040	1	06112
				1	06484	1	06078	1	06441
				3	06782	1	06401	1	06482
				1	06783	1	06451	1	06515
				2	06786	1	06479	1	06516
				1	06801	1	06484	2	06525
				1	06824	1	06515	2	06759
				1	06902	2	06517	1	06783
				1	08090	1	06756	2	06786
				1	15801	2	06759	1	06801
						1	06781	2	06811
						3	06782	1	08854
						2	06786		
						1	08088		
						1	15801		
		3		16		24		18	
Total TWH B		*59*		*331*		*341*		*241*	

Table 2: *Historical* Volume for each Applicant by Service and Zip Code - Procedures

Cardiac Service Legend: A Primary Angioplasty B Elective Angioplasty C Open Heart Service

Fiscal Year to Date 2008: HCGW October 1 - July 31 and JDH July 1 - June 30

Applicant	Cardiac Service	FY2005 # of Procedures	Zip Code	FY2006 # of Procedures	Zip Code	FY2007 # of Procedures	Zip Code	FY2008 # of Procedures	Zip Code
		Open Heart Service - Primary Service Area							
TWH	C	2	06488	5	06410	2	06403	1	06403
		3	06704	11	06488	1	06410	2	06410
		1	06705	1	06702	6	06488	8	06488
		1	06706	9	06704	6	06704	2	06702
		2	06708	5	06705	8	06705	6	06704
		1	06762	6	06706	4	06706	11	06705
		2	06770	18	06708	15	06708	3	06706
		1	06778	3	06710	4	06710	11	06708
		1	06779	3	06712	2	06712	1	06710
		2	06787	3	06716	6	06716	3	06712
		3	06795	2	06751	2	06751	5	06716
		2	06798	3	06762	3	06762	3	06751
				13	06770	16	06770	8	06762
				5	06779	1	06778	8	06770
				6	06787	6	06779	2	06778
				14	06795	7	06787	8	06779
				2	06798	9	06795	4	06787
						9	06798	9	06795
								8	06798
		21		109		107		103	
		Open Heart Service - Secondary Service Area							
TWH	C			2	06478	1	06489	2	06489
				1	06790	1	06790	3	06790
		0		3		2		5	
		Open Heart Service - Other Service Area							
TWH	C	1	06611	1	06010	1	06460	1	06039
		1	06786	1	06525	2	06750	1	06525
				1	06756	1	06782	1	06759
				1	06786	5	06786	1	32976
				1	06810	1	07438		
				1	33908	1	19335		
		2		6		11		4	
Total TWH C		*23*		*118*		*120*		*112*	

Table 2: *Historical* Volume for each Applicant by Service and Zip Code - Procedures

Cardiac Service Legend: A Primary Angioplasty B Elective Angioplasty C Open Heart Service

Fiscal Year to Date 2008: HCGW October 1 - July 31 and JDH July 1 - June 30

Applicant	Cardiac Service	FY2005 # of Procedures	Zip Code	FY2006 # of Procedures	Zip Code	FY2007 # of Procedures	Zip Code	FY2008 # of Procedures	Zip Code
		Primary Angioplasty - Primary Service Area							
SMH	A	1	06410	1	06403	2	06410	1	06488
		1	06708	2	06488	2	06488	1	06702
		2	06770	3	06704	1	06702	2	06704
				10	06705	8	06704	6	06705
				6	06706	5	06705	4	06708
				4	06708	8	06706	3	06710
				2	06712	2	06708	1	06716
				8	06716	5	06716	6	06770
				1	06762	8	06770	1	06787
				5	06770	1	06787	1	06795
				2	06787	1	06795		
				1	06795				
		4		45		43		26	
		Primary Angioplasty - Secondary Service Area							
SMH	A			1	06478			1	06489
		0		1		0		1	
		Primary Angioplasty - Other Service Area							
SMH	A	1	02864	1	06473	1	04472	1	06477
				1	06786	1	06782	1	32968
				1	11767	1	06786		
		1		3		3		2	
Total SMH A		*5*		*49*		*46*		*29*	

Table 2: *Historical* Volume for each Applicant by Service and Zip Code - Procedures

Cardiac Service Legend: A Primary Angioplasty B Elective Angioplasty C Open Heart Service

Fiscal Year to Date 2008: HCGW October 1 - July 31 and JDH July 1 - June 30

Applicant	Cardiac Service	FY2005 # of Procedures	Zip Code	FY2006 # of Procedures	Zip Code	FY2007 # of Procedures	Zip Code	FY2008 # of Procedures	Zip Code
		Elective Angioplasty - Primary Service Area							
SMH	B	1	06410	12	06410	9	06410	7	06410
		2	06488	5	06488	2	06488	4	06488
		2	06702	6	06702	5	06702	6	06702
		7	06704	3	06703	1	06703	19	06704
		12	06705	28	06704	27	06704	22	06705
		4	06706	26	06705	24	06705	13	06706
		7	06708	21	06706	23	06706	26	06708
		2	06710	29	06708	24	06708	8	06710
		1	06712	10	06710	2	06710	9	06712
		5	06716	13	06712	11	06712	12	06716
		1	06762	31	06716	11	06716	5	06762
		6	06770	3	06751	5	06762	23	06770
		1	06779	6	06762	27	06770	3	06779
		2	06795	36	06770	4	06779	3	06787
		1	06798	5	06779	6	06787	3	06795
				4	06795	5	06795	7	06798
				3	06798	3	06798		
		54		241		189		170	
		Elective Angioplasty - Secondary Service Area							
SMH	B	1	06790	1	06478	2	06489	3	06483
				2	06483	1	06790	5	06790
				1	06489				
				2	06763				
		1		6		3		8	

Table 2: *Historical* Volume for each Applicant by Service and Zip Code - Procedures

Cardiac Service Legend: A Primary Angioplasty B Elective Angioplasty C Open Heart Service

Fiscal Year to Date 2008: HCGW October 1 - July 31 and JDH July 1 - June 30

Applicant	Cardiac Service	FY2005 # of Procedures	Zip Code	FY2006 # of Procedures	Zip Code	FY2007 # of Procedures	Zip Code	FY2008 # of Procedures	Zip Code
				Elective Angioplasty - Other Service Area					
SMH	B	1	06062	1	06063	2	01253	1	06053
		1	10705	1	06360	1	02554	1	06709
		1	32128	1	06401	1	06040	1	06776
				1	06457	1	06068	1	06782
				2	06492	4	06479	2	06786
				1	06759	2	06492	1	16731
				1	06776	2	06782	1	23669
				1	06794	2	06786		
				1	17603	1	27937		
				1	32725	1	34667		
				1	34606	1	34952		
				1	34952	1	77550		
		3		13		19		8	
Total SMH B		*58*		*260*		*211*		*186*	

Table 2: *Historical* Volume for each Applicant by Service and Zip Code - Procedures

Cardiac Service Legend: A Primary Angioplasty B Elective Angioplasty C Open Heart Service

Fiscal Year to Date 2008: HCGW October 1 - July 31 and JDH July 1 - June 30

Applicant	Cardiac Service	FY2005 # of Procedures	Zip Code	FY2006 # of Procedures	Zip Code	FY2007 # of Procedures	Zip Code	FY2008 # of Procedures	Zip Code
		Open Heart Service - Primary Service Area							
SMH	C	1	06410	2	06403	1	06403	1	06410
		1	06702	2	06410	5	06410	1	06488
		1	06704	2	06488	4	06488	2	06702
		2	06705	2	06702	15	06704	6	06704
		1	06706	12	06704	8	06705	12	06705
		6	06716	6	06705	12	06706	7	06706
		3	06770	5	06706	12	06708	5	06708
		2	06779	5	06708	4	06710	2	06710
		1	06787	4	06710	2	06712	2	06712
		1	06795	2	06712	9	06716	6	06716
				3	06716	1	06751	3	06762
				1	06762	2	06762	11	06770
				8	06770	15	06770	2	06779
				1	06779	1	06779	4	06795
				3	06787	1	06787		
				2	06795	4	06795		
				1	06798	2	06798		
		19		61		98		64	
		Open Heart Service - Secondary Service Area							
SMH	C			1	06478	1	06483	1	06478
				2	06483	2	06489		
				1	06790				
		0		4		3		1	
		Open Heart Service - Other Service Area							
SMH	C	1	10460	1	06450	4	06479	1	01253
				1	06524	1	06510	1	04530
				1	06525	1	39740	1	06107
				1	06902	1	77550	1	06479
				1	29526			1	22307
		1		5		7		5	
Total SMH C		*20*		*70*		*108*		*70*	

Table 2: *Historical* Volume for each Applicant by Service and Zip Code - Procedures

Cardiac Service Legend: A Primary Angioplasty B Elective Angioplasty C Open Heart Service

Fiscal Year to Date 2008: HCGW October 1 - July 31 and JDH July 1 - June 30

Applicant	Cardiac Service	FY2005 # of Procedures	Zip Code	FY2006 # of Procedures	Zip Code	FY2007 # of Procedures	Zip Code	FY2008 # of Procedures	Zip Code
		Elective Angioplasty - Primary Service Area							
JDH	B	17	06001	19	06001	10	06001	31	06001
		2	06002	3	06002	1	06002	6	06002
Note: JDH unable to identify primary vs elective angiopasty. Combined total in "Elective".		6	06013	5	06013	2	06013	8	06013
		5	06019	16	06019	14	06019	17	06019
		1	06022	0	06022	0	06022	0	06022
		9	06030	8	06030	4	06030	15	06030
		34	06032	20	06032	26	06032	44	06032
		2	06034	1	06034	0	06034	0	06034
		5	06035	2	06035	2	06035	0	06035
		2	06050	1	06050	0	06050	2	06050
		27	06051	23	06051	17	06051	24	06051
		13	06052	9	06052	6	06052	3	06052
		42	06053	35	06053	30	06053	29	06053
		7	06070	11	06070	9	06070	9	06070
		11	06085	10	06085	7	06085	5	06085
		1	06089	2	06089	3	06089	2	06089
		1	06092	1	06092	2	06092	1	06092
		0	06105	2	06105	3	06105	3	06105
		7	06106	5	06106	8	06106	6	06106
		8	06107	7	06107	8	06107	10	06107
		1	06108	1	06108	1	06108	2	06108
		3	06110	3	06110	3	06110	2	06110
		24	06111	14	06111	25	06111	20	06111
		1	06112	1	06112	1	06112	2	06112
		1	06114	2	06114	1	06114	0	06114
		6	06117	2	06117	3	06117	4	06117
		3	06118	1	06118	1	06118	1	06118
		2	06119	11	06119	3	06119	4	06119
		0	06127	2	06127	0	06127	1	06127
		241		217		190		251	

Table 2: *Historical* Volume for each Applicant by Service and Zip Code - Procedures

Cardiac Service Legend: A Primary Angioplasty B Elective Angioplasty C Open Heart Service

Fiscal Year to Date 2008: HCGW October 1 - July 31 and JDH July 1 - June 30

Applicant	Cardiac Service	FY2005 # of Procedures	Zip Code	FY2006 # of Procedures	Zip Code	FY2007 # of Procedures	Zip Code	FY2008 # of Procedures	Zip Code
		Elective Angioplasty - Secondary Service Area							
JDH	B	35	06010	27	06010	18	06010	25	06010
		0	06011	1	06011	1	06011	0	06011
Note: JDH unable to identify		2	06023	3	06023	0	06023	0	06023
primary vs elective angiopasty.		0	06026	0	06026	2	06026	2	06026
Combined total in "Elective".		0	06027	0	06027	0	06027	1	06027
		1	06033	6	06033	1	06033	1	06033
		22	06037	19	06037	21	06037	18	06037
		2	06040	6	06040	8	06040	2	06040
		0	06042	0	06042	1	06042	0	06042
		0	06057	1	06057	0	06057	2	06057
		0	06061	1	06061	0	06061	0	06061
		23	06062	18	06062	13	06062	12	06062
		1	06063	0	06063	1	06063	1	06063
		0	06065	0	06065	0	06065	1	06065
		2	06066	2	06066	1	06066	1	06066
		4	06067	7	06067	2	06067	6	06067
		1	06073	0	06073	0	06073	0	06073
		3	06074	5	06074	0	06074	2	06074
		0	06088	1	06088	0	06088	0	06088
		4	06095	2	06095	7	06095	1	06095
		2	06098	3	06098	3	06098	2	06098
		7	06109	6	06109	9	06109	4	06109
		4	06416	4	06416	2	06416	0	06416
		1	06479	3	06479	3	06479	3	06479
		14	06489	17	06489	14	06489	9	06489
		1	06759	0	06759	0	06759	0	06759
		1	06782	0	06782	0	06782	1	06782
		8	06786	7	06786	4	06786	1	06786
		8	06790	9	06790	6	06790	9	06790
		4	06791	1	06791	0	06791	0	06791
		150		149		117		104	
		Elective Angioplasty - Other Service Area							
JDH	B	149		53		49		36	
Total JDH B		*540*		*419*		*356*		*391*	

Table 2: *Historical* Volume for each Applicant by Service and Zip Code - Procedures

Cardiac Service Legend: A Primary Angioplasty B Elective Angioplasty C Open Heart Service

Fiscal Year to Date 2008: HCGW October 1 - July 31 and JDH July 1 - June 30

Applicant	Cardiac Service	FY2005 # of Procedures	Zip Code	FY2006 # of Procedures	Zip Code	FY2007 # of Procedures	Zip Code	FY2008 # of Procedures	Zip Code
		Open Heart Service - Primary Service Area							
JDH	C	4	06001	4	06001	1	06001	3	06001
		1	06002	0	06002	1	06002	0	06002
		0	06013	1	06013	2	06013	0	06013
		2	06019	1	06019	6	06019	6	06019
		0	06022	1	06022	0	06022	0	06022
		2	06030	2	06030	1	06030	1	06030
		6	06032	2	06032	3	06032	3	06032
		0	06034	0	06034	1	06034	0	06034
		0	06035	0	06035	2	06035	0	06035
		11	06051	6	06051	5	06051	4	06051
		5	06052	2	06052	3	06052	1	06052
		9	06053	7	06053	5	06053	7	06053
		0	06060	0	06060	1	06060	1	06060
		1	06070	3	06070	2	06070	5	06070
		1	06085	3	06085	1	06085	1	06085
		1	06090	0	06090	0	06090	0	06090
		1	06092	0	06092	1	06092	0	06092
		1	06106	1	06106	0	06106	0	06106
		1	06107	1	06107	0	06107	1	06107
		0	06110	1	06110	0	06110	1	06110
		12	06111	3	06111	1	06111	4	06111
		0	06112	0	06112	1	06112	0	06112
		1	06114	1	06114	0	06114	0	06114
		2	06117	1	06117	3	06117	1	06117
		1	06118	0	06118	1	06118	1	06118
		0	06119	1	06119	3	06119	0	06119
		0	06120	1	06120	0	06120	0	06120
		1	06131	0	06131	0	06131	0	06131
		63		42		44		40	

Table 2: *Historical* Volume for each Applicant by Service and Zip Code - Procedures

Cardiac Service Legend: A Primary Angioplasty B Elective Angioplasty C Open Heart Service

Fiscal Year to Date 2008: HCGW October 1 - July 31 and JDH July 1 - June 30

Applicant	Cardiac Service	FY2005 # of Procedures	Zip Code	FY2006 # of Procedures	Zip Code	FY2007 # of Procedures	Zip Code	FY2008 # of Procedures	Zip Code
		Open Heart Service - Secondary Service Area							
JDH	C	4	06010	4	06010	0	06010	8	06010
		1	06023	1	06023	0	06023	0	06023
		0	06026	1	06026	0	06026	0	06026
		1	06027	0	06027	0	06027	0	06027
		0	06033	0	06033	0	06033	1	06033
		6	06037	4	06037	1	06037	3	06037
		3	06040	2	06040	0	06040	0	06040
		0	06057	1	06057	0	06057	0	06057
		3	06062	6	06062	3	06062	4	06062
		0	06065	1	06065	0	06065	0	06065
		2	06066	1	06066	0	06066	0	06066
		1	06067	0	06067	0	06067	1	06067
		0	06074	1	06074	0	06074	0	06074
		1	06095	1	06095	1	06095	0	06095
		3	06109	1	06109	2	06109	0	06109
		1	06416	0	06416	1	06416	2	06416
		3	06479	0	06479	2	06479	0	06479
		8	06489	3	06489	3	06489	4	06489
		1	06759	0	06759	0	06759	0	06759
		0	06782	1	06782	0	06782	0	06782
		0	06786	1	06786	1	06786	0	06786
		1	06790	2	06790	3	06790	2	06790
		0	06791	0	06791	2	06791	0	06791
		39		31		19		25	
		Open Heart Service - Other Service Area							
JDH	C	58		50		11		14	
Total JDH C		*160*		*123*		*74*		*79*	

g) In table format, please provide last three years of cardiac catheterization volume (by facility) by inpatient and outpatient and by zip code.

Response:

Table 3: Historical Cardiac Catheterization Volume for each Applicant by Service and Zip Code is found on the following pages.

Table 3: ***Historical*** **Volume for each Applicant By Service and Zip Code - Procedures**
Cardiac Service Legend: D Cardiac Catheterizations
Fiscal Year to Date 2008: HCGW October 1 - July 31 and JDH July 1 - June 30

Applicant	Cardiac Service	FY 2005 # of Procedures	I/P	O/P	Zip Code	FY 2006 # of Procedures	I/P	O/P	Zip Code	FY 2007 # of Procedures	I/P	O/P	Zip Code	FY 2008 # of Procedures	I/P	O/P	Zip Code
Cardiac Catheterizations - Primary Service Area																	
TWH	D	1	1	0	06410	3	2	1	06403	6	4	2	06403	4	1	3	06403
		17	10	7	06488	10	5	5	06410	7	1	6	06410	7	1	6	06410
		10	6	4	06704	43	27	16	06488	37	17	20	06488	20	13	7	06488
		13	9	4	06705	8	4	4	06702	9	6	3	06702	11	5	6	06702
		7	3	4	06706	1	0	1	06703	48	31	17	06704	45	31	14	06704
		21	13	8	06708	59	29	30	06704	53	27	26	06705	35	14	21	06705
		7	4	3	06710	47	26	21	06705	30	18	12	06706	17	9	8	06706
		3	1	2	06712	28	9	19	06706	87	50	37	06708	64	32	32	06708
		3	0	3	06716	78	37	41	06708	16	8	8	06710	17	9	8	06710
		4	2	2	06751	16	7	9	06710	20	10	10	06712	12	4	8	06712
		4	3	1	06762	15	5	10	06712	23	10	13	06716	17	9	8	06716
		15	10	5	06770	22	13	9	06716	8	3	5	06751	9	1	8	06751
		2	2		06778	1	0	1	06723	17	8	9	06762	23	9	14	06762
		6	4	2	06779	8	4	4	06751	66	34	32	06770	55	30	25	06770
		7	5	2	06787	25	8	17	06762	1	0	1	06778	2	2	0	06778
		12	5	7	06795	68	39	29	06770	35	22	13	06779	30	16	14	06779
		7	4	3	06798	4	1	3	06778	21	11	10	06787	22	8	14	06787
						32	18	14	06779	44	26	18	06795	43	19	24	06795
						27	13	14	06787	23	12	11	06798	28	12	16	06798
						58	24	34	06795								
						27	13	14	06798								
		139	82	57		580	284	296		551	298	253		461	225	236	
Cardiac Catheterizations - Secondary Service Area																	
TWH	D	1	0	1	06478	5	3	2	06478	1	0	1	06478	3	2	1	06478
						1	1	0	06483	4	2	2	06489	4	3	1	06489
						5	1	4	06489	1	1	0	06763	1	1	0	06758
						1	0	1	06758	4	4	0	06790	2	2	0	06763
						1	0	1	06763	1	1	0	06791	5	2	3	06790
						3	0	3	06790					2	0	2	06791
		1	0	1		16	5	11		11	8	3		17	10	7	
Cardiac Catheterizations - Other Service Area																	
TWH	D	1	0	1	06010	1	1	0	01772	1	1	0	04969	2	1	1	06010
		1	0	1	06611	4	1	3	06010	1	0	1	06098	1	1	0	06039
		1	0	1	06615	1	1	0	06111	1	0	1	06401	1	1	0	06069
		1	1	0	06714	1	0	1	06418	1	1	0	06419	1	1	0	06084
		1	0	1	06782	1	0	1	06450	1	1	0	06450	1	1	0	06237
		1	1	0	06786	1	0	1	06451	1	1	0	06468	1	1	0	06401
		1	1	0	32904	1	0	1	06460	1	1	0	06524	1	0	1	06444
						1	1	0	06470	1	1	0	06525	2	1	1	06450
						1	0	1	06479	2	1	1	06750	3	2	1	06460
						1	1	0	06525	1	0	1	06759	1	1	0	06480
						1	1	0	06604	1	1	0	06777	1	0	1	06484
						1	1	0	06610	1	1	0	06781	1	0	1	06524
						1	1	0	06750	4	2	2	06782	1	0	1	06525
						1	0	1	06752	1	0	1	06783	1	0	1	06759
						1	1	0	06752	6	3	3	06786	3	1	2	06782
						3	1	2	06759	1	1	0	06793	2	1	1	06783
						3	2	1	06782	1	0	1	06810	4	3	1	06786
						4	1	3	06786	2	0	2	17406	1	0	1	06794
						1	0	1	06794	1	1	0	33710	1	1	0	06851
						1	0	1	06796	1	1	0	85701	1	1	0	12110
						1	1	0	06810	1	0	1	92532	1	0	1	13843
						1	0	1	06824					1	1	0	32976
						1	0	1	32563					1	1	0	71263
						1	0	1	33541					1	0	1	77301
						1	0	1	33852								
						1	1	0	33908								
		7	3	4		36	15	21		31	17	14		34	19	15	
Total TWH D		*147*	*85*	*62*		*632*	*304*	*328*		*593*	*323*	*270*		*512*	*254*	*258*	

Table 3: *Historical* Volume for each Applicant By Service and Zip Code - Procedures
Cardiac Service Legend: D Cardiac Catheterizations
Fiscal Year to Date 2008: HCGW October 1 - July 31 and JDH July 1 - June 30

Applicant	Cardiac Service	FY 2005 # of Procedures	I/P	O/P	Zip Code	FY 2006 # of Procedures	I/P	O/P	Zip Code	FY 2007 # of Procedures	I/P	O/P	Zip Code	FY 2008 # of Procedures	I/P	O/P	Zip Code
									Cardiac Catheterizations - Primary Service Area								
SMH	D	1	0	1	06403	5	1	4	06403	3	1	2	06403	2	2	0	06403
		4	2	2	06410	22	7	15	06410	27	12	15	06410	14	2	12	06410
		3	0	3	06488	11	4	7	06488	14	5	9	06488	14	5	9	06488
		5	4	1	06702	1	1	0	06701	10	8	2	06702	13	6	7	06702
		1	0	1	06703	13	7	6	06702	63	32	31	06704	42	22	20	06704
		9	2	7	06704	69	42	27	06704	64	30	34	06705	47	18	29	06705
		14	5	9	06705	55	29	26	06705	39	15	24	06706	24	7	17	06706
		7	3	4	06706	41	25	16	06706	56	19	37	06708	51	13	38	06708
		7	2	5	06708	41	19	22	06708	17	5	12	06710	16	5	11	06710
		4	3	1	06710	23	11	12	06710	15	8	7	06712	13	3	10	06712
		6	3	3	06712	21	8	13	06712	50	24	26	06716	24	10	14	06716
		13	4	9	06716	36	13	23	06716	1	1	0	06722	1	1	0	06724
		1	1	0	06751	2	2	0	06720	1	1	0	06751	4	3	1	06751
		2	1	1	06762	2	0	2	06751	9	4	5	06762	8	4	4	06762
		15	7	8	06770	1	1	0	06751	49	27	22	06770	49	13	36	06770
		5	2	3	06779	8	3	5	06762	1	0	1	06778	8	4	4	06779
		2	2	0	06787	59	21	38	06770	7	2	5	06779	6	2	4	06787
		4	2	2	06795	5	2	3	06779	8	2	6	06787	13	3	10	06795
		2	0	2	06798	7	3	4	06787	23	9	14	06795	3	1	2	06798
						12	7	5	06795	5	4	1	06798				
						10	4	6	06798								
		105	43	62		444	210	234		462	209	253		352	124	228	
									Cardiac Catheterizations - Secondary Service Area								
SMH	D	2	0	2	06489	3	1	2	06478	3	0	3	06478	3	2	1	06478
		2	0	2	06790	2	1	1	06483	3	2	1	06483	1	0	1	06483
						1	0	1	06489	6	5	1	06489	2	1	1	06489
						1	1	0	06763	1	1	0	06763	1	1	0	06763
						4	1	3	06790	2	0	2	06790	2	1	1	06790
						1	0	1	06791								
		4	0	4		12	4	8		15	8	7		9	5	4	
									Cardiac Catheterizations - Other Service Area								
SMH	D	1	1	0	04112	1	0	1	02891	1	1	0	01253	1	1	0	01253
		1	0	1	06048	1	0	1	06029	2	0	2	06010	1	0	1	04530
		1	0	1	06062	1	0	1	06068	1	0	1	06070	4	0	4	06010
		1	0	1	06482	1	0	1	06098	1	0	1	06119	1	1	0	06062
		1	0	1	06492	1	0	1	06108	2	0	2	06401	1	0	1	06100
		1	0	1	06756	1	0	1	06237	1	0	1	06450	1	0	1	06107
		1	0	1	06786	1	0	1	06371	1	0	1	06451	1	1	0	06450
		1	1	0	10460	1	1	0	06450	9	5	4	06479	1	0	1	06457
						4	2	2	06479	1	0	1	06482	1	1	0	06460
						2	0	2	06492	1	1	0	06492	1	0	1	06461
						3	3	0	06524	1	0	1	06516	1	0	1	06479
						1	1	0	06525	1	1	0	06750	1	0	1	06515
						1	0	1	06776	1	0	1	06759	3	1	2	06524
						1	0	1	06777	1	1	0	06776	1	1	0	06750
						1	0	1	06782	1	1	0	06777	5	1	4	06759
						1	0	1	06786	5	0	5	06786	2	0	2	06776
						1	0	1	06801	1	1	0	06810	2	0	2	06782
						1	0	1	06811	1	1	0	07066	1	0	1	06783
						1	1	0	06902	1	0	1	12076	1	1	0	06804
						1	1	0	10457	1	1	0	33947	1	1	0	10027
						1	1	0	10460	1	0	1	77550	1	1	0	20024
						1	1	0	29526					1	0	1	22307
						1	1	0	29662					1	0	1	32966
														1	0	1	32968
														1	1	0	33321
														1	0	1	33432
		8	2	6		29	12	17		35	13	22		37	11	26	
Total SMH D		*117*	*45*	*72*		*485*	*226*	*259*		*512*	*230*	*282*		*398*	*140*	*258*	

Table 3: *Historical* Volume for each Applicant By Service and Zip Code - Procedures
Cardiac Service Legend: D Cardiac Catheterizations
Fiscal Year to Date 2008: HCGW October 1 - July 31 and JDH July 1 - June 30

Applicant	Cardiac Service	FY 2005 # of Procedures	I/P	O/P	Zip Code	FY 2006 # of Procedures	I/P	O/P	Zip Code	FY 2007 # of Procedures	I/P	O/P	Zip Code	FY 2008 # of Procedures	I/P	O/P	Zip Code
Cardiac Catheterizations - Primary Service Area																	
JDH	D	13	6	7	06001	18	8	10	06001	16	7	9	06001	18	8	10	06001
		6	2	4	06002	6	3	3	06002	4	0	4	06002	6	0	6	06002
		4	2	2	06013	7	3	4	06013	7	1	6	06013	8	2	6	06013
		11	3	8	06019	11	5	6	06019	10	4	6	06019	15	7	8	06019
		0	0	0	06020	0	0	0	06020	1	0	1	06020	0	0	0	06020
		0	0	0	06022	2	0	2	06022	0	0	0	06022	0	0	0	06022
		12	11	1	06030	3	3	0	06030	7	4	3	06030	8	6	2	06030
		30	21	9	06032	34	16	18	06032	18	9	9	06032	28	12	16	06032
		0	0	0	06034	1	1	0	06034	1	0	1	06034	0	0	0	06034
		0	0	0	06035	0	0	0	06035	5	2	3	06035	4	2	2	06035
		2	0	2	06050	0	0	0	06050	1	0	1	06050	0	0	0	06050
		34	19	15	06051	19	3	16	06051	22	5	17	06051	19	3	16	06051
		10	2	8	06052	9	2	7	06052	10	1	9	06052	3	0	3	06052
		34	12	22	06053	30	8	22	06053	29	4	25	06053	25	5	20	06053
		1	0	1	06059	0	0	0	06059	1	1	0	06059	0	0	0	06059
		0	0	0	06060	0	0	0	06060	2	2	0	06060	1	1	0	06060
		5	2	3	06070	13	3	10	06070	13	6	7	06070	12	5	7	06070
		10	2	8	06085	10	5	5	06085	5	1	4	06085	11	6	5	06085
		0	0	0	06089	1	0	1	06089	1	0	1	06089	1	1	0	06089
		1	0	1	06090	0	0	0	06090	0	0	0	06090	0	0	0	06090
		2	1	1	06092	1	1	0	06092	4	2	2	06092	2	1	1	06092
		0	0	0	06103	0	0	0	06103	0	0	0	06103	1	1	0	06103
		4	3	1	06105	4	1	3	06105	4	0	4	06105	2	1	1	06105
		4	2	2	06106	5	1	4	06106	7	2	5	06106	11	2	9	06106
		12	9	3	06107	7	5	2	06107	11	5	6	06107	11	5	6	06107
		4	1	3	06108	7	5	2	06108	1	0	1	06108	4	2	2	06108
		5	3	2	06110	5	2	3	06110	3	2	1	06110	4	2	2	06110
		25	4	21	06111	23	11	12	06111	25	3	22	06111	18	6	12	06111
		3	2	1	06112	0	0	0	06112	4	0	4	06112	4	3	1	06112
		1	0	1	06114	4	2	2	06114	6	0	6	06114	4	0	4	06114
		12	5	7	06117	6	3	3	06117	5	1	4	06117	2	1	1	06117
		4	0	4	06118	8	3	5	06118	6	2	4	06118	7	1	6	06118
		4	2	2	06119	6	3	3	06119	10	4	6	06119	2	0	2	06119
		3	1	2	06120	3	1	2	06120	1	0	1	06120	4	0	4	06120
		0	0	0	06127	1	1	0	06127	0	0	0	06127	0	0	0	06127
		1	1	0	06131	0	0	0	06131	0	0	0	06131	0	0	0	06131
		0	0	0	06133	0	0	0	06133	0	0	0	06133	1	1	0	06133
		0	0	0	06138	0	0	0	06138	1	1	0	06138	0	0	0	06138
		257	116	141		244	99	145		241	69	172		236	84	152	
Cardiac Catheterizations - Secondary Service Area																	
JDH	D	33	11	22	06010	24	8	16	06010	20	3	17	06010	31	5	26	06010
		0	0	0	06011	1	0	1	06011	0	0	0	06011	0	0	0	06011
		0	0	0	06016	2	1	1	06016	0	0	0	06016	1	1	0	06016
		1	0	1	06023	1	0	1	06023	2	1	1	06023	0	0	0	06023
		0	0	0	06026	2	1	1	06026	1	0	1	06026	2	0	2	06026
		1	0	1	06027	1	1	0	06027	0	0	0	06027	0	0	0	06027
		0	0	0	06033	4	0	4	06033	3	2	1	06033	3	1	2	06033
		22	8	14	06037	8	1	7	06037	18	4	14	06037	21	2	19	06037
		6	4	2	06040	4	1	3	06040	4	0	4	06040	2	0	2	06040
		0	0	0	06042	0	0	0	06042	1	0	1	06042	1	0	1	06042
		0	0	0	06057	1	0	1	06057	3	0	3	06057	2	0	2	06057
		21	6	15	06062	13	4	9	06062	16	0	16	06062	20	4	16	06062
		1	1	0	06063	2	0	2	06063	0	0	0	06063	0	0	0	06063
		0	0	0	06065	1	0	1	06065	0	0	0	06065	0	0	0	06065
		5	3	2	06066	4	0	4	06066	1	0	1	06066	3	0	3	06066
		12	7	5	06067	5	3	2	06067	4	0	4	06067	6	1	5	06067
		2	0	2	06074	2	1	1	06074	1	0	1	06074	3	0	3	06074
		1	0	1	06088	1	1	0	06088	0	0	0	06088	1	0	1	06088
		4	1	3	06095	7	2	5	06095	3	0	3	06095	3	0	3	06095
		2	2	0	06098	0	0	0	06098	2	0	2	06098	2	1	1	06098
		5	2	3	06109	8	0	8	06109	1	0	1	06109	11	3	8	06109
		4	1	3	06416	6	2	4	06416	3	0	3	06416	3	0	3	06416
		4	0	4	06479	3	1	2	06479	5	1	4	06479	5	1	4	06479

Table 3: ***Historical*** **Volume for each Applicant By Service and Zip Code - Procedures**
Cardiac Service Legend: D Cardiac Catheterizations
Fiscal Year to Date 2008: HCGW October 1 - July 31 and JDH July 1 - June 30

Applicant	Cardiac Service	FY 2005 # of Procedures	I/P	O/P	Zip Code	FY 2006 # of Procedures	I/P	O/P	Zip Code	FY 2007 # of Procedures	I/P	O/P	Zip Code	FY 2008 # of Procedures	I/P	O/P	Zip Code
		19	4	15	06489	20	7	13	06489	20	6	14	06489	24	1	23	06489
		0	0	0	06750	1	1	0	06750	0	0	0	06750	0	0	0	06750
		0	0	0	06759	0	0	0	06759	0	0	0	06759	2	0	2	06759
		0	0	0	06778	0	0	0	06778	1	0	1	06778	0	0	0	06778
		6	1	5	06786	8	3	5	06786	0	0	0	06786	6	1	5	06786
		7	5	2	06790	5	2	3	06790	11	3	8	06790	12	3	9	06790
		3	3	0	06791	5	0	5	06791	1	1	0	06791	3	2	1	06791
		159	59	100		139	40	99		121	21	100		167	26	141	
Cardiac Catheterizations - Other Service Area																	
JDH	D	145	49	96		86	24	62		97	17	80		84	16	68	
Total JDH D		*561*	*224*	*337*		*469*	*163*	*306*		*459*	*107*	*352*		*487*	*126*	*361*	

iv. Please provide year-to-date volumes for Fiscal year 2008 by Applicant and Service as provided in Tables 2 & 3. Be sure to include all assumption and calculations.

Response:
Fiscal year to date 2008 procedure volumes by service and zip code for all Applicants are provided in Tables 2 and 3.

As in Table 1, for all Applicants the data was collected based on each procedure by procedure date. For each procedure, patient related data such as zip code was collected. In Tables 2 and 3 procedure data was sorted by zip code for primary service area, secondary service area and all other zip codes.

v. In the following table provide the number of patients that were transferred between the Applicants during FYs 2005, 2006, 2007, and year-to-date FY 2008 related to interventional cardiac services. Be sure to cite the reasons as well.

Response:
In the first three years of operation, HCGW occasionally transferred patients to JDH for open heart surgery services as noted below. The surgeons have been able to easily facilitate transfers if necessary or if by patient choice. As expected, transfers have declined with each subsequent year of the demonstration project as community confidence and awareness has grown. There has been no need to transfer any patients from JDH to SMH or TWH.

Transfer of patients between SMH and TWH has not occurred. There is close communication between campuses to redirect patients to SMH or TWH for reasons such as equipment or building maintenance. In cases of this nature, transfer of patients from one hospital campus to the other is not necessary. This is because directing the patient to another campus occurs prior to the patient's arrival at the emergency room through careful planning and communication among the hospitals, physician office, transporter and patient.

Table 4: *Historical* Patient Transfer between the Applicants

	FY 2005 Commencing July 18	FY 2006	FY 2007	FY 2008 YTD	List reasons for transfer
JDH to SMH	0	0	0	0	
JDH to TWH	0	0	0	0	
SMH to JDH	1	5	1	0	1 patient transferred for scheduling reasons due to anesthesia coverage, 1 patient transferred upon request of patient/family, 5 patients transferred based on physician assessment of multiple severe medical issues, multiple risk factors and complexity of surgery
TWH to JDH	0	7	0	1	1 patient transferred for scheduling reasons due to anesthesia coverage, 2 patients transferred upon request of patient/family, 5 patients transferred based on physician assessment of multiple severe medical issues, multiple risk factors and complexity of surgery
SMH to TWH	0	0	0	0	
TWH to SMH	0	0	0	0	

As of July 2006, additional cardiac anesthesiologists joined the Program, decreasing the need to transfer due to anesthesia coverage.

vi. Provide the following for the projected utilization of the proposed service for each Applicant:

Table 5: *Projected* Volume for each Applicant (Institutional) - Procedures

	FY 2009				FY 2010				FY 2011			
	A	B	C	D	A	B	C	D	A	B	C	D
TWH	52	275	134	625	50	266	129	638	50	266	129	638
SMH	33	207	81	472	32	200	78	481	32	200	78	481
HCGW Total	85	482	215	1,097	82	466	207	1,119	82	466	207	1,119
JDH	40	359	81	498	41	366	83	509	42	373	85	520

Cardiac Service Legend: A Primary Angioplasty B Elective Angioplasty C Open Heart Service D Cardiac Catheterizations

h) Provide all assumptions and calculations utilized to project institutional volumes in Table 5.

Response:

The assumptions and key calculation data utilized by HCGW will be described first, followed by that of JDH. With each Applicant, actual experience over the last few years served as the foundation for future projections.

HCGW:

As HCGW sought to determine future volumes by service line, a review of historical total market volume, a review of Program specific volume, consultations with Program physicians and a review of demographic and risk factor data took place. The following outlines the major assumptions and key calculation data elements.

Various databases were consulted including Connecticut Hospital Association's CHIME data, Patient Census Report data and HCGW's own internal databases. There is an inherent challenge when utilizing varied data sources for information. What may be categorized as a DRG discharge in one database might be shown as a procedure according to ICD-9-CM codes in another. What is important is that the projected procedure volumes outlined in Table 5 above make inherent sense when one considers all of the variables in total.

Historical Market Volumes & HCGW Market Share

A review of historical PSA volume during the fiscal years 2006, 2007, 2008 indicate an overall PSA market trend of declining discharges for angioplasty and open heart services and a flat-to-modest upward trend for cardiac catheterization procedures (all hospitals). However, during this same period HCGW Program's market capture rate (market share) has increased, a positive indicator for the future.

The Applicants conservatively estimate that HCGW's market share from fiscal year 2008 will remain constant for all services through fiscal year 2011 except open heart surgery. The market share for open heart surgery is estimated to reach the same level of angioplasty market capture in fiscal year 2009 (moving from 75.8% to 80.5%) and then remain constant through fiscal year 2011. Several points serve as the rationale for the estimated increase of open heart surgery market capture. HCGW's open heart surgery market share rates have been steadily increasing since program inception (58.6% fiscal year 2006; 68.3% fiscal year 2007; 75.8% fiscal year 2008). While the interventional cardiologists and cardiologists were well established at the time of Program commencement, the cardiothoracic surgeons were fairly new to the community. The public and local referring physicians are becoming more familiar with the talents of the cardiothoracic surgeons and it is reasonable to assume that the HCGW rate of market capture for open heart surgery will grow to match that of angioplasty services. (See response to question 5.D.b. for further detail regarding market share.)

Actual and Projected HCGW Market Share

Service	Actual FY 2008	FY 2009	FY 2010	FY 2011
PCI	80.5%	80.5%	80.5%	80.5%
OHS	75.8%	80.5%	80.5%	80.5%
I/P Cath	71.7%	71.7%	71.7%	71.7%
O/P Cath	49.3%	49.3%	49.3%	49.3%

Physician Consultations

Consultations with Program interventional cardiologists and cardiothoracic surgeons provided valuable insight that assisted in arriving at the projected volumes. The physicians see the downward volume trend of recent years slowing and leveling out. This is due to the aging population and other risk factors associated with our market. Specific to the HCGW market, our percent of market capture has been growing as the reputation for the Program has broadened and this is expected to hold and even grow in certain segments. It is the physicians' professional opinion that the market projections outlined are appropriately conservative and sound.

Demographics & Risk Factors

Actual experience indicates that the majority of patients that utilize the Program reside in the PSA (see response to question 5.iii a.). As such, the Applicants focused on trends associated with this market when determining future procedure volume.

Primary Service Area Population Projections

2009	2010	2011
278,303	280,044	281,800

Claritas, Inc.

As discussed earlier in the application, the age 65+ population will represent 15.4% of the total PSA population in 2011. Compare this to a national average of 13.6% and a Connecticut average of 14.9%. The age 65+ demographic will have a higher incidence of cardiovascular and coronary artery disease. This and other risk factors are outlined in detail in the response to question 5.iii.b. All were considered as projections were formulated.

Primary /Elective Angioplasty Proportion & Campus Volume Distribution

OHCA requested that the angioplasty projections be categorized as primary and elective. Primary versus elective angioplasty projections were estimated based on HCGW actual data from the initial Program years. The proportions are 15% primary angioplasty / 85% elective angioplasty.

OHCA also requested that HCGW projections be outlined by campus location. Such has been done, but it should be noted that as this is one Program, this is akin to requesting projections regarding specific operating room usage at other open heart surgery programs around the state. Volume distribution between the two campuses for future years was estimated utilizing HCGW actual data from internal records and reflects recent experience. Volume distribution between hospitals is shown below.

Distribution of Volume Between Campuses - Used in Table 5 Projections

Hospital	Primary PCI	Elective PCI	OHS	Cardiac Catheterizations
TWH	61%	57%	62%	57%
SMH	39%	43%	38%	43%
Total	100%	100%	100%	100%

While the HCGW chose to use recent experience when estimating the future volume distribution between campuses, it is interesting to note that differences occur from year to year. Patient preferences and physician referral patterns influence campus choice. One of the advantages of the Program's two campus model is that it optimizes patient access; it allows for the flexibility of patients' and physicians' hospital use patterns.

For example, if one was to look at fiscal year 2007 the volume distribution was somewhat different as outlined below.

EXAMPLE: Fiscal Year 2007 Distribution of Volume Between Campuses

Hospital	Primary PCI	Elective PCI	OHS	Cardiac Catheterizations
TWH	57%	62%	53%	54%
SMH	43%	38%	47%	46%
Total	100%	100%	100%	100%

Had HCGW chosen to use fiscal year 2007 as the basis for future projections, angioplasty volume in fiscal year 2009 would have been projected at 347 procedures on THW campus and 220 procedures on the SMH campus (versus 327 / 240 as shown in Table 5). Similarly, open heart surgery volume in fiscal year 2009 would have been projected at 114 procedures on TWH campus and 101 procedures on the SMH campus (versus 134 / 81 as shown in Table 5). The point of this example is that projections are simply an estimate of something in the future. Actual experience in future years may vary.

JDH:

A historical review of JDH actual volume showed a decline in angioplasty and open heart surgery in the fiscal years 2005 through 2007. By fiscal year 2008, the volume began to grow again. The hospital believes the primary reason for this increase is the considerable investment of capital and human resources in recent years to strengthen the cardiology program, including five new cardiologists coming on board in July 2008. JDH believes this investment as well as the hospital's growing reputation for quality and the growing and aging population in the immediate service area will lead to modest increases in angioplasty and cardiac catheterizations and a small increase in open heart surgery volume in the next three years.

i) In the following table format, please provide the projected first three years of cardiac catheterization volume (by facility) by inpatient and outpatient:

Table 6: *Projected* Cardiac Catheterization Volume for Each Applicant - Procedures

Applicant	FY 2009 (# of Procedures)	I/P	O/P	FY 2010 (# of Procedures)	I/P	O/P	FY 2011 (# of Procedures)	I/P	O/P
TWH	625	294	331	638	300	338	638	300	338
SMH	472	222	250	481	226	255	481	226	255
JDH	498	125	373	509	127	382	520	130	390

Key: Inpatient= I/P, Outpatient= O/P

j) Provide all assumptions and calculations utilized to project institutional volumes in Table 6.

Response:
For the Waterbury based hospitals, the historical split between inpatient and outpatient cardiac catheterizations has been approximately 47% inpatient versus 53% outpatient. At times it would vary year to year however; the above approximation reflects an average historical view. The projection for fiscal years 2009 to 2011 is based on this historical split.

With regard to JDH, over the last two years approximately 25% of diagnostic cardiac catheterization cases have occurred on an inpatient basis and 75% on an outpatient basis. JDH is projecting this ratio will remain stable over the next three years.

A review of Patient Census Report data shows that inpatient versus outpatient cardiac catheterization splits among hospitals vary. As such, it is not unusual for HCGW and JDH to have different inpatient to outpatient ratios. (Reference Appendix 5.D.c).

k) Provide the historical operator volume by unique physician identifier currently providing services at each Applicant's facility as follows:

Response:
Table 7: Historical Operator Volume for each Applicant is found on the following pages.

Table 7: Historical Operator Volume for each Applicant - Procedures

Cardiac Service Legend: A Primary Angioplasy B Elective Angioplasty C Open Heart Services D Cardiac Catheterizations

Fiscal Year to Date 2008: HCGW October 1 - July 31 ; JDH July 1 - June 30; Hartford Hospital October 1- July 31

			FY 2005				FY 2006				FY 2007				FY 2008			
ID	Physician	By Facility	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
019578	Paul L. Preissler M.D.	TWH	0	0	12	0	0	0	38	0	0	0	35	0	0	0	32	0
		SMH	0	0	6	0	0	0	24	0	0	0	24	0	0	0	21	0
		JDH	0	0	72	0	0	0	36	0	0	0	22	0	0	0	21	0
		HH	0	0	59	0	0	0	77	0	0	0	77	0	0	0	70	0
		Total	***0***	***0***	***149***	***0***	***0***	***0***	***175***	***0***	***0***	***0***	***158***	***0***	***0***	***0***	***144***	***0***
027604	Jonathan A. Hammond M.D.	TWH	0	0	2	0	0	0	13	0	0	0	18	0	0	0	15	0
		SMH	0	0	4	0	0	0	10	0	0	0	26	0	0	0	23	0
		JDH	0	0	64	0	0	0	48	0	0	0	18	0	0	0	7	0
		HH	0	0	126	0	0	0	147	0	0	0	133	0	0	0	117	0
		Total	***0***	***0***	***196***	***0***	***0***	***0***	***218***	***0***	***0***	***0***	***195***	***0***	***0***	***0***	***162***	***0***
032227	David J. Underhill M.D.	TWH	0	0	3	0	0	0	16	0	0	0	26	0	0	0	22	0
		SMH	0	0	4	0	0	0	16	0	0	0	28	0	0	0	10	0
		JDH	0	0	24	0	0	0	11	0	0	0	11	0	0	0	5	0
		HH	0	0	77	0	0	0	74	0	0	0	65	0	0	0	69	0
		Totals	***0***	***0***	***108***	***0***	***0***	***0***	***117***	***0***	***0***	***0***	***130***	***0***	***0***	***0***	***106***	***0***
040489	Daniel S. Fusco M.D.	TWH	0	0	6	0	0	0	51	0	0	0	41	0	0	0	43	0
		SMH	0	0	6	0	0	0	20	0	0	0	30	0	0	0	16	0
		JDH	0	0	0	0	0	0	28	0	0	0	23	0	0	0	46	0
		HH	0	0	5	0	0	0	26	0	0	0	23	0	0	0	18	0
		Totals	***0***	***0***	***17***	***0***	***0***	***0***	***125***	***0***	***0***	***0***	***117***	***0***	***0***	***0***	***123***	***0***
015360	Suphichaya Muangman M.D.	TWH	1	13	0	25	9	104	0	103	18	89	0	73	15	58	0	68
		SMH	0	5	0	4	12	18	0	15	5	9	0	12	11	13	0	10
		JDH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***1***	***18***	***0***	***29***	***21***	***122***	***0***	***118***	***23***	***98***	***0***	***85***	***26***	***71***	***0***	***78***
029001	Kevin G. Kett M.D	TWH	1	15	0	12	10	67	0	68	7	62	0	55	0	0	0	8
		SMH	3	12	0	13	14	76	0	86	11	52	0	78	0	1	0	14
		JDH	0	37	0	18	0	7	0	1	0	0	0	0	0	0	0	0
		Totals	***4***	***64***	***0***	***43***	***24***	***150***	***0***	***155***	***18***	***114***	***0***	***133***	***0***	***1***	***0***	***22***
030739	Stephen C. Widman M.D.	TWH	2	14	0	15	14	89	0	85	15	73	0	88	9	53	0	75
		SMH	1	28	0	23	11	79	0	97	12	58	0	99	8	49	0	100
		JDH	0	44	0	15	0	5	0	0	0	0	0	0	0	0	0	0
		Totals	***3***	***86***	***0***	***53***	***25***	***173***	***0***	***182***	***27***	***131***	***0***	***187***	***17***	***102***	***0***	***175***
043316	Ehsan Ansari M.D.	TWH	4	17	0	27	17	71	0	131	19	96	0	165	8	56	0	94
		SMH	1	13	0	25	12	87	0	138	15	73	0	165	6	59	0	104
		JDH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***5***	***30***	***0***	***52***	***29***	***158***	***0***	***269***	***34***	***169***	***0***	***330***	***14***	***115***	***0***	***198***
045393	Raghuraman Vidhun M.D.	TWH	0	0	0	0	0	0	0	0	1	21	0	10	10	74	0	122
		SMH	0	0	0	0	0	0	0	0	3	19	0	31	4	64	0	114
		JDH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***4***	***40***	***0***	***41***	***14***	***138***	***0***	***236***
000239	Michael C. Malinics D.O.	TWH	0	0	0	10	0	0	0	12	0	0	0	33	0	0	0	42
		SMH	0	0	0	1	0	0	0	0	0	0	0	8	0	0	0	13
		JDH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***11***	***0***	***0***	***0***	***12***	***0***	***0***	***0***	***41***	***0***	***0***	***0***	***55***
015678	Joel A. Sherman M.D.	TWH	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0
		SMH	0	0	0	0	0	0	0	14	0	0	0	5	0	0	0	4
		JDH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***16***	***0***	***0***	***0***	***7***	***0***	***0***	***0***	***4***
017679	Henry Borkowski, Jr. M.D	TWH	0	0	0	4	0	0	0	17	0	0	0	11	0	0	0	0
		SMH	0	0	0	4	0	0	0	19	0	0	0	21	0	0	0	0
		JDH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***8***	***0***	***0***	***0***	***36***	***0***	***0***	***0***	***32***	***0***	***0***	***0***	***0***

Table 7: Historical Operator Volume for each Applicant - Procedures

Cardiac Service Legend: A Primary Angioplasy B Elective Angioplasty C Open Heart Services D Cardiac Catheterizations

Fiscal Year to Date 2008: HCGW October 1 - July 31 ; JDH July 1 - June 30; Hartford Hospital October 1- July 31

ID	Physician	By Facility	FY 2005				FY 2006				FY 2007				FY 2008			
			A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
022917	Dennis Dobkin M.D.	TWH	0	0	0	8	0	0	0	32	0	0	0	13	0	0	0	9
		SMH	0	0	0	13	0	0	0	30	0	0	0	39	0	0	0	13
		JDH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***21***	***0***	***0***	***0***	***62***	***0***	***0***	***0***	***52***	***0***	***0***	***0***	***22***
027440	Mark S. Rosenberg M.D.	TWH	0	0	0	11	0	0	0	28	0	0	0	32	0	0	0	28
		SMH	0	0	0	2	0	0	0	1	0	0	0	5	0	0	0	1
		JDH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***13***	***0***	***0***	***0***	***29***	***0***	***0***	***0***	***37***	***0***	***0***	***0***	***29***
033880	Mark L. Ruggiero M.D.	TWH	0	0	0	4	0	0	0	33	0	0	0	7	0	0	0	5
		SMH	0	0	0	5	0	0	0	32	0	0	0	12	0	0	0	2
		JDH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***9***	***0***	***0***	***0***	***65***	***0***	***0***	***0***	***19***	***0***	***0***	***0***	***7***
035100	Joseph P. Morley M.D.	TWH	0	0	0	27	0	0	0	90	0	0	0	63	0	0	0	36
		SMH	0	0	0	5	0	0	0	11	0	0	0	8	0	0	0	9
		JDH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***32***	***0***	***0***	***0***	***101***	***0***	***0***	***0***	***71***	***0***	***0***	***0***	***45***
035359	Paul F. Kelly M.D.	TWH	0	0	0	1	0	0	0	12	0	0	0	7	0	0	0	0
		SMH	0	0	0	21	0	0	0	40	0	0	0	25	0	0	0	0
		JDH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***22***	***0***	***0***	***0***	***52***	***0***	***0***	***0***	***32***	***0***	***0***	***0***	***0***
042450	George Antonopoulos M.D.	TWH	0	0	0	3	0	0	0	19	0	0	0	34	0	0	0	25
		SMH	0	0	0	1	0	0	0	2	0	0	0	4	0	0	0	14
		JDH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***4***	***0***	***0***	***0***	***21***	***0***	***0***	***0***	***38***	***0***	***0***	***0***	***39***
13995	Michael Rinaldi, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	0	0	0	0	5	0	1	0	5	0	6	0	2	0	0
		Totals	***0***	***0***	***0***	***0***	***0***	***5***	***0***	***1***	***0***	***5***	***0***	***6***	***0***	***2***	***0***	***0***
19666	Anthony Lachman, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***14***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***
21038	Charles Primiano, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***0***	***0***	***1***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***
21718	Alan M. Kudler, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	164	0	150	0	115	0	92	0	109	0	111	0	98	0	123
		Totals	***0***	***164***	***0***	***150***	***0***	***115***	***0***	***92***	***0***	***109***	***0***	***111***	***0***	***98***	***0***	***123***
22841	Wesley D. Hager, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	81	0	159	0	81	0	153	0	57	0	134	0	37	0	111
		Totals	***0***	***81***	***0***	***159***	***0***	***81***	***0***	***153***	***0***	***57***	***0***	***134***	***0***	***37***	***0***	***111***
22933	Francis Kiernan, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***1***	***0***	***0***	***0***	***1***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***
23725	Jeffery A. Hisrt, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	1	0	1	0	1	0	0	0	1	0	0	0	3	0	1
		Totals	***0***	***1***	***0***	***1***	***0***	***1***	***0***	***0***	***0***	***1***	***0***	***0***	***0***	***3***	***0***	***1***

Table 7: Historical Operator Volume for each Applicant - Procedures

Cardiac Service Legend: A Primary Angioplasy B Elective Angioplasty C Open Heart Services D Cardiac Catheterizations

Fiscal Year to Date 2008: HCGW October 1 - July 31 ; JDH July 1 - June 30; Hartford Hospital October 1- July 31

			FY 2005				FY 2006				FY 2007				FY 2008			
ID	Physician	By Facility	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
27770	Jan R Paris, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0
		Totals	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
29036	Michael A. Azrin, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	206	0	186	0	201	0	192	0	182	0	188	0	153	0	123
		Totals	*0*	*206*	*0*	*186*	*0*	*201*	*0*	*192*	*0*	*182*	*0*	*188*	*0*	*153*	*0*	*123*
29156	Raymond McKay, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	1	0	0	0	0	0	0	0	2	0	0	0	3	0	1
		Totals	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*2*	*0*	*0*	*0*	*3*	*0*	*1*
29979	Daniel B. Fram, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		Totals	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
30271	William Farrell, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	5	0	2	0	0	0	1	0	0	0	0	0	0	0	0
		Totals	*0*	*5*	*0*	*2*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
34848	Satesh C. Singh, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	0	0	0	0	0	0	6	0	0	0	6	0	0	0	1
		Totals	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*6*	*0*	*0*	*0*	*6*	*0*	*0*	*0*	*1*
39462	Carol Gemayel, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	0	0	9	0	0	0	8	0	0	0	13	0	0	0	12
		Totals	*0*	*0*	*0*	*9*	*0*	*0*	*0*	*8*	*0*	*0*	*0*	*13*	*0*	*0*	*0*	*12*
40740	Maha B. Mikhail, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	0	0	7	0	0	0	13	0	0	0	1	0	0	0	0
		Totals	*0*	*0*	*0*	*7*	*0*	*0*	*0*	*13*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*
44919	Kennth Merkatz, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
		Totals	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*6*
45153	Kanwar P. Singh, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	0	0	0	0	0	0	0	0	0	0	0	0	90	0	109
		Totals	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*90*	*0*	*109*
TWH		*Totals*	8	59	23	147	50	331	118	632	60	341	120	593	42	241	112	512
SMH		*Totals*	5	58	20	117	49	260	70	485	46	211	108	512	29	186	70	398
HCGW		*Totals*	13	117	43	264	99	591	188	1117	106	552	228	1105	71	427	182	910
JDH		*Totals*	0	540	160	561	0	419	123	469	0	356	74	459	0	386	79	487

l) Please provide year-to-date volumes for FY 2008 by Operator and by Facility and Service as provided in Table 7. Be sure to include all assumption and calculations.

Response:
Fiscal year to date 2008 procedure volumes by operator, facility and service for all Applicants are provided in Table 7. Assumptions and calculation methodology are outlined in the response to question 5.iii.d.

m) Provide the projected operator volume by unique physician identifier currently providing services at each Applicants' facility as follows:

Response:
Table 8: Projected Operator Volume for each Applicant is shown on the following pages.

Table 8: Projected Operator Volume for each Applicant - Procedures

Cardiac Service Legend: A Primary Angioplasty B Elective Angioplasty C Open Heart Services D Cardiac Catheterizations

ID	Physician	By Facility	FY 2009				FY 2010				FY 2011			
			A	B	C	D	A	B	C	D	A	B	C	D
019578	Paul L. Preissler M.D.	TWH	0	0	38	0	0	0	37	0	0	0	37	0
		SMH	0	0	25	0	0	0	24	0	0	0	24	0
		JDH	0	0	21	0	0	0	21	0	0	0	21	0
		Total	***0***	***0***	***84***	***0***	***0***	***0***	***82***	***0***	***0***	***0***	***82***	***0***
027604	Jonathan A. Hammond M.D.	TWH	0	0	18	0	0	0	17	0	0	0	17	0
		SMH	0	0	27	0	0	0	26	0	0	0	26	0
		JDH	0	0	7	0	0	0	7	0	0	0	7	0
		Total	***0***	***0***	***52***	***0***	***0***	***0***	***50***	***0***	***0***	***0***	***50***	***0***
032227	David J. Underhill M.D.	TWH	0	0	26	0	0	0	25	0	0	0	25	0
		SMH	0	0	11	0	0	0	10	0	0	0	10	0
		JDH	0	0	5	0	0	0	5	0	0	0	5	0
		Totals	***0***	***0***	***42***	***0***	***0***	***0***	***40***	***0***	***0***	***0***	***40***	***0***
040489	Daniel S. Fusco M.D.	TWH	0	0	51	0	0	0	50	0	0	0	50	0
		SMH	0	0	19	0	0	0	18	0	0	0	18	0
		JDH	0	0	48	0	0	0	50	0	0	0	52	0
		Totals	***0***	***0***	***118***	***0***	***0***	***0***	***118***	***0***	***0***	***0***	***120***	***0***
015360	Suphichaya Muangman M.D.	TWH	18	65	0	82	18	63	0	84	18	63	0	84
		SMH	14	14	0	11	13	13	0	11	13	13	0	11
		JDH	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***32***	***79***	***0***	***93***	***31***	***76***	***0***	***95***	***31***	***76***	***0***	***95***
029001	Kevin G. Kett M.D	TWH	0	0	0	10	0	0	0	10	0	0	0	10
		SMH	0	1	0	16	0	1	0	17	0	1	0	17
		JDH	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***1***	***0***	***26***	***0***	***1***	***0***	***27***	***0***	***1***	***0***	***27***
030739	Stephen C. Widman M.D.	TWH	11	62	0	90	11	60	0	92	11	60	0	92
		SMH	9	57	0	125	8	55	0	127	8	55	0	127
		JDH	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***20***	***119***	***0***	***215***	***19***	***115***	***0***	***219***	***19***	***115***	***0***	***219***
043316	Ehsan Ansari M.D.	TWH	10	64	0	118	10	62	0	120	10	62	0	120
		SMH	7	66	0	125	7	64	0	127	7	64	0	127
		JDH	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***17***	***130***	***0***	***243***	***17***	***126***	***0***	***247***	***17***	***126***	***0***	***247***
045393	Raghuraman Vidhun M.D.	TWH	12	84	0	148	12	81	0	151	12	81	0	151
		SMH	4	69	0	130	4	67	0	132	4	67	0	132
		JDH	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***16***	***153***	***0***	***278***	***16***	***148***	***0***	***283***	***16***	***148***	***0***	***283***
000239	Michael C. Malinics D.O.	TWH	0	0	0	52	0	0	0	54	0	0	0	54
		SMH	0	0	0	13	0	0	0	13	0	0	0	13
		JDH	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***65***	***0***	***0***	***0***	***67***	***0***	***0***	***0***	***67***
015678	Joel A. Sherman M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	4	0	0	0	4	0	0	0	4
		JDH	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***4***	***0***	***0***	***0***	***4***	***0***	***0***	***0***	***4***
017679	Henry Borkowski, Jr. M.D	TWH	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***

Table 8: Projected Operator Volume for each Applicant - Procedures

Cardiac Service Legend: A Primary Angioplasy B Elective Angioplasty C Open Heart Services D Cardiac Catheterizations

ID	Physician	By Facility	FY 2009				FY 2010				FY 2011			
			A	B	C	D	A	B	C	D	A	B	C	D
022917	Dennis Dobkin M.D.	TWH	0	0	0	11	0	0	0	11	0	0	0	11
		SMH	0	0	0	16	0	0	0	17	0	0	0	17
		JDH	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***27***	***0***	***0***	***0***	***28***	***0***	***0***	***0***	***28***
027440	Mark S. Rosenberg M.D.	TWH	0	0	0	35	0	0	0	36	0	0	0	36
		SMH	0	0	0	1	0	0	0	1	0	0	0	1
		JDH	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***36***	***0***	***0***	***0***	***37***	***0***	***0***	***0***	***37***
033880	Mark L. Ruggiero M.D.	TWH	0	0	0	6	0	0	0	6	0	0	0	6
		SMH	0	0	0	2	0	0	0	3	0	0	0	3
		JDH	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***8***	***0***	***0***	***0***	***9***	***0***	***0***	***0***	***9***
035100	Joseph P. Morley M.D.	TWH	0	0	0	45	0	0	0	46	0	0	0	46
		SMH	0	0	0	11	0	0	0	11	0	0	0	11
		JDH	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***56***	***0***	***0***	***0***	***57***	***0***	***0***	***0***	***57***
035359	Paul F. Kelly M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***
042450	George Antonopoulos M.D.	TWH	0	0	0	28	0	0	0	28	0	0	0	28
		SMH	0	0	0	18	0	0	0	18	0	0	0	18
		JDH	0	0	0	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***46***	***0***	***0***	***0***	***46***	***0***	***0***	***0***	***46***
13995	Michael Rinaldi, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	2	0	0	0	2	0	0	0	2	0	0
		Totals	***0***	***2***	***0***	***0***	***0***	***2***	***0***	***0***	***0***	***2***	***0***	***0***
21718	Alan M. Kudler, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	100	0	126	0	102	0	129	0	104	0	131
		Totals	***0***	***100***	***0***	***126***	***0***	***102***	***0***	***129***	***0***	***104***	***0***	***131***
22841	Wesley D. Hager, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	38	0	114	0	39	0	116	0	39	0	119
		Totals	***0***	***38***	***0***	***114***	***0***	***39***	***0***	***116***	***0***	***39***	***0***	***119***
23725	Jeffery A. Hisrt, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	3	0	1	0	3	0	1	0	3	0	1
		Totals	***0***	***3***	***0***	***1***	***0***	***3***	***0***	***1***	***0***	***3***	***0***	***1***
29036	Michael A. Azrin, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	161	0	126	0	164	0	129	0	168	0	131
		Totals	***0***	***161***	***0***	***126***	***0***	***164***	***0***	***129***	***0***	***168***	***0***	***131***
29156	Raymond McKay, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	3	0	1	0	3	0	1	0	3	0	1
		Totals	***0***	***3***	***0***	***1***	***0***	***3***	***0***	***1***	***0***	***3***	***0***	***1***
34848	Satesh C. Singh, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	0	0	1	0	0	0	1	0	0	0	1
		Totals	***0***	***0***	***0***	***1***	***0***	***0***	***0***	***1***	***0***	***0***	***0***	***1***

Table 8: Projected Operator Volume for each Applicant - Procedures
Cardiac Service Legend: A Primary Angioplasy B Elective Angioplasty C Open Heart Services D Cardiac Catheterizations

ID	Physician	By Facility	FY 2009 A	FY 2009 B	FY 2009 C	FY 2009 D	FY 2010 A	FY 2010 B	FY 2010 C	FY 2010 D	FY 2011 A	FY 2011 B	FY 2011 C	FY 2011 D
39462	Carol Gemayel, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	0	0	12	0	0	0	12	0	0	0	13
		Totals	***0***	***0***	***0***	***12***	***0***	***0***	***0***	***12***	***0***	***0***	***0***	***13***
44919	Kennth Merkatz, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	0	0	6	0	0	0	6	0	0	0	6
		Totals	***0***	***0***	***0***	***6***	***0***	***0***	***0***	***6***	***0***	***0***	***0***	***6***
45153	Kanwar P. Singh, M.D.	TWH	0	0	0	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0	0	0	0
		JDH	0	92	0	111	0	94	0	114	0	96	0	117
		Totals	***0***	***92***	***0***	***111***	***0***	***94***	***0***	***114***	***0***	***96***	***0***	***117***
TWH		***Totals***	52	275	134	625	50	266	129	638	50	266	129	638
SMH		***Totals***	33	207	81	472	32	200	78	481	32	200	78	481
HCGW		***Totals***	85	482	215	1097	82	466	207	1119	82	466	207	1119
JDH		***Totals***	0	399	81	498	0	407	83	509	0	415	85	520

n) Provide all assumptions and calculations utilized to project operator volumes in Table 8.

Response:
For all Applicants fiscal year 2008 physician data was analyzed to determine the proportion of services provided at all facilities. Assuming no change in physician rosters or in practice patterns the proportions were kept constant for fiscal years 2009 through 2011.

o) In the following table format, please provide projected cardiac catheterization volume by inpatient and outpatient, by operator and facility.

Response:
Table 9: Projected Cardiac Catheterization Volume by Operator is found on the following pages.

Table 9: Projected Catheterizations Inpatient (IP) and Outpatient (OP) by Physician

ID	Physician	By Facility	FY 2009 Patients	FY 2009 IP	FY 2009 OP	FY 2010 Patients	FY 2010 IP	FY 2010 OP	FY 2011 Patients	FY 2011 IP	FY 2011 OP
015360	Suphichaya Muangman M.D.	TWH	83	39	44	84	40	45	84	40	45
		SMH	11	5	6	11	5	6	11	5	6
		JDH	0	0	0	0	0	0	0	0	0
		Totals	***94***	***44***	***50***	***95***	***45***	***51***	***95***	***45***	***51***
029001	Kevin G. Kett M.D	TWH	10	5	5	10	5	5	10	5	5
		SMH	16	7	9	16	7	9	16	7	9
		JDH	0	0	0	0	0	0	0	0	0
		Totals	***26***	***12***	***14***	***26***	***12***	***14***	***26***	***12***	***14***
030739	Stephen C. Widman M.D.	TWH	90	42	48	92	43	49	92	43	49
		SMH	125	59	66	127	60	67	127	60	67
		JDH	0	0	0	0	0	0	0	0	0
		Totals	***215***	***101***	***114***	***219***	***103***	***116***	***219***	***103***	***116***
043316	Ehsan Ansari M.D.	TWH	117	55	62	120	56	64	120	56	64
		SMH	125	59	66	127	60	67	127	60	67
		JDH	0	0	0	0	0	0	0	0	0
		Totals	***242***	***114***	***128***	***247***	***116***	***131***	***247***	***116***	***131***
045393	Raghuraman Vidhun M.D.	TWH	147	70	77	151	71	80	151	71	80
		SMH	130	61	69	132	62	70	132	62	70
		JDH	0	0	0	0	0	0	0	0	0
		Totals	***277***	***131***	***146***	***283***	***133***	***150***	***283***	***133***	***150***
000239	Michael C. Malinics D.O.	TWH	53	25	28	54	25	28	54	25	28
		SMH	12	6	6	13	6	7	13	6	7
		JDH	0	0	0	0	0	0	0	0	0
		Totals	***65***	***31***	***34***	***67***	***31***	***35***	***67***	***31***	***35***
015678	Joel A. Sherman M.D.	TWH	0	0	0	0	0	0	0	0	0
		SMH	4	2	2	4	2	2	4	2	2
		JDH	0	0	0	0	0	0	0	0	0
		Totals	***4***	***2***	***2***	***4***	***2***	***2***	***4***	***2***	***2***
017679	Henry Borkowski, Jr. M.D	TWH	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0
		JDH	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***
022917	Dennis Dobkin M.D.	TWH	11	5	6	11	5	6	11	5	6
		SMH	17	8	9	17	8	9	17	8	9
		JDH	0	0	0	0	0	0	0	0	0
		Totals	***28***	***13***	***15***	***28***	***13***	***15***	***28***	***13***	***15***
027440	Mark S. Rosenberg M.D.	TWH	35	16	19	36	17	19	36	17	19
		SMH	2	1	1	2	1	1	2	1	1
		JDH	0	0	0	0	0	0	0	0	0
		Totals	***37***	***17***	***20***	***38***	***18***	***20***	***38***	***18***	***20***
033880	Mark L. Ruggiero M.D.	TWH	6	3	3	6	3	3	6	3	3
		SMH	2	1	1	3	2	1	3	2	1
		JDH	0	0	0	0	0	0	0	0	0
		Totals	***8***	***4***	***4***	***9***	***5***	***4***	***9***	***5***	***4***
035100	Joseph P. Morley M.D.	TWH	45	21	24	46	22	24	46	22	24
		SMH	11	5	6	11	5	6	11	5	6
		JDH	0	0	0	0	0	0	0	0	0
		Totals	***56***	***26***	***30***	***57***	***27***	***30***	***57***	***27***	***30***
035359	Paul F. Kelly M.D.	TWH	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0
		JDH	0	0	0	0	0	0	0	0	0
		Totals	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***

Table 9: Projected Catheterizations Inpatient (IP) and Outpatient (OP) by Physician

ID	Physician	By Facility	FY 2009 Patients	FY 2009 IP	FY 2009 OP	FY 2010 Patients	FY 2010 IP	FY 2010 OP	FY 2011 Patients	FY 2011 IP	FY 2011 OP
042450	George Antonopoulos M.D.	TWH	28	13	15	28	13	15	28	13	15
		SMH	17	8	9	18	8	10	18	8	10
		JDH	0	0	0	0	0	0	0	0	0
		Totals	***45***	***21***	***24***	***46***	***21***	***25***	***46***	***21***	***25***
13995	Michael Rinaldi, M.D.	TWH	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0
		JDH	0	2	0	0	2	0	0	2	0
		Totals	***0***	***2***	***0***	***0***	***0***	***0***	***0***	***0***	***0***
21718	Alan M. Kudler, M.D.	TWH	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0
		JDH	126	32	94	129	32	97	131	33	98
		Totals	***126***	***32***	***94***	***129***	***32***	***97***	***131***	***33***	***98***
22841	Wesley D. Hager, M.D.	TWH	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0
		JDH	114	29	85	116	29	87	119	30	89
		Totals	***114***	***29***	***85***	***116***	***0***	***87***	***119***	***0***	***89***
23725	Jeffery A. Hisrt, M.D.	TWH	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0
		JDH	1	0	1	1	0	1	1	0	1
		Totals	***1***	***0***	***1***	***1***	***0***	***1***	***1***	***0***	***1***
29036	Michael A. Azrin, M.D.	TWH	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0
		JDH	126	31	95	129	32	97	131	33	98
		Totals	***126***	***31***	***95***	***129***	***0***	***97***	***131***	***0***	***98***
29156	Raymond McKay, M.D.	TWH	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0
		JDH	1	0	1	1	0	1	1	0	1
		Totals	***1***	***0***	***1***	***1***	***0***	***1***	***1***	***0***	***1***
34848	Satesh C. Singh, M.D.	TWH	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0
		JDH	1	0	1	1	0	1	1	0	1
		Totals	***1***	***0***	***1***	***1***	***0***	***1***	***1***	***0***	***1***
39462	Carol Gemayel, M.D.	TWH	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0
		JDH	12	3	9	12	3	9	13	3	10
		Totals	***12***	***3***	***9***	***12***	***3***	***9***	***13***	***3***	***10***
44919	Kennth Merkatz, M.D.	TWH	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0
		JDH	6	2	4	6	2	4	6	2	4
		Totals	***6***	***2***	***4***	***6***	***2***	***4***	***6***	***2***	***4***
45153	Kanwar P. Singh, M.D.	TWH	0	0	0	0	0	0	0	0	0
		SMH	0	0	0	0	0	0	0	0	0
		JDH	111	28	83	114	29	85	117	29	88
		Totals	***111***	***28***	***83***	***114***	***29***	***85***	***117***	***29***	***88***

TWH	***Totals***	625	294	331	638	300	338	638	300	338
SMH	***Totals***	472	222	250	481	226	255	481	226	255
HCGW	***Totals***	1097	516	581	1119	526	593	1119	526	593
JDH	***Totals***	498	127	373	509	129	382	520	132	390

p) Provide all assumptions and calculations utilized to project operator volume by facility in Table 9.

Response:
For all Applicants fiscal year 2008 physician data was analyzed to determine the proportion of services provided at all facilities. Assuming no change in physician rosters or in practice patterns the proportions were kept constant for fiscal years 2009 through 2011.

B. Please address the following questions regarding the existing providers:

a. Identify the existing providers of interventional cardiac services that will be affected by this proposal.

Response:
HCGW is the sole provider of advanced cardiac services in the greater Waterbury service area. The addition of these services in 2005 has allowed the entire region and specifically over 2,400 community members and their families the ability to be cared for locally in their community hospital, by local physicians with excellent quality outcomes, in an environment with which they are comfortable and by providers in whom they have tremendous confidence. A review of program data demonstrates that approximately 90% of the patients served by the interventional cardiac Program are from the primary service area and, as such, no other providers will be significantly affected by the replacement of the current services under the new CON. This Program must be evaluated in the context of being an existing advanced cardiac service program and as such should have little impact on other existing programs.

b. Please explain how these aforementioned providers of interventional cardiac services will be affected by your proposal (i.e. patient volume, quality of care, etc.).

Response:
Based on historical data from the greater Waterbury area prior to the commencement of the demonstration project, cardiac services for area citizens was for the most part provided at hospitals to the south of Waterbury. Therefore, no discussion or analysis related to existing programs in Hartford or Farmington is provided in this response. Existing providers of interventional cardiac services located in Bridgeport, Danbury and New Haven should see no additional effect on the services that they currently provide. Illustrated below is the number of discharges for fiscal year to date 2008 by aforementioned hospitals for each HCGW primary service area town. Over the last three years the majority of patients have chosen to stay locally for their cardiac care.

Angioplasty Data Fiscal Year 2008: October through March - Discharges

Town	Bridgeport Hospital	Danbury Hospital	Hospital of Saint Raphael	St. Vincent's Medical Center	Yale New Haven Hospital
Beacon Falls	0	0	3	0	0
Bethlehem	0	0	0	0	0
Cheshire	0	0	5	0	6
Middlebury	0	0	0	0	0
Naugatuck	1	0	0	3	0
Prospect	0	0	1	1	0
Southbury	0	12	0	0	0
Thomaston	0	0	0	0	0
Waterbury	0	0	2	1	3
Watertown	0	0	0	0	1
Wolcott	0	0	1	0	0
Woodbury	0	1	0	0	1
PSA Total	**1**	**13**	**12**	**5**	**11**
Morris	0	0	0	0	0
Oxford	0	0	1	1	0
Plymouth	0	0	0	1	2
Seymour	4	1	13	4	0
Southington	0	0	34	1	4
Torrington	0	0	1	0	0
SSA Total	**4**	**1**	**49**	**7**	**6**
Other Total	295	138	251	514	608
Total	**300**	**152**	**312**	**526**	**625**

Source: CHIME decision support tool

CABG Surgery Data Fiscal Year 2008: October through March – Discharges

Town	Bridgeport Hospital	Danbury Hospital	Hospital of Saint Raphael	St .Vincent's Medical Center	Yale New Haven Hospital
Beacon Falls	0	0	0	0	0
Bethlehem	0	0	0	0	0
Cheshire	0	0	1	0	3
Middlebury	0	1	0	0	0
Naugatuck	0	0	0	1	0
Prospect	0	0	0	0	0
Southbury	0	0	0	0	1
Thomaston	0	0	0	0	0
Waterbury	0	0	0	0	0
Watertown	0	0	0	0	0
Wolcott	0	0	0	0	0
Woodbury	0	0	0	0	0
PSA Total	**0**	**1**	**1**	**1**	**4**
Morris	0	0	0	0	0
Oxford	0	0	0	0	0
Plymouth	0	0	0	0	0
Seymour	2	0	6	1	1
Southington	0	0	9	0	0
Torrington	0	0	0	0	0
SSA Total	**2**	**0**	**15**	**1**	**1**
Other Total	28	46	74	64	151
Total	**30**	**47**	**90**	**66**	**156**

Source: CHIME decision support tool

Valve Surgery Data Fiscal Year 2008: October through March - Discharges

Town	Bridgeport Hospital	Danbury Hospital	Hospital of Saint Raphael	St. Vincent's Medical Center	Yale New Haven Hospital
Beacon Falls	0	0	0	0	0
Bethlehem	0	0	0	0	0
Cheshire	0	0	0	0	4
Middlebury	0	0	0	0	0
Naugatuck	0	0	0	0	0
Prospect	0	1	0	0	0
Southbury	0	2	1	0	0
Thomaston	0	0	0	0	1
Waterbury	0	0	0	1	3
Watertown	0	0	0	0	0
Wolcott	0	0	0	0	0
Woodbury	0	0	0	0	1
PSA Total	0	3	1	1	9
Morris	0	0	0	0	0
Oxford	1	0	0	1	2
Plymouth	0	0	0	0	0
Seymour	1	0	6	0	1
Southington	0	0	2	0	1
Torrington	0	0	0	0	2
SSA Total	2	0	8	1	6
Other Total	22	18	42	55	166
Total	**24**	**21**	**51**	**57**	**181**

Source: CHIME decision support tool

Currently HCGW is capturing 80% of the market share for angioplasty, 84% of the market share for CABG, and 65% of the market share for valve surgery in the primary service area. Future projections indicate that the other existing providers should see no significant impact on volumes as a result of HCGW.

c. Discuss in detail the impact HCGW has had on these providers (i.e. volume, quality of care, etc.) over the past three years HCGW has been in operation.

Response:

The tables portrayed in the response to question 5.B.c illustrate discharge volume as taken from the CHIME decision support tool.

Danbury Hospital:

HCGW began providing advanced cardiac services in July 2005. Danbury Hospital (DH) began providing interventional cardiac services in January 2005. With no historical data for DH and a service area that includes Western Connecticut and nearby New York, it is not apparent that HCGW has had any impact on the volumes of DH. The Town of Southbury, in HCGW's primary service area, has a volume of interventional procedures including angioplasty and open heart surgery that is typically split with DH per CHIME data.

The DH website notes that it has been named to the Solucient Top 100 Hospitals® for better patient safety, shorter length of stay and lower mortality (death rate) than its peer hospitals. The Program assumes no impact on the quality of care at DH.

Bridgeport Hospital:

According to CHIME data open heart surgery discharges for Bridgeport Hospital (BH) from fiscal year 2003 to fiscal year 2008 are shown below:

BH	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
CABG	214	171	153	92	96	60
Valve	76	71	90	68	77	48
Total OHS	290	242	243	160	173	128

Based on DRG 547,548,549,550,104,105,106
FY 08 is YTD through March 2008 (annualized)

In fiscal year 2003, 15% or 44 cases of BH total open heart surgery volume came from the primary service area of HCGW. In fiscal year 2008, 0% of cases of BH total open heart surgery volume came from the primary service area of HCGW. The overall decline in volumes at BH, however, cannot be solely attributed to HCGW. Decreasing volume, consistent with the statewide decline in open heart surgery volumes, had been noted at BH prior to the opening of HCGW. In addition, St. Vincent's Medical Center (SVMC) in Bridgeport, with presumably the same service area, has surpassed BH in volume capture from fiscal year 2003 to fiscal year 2008.

According to CHIME data in fiscal year 2003, 32% or 400 cases of BH total angioplasty discharges came from the primary service area of HCGW. In fiscal year 2008, 0.3% of the cases of BH total angioplasty volume came from the primary service area of HCGW. The overall decline in volume at BH cannot be solely attributed to HCGW. In fiscal year 2006, when volumes started to significantly decline, DH also began providing angioplasty. In addition, the discharges at SVMC have significantly surpassed the discharges of BH from fiscal year 2006 to fiscal year 2008 as noted below:

Hospital	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
BH-PCI	1263	1329	1103	761	598	600
SVMC-PCI	592	976	1070	1131	1055	1052

Based on DRG 518,555,556,557,558
FY 08 is YTD through March 2008 (annualized)

As to quality, unlike HCGW, BH is under no obligation to report quality data to the CT OHCA Cardiac Registry. Therefore, quality data is not accessible to the public. However, according to the BH website, BH is the only Connecticut hospital named as one of the nation's 100 Top Hospitals® for cardiovascular care by Thomson Healthcare (formerly Solucient) in 2005, 2006 and 2007. Delivery of quality cardiac

services does not appear to have been effected at BH despite volumes that have decreased over time.

St. Vincent's Medical Center:

According to CHIME data, open heart surgery discharges for SVMC from fiscal year 2003 to fiscal year 2008 are shown below:

SVMC	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
CABG	215	212	180	150	127	132
Valve	52	65	92	88	93	114
Total OHS	277	287	272	238	220	246

Based on DRG 547,548,549,550,104,105,106
FY 08 is YTD through March 2008 (annualized)

In fiscal year 2003, only 1.8% or 5 cases of SVMC total open heart surgery volume came from the primary service area of HCGW. In fiscal year 2008 that had decreased to 1.6% or 2 cases. With the overall decline in open heart surgery volumes statewide and at SVMC, it cannot be presumed that this was due to the HCGW Program.

During this same timeframe, angioplasty volumes at SVMC significantly increased as shown above in the comparison to BH. A 78% increase in angioplasty volumes at SVMC is noted from fiscal year 2003 to fiscal year 2008. In addition, total interventional cardiac volume (angioplasty and open heart surgery combined) increased 49% during the same time period. SVMC has demonstrated growth in its comprehensive cardiovascular services despite the introduction of HCGW as well as the DH program.

As to quality, SVMC is also not obligated to report quality data to the CT OHCA Cardiac Registry. However, the SVMC websites notes that SVMC is "A recipient of HealthGrades 2007 Cardiac Care Excellence Award. St. Vincent's was named to the top 10% in the nation for cardiac care, including surgery, interventions and the treatment of heart attack and heart failure. It is the second consecutive year that St. Vincent's has earned national distinction for "Five Star" interventions in the study." Quality at SVMC appears not to have been affected by other programs.

Yale-New Haven Hospital:

According to CHIME data open heart surgery discharges for Yale-New Haven Hospital (YNNH) from fiscal year 2003 to fiscal year 2008 are shown below:

YNHH	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
CABG	522	461	455	333	318	312
Valve	352	369	353	341	322	362
Total OHS	874	830	808	674	640	674

Based on DRG 547,548,549,550,104,105,106
FY 08 is YTD through March 2008 (annualized)

In fiscal year 2003, 14% or 122 cases of YNNH total open heart surgery volume came from the primary service area of HCGW. In fiscal year 2008 that had decreased to 3.8% or 26 cases. The overall decline in open heart surgery procedures at YNNH cannot solely be attributed to HCGW. Factors including the decline in statewide open heart surgery volumes, the opening of two new open heart surgery programs in fiscal year 2005, as well as a second open heart surgery program in New Haven could all have impacted YNNH.

According to CHIME data angioplasty discharges for YNNH from fiscal year 2003 to fiscal year 2008 are shown below:

YNHH	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
PCI	1866	1502	1378	1288	1204	1250

Based on DRG 518,555,556,557,558
FY 08 is YTD through March 2008 (annualized)

In fiscal year 2003, 16% of the angioplasty volume at YNNH originated from the HCGW primary service area. In fiscal year 2008, 1.8% of the angioplasty volume at YNNH originated from the HCGW primary service area. As above, the same factors apply to angioplasty as to open heart surgery. The statewide decline in angioplasty, the opening of three new angioplasty programs in fiscal year 2005 and fiscal year 2006, as well as a second angioplasty program in New Haven could all have had an impact.

Similar to BH and SVMC, YNNH is not obligated to report quality data to the CT OHCA Cardiac Registry. However, the YNNH website posted on July 11, 2008, the following announcement demonstrating that the quality of care has not been compromised at YNNH:

> ...For the second consecutive year, *U.S. News & World Report* has named Yale-New Haven Hospital (YNHH) to its national honor roll as one of the top hospitals in the United States. YNHH is ranked 19th in the U.S. according to the publication's annual "America's Best Hospitals" ranking in the July 14 issue. Yale-New Haven Hospital was one of only three New England hospitals to be selected, joining Massachusetts General Hospital and Brigham and Women's Hospital, both of Boston, on the 2008 honor roll....

Hospital of Saint Raphael:

According to CHIME data, open heart surgery discharges for Hospital of Saint Raphael's (HSR) from fiscal year 2003 to fiscal year 2008 are shown below:

HSR	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
CABG	484	406	292	226	215	180
Valve	168	163	153	91	97	102
Total OHS	652	569	445	317	312	282

Based on DRG 547,548,549,550,104,105,106
FY 08 is YTD through March 2008 (annualized)

In fiscal year 2003, 27% or 177 cases of HSR total open heart surgery volume came from the primary service area of HCGW. In fiscal year 2008 that had decreased to 1.4 % or 4 cases. The decline in open heart surgery procedures from fiscal year 2003 to fiscal year 2008 at HSR cannot solely be attributed to HCGW. Factors including the decline in statewide open heart surgery volumes, the opening of two new open heart surgery programs in fiscal year 2005, as well as a second open heart surgery program in New Haven could all have had an impact.

According to CHIME data, angioplasty discharges for Hospital of HSR from fiscal year 2003 to fiscal year 2008 are shown below:

HSR	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
PCI	960	996	727	713	654	624

Based on DRG 518,555,552,557,558
FY 08 is YTD through March 2008 (annualized)

In fiscal year 2003, 12% of the angioplasty volume at HSR originated from the HCGW primary service area. In fiscal year 2008, 3.8% of the angioplasty volume at HSR originated from the HCGW primary service area. As above, the same factors apply to angioplasty as to open heart surgery. The statewide decline in angioplasty, the opening of three new angioplasty programs in fiscal year 2005 and fiscal year 2006, as well as a second angioplasty program in New Haven could all have impacted HSR.

HSR is also not required to submit quality data to OHCA, however, www.hospitalcompare.hhs.gov reports hospital level data for Medicare recipients in key quality areas. According to this website HSR demonstrates compliance in 100% of the Heart Attack Process Care Measures and it reports that 84% of STEMI patients are re-perfused in less than 90 minutes. This seems to demonstrate that HSR has an acceptable level of quality for these services.

Conclusion:

The volumes at the existing programs have been impacted by multiple factors including advances in cardiac medicine for prevention and early treatment of heart disease and improvements in cardiovascular surgical and interventional techniques which are difficult to quantify. Although it may be presumed that a percentage of volume from the greater Waterbury area has been shifted to the HCGW (a Program that can provide timely access to excellent care and that is in close proximity to area residents) it has not seemed to impact the quality of and access to care that residents in the Danbury, Bridgeport and New Haven areas are receiving.

C. Will your proposal remedy any of the following barriers to access? *Please provide an explanation.*

☒	Cultural	☒	Transportation
☒	Geographic	☒	Economic
☐	None of the above	☒	Other (Identify) Access to timely life saving care.

If you checked other than None of the above, please provide an explanation.

Response:
The people of the greater Waterbury community are the sole reason the Program was developed and implemented. This community needs and deserves access to advanced cardiac care available in a timely, cost-efficient manner. The following barriers to access were addressed over the last three years with continued improvement expected with approval of a permanent advanced cardiac Program.

Cultural:

The greater Waterbury area, and Waterbury in particular, has several cultural factors which put residents at distinct risk. Continued local access to a quality full-service cardiac Program will allow residents to benefit from a decreased risk of mortality.

According to the most recent US 2000 Census data, (Appendix 5.iii.b) approximately 50% of the Waterbury population is Black, Hispanic, or other minority. The Connecticut Department of Public Health report titled "The Burden of Cardiovascular Disease in Connecticut 2006 Surveillance Report" (Appendix 5.iii.b) reports that, "Coronary Heart Disease (CHD) death rates differ by race, ethnicity and gender with Black (non-Hispanic) males and females having significantly higher CHD death rates compared with White (non-Hispanic) males and females, respectively ($p<.01$)".

Similarly, the report indicates that Black (non-Hispanic) residents have higher hospitalization rates for CHD and age adjusted premature mortality from CHD compared with White (non-Hispanic) and Hispanic residents.

The key risk factor for all cardiovascular diseases is increasing age. Per the report, 86% of all deaths from CHD occurs in those over the age of 65. Population data for the greater Waterbury area demonstrates that by 2011 15.4% of the population in the HCGW primary service area will be over 65 years of age.

Geographic:

An advanced cardiac care Program in Waterbury eliminates any barriers related to travel for the care needed. Over the last three years patients have overwhelmingly chosen to

stay in the greater Waterbury area for the care they need. This is demonstrated by the fact that approximately 90% of patients live in the Program's primary service area. Any change to the current delivery of services would create a geographic barrier to care that is unnecessary and burdensome and catastrophic to the citizens of greater Waterbury.

Transportation:

The demonstration project eliminated transportation issues related to cardiac care and in particular emergency cardiac care. Patients in need of immediate cardiac care have not been transferred to other distant emergency rooms for timely reperfusion, but instead have been treated at either campus to which they are brought by ambulance. As a result, STEMI patients are arriving at the catheterization labs and are having their arteries opened in under 90 minutes 88% of the time. This is superior when compared to just over three years ago when this occurred 0% of the time due to the transportation time to other facilities.

In addition, families are no longer required to travel to cities 25-30 miles away to be with their loved ones while they receive care. With the current cost of gasoline at close to $4.00 per gallon, thousands of dollars per year will be saved by local families if there is no need to drive to other cities.

The demonstration also allowed local ambulance companies to attend to patients in this area without the burden and cost of transporting patients to distant cities, therefore, bringing them outside of the typical service area (Appendix 5.C).

Economic:

According to US 2000 Census Data, the median household income in Waterbury was reported at approximately $34,000 per year (as compared to $53,000 for the State as a whole). Only 14% of the population has a Bachelors Degree or higher. The Connecticut Economic Resource Center (www.cerc.com) reports that 16% of the Waterbury population is living under the poverty line (Appendix 5.C).

Additionally, the socio-economic profile in Waterbury is well documented in the May 2007 *Office of Health Care Access Report of Investigative Proceedings* - (Appendix 5.C), showing that Waterbury and its neighboring towns of Naugatuck and Watertown have:

- *A higher percentage of residents over 75 years old (which as a group has the highest potential to suffer from chronic diseases including cardiac disease that needs management).*
- *Minorities that have high hospitalization and uninsured rates.*
- *A labor force that has a comparably higher tendency to work in service, production, transportation and material moving industries that are seasonal, temporary or part-time in nature.*

The table below illustrates other socio-economic factors that impact Waterbury. Lack of education, higher unemployment and lower household incomes are key contributors to the status of the local economy.

Selected Socio-Economic Statistics						
	% High School Graduation	% with Bachelor's Degree or Higher	% of Civilian labor force Unemployed	% in Mg't Professional related Jobs	% in Service/ Sales/ Transp. Jobs	Average Household Income
Waterbury	71.7	13.9	8.6	25.1	55.9	51,888
State of CT	84	31.4	5.6	39.1	52.8	82,601

Source: US Census Bureau 2000

These socio-economic statistics and Program data indicate that some of Connecticut's most vulnerable patients make up the population of greater Waterbury and would be greatly impacted if there was a need to return to receiving care at facilities in New Haven, Bridgeport or elsewhere. Residents rely on our city hospitals to provide for their needs as many do not have adequate transportation and support systems to seek services in distance cities. Similarly, travel, food and lodging costs for families desiring to visit or stay with patients who may receive care in distant cities, would be an unnecessary burden and a barrier to supportive care.

The Connecticut Department of Public Health report titled "The Burden of Cardiovascular Disease in Connecticut 2006 Surveillance Report" (Appendix 5.iii.b) also reports that lower socioeconomic position is an important risk factor for cardiovascular disease (CVD). This is measured by personal income, household income or educational level attained. As behavioral risk factors such as smoking, hypertension and obesity are more prevalent with individuals in with lower socioeconomic standing, this correlates to higher incidences of CVD. Similarly, those with lower incomes tend to use preventative health services less frequently further increasing their health risks.

Local access to services to prevent, diagnose and treat cardiac health issues is critical to the well being of the greater Waterbury population.

Timely Access to Treatment:

A significant barrier that will be remedied by the establishment of a permanent cardiac Program is the barrier to timely treatment for cardiac care. Prior to the approval of the demonstration project, citizens of greater Waterbury were forced to travel to hospitals miles away for care that they so desperately needed. Prior to 2005, advanced cardiac services were only available in Farmington, Hartford, New Haven and Bridgeport.

The current accepted standard of care is that STEMI patients are treated in 90 minutes or less. Recent Program data shows that through July 2008 greater Waterbury residents were being treated in an average of 67 minutes. Access to this level of timely care would not be available without the Program. Transporting patients to distant cities should not be a consideration when lives are at stake and qualified physicians and hospitals are available locally.

D. Have the Applicants conducted a Needs Assessment and a Market Share Analysis for the proposed cardiac services?

a. If the response is No, please explain in detail why not and what did the Applicants utilize to assess the need for this proposal?

Response:
This question assumes a hypothetical consideration of what a future Program could mean to a not previously serviced region. No needs assessment was undertaken because the Program exists and rather than relying on projections and estimates, real verifiable evidence is available. The patients served, the market share and the quality of the Program overwhelmingly demonstrate the need for a permanent Program with the full continuum of advanced cardiac care for the region. In addition, need was clearly identified through the analysis of a variety of secondary data sources that outline national, state and local community need, health risks and conditions. In addition to these data sources, data collected in the three year history of service provision to the greater Waterbury area is sufficient evidence to demonstrate the ongoing need for advanced cardiac services.

These secondary data sources have been summarized in response to questions 5.ii and 5.iii.b and are available for review in Appendices 5.ii and 5.iii.b.

b. If yes, explain in detail what Needs Assessment and Market Share Analysis were conducted, the process and the results.

Response:
A market share analysis was conducted utilizing the Connecticut Hospital Association's CHIME data and Patient Census Report (Appendix 5.D.c).

CHIME inpatient discharge data for the following DRGs was included in the analysis.

Angioplasty:	518, 555, 556, 557, 558
Valve Surgery:	104, 105
CABG:	106, 547, 548, 549, 550

Because CHIME data does not provide outpatient statistics, the Patient Census Report for fiscal year end 2006 and 2007 and fiscal year to date June 2008 were used to identify inpatient and outpatient cardiac catheterization procedures.

The primary service area volumes* for each service were summarized for each hospital, by fiscal year. The individual hospital totals were compared to the total volumes* originating from the primary service area as a whole to determine hospital market share. SMH and TWH volumes* were combined to create the HCGW market share. All other hospitals were grouped into an "other" category.

SMH + TWH PSA Volume* ÷ Total PSA Volume*= HCGW PSA Market Share
*CHIME discharges for angioplasty and open heart surgery & PCR procedures for cardiac catheterizations

It is noteworthy that the Patient Census Report does not provide zip code level data to identify the procedures that originate from the primary service area. Therefore, the HSA 5 town grouping served as a suitable proxy. For the purpose of the market share projections for catheterization procedures, the HSA 5 totals are assumed to be the total market. In all likelihood, HSA 5 represents a greater number of catheterization procedures than actually originate from the HCGW PSA, and as such the estimated market share resulting from this analysis is a more conservative estimate than actual market share.

Primary Service Area Market Volume

	FY 2006		FY 2007		FY 2008 YTD (3)	
	HCGW	Other Hospitals	HCGW	Other Hospitals	HCGW	Other Hospitals
PCI (1)	**570**	**155**	**534**	**156**	**251**	**61**
OHS (1)	**167**	**118**	**185**	**86**	**91**	**29**
Valve	51	56	61	46	33	18
CABG	116	62	124	40	58	11
Catheterizations (2)	**1426**	**967**	**1554**	**849**	**1154**	**691**
Inpatient	847	412	1024	378	781	308
Outpatient	579	555	530	471	373	383

(1) Discharges per CHIME
(2) Procedures per Patient Census Report
(3) Discharges: October to March 2008; Procedures: October to June 2008

Primary Service Area Market Share
% of Market Capture

	FY 2006		FY 2007		FY 2008 YTD (3)	
	HCGW	Other Hospitals	HCGW	Other Hospitals	HCGW	Other Hospitals
PCI (1)	**78.6%**	**21.4%**	**77.4%**	**22.6%**	**80.5%**	**19.6%**
OHS (1)	**58.6%**	**41.4%**	**68.3%**	**31.7%**	**75.8%**	**24.2%**
Valve	47.7%	52.3%	57.0%	43.0%	64.7%	35.3%
CABG	65.2%	34.8%	75.6%	24.4%	84.1%	16.9%
Catheterizations (2)	**59.6%**	**40.4%**	**64.7%**	**35.3%**	**62.6%**	**37.5%**
Inpatient	67.3%	32.7%	73.0%	27.0%	71.7%	28.3%
Outpatient	51.1%	48.9%	53.0%	47.1%	49.3%	50.7%

(1) Discharges per CHIME
(2) Procedures per Patient Census Report
(3) Discharges: October to March 2008; Procedures: October to June 2008

The results of the analysis show constant growth in market share for HCGW and a significant slowing of outmigration, which indicates that patients originating from the proposed service area are selecting to receive their cardiac care locally.

c. Provide a copy of the Needs Assessment and the Market Share Analysis conducted by the Applicants.

Response:
The secondary data sources used to assess need are included in Appendices 5.ii and 5.iii.b. The hospital specific market share excerpts from CHIME Data are noted in the response to 5.D.b. and the cardiac catheterization data excerpted from the Patent Census Reports are included in Appendix 5.D.c.

E. Provide copies of any of the following plans, studies or reports *related to your proposal:*

☐ Epidemiological studies ☐ Public information reports

☒ Other (Identify) see below

Response:
All recent medical literature and guidelines and governmental reports are included in Appendices appropriately labeled by question 5.1.a.

6. Quality Measures

A. Check off all the Standard of Practice Guidelines that will be utilized by the Applicants for the proposed services. Please submit the most recent copy of each report related to the proposal:

☒ American College of Cardiology	☐ National Committee for Quality Assurance	☐ Public Health Code & Federal Corollary
☐ National Association of Child Bearing Centers	☐ American College of Obstetricians & Gynecologists	☐ American College of Surgeons
☐ Report of the Inter-Council for Radiation Oncology	☐ American College of Radiology	☒ Other: Specify: Society of Thoracic Surgeons

Response:
See Appendix 5.1.a. for above referenced guidelines.

B. Explain how the Applicants plan to meet the American College of Cardiology/American Heart Association practice guidelines related to this proposal. If the Applicants do not expect the proposed interventional cardiac Program to meet these guidelines and protocols, please explain how quality of the interventional cardiac Programs will be maintained in relation to the ACC/AHA guidelines.

Response:
As to Angioplasty:

The Program will continue to meet ACCF/AHA/SCAI 2007 Update of The Clinical Competence Statement on Cardiac Interventional Procedures as well as the ACC/AHA/SCAI 2005 Guideline Update for PCI (Appendix 5.i.a). Individual operator (minimum volumes of 75 per physician) will continue to be met. The Program will continue to participate in the D2B Alliance for Quality (see response to question 6.E) and will continue to submit data to the ACC-NCDR for benchmarking and quality improvement purposes.

The Applicants will monitor risk adjusted outcomes and continue to meet all CT OHCA cardiac registry data reporting requirements as well as any future State mandated data reporting requirements.

As to Open Heart Surgery:

As per the response to question 5.i.a., the Program expects to continue to meet the guidelines set forth for angioplasty and open heart surgery. The ACC/AHA revised Guideline Update for Coronary Artery Bypass Graph Surgery (CABG) published in 2004

is the most recent ACC/AHA guidelines for open heart surgery. *Section 7 Institutional and Operator Competence, 7.1 Volume Consideration* states: (Appendix 5.i.a).

> ...In summary, studies suggest that survival after CABG is negatively affected when carried out in institutions that perform less than a threshold number of cases annually. Similar conclusions have been drawn regarding individual surgeon volumes. In states where reporting of outcomes is an accepted practice (e.g., New York State), the relationship between low volumes at either an institutional or individual level seems to have diminished over time. This observation strengthens the argument for outcome tracking and supports a posture of close monitoring of institutions or individuals that perform less than 100 cases annually. It must be remembered that these same studies also found a wide variation in risk-adjusted mortality rates in low volume situations; i.e., some institutions and practitioners maintained excellent outcomes despite relatively low volumes....

The above referenced Guideline Update for CABG Surgery continues to support the argument for monitoring clinical outcomes in those programs that perform less than 100 cases annually. However, the guidelines do not support the position that quality programs with an institutional volume of less than 100 surgical cases not be allowed to operate. As a Program, HCGW performed over 100 surgical cases and as demonstrated in the application, is projected to do so. These guidelines refer to surgeon volume as well and as stated in the response to question 5.i.b., this may be a more important issue for OHCA to consider as it evaluates the permanency of the Program.

The application for the original demonstration project referred to the American College of Surgeons Guidelines for Cardiothoracic Surgery and volume targets were set in part based on these guidelines. The Applicants do not support the use of these Guidelines as previously stated in the response to question 5.1.a. because they are significantly outdated and there are more relevant and reliable recent studies that should be considered instead

More relevant is the report of the STS Quality Measure Task Force entitled *Quality Measurement in Adult Cardiac Surgery: Part 1—Conceptual Framework and Measure Selection* (Appendix 5.i.a.) that was published in 2007 and recommends the use of National Quality Forum measures of quality in program evaluation. The STS does not endorse threshold volume for cardiac surgeons or open heart surgical programs (Appendix 5.i.a). The 2007 states the following regarding the use of volume as a proxy for quality for CABG procedures:

> ...Structure: Structural measures refer to inherent characteristics of the provider that are believed to be associated with higher quality. These may include, for example, the volume of a particular type of procedure performed annually, advanced information technology such as electronic health records or computerized order entry, participation in an outcomes database registry, sophisticated radiographic imaging capabilities, number of approved residencies, and nurse staffing ratios. For many such measures, the strength of their relationship with desired health care outcomes is not well defined....

...Without question, volume is the most extensively studied structural measure of quality in all of medicine and surgery. Whether this reflects "practice makes perfect" or "selective referral" to institutions perceived to be of higher quality is uncertain. The strength of the volume outcome relationship varies widely. For complex procedures such as esophagectomy or pancreatectomy that are performed relatively infrequently even at high volume institutions, the volume-outcome association is strong. For some frequently performed, relatively standardized and mature complex procedures such as CABG, where annual hospital volumes may range from 100 to more than 1000 cases, the volume-outcome relationship is weak....

The Program is committed to monitoring its outcomes and utilizing the STS national data registry to identify potential areas of improvement. Program physicians ardently support the use of the STS database for monitoring outcomes.

C. Submit a list of all key professional and administrative personnel, including the Chief Executive Officer (CEO) and Chief Financial Officer (CFO), Medical Director of Interventional Cardiac Program, Cardiac Surgeons, Interventional Cardiologists, etc. related to the proposal and a copy of their Curriculum Vitae.

Note: For physicians, please provide a list of hospitals where the physicians have admitting privileges.

Response:
Curriculum Vitae of those below are provided in Appendix 6.C.

Name	Title	Hospital	Admitting Privileges
John Tobin	President and CEO	TWH	Not applicable
William Casey	Interim President and CEO	SMH	Not applicable
James Thornton	Hospital Administrator	JDH	Not applicable
Colleen Scott	CFO	TWH	Not applicable
Robert Halko	CFO	SMH	Not applicable
Daniel Upton	CFO	JDH	Not applicable
Loraine Shea	Executive Director	HCGW	Not applicable
Henry Borkowski, MD	Medical Director HCGW	TWH SMH	TWH, SMH
Stephen Widman, MD	Medical Director of Interventional Cardiology	TWH SMH	TWH, SMH
Ehsan Ansari, MD	Interventional Cardiologist	TWH SMH	TWH, SMH
Ragurahmen Vidhun, MD	Interventional Cardiologist	TWH SMH	TWH, SMH
Suphichaya Muangman, MD	Interventional Cardiologist	TWH SMH	TWH, SMH
Paul Preissler, MD	Chief of Cardiothoracic Surgery	TWH SMH JDH	TWH, SMH, JDH, Hartford Hospital (HH) Connecticut Children's Medical Center (CCMC)
Daniel Fusco, MD	Cardiothoracic Surgeon	TWH SMH JDH	TWH, SMH, JDH, HH
Jonathan Hammond, MD	Cardiothoracic Surgeon	TWH SMH JDH	TWH, SMH, JDH, HH, CCMC
David Underhill, MD	Cardiothoracic Surgeon	TWH SMH JDH	TWH, SMH, JDH, HH, CCMC
Paul Langevin, MD	Cardiac Anesthesiologist	TWH SMH	Not applicable
Ronald Burt, MD	Cardiac Anesthesiologist	TWH SMH	Not applicable
David Heimbinder, MD	Cardiac Anesthesiologist	TWH SMH	Not applicable
Ricardo Cardenas, MD	Cardiac Anesthesiologist	TWH SMH	Not applicable
David Rosinski	Perfusionist	TWH SMH JDH	Not applicable
David D'Onofrio	Perfusionist	TWH SMH JDH	Not applicable
Ronald Salonia	Perfusionist	TWH SMH JDH	Not applicable
Paul Juregei	Perfusionist	TWH SMH JDH	Not applicable

D. Provide a copy of the most recent inspection reports and/or certificate for each facility:

☒	DPH	☒	JCAHO
☒	Fire Marshall Report	☐	AAAHC
☐	AAAASF	☐	Other: _____

Note: Above referenced acronyms are defined below. [1]

Response:
The above referenced reports/certificates for all three Applicants are provided in Appendix 6.D.

E. Provide a copy of the following (as applicable):

☒ A copy of the related Quality Assurance plan
☒ Protocols for service
☒ Patient Selection Criteria/Intake form

Response:
All of the above referenced documents are provided in Appendix 6.E.

As to quality, the Program with JDH has monitored its outcomes since its inception. On a monthly basis the Program has an interdisciplinary case review for all Program physicians and clinicians to review individual angioplasty and open heart surgery cases for the purpose of shared learning and process improvements. The Program Joint Quality Committee meets every other month to discuss Program data, registry submission outcome reports and Program processes. Program physicians provide ongoing education and consultation to clinical staff as a means to continued learning.

As a result, the Program has successfully provided quality cardiac services during the three year demonstration project and will continue to produce outcome excellence. Outcomes measures demonstrate that advanced cardiac services provided are meeting or exceeding national registry benchmarks.

Angioplasty:

As to Angioplasty, the Program has consistently demonstrated outcomes in major areas that are comparable to or better than the national benchmarks. Of particular note is the Program's door to balloon time. The ACC in conjunction with a national quality group named the D2B Alliance (Appendix 6.E) has set a standard for hospitals that provide primary angioplasty. The standard is that a minimum of 75% of the patients presenting with STEMI should have their arteries opened or unblocked within 90 minutes of entering the emergency department. In Waterbury, if a STEMI patient is admitted to the

[1] DPH – Department of Public Health; JCAHO – Joint Commission on Accreditation of Hospitals Organization; AAAHC – Accreditation Association for Ambulatory Health Care, AAAASF – American Association for Ambulatory Surgery Facilities, Inc.

emergency department at either campus, 88% of the time the patient's arteries will be opened in less than 90 minutes. As of July 2008, the average door to balloon time for the Program was 67 minutes. This far exceeds the national benchmark and is due to the superb teamwork of the clinical staff and physicians. Angioplasty outcomes as reported to the ACC are noted in the Tables F, G and H below and encompass data from April 2007 to March 2008. All demonstrate the exceptional quality of the angioplasty services.

Table F Proportion of STEMI Patients with door to balloon time <= 90 Minutes

	April 07 to March 08	ACC Mean D2B <= 90 minutes
WH (381 cases)		
% D2B <= 90 minutes	83%	72%
SMH (245 cases)		
% D2B <= 90 minutes	93%	72%

Source: American College of Cardiology (ACC)

Table G Angiographic Success

	April 07 to March 08	ACC Mean Angiographic Success
WH (381 cases)		
Angiographic Success	99.6%	99.3%
SMH (245 cases)		
Angiographic Success	99.3%	99.3%

Source: American College of Cardiology (ACC)

Table H Risk Adjusted Mortality (RAM)

	April 07 – March 08	ACC Mean RAM
WH (381)		
Risk Adjusted Mortality	1.05%	1.23%
SMH (245 cases)		
Risk Adjusted Mortality	.067%	1.23%

Source: American College of Cardiology (ACC)

The Program has demonstrated the need for the services and the quality of the services provided. The community has demonstrated the confidence in and overwhelming support of the Program continuing to provide these necessary cardiac services.

Open Heart Surgery:

As noted previously, the Program has submitted data to the STS National Adult Cardiac Surgery Database since it began providing services. In addition to specific Program data, the STS also provides comparisons to other programs across the country. National Quality Forum measures identify key quality indicators for open heart surgery programs. The most recent STS Composite Quality Rating of these measures gives both SMH and TWH an excellent rating for overall quality and avoidance of morbidity and mortality for calendar year 2007. This rating is produced annually and demonstrates that the Program produces outcomes that meet or exceed the STS benchmarks. 77% of the programs reporting to the STS received similar ratings demonstrating that the services provided in Waterbury are comparable to those throughout the country. In 2007, 768 hospitals reported their open heart surgery data to the STS regarding over 200,000 procedures.

In addition, outcome data for the two major open heart surgery procedures that make up the majority of the open heart surgery volume are noted below and are compared to the most recent STS benchmark for the same outcome. All HCGW data compares favorably to the data in the STS database.

Table I **Open Heart Surgery Outcome Data**

TWH	2007	STS Benchmark
CABG (57 Cases)		
Inpatient Mortality	0%	1.8%
Deep Sternal Wound Infection	0%	0.3%
Post Operative Stroke	0%	1.1%
Aortic Valve Replacement (9 Cases)		
Inpatient Mortality	0%	2.5%
Deep Sternal Wound Infection	0%	0.4%
Post Operative Stroke	0%	1.6%

SMH	2007	STS Benchmark
CABG (69 Cases)		
Inpatient Mortality	1.4%	1.8%
Deep Sternal Wound Infection	0%	0.3%
Post Operative Stroke	1.3%	1.1%
Aortic Valve Replacement (6 Cases)		
Inpatient Mortality	0%	2.5%
Deep Sternal Wound Infection	0%	0.4%
Post Operative Stroke	0%	1.6%

Source: STS database 2007

7. Improvements to Productivity and Containment of Costs

In the past year have your facilities undertaken any of the following activities to improve productivity and contain costs?

- ☒ Energy conservation
- ☒ Group purchasing
- ☒ Reengineering
- ☐ None of the above
- ☒ Application of technology (e.g., computer systems, robotics, telecommunication systems, etc.)
- ☒ Other (identify): Inpatient pediatric program consolidation, staff reductions, pharmacy standardization and inventory control.

Response:

SMH and TWH routinely engage in efforts to improve productivity and contain costs. This has been accomplished by implementing programs, using process improvement and lean techniques, and looking at efforts to consolidate services at the two hospitals.

Energy Conservation:

Energy conservation programs and initiatives for improved environmental and cost efficiency have enabled SMH and TWH to reduce the impact of escalating inflationary energy costs. Renovations and changes in equipment have occurred to accommodate energy efficient fixtures/equipment.

Reengineering:

Process improvement and reengineering are a mainstay to each hospital's quality improvement program and efforts to provide cost effective services. These projects work to refine inefficient processes, eliminate redundant work and work arounds, which all lead to an increase in efficiency and improved quality and patient satisfaction.

Applications of Technology:

Investments have been made at both hospitals in various technological applications aimed at improving productivity. Clinical information systems, Picture Archiving and Communication Systems (PACS), and the updating of nursing call systems are just some of the examples of technology used to enhance the delivery of clinical care.

Other:

During the past year, approval was granted by the OHCA to consolidate the inpatient pediatric programs at both Waterbury hospitals into one unit that will be owned and operated by Connecticut Children's Medical Center at a Waterbury campus. In addition to the many past collaborative efforts, the pediatric project is yet another example of a collaborative arrangement among three hospitals and community physicians in order to maintain the high standard of care in the Waterbury community. This effort, like the others before it, will lead to improving the access to quality of care, but also greater efficiency for the health care delivery system in Waterbury.

Both hospitals have had to engage in staff reductions in the last several years. Such actions are difficult by necessary given the payer climate. Other actions to contain costs include pharmacy standardization and inventory control.

Group Purchasing:

Both hospitals are members of national group purchasing networks, which help to reduce costs based on purchase and volume contracts. Every effort is made to focus on utilization of supplies and on standardization of products. Both of these efforts are accomplished through staff involvement and monitoring.

8. Miscellaneous

A. Will this proposal result in new (or a change to) your teaching or research responsibilities?

☐ Yes ☒ No

If you checked "Yes," please provide an explanation.

B. Are there any characteristics of your patient/physician mix that makes your proposal unique?

☒ Yes ☐ No

If you checked "Yes," please provide an explanation.

Response:
This proposal is unique as it will replace a mature program with demonstrated quality outcomes with one that is equally successful under the direction of a new CON. The Program already has a proven track record of high utilization by the greater Waterbury area as well as excellent clinical results.

The number of cardiologists that live and practice in the greater Waterbury area is significant as they are key to a successful comprehensive cardiac care Program. Over the last three years, the number of community based dedicated cardiologists has grown from 14 to 17 and a new practice has opened (Naugatuck Valley Cardiology Associates-NVCC). For the angioplasty Program there are now 4 practicing interventional cardiologists.

In addition, over the last three years, greater Waterbury has added 4 cardiothoracic surgeons and 4 cardiac anesthesiologists to the physician mix. These loyal physicians came to the Waterbury area solely for the original implementation of the Program and remain committed to the Program in the future. What makes these physicians valuable is the fact that they have brought to this Program decades of experience and systems of care that have been utilized in other successful programs. In addition, each of the cardiothoracic surgeons provides surgical services not just at SMH and TWH, but also at JDH and HH. This is a clear example of where sufficient utilization should not be based upon the volume of one type of service at one location. But instead, sufficient utilization should be based on the total amount of services provided along with the consideration of the entire population served by physician groups and the Program.

There is currently no need to further recruit physicians for this Program to successfully meet community needs.

All physicians have demonstrated full involvement in the Program. This has been demonstrated by participation in all levels of community based education, ongoing education of the clinical staff, participation in hospital and Program events, radio and television appearances, and, most importantly, the delivery of "state of the art" care to the citizens of greater Waterbury.

The greater Waterbury population has been described in great detail in question 5.iii.b. in terms of risk factors for coronary heart disease. The prevalence of these risk factors speaks to the ongoing need for the availability of advanced cardiac care in this city.

What is not documented in scientific or demographic literature, but what is prevalent in greater Waterbury, is the outpouring of support and gratitude for HCGW over the first three years of the Program. The greater Waterbury community is made up residents with a significant amount of loyalty to both SMH and TWH as demonstrated in the market share statistics outlined earlier in the application. They live, work, worship and seek healthcare in this community because they are connected to this community. Over 12,000 letters of support have been signed by members of this community to date and it is likely that many more have been sent directly to OHCA and other State officials. On August 20, 2008, approximately 2,000 members of the community attended a rally in support of all the efforts to keep this Program operational. These intangible and often overlooked aspects of the population should be considered in this proposal because they are enormous factors. The role of the local hospitals is to serve the community - without the Program the HCGW cannot do this to the fullest.

9. Affiliation

a. Provide a copy of the agreement SMH and TWH have drafted or signed with JDH to act as a tertiary care hospital to the proposed cardiac services.

Response:
See Appendix 9.a.

b. Provide a copy of any and all agreements between the Applicants, including a signed collaboration agreement, related to the proposal. The collaboration agreement should include at a minimum a description of each Applicant's responsibilities, patient selection guidelines, provision of emergency transfers, joint quality assurance reviews and joint training.

Response:
See Appendix 9.b. All of the above are included in the Appendix except for those listed below.

Patient Selection Guidelines: Included in clinical protocols (Appendix 6.E).

Provision for emergency transfers:

There is no formal written agreement among the three Applicants as it pertains to provision of emergency transfers. Emergency transfers are made physician to physician and are handled via direct communication between physicians and the ambulance service. The three year history of the HCGW demonstration project has not dictated that formal agreements are necessary for this purpose.

c. Provide a detailed discussion on what role has JDH played in HCGW operation beyond the initial training of the staff and establishment of the protocols.

Response:
JDH has been an active and formal participant in administrative, clinical and quality activities for HCGW since July 2004. After the initial assistance and guidance in the development of the Program including input into protocols, staff training and equipment purchases, the relationship with JDH has evolved into a collegial partnership of shared learning. JDH continues to act in an advisory capacity in all aspects of the Program. In 2007 and 2008 our agreements and relationships were formally renewed and continue through this application process.

Clinical/Quality:

JDH provides cardiothoracic surgical services and perfusion services via contract. JDH's director of cardiology is a member of the HCGW Advisory Board and, as such, has been involved in review and discussion of quality data. Since Program implementation, the director has provided advice and direction for peer review.

JDH participates in joint clinical case discussions held monthly at one of the partner hospitals. The purpose of these case discussions is to review specific cases for clinical learning opportunities and for colleagues to share clinical perspectives. JDH's chief of cardiothoracic surgery is also the chief of cardiothoracic surgery for HCGW. The chief and his colleagues participate in regular case reviews and joint quality meetings with the HCGW team to review Program data, clinical processes and overall areas of improvement. The JDH and HCGW chief of perfusion also participates in these quality review committees. JDH personnel continue to provide guidance to the Program as it relates to new technology (i.e. Robotics), equipment (i.e. new balloon pumps), supplies and possible purchases related to these.

Administrative:

JDH Administration has membership on the HCGW Advisory Board providing advice, direction and feedback on programmatic issues. JDH has given guidance and assistance in the area of marketing the Program, and has been involved in CON discussions including several planning sessions regarding their ongoing support of this process.

d. Discuss in detail the responsibilities of JDH in the establishment of the proposed services at TWH and SMH and the operation of HCGW.

Response:
JDH has committed to supporting HCGW administratively and clinically. This relationship has grown and developed over the three years as the Program has matured. It remains strong and one of mutual support.

HCGW will continue to seek advice, guidance and direction on clinical and administrative issues and, as such, will have representation from JDH on its Advisory Board. The cardiothoracic surgeons and perfusion teams remain contracted with HCGW through 2009 with the ability to extend the agreements. The responsibilities of JDH in the establishment of the proposed services at SMH and TWH d/b/a HCGW will remain in place going forward.

e. Provide Board of Directors or governing body resolutions from **each** Applicant approving the proposal.

Response:
See Appendix 9.e.

10. Financial Information

a. Type of ownership: (Please check off all that apply)

☒	Corporation (Inc.)	☐	Limited Liability Company (LLC)
☐	Partnership	☐	Professional Corporation (PC)
☐	Joint Venture	☒	Other (Specify): State Agency- JDH

b. Provide the following financial information:

i) Please confirm that each of the Applicants involved in this proposal has filed its FY 2007, audited financial statements with OHCA, as required pursuant to Section 19a-644, C.G.S.

Response:
SMH submitted audited financial statement with OHCA, as required pursuant to Section 19a-644, C.G.S. in February 2008.

TWH submitted audited financial statement with OHCA, as required pursuant to Section 19a-644, C.G.S. in February 2008.

JDH submitted audited financial statement with OHCA, as required pursuant to Section 19a-644, C.G.S. in June 2008.

ii) Provide the cash equivalent balance of each Applicant at the date of submission of this application.

Response:
The cash equivalent balance for SMH as of July 2008 was $30,011,000.

The cash equivalent balance for TWH as of July 2008 was $33,553,132.

The cash equivalent balance for JDH as of July 2008 was $ -17,870,154.

iii) Provide a copy of the most recently completed internal monthly financial statement for each Applicant.

Response:
Completed internal monthly financial statements are in Appendix 10.b.iii.

11. Revenue, Expense and Volume Projections

a. Payer Mix Projection

Please provide both the current payer mix and the projected payer mix with the CON proposal for the Total Facility based on Gross Patient Revenue in the following reporting format for **SMH**, **TWH**, **HCGW** and **JDH**, separately:

Total SMH Description	Current Payer Mix	FY 2009 Projected Payer Mix	FY 2010 Projected Payer Mix	FY 2011 Projected Payer Mix
Medicare*	40.7%	40.7%	40.7%	40.7%
Medicaid* (includes other medical assistance)	21.3%	21.3%	21.3%	21.3%
TriCare (CHAMPUS)	0.2%	0.2%	0.2%	0.2%
Total Government Payers	62.2%	62.2%	62.2%	62.2%
Commercial Insurers*	33.1%	33.1%	33.1%	33.1%
Self-Pay	2.5%	2.5%	2.5%	2.5%
Workers Compensation	2.2%	2.2%	2.2%	2.2%
Total Non-Government Payers	37.8%	37.8%	37.8%	37.8%
Uncompensated Care	0%	0%	0%	0%
Total Payer Mix	100.0%	100.0%	100.0%	100.0%

*Includes managed care activity.

Total TWH Description	Current Payer Mix	FY 2009 Projected Payer Mix	FY 2010 Projected Payer Mix	FY 2011 Projected Payer Mix
Medicare*	46.7%	46.7%	46.7%	46.7%
Medicaid* (includes other medical assistance)	16.8%	16.8%	16.8%	16.8%
TriCare (CHAMPUS)	0%	0%	0%	0%
Total Government Payers	63.5%	63.5%	63.5%	63.5%
Commercial Insurers*	32.2%	32.2%	32.2%	32.2%
Self-Pay	2.9%	2.9%	2.9%	2.9%
Workers Compensation	1.4%	1.4%	1.4%	1.4%
Total Non-Government Payers	36.5%	36.5%	36.5%	36.5%
Uncompensated Care	0%	0%	0%	0%
Total Payer Mix	100.0%	100.0%	100.0%	100.0%

*Includes managed care activity.

Total JDH Description	Current Payer Mix	FY 2009 Projected Payer Mix	FY 2010 Projected Payer Mix	FY 2011 Projected Payer Mix
Medicare*	39.5%	39.5%	39.5%	39.5%
Medicaid* (includes other medical assistance)	11.9%	11.9%	11.9%	11.9%
TriCare (CHAMPUS)	0.3%	0.3%	0.3%	0.3%
Total Government Payers	51.7%	51.7%	51.7%	51.7%
Commercial Insurers*	45.8%	45.8%	45.8%	45.8%
Self-Pay	0.3%	0.3%	0.3%	0.3%
Workers Compensation	1.2%	1.2%	1.2%	1.2%
Total Non-Government Payers	47.3%	47.3%	47.3%	47.3%
Uncompensated Care	1.0%	1.0%	1.0%	1.0%
Total Payer Mix	100.0%	100.0%	100.0%	100.0%

*Includes managed care activity.

Response:
HCGW Inc. as an entity is the administrative arm of the Heart Center Program. It is not, in and of itself, an organization that provides patient care. Therefore, it does not generate patient revenue or have a payer mix.

b. Provide the following for **SMH**, **TWH**, **HCGW**, **JDH** and the **parent corporations**, regarding the financial projections:

i) A summary of revenue, expense and volume statistics, with the CON project, without the CON project and incremental to the CON project. **See attached.**

Response:
Please see Appendix 11.b.i. and Appendix 11.c.i. HCGW, Inc. does not provide patient care therefore this question does not apply. HCGW financials are provided in Appendix 11.c.i.

ii) As an addendum to your completed financial attachments as provided in 11b(1), for **each** Applicant (by facility and total system) provide a break out of the financial expenses and revenues by service (i.e. Primary Angioplasty, Elective Angioplasty and Open Heart Surgery).

Response:
Please see Appendix 11.b.i. Financial Attachment II.

iii) The assumptions utilized in developing the projections (e.g., FTE's, volume statistics, other expenses, revenue and expense % increases, project implementation date, etc.).

Response:

For TWH the overall assumptions utilized in developing projection are as follows:

- Salaries and fringe benefits will increase 3.5%
- Professional and contracted services will increase 4%
- Net patient revenue will increase 4%
- Supplies and drugs will increase 5%
- Bad debt will increase 3%
- Other operating expenses will increase 3%
- Non operating revenue will increase 3%
- Case volume was held constant
- FTE's will remain flat
- In order to mitigate operating losses for FY 2009, TWH Management Team will be engaging an independent consultant group to work with management on improving revenues and reducing expenses. We conservatively estimated a $5 million improvement in revenue and a $3 million improvement in expenses.

For SMH the overall assumptions utilized in developing projections are as follows:

- Salaries and Fringe benefits will increase 3.5%
- Net Patient revenues will increase 4%
- Supplies and non-salary expenses will increase 5%
- Case volume was held constant
- FTE's will remain flat

For JDH the overall assumptions utilized in developing projections are as follows:

- FTEs will increase 1% in FY 09, 0% in FY 10 and FY 11 based on inpatient growth. FTEs will increase to maintain FTE per adjusted occupied bed equal to 4.2.
- Inpatient Volume will increase will be 0%
- Outpatient Volume will increase will be 5%
- Net revenue will increase 2% per unit assumption
- Salaries, Wages and Fringe Benefits will increase 4.5% per year
- Expense inflation rate will increase 3% per year
- Since HCGW has been fully operational for three years, JDH is not assuming any incremental increases in angioplasty, open heart services, or cardiac catheterizations as a result of the project. In addition JDH is not assuming there will be any inpatient transfers from SMH or TWH.

iv) Provide a description of the additional staff, equipment, and supplies (including drug-eluting stents) required to provide the proposed services. Include a description of the availability of cardiac interventionalists, cardiac surgeons, nurses

and anesthesiologists.

Response:
To continue to provide advanced cardiac services at SMH and TWH there will be no additional staff, equipment or renovations needed as the investment for these key components of the Program were accounted for in the start up phase of the Program. All clinical areas are appropriately equipped and staffed and are currently providing services. Stents are an operational expense and have been considered along with all necessary patient supplies in the financial projections. Drug eluting and bare metal stents currently account for approximately 45% of the patient chargeable items line in a cardiology department budget.

Although no additional start up expenses will be incurred, there will be a significant financial impact should the proposal not be approved. SMH and TWH have been classified as financially distressed by the State of Connecticut for several years and continue to be so. Since the inception of services in July 2005, capital investment in the Program was approximately $7 million dollars, a sizeable sum. Hospitals typically have several years to utilize invested resources of this magnitude to the fullest and to depreciate the cost on their financial statements.

If the Program is not continued under the direction of a new CON it will have a dramatic negative financial impact on both SMH and TWH. The combined loss of net revenue from angioplasty, open heart surgery and a significant number of cardiac catheterizations will reach at least $20 million annually. Even after adjusting for a reduction in approximately $10 million of direct expenses, the combined impact to both hospitals would be approximately $10 million annually. These figures are conservative and as such do not include loss of patients with other cardiac diagnoses who would choose or would be referred by their physicians to facilities able to provide a full complement of advanced cardiac services. It also does not include the full array of outpatient cardio-pulmonary services that would also be impacted.

Further, the financial impact of ceasing the Program would cause the likely closure of other unprofitable medical services operated by SMH and TWH. As major employers in the City of Waterbury, the financial viability of the hospitals is critical to the overall economic health of the region. In recent testimony before the Department of Economic and Community Development, Stephen Frayne, Senior Vice President of Health Policy for the Connecticut Hospital Association discussed the economic impact provided by hospitals (Appendix 11.b.iv). Mr. Frayne testified that hospitals statewide generate $12.2 billion per year for state and local economies. In greater Waterbury, with two local hospitals, this impact is of economic significance.

Absent a Program in Waterbury, there would be an inherent increase in costs transferred to patients and families in the greater Waterbury area for items such as transportation, duplicative co-pays from a second hospital admission, lost work,

childcare fees and travel expenses to name a few. The full financial impact with and without the Program are demonstrated in the financial tables.

Availability of Physicians and professional staff:

As noted in questions 6.C and 8 B. the Program maintains a large staff of physicians and professional staff who are committed to providing care to greater Waterbury residents. The greater Waterbury community is fortunate to have a group of physicians and staff of such quality and dedication to the Program. No addition physician recruitment is necessary.

v) An explanation for any incremental losses (Historical and Projected) by service (i.e. Primary Angioplasty, Elective Angioplasty and Open Heart Service).

Response:
As per Appendix 11.b.i, the Program has not had incremental losses historically and as per Appendix 11.b.vi, the Program is not projected to have incremental losses.

vi) Please complete the enclosed, OHCA's **Financial Attachment II,** for SMH, TWH, and JDH.

Response:
Please see Appendix 11.b.vi.

APPENDIX 2.

Smoking Cessation Flyer

Heart Health Education: Signs and Symptoms of Heart Disease

Heart Health Education: Sugar Tips

Heart Health Education: Healthy Eating

HCGW Newsletters

Heart Health Education Event Flyers

Community Outreach Calendars

HEART CENTER
of Greater Waterbury

CONNECTICUT COMMUNITY FOUNDATION

American Heart Association®
Learn and Live℠

Everybody Loves A Quitter!

Would You Like to Quit Smoking?

Freedom From Smoking

Seven-session Stop Smoking Program

Orientation: Thursday, January 18, 2007
Session 1: Thursday, January 25, 2007

Class dates are: 1/18, 1/25/ 2/1, 2/6, 2/8, 2/15, 2/22, and 3/8
A schedule of session with class dates will be distributed at the Orientation session.

6:30 to 8:00 p.m.

All Classes will be held at the Harold Leever Regional Cancer Center

First Floor Conference Room

1075 Chase Parkway Waterbury, CT

For more information and to register please call 203-575-1992
Cost for participation is $25.00. Class is limited to 20 participants.

Classes will be facilitated by:

AMERICAN LUNG ASSOCIATION®
of Connecticut

WATERBURY HOSPITAL

Saint Mary's HOSPITAL

UConn Health Center

0111
09/15/08

HEART
CENTER
of Greater Waterbury

♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥

Sandra Micalizzi, APRN, CDE
Heart Center of Greater Waterbury's
Clinical Nurse Specialist

Phone: (203) 575-5573
Email: smicalizzi@hcogw.org
www.heartcentergw.org

Presents:

"SPRING INTO HEALTH" WAYS TO KEEP YOUR HEART HEALTHY

♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥

WATERBURY HOSPITAL Saint Mary's HOSPITAL UConn Health Center

HEART
CENTER
of Greater Waterbury

An Introduction to the Heart Center of Greater Waterbury

The Heart Center of Greater Waterbury is an advanced cardiac care program offering the greater Waterbury community the ability to have all types of heart care services at both Saint Mary's Hospital and Waterbury Hospital.

The program builds upon a strong foundation of heart services, including the catheterization labs available at both hospitals, and the complementary services provided by our emergency departments and intensive care units. By adding the ability to perform advanced cardiac procedures, patients will now receive full cardiac services without having to leave Waterbury. With the creation of the Heart Center, patients in need of cardiac treatment will be cared for at either hospital by their private physician.

The cardiologist who provide these services are among the most experienced in Connecticut, having already performed thousands of cardiac procedures for Waterbury patients. They have established a strong track record of quality care and positive patient outcomes.

Saint Mary's and Waterbury Hospital in conjunction with the University of Connecticut Health Center/John Dempsey Hospital in Farmington have brought the knowledge of their cardiothoracic surgeons to Waterbury in the event that a patient requires cardiac surgery.

These same surgeons perform life-saving cardiac procedures each day for patients at UConn Health Center and Hartford Hospital. Now, they have brought their experience and expertise to Waterbury, so cardiac patients here can receive the comprehensive care they need and deserve close to home.

The Heart Center of Greater Waterbury provides a full continuum of care, which begins with education and awareness, continues through diagnosis and treatment, and finally the rehabilitation needed to complete the healing process. All of the services in this continuum are available to patients at both Saint Mary's Hospital and Waterbury Hospital. It's the quality care you need where you need it – close to home.

WATERBURY HOSPITAL Saint Mary's HOSPITAL UConn Health Center

HEART
CENTER
of Greater Waterbury

BASICS OF HEART DISEASE

HEART DISEASE RISK FACTORS

Risk Factors You Can Change

- ♥ High blood cholesterol
- ♥ High blood pressure
- ♥ Smoking
- ♥ Your stress level
- ♥ Being overweight
- ♥ Diabetes

Risk Factors You Can't Change

- ♥ Your age
- ♥ Your sex
- ♥ Your family medical history

HOW HEART DISEASE DEVELOPS

Heart Disease occurs when a process called arteriosclerosis clogs or blocks the coronary arteries. Your coronary arteries are the pipes that supply your heart with oxygen-rich blood it needs.

The Process of Arteriosclerosis

- ♥ Medical conditions, bad habits and other factors damage the walls of the coronary arteries. Cholesterol and other fatty substances in the blood collect on the damaged artery walls.

- ♥ The fatty substances build up layer upon layer and form a hard substance called plaque.

- ♥ Plaque build-up narrows the arteries reducing or blocking the flow of blood to the heart.

HEART CENTER
of Greater Waterbury

CLASSIC SIGNS OF A HEART ATTACK

Heart attacks can sneak up on you. Your best defense is knowledge about what to look for.

Take these signs seriously:

Sudden, intense pressure (as if an elephant were sitting on your chest), squeezing, fullness, tightness, burning or pain in the chest that lasts more than a few minutes.

Chest pain that travels to the arm, neck, jaw, inside arm, shoulder (left side more than right), upper abdomen (often mistaken for indigestion pain) or back between the shoulder blades. Pain may be continuous or may come and go.

Chest discomfort and feeling lightheaded.
Shortness of breath, dizziness
Fainting
Sweating
Nausea
Vomiting
Unexplained tiredness (mostly in women)

♥♥IF YOU HAVE THESE WARNINGS CALL 911 AND♥♥
GO TO THE HOSPITAL

WATERBURY HOSPITAL Saint Mary's HOSPITAL UConn Health Center

HEART CENTER
of Greater Waterbury

CHOLESTEROL

THE GOOD -

HDL - 40 or greater Desirable
Under 40 Not desirable

HDL (High Density Lipoprotein) is known as "good" cholesterol. HDL cholesterol actually contains very little cholesterol in its core. As it travels through the bloodstream it carries LDL or "bad" cholesterol away from the arteries to the liver where it is either recycled or removed from the body.

THE BAD -

LDL – Under 100 Desirable for those at high risk
Under 130 Desirable
130 – 159 Borderline high
160 or greater High

LDL (Low Density Lipoprotein) is called the "bad" cholesterol. The core of the LDL is almost all cholesterol. If LDL levels are high, as it travels through the blood stream, it builds up on the artery walls. When LDL cholesterol combine with other substances, a plague like substance is produced that can clog the arteries.

THE UGLY -

Triglyceride – Under 150 Normal
150 – 199 Borderline High
200 – 499 High
500 or higher Very High

Triglyceride is a form of fat found in food, body fat, and is also carried in the blood as part of the cholesterol molecule. The visible fat on chicken or steak is actually triglycerides. If you are over weight, your body stores the extra calories you eat as triglycerides. People with high triglyceride levels often have low HDL or "good" cholesterol levels and this combination is considered by many experts to be associated with an increase risk of heart disease.

WATERBURY HOSPITAL
Saint Mary's HOSPITAL
UConn Health Center

P.O. Box 2153, Waterbury, CT 06722

HEART
CENTER
of Greater Waterbury

EXERCISE: WHAT'S IN IT FOR ME?

Quite a lot! Exercise is a small investment that reaps big benefits. Exercise can:

- ♥ Help you loose weight
- ♥ Tone your muscles
- ♥ Help you sleep
- ♥ Reduce stress
- ♥ Enhance your self-esteem
- ♥ Help reduce high blood pressure

The Basics of Heart Health Exercise

Here is the basic tenet of our exercise philosophy: Whatever you do is better than doing nothing at all. You need to understand three types of exercise that will strengthen your body in different ways:

Aerobic Exercise – This type of exercise is vital if you want to improve the functioning of your cardiovascular system, which includes your heart. Aerobic exercise also improves your endurance and strengthens your musculoskeletal system, the bony skeleton of your body and the muscles attached to it. Aerobic exercise makes use of rhythmic, repetitive exercises that use large muscle groups.

Weight-Bearing Exercise – As a woman, you especially need to incorporate weight –bearing exercises into your daily life. Aerobic exercise is marvelous for the cardiovascular system, but alone does not help prevent the loss of bone mineral, which, as you age, can result in osteoporosis. Weight-bearing exercises are those that provide impact on the joints and, in doing so, stimulate the ends of your bones.

There are ways to build in weight-bearing exercise into your activity. One is by choosing aerobic activities that apply some force to the bones. Swimming provides aerobic exercise but, because your body is suspended weightless in the water, there is no force to your bones. Walking, jogging, aerobic dancing, and racquet sports qualify as both aerobic and weight-bearing activities.

Anaerobic Exercise (Strength Resistance Training)

Women especially should be aware of the need to keep the strength in their upper arms. Women tend to focus on their hips and thighs, but as we age, we need to build up our arms. This enables us carrying packages more easily, for example, and keeps the skin on our arms.

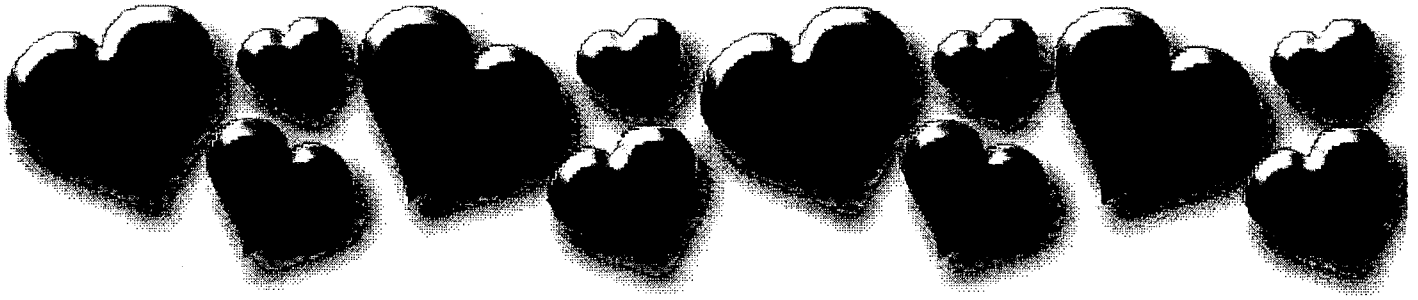
A good way to strengthen your upper body is to work out with weights. A simple exercise using dumbbells or other weights will accomplish your goal.

If you have heart disease, you must consult with your doctor before starting a new exercise program. As you start or increase your level of activity, if you experience any symptoms as chest pain, shortness of breath, dizziness or under fatigue, consult your doctor.

Before beginning activity, you should take a medical "inventory" of yourself. Recall any injuries or problems with your back, ankles arms or legs you may have suffered. Make certain that the activities you choose will not damage, but instead strengthen, these problem areas. Research shows that higher rates of injury are associated with weight-bearing activities like jogging and running. Those most likely to injure them selves are people who run for long distances, have a personal history of injury, or suddenly increase their exercise schedule.

HEART
CENTER
of Greater Waterbury

Sugar tips - Detection and Prevention of Diabetes



Sandra Micalizzi APRN,CDE

Phone 203-575-5573

smicalizzi@hcogw.org

www.heartcentergw.org



An Introduction to the Heart Center of Greater Waterbury

The Heart Center of Greater Waterbury is an advanced cardiac care program offering the greater Waterbury community the ability to have all types of heart care services at both Saint Mary's Hospital and Waterbury Hospital.

The program builds upon a strong foundation of heart services, including the catheterization labs available at both hospitals, and the complementary services provided by our emergency departments and intensive care units. By adding the ability to perform advanced cardiac procedures, patients will now receive full cardiac services without having to leave Waterbury. With the creation of the Heart Center, patients in need of cardiac treatment will be cared for at either hospital by their private physician.

The cardiologist who provide these services are among the most experienced in Connecticut, having already performed thousands of cardiac procedures for Waterbury patients. They have established a strong track record of quality care and positive patient outcomes.

Saint Mary's and Waterbury Hospital in conjunction with the University of Connecticut Health Center/John Dempsey Hospital in Farmington have brought the knowledge of their cardiothoracic surgeons to Waterbury in the event that a patient requires cardiac surgery.

These same surgeons perform life-saving cardiac procedures each day for patients at UConn Health Center and Hartford Hospital. Now, they have brought their experience and expertise to Waterbury, so cardiac patients here can receive the comprehensive care they need and deserve close to home.

The Heart Center of Greater Waterbury provides a full continuum of care, which begins with education and awareness, continues through diagnosis and treatment, and finally the rehabilitation needed to complete the healing process. All of the services in this continuum are available to patients at both Saint Mary's Hospital and Waterbury Hospital. It's the quality care you need where you need it – close to home.

HEART
CENTER
of Greater Waterbury

What is Diabetes?

Our bodies use the food we eat to make the sugar we need for energy. Insulin helps the sugar leave the blood And go into our blood cells, where it is used as a kind of fuel. When this happens the way it should, the level of sugar in the blood goes down and our bodies have the energy for a full and active life.

In people with diabetes, this system doesn't work. When you have diabetes, your body can't make energy from the food you eat. Sugar stays in the blood instead of going in to the cells of the body.

Diabetes is a lifelong disease

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

P.O. Box 2153, Waterbury, CT 06722

HEART
CENTER
of Greater Waterbury

Type 1 diabetes

10% have Type 1

Characterized by;

Resistance to endogenous and exogenous insulin

Impaired insulin secretion

Type 2 diabetes

Increased hepatic glucose production

Onset often insidious

75% are obese at diagnosis

Often diagnosed at first cardiac event

Increased frequency in teens

HEART
CENTER
of Greater Waterbury

What are the symptoms of Type 2 Diabetes?

1. feeling weak, tired, or dizzy
2. excessive thirst
3. frequent urination
4. sudden weight loss
5. blurred vision
6. lack of ability to concentrate
7. loss of coordination
8. slow healing of skin infections, cuts or sores
9. sexual problems
10. Itching
11. Numbness or tingling in the hands or feet
12. Increased hunger
13. Excessive weight
14. Nausea and vomiting

WATERBURY HOSPITAL
Saint Mary's HOSPITAL
UConn Health Center

P.O. Box 2153, Waterbury, CT 06722

HEART
CENTER
of Greater Waterbury

What is pre-diabetes?

Prediabetes is a condition that comes before diabetes. It means that the blood sugar levels are higher than normal but are not high enough to be called diabetes.

If you have pre-diabetes, it means

You might get type 2 diabetes soon or sometime down the road

You are also more likely to get heart disease or have a stroke.

The way to delay or prevent type 2 diabetes is to have regular physical activity such as walking every day, lose weight and have a healthy diet.

WATERBURY HOSPITAL
Saint Mary's HOSPITAL
UConn Health Center

P.O. Box 2153, Waterbury, CT 06722

HEART
CENTER
of Greater Waterbury

KEEP TABS ON YOUR HEALTH

Regular testing tells you and your healthcare provider how well your Action Plan is working. Here are some tests he or she may want you to have:

Blood sugar. One of the most important tests in helping manage your diabetes you do yourself. This is the blood–sugar reading that you may take several times a day. Your healthcare provider will tell you how often to test your blood sugar.

Often your home tests show blood sugar levels that are about 10% lower than found in lab tests. So, it is important to also have your blood sugar tested by your healthcare provider.

Hemoglobin A1c. This blood test shows the blood sugar levels that you average over the past two to three months. A1c tests give the "big picture" of diabetes. A1c tests are usually done in a lab. The American Diabetes Association (ADA) advises people with type 2 diabetes to get an A1c test at least twice a year. You need your level checked more often if you are not at your goal or if your therapy changes.

Microalbuminuria. At last once a year, your healthcare provider will test for protein in your urine. A positive test may mean that your kidneys have been damaged by diabetes or blood pressure. Fever and exercise can raise the protein in your urine short-term; your healthcare provider may want to repeat the test. He or she may prescribe high blood pressure medicine(s).

Cholesterol. Substance in your blood, called cholesterol and triglycerides, should be tested at least once a year to help prevent heart disease. You want your LDL cholesterol to be less than 100 mg/dL. This should even be lower, if you have had a heart attack and have diabetes. You want your HDL cholesterol to be over 40 for men and over 50 mg/dL for women. If you can't control your cholesterol with diet and exercise your doctor should provide medicine.

Blood pressure. Your blood pressure should be tested every time you visit your healthcare provider. People with diabetes should try to keep their blood pressure below 130/80 mm Hg. High blood pressure can cause heart disease, eye disease, stroke, and kidney disease. Again, your healthcare provider may prescribe medicine if your blood pressure doesn't come down with diet and exercise.

Feet. You should check your feet daily for calluses, bunions, sores, or discolored skin. These can lead to infections or ulcers, and, in people with severe nerve disease they can lead to amputations. Your healthcare provider should do a complete exam at least once a year. Also, keep your toenails short. Long nails may cause friction and lead to hidden ulcers in between your toes.

Eyes and teeth. Get an eye exam at least once a year. Ask a dentist to check your teeth and gums every six months.



Daily Meal Planning Guide

When you find out you have diabetes there are so many things to learn! One of the first things you may want to know is – what can I eat? Choosing healthy foods can help you control your blood glucose. A daily meal plan is an important part of your diabetes management, along with physical activity, blood glucose checks, and often diabetes medications.

There is no one meal plan that works for everybody with diabetes. This guide will provide you with three ways that may help you plan your meals.

- *Balance Your Plate:* Many people with diabetes like to keep meal planning simple. This food plan can help you to easily portion out your food.
- *Food List for Meal Planning* and *Personal Meal Plan:* If you want to count servings of food and follow a plan that is good for your diabetes too, check out the *Food List for Meal Planning* and the *Personal Meal Plan.* This plan will help you know how much of carbohydrate, protein, and fat you can eat each day.
- *Carbohydrate Counting:* There are many carbohydrate foods to enjoy, including grains, fruits, vegetables, milk products and those with sugar. Carbohydrate foods raise your blood glucose level more than proteins and fats. This meal planning approach helps you to keep track of how much carbohydrate you eat at your meals and snacks. Many people who take insulin like to use this plan.

Some key things to remember no matter which meal plan you choose to follow:

- Keep your food intake consistent from day to day
- Make half your grains whole grains
- Choose whole fruits and vegetables often
- Go with lean protein
- Get your calcium-rich foods
- Know your limits on fats, salt, and sugars
- Choose water instead of sugary beverages, juice "drinks", and sports drinks

Checking your blood glucose will help you to see how your food choices affect your blood glucose control.

A Registered Dietitian (RD) can help you make a meal plan that best meets your needs and lifestyle. Ask your healthcare provider, diabetes educator, hospital, or local diabetes association for the names of RDs in your area who work with people that have diabetes.

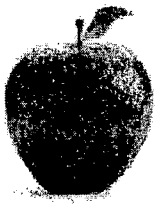
Visit us at **www.LillyDiabetes.com**

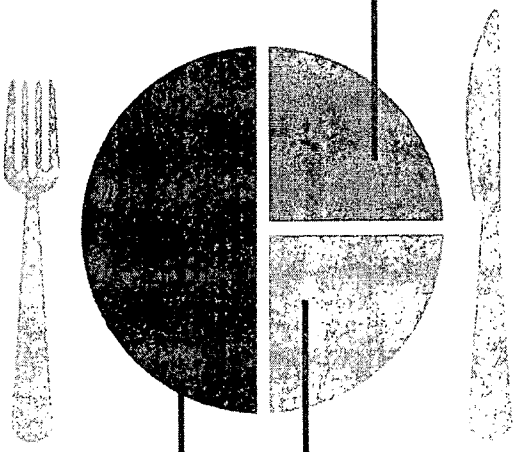
Lilly

Meal Planning Options

Balance Your Plate

One fruit serving is 1 small fresh fruit, 2 Tbs. dried fruit, or ½ cup canned fruit or unsweetened fruit juice.





Fill this ¼ of the plate with a starch, grain, or starchy vegetable, such as corn, peas or potatoes.



Use fat-free/low-fat milk and milk products.

Fill this ½ of the plate with non-starchy vegetables, such as broccoli, carrots, cauliflower, or green beans.

Fill this ¼ of the plate with lean meat, poultry or fish. If you choose a plant-based protein, such as dried beans, consider the carbohydrate content as part of your total carbohydrate amount for the meal.

Practical Nutrition: The Idaho Plate Method Practical Diabetol 1998;17:42-45.

Try your hand at these guidelines for estimating portion sizes*:



Your palm, not including fingers and thumb, is about 3 ounces of cooked and boneless meat.



A fist is about 1 cup or about 30 grams of carb for foods such as 1 cup ice cream or 1 cup cooked cereal.



Your thumb is about 1 tablespoon or 1 serving of regular salad dressing, reduced-fat mayonnaise or reduced-fat margarine.



Your thumb tip is about 1 teaspoon or 1 serving of margarine, mayonnaise or other fats such as oils.

These portion estimates are based on a woman's hand size. Hand sizes vary.
Measuring or weighing foods is the most accurate way to figure out a portion size.

**Adapted from: Warshaw, H.S., Kulkarni, K. Complete Guide to Carb Counting 2nd Edition. Alexandria, VA: American Diabetes Association, 2004; and Wondering How Much to Eat? Do the Hand Jive! Diabetes Spectrum 1999; 12:177-178.*

Food List for Meal Planning

Key

* Foods marked with * should be counted as 1 starch + 1 fat per serving

☺ Foods marked with ☺ contain more than 3 grams of dietary fiber per serving

! Foods marked with ! contain 480 mg or more of sodium per serving

oz= ounce
tsp= teaspoon
Tbsp= Tablespoon

Resources:
Choose Your Foods: Exchange Lists for Diabetes, American Diabetes Association and American Dietetic Association, 2007.
Beyond Rice and Beans by Lorena Drago (American Diabetes Association, 2006)

Starch

Each serving from this list contains **15 grams carbohydrate,** 0-3 grams protein, 0-1 gram fat and 80 calories.

These foods are the cornerstone of a healthy eating plan. Most of their calories come from carbohydrate, a good source of energy. Many foods from this group also give you fiber, vitamins and minerals. Prepare and eat starchy foods with as little added fat as possible. Choose whole grain starches as often as you can.
In general, a single serving of starch is:

- ½ cup of cooked cereal, grain or starchy vegetable
- ⅓ cup of cooked rice or pasta
- 1 oz of a bread product such as 1 slice of whole wheat bread
- ¾ to 1 oz of most snack foods (some snack foods may also have extra fat)

Bread	**Serving Size**
Bagel, large (about 4 oz)	¼ (1 oz)
*Biscuit, 2 ½ inches across	1
Bread (whole wheat, white or rye)	1 slice (1 oz)
*Cornbread	1 ¾ inch cube (1 ½ oz)
English muffin	½
Hot dog or hamburger bun	½ (1 oz)
Pancake	4 inches across, ¼ inch thick (1)
Pita pocket bread (6" across)	½
Roll, plain, small	1 (1 oz)
Tortilla, corn or flour (6" across)	1
*Waffle	4 inch square or 4 inches across (1)

Cereals and Grains	**Serving Size**
Cereals, cooked (oats, oatmeal)	½ cup
Cereals, unsweetened, ready-to-eat	¾ cup
Couscous	⅓ cup
Granola, low-fat	¼ cup
Pasta, cooked	⅓ cup
Rice, white or brown, cooked	⅓ cup

Starchy Vegetables	**Serving Size**
Breadfruit	¼ cup small cubes
Corn, cooked	½ cup
Corn on cob, large	½ cob (5 oz)
☺ Hominy, canned	¾ cup
☺ Peas, green, cooked	½ cup
Plantain, ripe	⅓ cup
Potato	
baked with skin	¼ large (3 oz)
boiled, all kinds	½ cup or ½ medium (3 oz)
* mashed with milk and fat	½ cup
French fried (oven-baked)	1 cup (2 oz)
Spaghetti/pasta sauce	½ cup
☺ Squash, winter (acorn, butternut)	1 cup
Yam, sweet potato, plain	½ cup
Yucca	⅓ cup

Crackers and Snacks	**Serving Size**
Crackers	
*round, butter-type	6
saltines	6
Graham cracker, 2 ½ inch square	3
Popcorn	
* ☺ with butter	3 cups
☺ lower fat or no fat added	3 cups
Pretzels	¾ oz
Snack chips (tortilla chips, potato chips)	
fat-free or baked	15-20 (¾ oz)
* regular	9-13 (¾ oz)

Beans, Peas and Lentils (Count as 1 Starch + 1 Lean Meat)	**Serving Size**
☺ Baked beans	⅓ cup
☺ Beans, cooked (black, garbanzo, kidney, lima, navy, pinto, white)	½ cup
☺ Lentils, cooked (brown, green, yellow)	½ cup
☺ Peas, cooked (black-eyed, split)	½ cup

Fruits

Each serving from this list contains **15 grams carbohydrate,** 0 grams fat, 0 grams protein and 60 calories.

Fruits are good sources of fiber, regardless if they are fresh, frozen, or dried. Fruit juices contain very little fiber. Choose fruits instead of juices whenever possible. When using canned fruit, choose fruit packed in its own juice or light syrup.

In general, a single serving of fruit is:
- ½ cup of canned or fresh fruit or unsweetened fruit juice
- 1 small fresh fruit (4 oz)
- 2 tablespoons of dried fruit

Fruit	**Serving Size**
Apple, unpeeled, small	1 (4 oz)
Applesauce, unsweetened	½ cup
Banana, extra small	1 (4 oz)
Berries	
☺ Blackberries	¾ cup
Blueberries	¾ cup
☺ Raspberries	1 cup
☺ Strawberries	1 ¼ cup whole berries
Cantaloupe, small	⅓ melon or 1 cup cubed (11 oz)
Cherries, sweet fresh	12 (3 oz)
Dried fruits (blueberries, cherries, cranberries, mixed fruit, raisins)	2 Tbsp
Grapefruit, large	½ (11 oz)
Grapes, small	17 (3 oz)
Guava	½ cup
☺ Kiwi	1 (3 ½ oz)
Mandarin oranges, canned	¾ cup
Mango, small	½ fruit (5 ½ oz) or ½ cup
☺ Orange, small	1 (6 ½ oz)
Papaya	½ fruit or 1 cup cubed (8 oz)
Passion fruit	¼ cup
Peaches (fresh, medium)	1 (6 oz)
Pears (fresh, large)	½ (4 oz)
Pineapple (fresh)	¾ cup
Plums	
dried (prunes)	3
small	2 (5 oz)
Tamarind	¼ cup whole or 1 oz dried
Watermelon	1 slice or 1 ¼ cups cubes (13 ½ oz)

Fruit Juice	**Serving Size**
Apple, grapefruit, orange, pineapple	½ cup
Fruit juice blends, 100% juice, grape juice, prune juice	⅓ cup

Milk

Milk and yogurt are rich in calcium and protein. Choose fat-free, low-fat and reduced-fat varieties for health. They have less saturated fat and cholesterol than whole milk products.

Fat-free (skim) or low-fat (1%) milk and yogurt: Each serving from this list contains **12 grams carbohydrate,** 8 grams protein, 0-3 grams fat and 100 calories.

Milk, buttermilk, acidophilus milk, Lactaid	1 cup
Evaporated milk	½ cup
Yogurt, plain or flavored with a low calorie sweetener	⅔ cup (6 oz)

Reduced-fat (2%) milk and yogurt: Each serving from this list contains **12 grams carbohydrate,** 8 grams protein, 5 grams fat and 120 calories.

Milk, acidophilus milk, kefir, Lactaid	1 cup
Yogurt, plain	⅔ cup (6 oz)

Whole milk and yogurt: Each serving from this list contains **12 grams carbohydrate,** 8 grams protein, 8 grams fat and 160 calories.

Milk, buttermilk, goat's milk	1 cup
Evaporated milk	½ cup
Yogurt, plain	8 oz

Dairy-Like Foods	**Serving Size**
Chocolate milk	
fat-free (1 fat-free milk + 1 carbohydrate)	1 cup
whole (1 whole milk + 1 carbohydrate)	1 cup

Food List for Meal Planning

Smoothies, flavored, regular *(1 fat-free milk + 2 ½ carbohydrate)*	10 oz
Soy milk, regular, plain *(1 carbohydrate + 1 fat)*	1 cup
Yogurt	
juice blends *(1 fat-free milk + 1 carbohydrate)*	1 cup
with fruit, low-fat *(1 fat-free milk + 1 carbohydrate)*	⅔ cup (6 oz)

Sweets, Desserts, and Other Carbohydrates

Each serving from this list contains **15 grams of carbohydrate;** the amount of protein, fat and calories varies. You can substitute food choices from this list for other carbohydrate-containing foods (such as those found on the Starch, Fruit or Milk lists) in your meal plan, even though these foods have added sugars or fat. The foods on this list do not have as many vitamins, minerals and fiber. Choose foods from this list less often if you are trying to lose weight. Many sugar-free, fat-free and reduced-fat products are made with ingredients that contain carbohydrate, so check the Total Carbohydrate information on the Nutrition Facts food label.

Food	**Serving Size**
Brownie, small, unfrosted *(Count as 1 carbohydrate + 1 fat)*	1 ¼ inch square, ⅞ inch high (about 1 oz)
Cake	
frosted *(Count as 2 carbohydrates + 1 fat)*	2-inch square (about 1 oz)
unfrosted *(Count as 1 carbohydrate + 1 fat)*	2-inch square (about 1 oz)
Candy bar, chocolate/peanut *(Count as 1 ½ carbohydrates + 1 ½ fats)*	2 "fun size" bars (1 oz)
Candy, hard	3 pieces
Cookies	
chocolate chip *(Count as 1 carbohydrate + 2 fats)*	2 cookies (2 ¼ inch across)
vanilla wafer *(Count as 1 carbohydrate + 1 fat)*	5 cookies
Doughnut, cake, plain *(Count as 1 ½ carbohydrates + 2 fats)*	1 medium (1 ½ oz)
Flan (caramel custard) *(Count as 2 carbohydrates)*	½ cup
Fruit juice bars, frozen, 100% juice	1 bar (3 oz)
Gelatin, regular	½ cup
Granola or snack bar, regular or low-fat *(Count as 1 ½ carbohydrates)*	1 bar (1 oz)
Hot chocolate, regular *(Count as 1 carbohydrate + 1 fat)*	1 envelope added to 8 oz water
Ice cream	
light and no sugar added *(Count as 1 carbohydrate + 1 fat)*	½ cup
regular *(Count as 1 carbohydrate + 2 fats)*	½ cup
Jam or jelly, regular	1 Tbsp
Muffin (4 oz) *(Count as 1 carbohydrate + ½ fat)*	¼ muffin (1 oz)
Pie, commercially prepared fruit, 2 crusts *(Count as 3 carbohydrates + 2 fats)*	⅙ of 8-inch pie
Pudding	
regular (made with reduced-fat milk) *(Count as 2 carbohydrates)*	½ cup
sugar-free or sugar- and fat-free (made with fat-free milk)	½ cup
Sports drink	1 cup (8 oz)
Sugar	1 Tbsp
Syrup	
light (pancake type)	2 Tbsp
regular (pancake type)	1 Tbsp
Yogurt, frozen, fat-free	⅓ cup

Nonstarchy Vegetables

Each serving from this list contains **5 grams carbohydrate,** 2 grams protein and 25 calories. You should try to eat at least 2 to 3 nonstarchy vegetable servings each day. Choose a variety of vegetables to benefit from their important vitamins, minerals and antioxidants. When using canned vegetables, choose no salt added versions or rinse regular canned vegetables. In general, a single serving of a nonstarchy vegetable is:

- ½ cup of cooked vegetables or vegetable juice
- 1 cup of raw vegetables

Amaranth or Chinese spinach
Beans (green, wax, Italian)
Bean sprouts
Broccoli
Cabbage (green, bok choy, Chinese)
☺ Carrots
Cauliflower
Celery
Cucumber
Eggplant
Greens (collard, kale, mustard, turnip)
Jicama
Mushrooms, all kinds, fresh
Okra
Onions
Pea pods
☺ Peppers (all varieties)
Radishes
! Sauerkraut
Spinach
Squash (summer, crookneck, zucchini)
Tomatoes, fresh and canned
! Tomato sauce
! Tomato/vegetable juice
Water chestnuts

Meat and Meat Substitutes

Meat and meat substitutes are rich in protein. Whenever possible, choose lean meats. Portion sizes on this list are based on cooked weight, after bone and fat have been removed. The carbohydrate content varies among plant-based proteins, so read food labels carefully.

Lean meats and meat substitutes: Each serving from this list contains **0 grams carbohydrate,** 7 grams protein, 0-3 grams fat and 45 calories.

Beef: Select or Choice grades: ground round, roast (chuck, rib, rump), round, sirloin, steak (cubed, flank, porterhouse, T-bone), tenderloin	1 oz
Cheeses with 3 grams of fat or less per oz	1 oz
Cottage cheese	¼ cup
Egg whites	2
Fish, fresh or frozen, plain: catfish, cod, flounder, haddock, halibut, orange roughy, salmon, tilapia, trout, tuna	1 oz
Hot dog with 3 grams of fat or less per oz	1
Pork, lean	
Canadian bacon	1 oz
Rib or loin chip/roast, ham, tenderloin	1 oz
Poultry, without skin	1 oz
Processed sandwich meats with 3 grams of fat or less per oz	1 oz
Tuna, canned in water or oil, drained	1 oz

Medium-fat meat and meat substitutes: Each serving from this list contains **0 grams carbohydrate,** 7 grams protein, 4-7 grams fat and 75 calories.

Beef: corned beef, ground beef, meatloaf, Prime grades trimmed of fat (prime rib)	1 oz
Cheeses with 4-7 grams of fat per oz: feta, mozzarella, pasteurized processed cheese spread, reduced-fat cheeses, string cheese	1 oz
Egg	1
Fish, any fried product	1 oz
Pork, cutlet, shoulder roast	1 oz
Poultry, with skin or fried	1 oz
Ricotta cheese	2 oz or ¼ cup
! Sausage with 4-7 grams of fat per oz	1 oz

High-fat meat and meat substitutes: Each serving from this list contains **0 grams carbohydrate,** 7 grams protein, 8+ grams fat and 100 calories.

Bacon	
! pork	2 slices
! turkey	3 slices
Cheese, regular: American, bleu, brie, cheddar, hard goat, Monterey jack, queso and swiss	1 oz
*! Hot dog: beef, pork or combination	1
Pork spareribs	1 oz
Processed sandwich meats with 8 grams of fat or more per oz: bologna, pastrami, hard salami	1 oz

! Sausage with 8 grams fat or more per oz: bratwurst, chorizo, Italian, knockwurst, Polish, smoked, summer	1 oz

Plant-based proteins: Each serving from this list contains 7 grams protein and a **variable amount of carbohydrate,** fat and calories. Beans, peas and lentils are also found on the Starch list. Nut butters in smaller amounts are found in the Fats list.

Food	**Amount**
Beans, lentils, or peas (cooked) *(Count as 1 starch + 1 lean meat)*	½ cup
☺Hummus *(Count as 1 carbohydrate + 1 high-fat meat)*	⅓ cup
Nut spreads: almond butter, cashew butter, peanut butter, soy nut butter *(Count as 1 high-fat meat)*	1 Tbsp
Tempeh *(Count as 1 medium-fat meat)*	¼ cup
Tofu *(Count as 1 medium-fat meat)*	4 oz (½ cup)

Fats

Each serving from this list contains **0 grams carbohydrate,** 0 grams protein, 5 grams fat and 45 calories.

Choose heart-healthy fats from the monounsaturated and polyunsaturated groups more often. In general, a single serving of fat is:

- 1 teaspoon of regular margarine, vegetable oil or butter
- 1 tablespoon of regular salad dressing

Unsaturated Fats

Monounsaturated Fats	**Serving Size**
Avocado, medium	2 Tbsp (1 oz)
Nut butters (*trans*-fat free)	1 ½ tsp
Nuts	
almonds, cashews	6 nuts
macadamia	3 nuts
peanuts	10 nuts
pecans	4 halves
Oil: canola, olive, peanut	1 tsp
Olives, black (ripe)	8 large
Olives, green (stuffed)	10 large

Polyunsaturated Fats	**Serving Size**
Margarine	
lower-fat spread	1 Tbsp
stick, tub or squeeze	1 tsp
Mayonnaise	
reduced-fat	1 Tbsp
regular	1 tsp
Oil: corn, cottonseed, flaxseed, grape seed, safflower, soybean, sunflower	1 tsp
Salad dressing	
reduced-fat	2 Tbsp
regular	1 Tbsp

Saturated Fats	**Serving Size**
Bacon, cooked, regular or turkey	1 slice
Butter, stick	1 tsp
Cream, half and half	2 Tbsp
Cream cheese	
reduced-fat	1 ½ Tbsp (¾ oz)
regular	1 Tbsp (½ oz)
Sour cream	
reduced-fat or light	3 Tbsp
regular	2 Tbsp

Free Foods

Each serving from this list has **5 grams or less of carbohydrate** and less than 20 calories per serving. Eat up to 3 servings per day of the free foods with a serving size noted without counting any carbohydrate. Choices listed without a serving size noted can be eaten whenever you like. For better blood glucose control, spread your servings of these foods throughout the day.

Low Carbohydrate Foods	**Serving Size**
Cabbage, raw	½ cup
Gelatin, sugar-free or unflavored	
Gum	
Jam or jelly, light or no sugar added	2 tsp
Salad greens	
Sugar substitutes (low calorie sweeteners)	

Modified Fat Foods with Carbohydrate	**Serving Size**
Cream cheese, fat-free	1 Tbsp (½ oz)
Creamers	
nondairy, liquid	1 Tbsp
nondairy, powdered	2 tsp
Salad dressing	
fat-free or low-fat	1 Tbsp
fat-free Italian	2 Tbsp

Condiments	**Serving Size**
Barbecue sauce	2 tsp
Catsup (ketchup)	1 Tbsp
Mustard	
! Pickles, dill	1 ½ medium
Salsa	¼ cup
Taco sauce	1 Tbsp
Vinegar	

Drinks/Mixes

! Bouillon, broth, consommé
Carbonated or mineral water, club soda
Coffee or tea
Diet soft drinks or sugar-free drink mixes

Seasonings

Flavoring extracts
Garlic
Herbs, fresh or dried
Nonstick cooking spray
Spices
Worcestershire sauce

Combination Foods

Combination foods contain foods from more than one food list, but with the help of a Registered Dietitian (RD) you can fit these foods into your meal plan.

Entrees	**Serving Size**
! Casserole type (tuna noodle, lasagna, macaroni and cheese) *(Count as 2 carbohydrates + 2 medium-fat meats)*	1 cup (8 oz)

Frozen Meals/Entrees	**Serving Size**
!☺Burrito (beef and bean) *(Count as 3 carbohydrates + 1 lean meat + 2 fats)*	1 (5 oz)
!Enchilada *(Count as 3 carbohydrates)*	1 (11 oz)
! Pizza, cheese/vegetarian, thin crust *(Count as 2 carbohydrates + 2 medium-fat meats)*	¼ of a 12 inch (4 ½-5 oz)
!Taco *(Count as 2 carbohydrates)*	1 (5-6 oz)

Soups	**Serving Size**
! Bean, lentil or split pea *(Count as 1 carbohydrate + 1 lean meat)*	1 cup
! Tomato (made with water) *(Count as 1 carbohydrate)*	1 cup

These Food Lists are not intended to be all inclusive. Consult with your RD about any foods that you eat which are not listed.

Sample Meal Plan

The table below shows sample meal plans, by number of servings, for different calorie levels. Ask your RD, diabetes educator, or healthcare provider which plan works best for you. Each plan provides about half of its calories from carbohydrate and less than 25% of calories from fat, based on choosing fat-free milk and low-fat meats (Lean Meat Group) and cheeses.

Calories per day*					
	1200	1600	1800	2000	2200
Carbohydrates					
Starches	5	7	8	9	10
Fruits	3	3	3	4	4
Milk	2	3	3	3	3
Sweets, Desserts, & Other Carbohydrate					
Nonstarchy Vegetables	3	4	5	6	6
Meat & Meat Substitutes	4 oz	6 oz	6 oz	7 oz	8 oz
Fats	3	5	6	6	7

*The numbers included in the chart are individual servings from each food list.

Alcohol – In general, 1 alcohol equivalent has about 100 calories. One alcohol equivalent is 12 ounces beer or 1 ½ ounces distilled spirits or 5 ounces wine. If you choose to drink alcohol, limit it to 1 drink or less per day if you are a woman and 2 drinks or less per day if you are a man.

Carbohydrate Counting

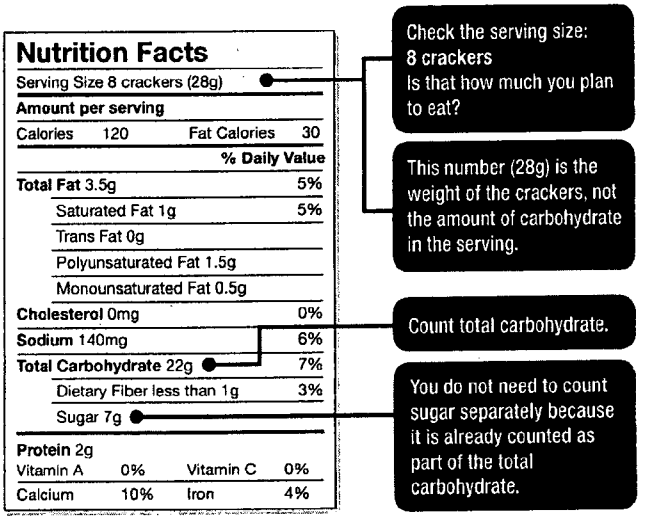
Carbohydrate (starch and sugar) is the main nutrient in food that raises blood glucose. When you plan meals based on carbohydrate counting, count only the foods that contain carbohydrate. Use either the portion sizes shown in the Food Lists, or calculate the carbohydrate grams or choices using the bolded carbohydrate numbers at the top of each food list. If you are using a packaged food with a Nutrition Facts label, count the number of "Total Carbohydrate" grams based on the serving size listed on the label.

How much carbohydrate do you need?
Your RD can help decide how much carbohydrate you need. The amount depends on your age, weight, activity, and diabetes medications if needed.

It's important to know that...
1 carbohydrate choice = 15 grams carbohydrate

Women often need about 45-60 grams carbohydrate (3-4 choices) at each of three meals and 15 grams carbohydrate (1 choice) for snacks as needed.

Men often need 60-75 grams carbohydrate (4-5 choices) at each of three meals and 15-30 grams carbohydrate (1-2 choices) for snacks as needed.

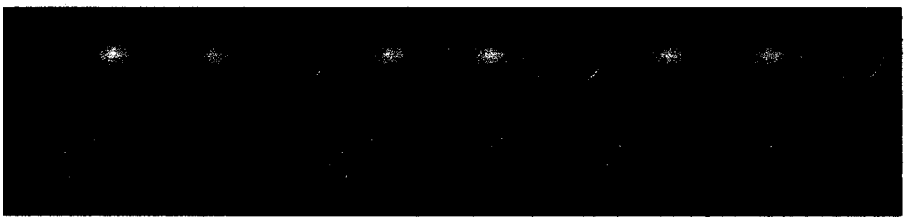


TO CALCULATE CARBOHYDRATE CHOICES:
Divide the number of grams of total carbohydrate by 15 (because 1 carbohydrate choice = 15 grams of carbohydrate).
Total carbohydrate = 22g
22 divided by 15 = 1.5 (round to 2)
So, 8 crackers = 2 carbohydrate choices

HEART
CENTER
of Greater Waterbury

YOU ARE WHAT YOU EAT

HEALTHY EATING TIPS



SANDRA MICALIZZI APRN,CDE
PHONE 203-575-5573
SMICALIZZI@HCOGW.ORG
WWW.HEARTCENTERGW.ORG

HEART
CENTER
of Greater Waterbury

THE HEALTHY HEART

REDUCED SATURATED FAT AND CHOLESTEROL

Saturated fat and cholesterol are the two biggest threats to your heart. Do your heart a favor, and choose low fat, low cholesterol foods whenever possible.

FOODS TO CHOOSE	FOODS TO LOSE
Canola oil, olive oil, olives, avocado, nuts	Coconut oil, palm oil, coconut, butter
Non-fat or 1% milk, non-fat or low fat yogurt	Cream, whole milk, powdered creamers
Fresh fruits and vegetables, plain frozen vegetables	Vegetables fried in deep fat
Whole grain bread, cereal, pasta, pretzels	Donuts, muffins, pastries
Fish, White meat chicken and turkey, dried beans, tofu, lean cuts of meat	Hot dogs, bacon, beef, sausage, liver, bologna, salami

LOW FAT COOKING TIPS

- ♥ Broil, roast, bake, steam or microwave fish, chicken, turkey and red meat.
- ♥ Take the skin off chicken and cut the extra fat off meat before you cook it.
- ♥ Brown meat under the broiler.
- ♥ Use wine or broth instead of fat.
- ♥ Use nonstick pans or cooking sprays

HEART
CENTER
of Greater Waterbury

MORE HEART HEALTHY EATING

Heart healthy eating starts with making the right choices for meals and snacks. If you prepare the meals in your household, your healthy choices will be good for the whole family.

Choose Fats Wisely

Pick unsaturated fats. This type of fat is good for you in small amounts. It is found in nuts, seeds, fish, avocados, and vegetable oils (not hydrogenated).

Limit saturated fats. It raises LDL (bad) cholesterol. This fat is mostly found in animal foods (such as beef, chicken or dairy). Eat as little of this fat as you can. Try to use unsaturated fat instead. For instance, cook with vegetable oil instead of butter.

Avoid trans fats. This is found in snack foods, shortening, fresh fries, and stick margarine. Even if it is not listed on the back label, look for it in the ingredients in the form of hydrogenated or partially hydrogenated oils.

What About Cholesterol?

The level of cholesterol in your blood shows if you are at risk for heart disease. Your body makes some cholesterol. Cholesterol is

also absorbed into your blood from the foods you eat. Egg yolks, organ meat, and fatty animal foods are some foods that are high in cholesterol. Most high cholesterol foods are high in saturated fat. So eating less saturated fat will help lower your cholesterol.

Find Hidden Sodium

Your body does need some sodium (salt), but too much can raise blood pressure. Be aware that sodium is "hidden" in many foods. These include canned soup and vegetables, packages pasta and rice dishes, condiments such as ketchup, and snack foods such as chips. Sodium is also hidden in most restaurant and fast foods.

Read Food Labels

Reading food labels is the best way to keep track of what's in the food you eat. Labels can help you see how much fat and sodium is in packaged food. With a little practice, getting the information you need from labels is easy. Keep serving size in mind. If you eat twice as much as one serving size, you must double all the other numbers on the label.

Nutrition Facts

Serving size 2 cookies (26g/0.9oz.)
Servings per container 6

Amount per serving	
Calories 140	Calories from fat 70
	% of Daily Values
Total fat 7g	11%
Saturated Fat 2.5%	13%
Trans Fat 2.5%	
Cholesterol 10mg	3%
Sodium 105 mg	4%
Total Carbohydrates 16%	5%
Dietary Fiber 1g	4%
Sugars 5%	
Protein 2g	

Vitamin A 0%	•	Vitamin C 0%
Calcium 0%	•	Iron 0%

Percent Daily Values are based on a 2,000 calorie diet.

Ingredients: UNBLEACHED ENRICHED WHEAT FLOUR [FLOUR, NICIN, REDUCED IRON, THIAMINE MONOITRATE (VITAMION B1), RIBOFLAVIN (VITAMIN B2) FOLIC ACIS], PARTIALLY HYDROGENTAED VEGETABLE SHORTENING (SOY-BEAN AND COTTONSEED OILS), SUGAR, BUTTER, CORNSTARCH, INVERT SUGAR, CONTAINS 2% OR LESS OF : NON-FAT MILLK, EGG WHITES, SALT, BAKING SODA

HEART
CENTER
of Greater Waterbury

PRODUCE POWER

Apples contain vitamins A and C. Studies show that apples also have cancer – and virus – fighting agents and can work as anti-inflammatories. The boron in apples boosts blood level of estrogen and the other compounds to prevent calcium loss in bones.

Artichokes are full of fiber, which is known to combat Type 2 diabetes – a fourth leading cause of death by disease in the United States.

Bananas are rich in potassium, a mineral that regulates heart beat and blood pressure and can protect the elderly from strokes. Bananas are also commonly recommended to stabilize irritable intestines, thus alleviating both constipation and diarrhea.

Beets are a great source of the cancer-fight antioxidant betacyanin, which gives them their vibrant color. Fresh beets are full of folic acid and vitamin B, which may protect against heart disease and colon cancer.

Blueberries contain tannic acid, which many scientists believe neutralizes free radicals and acts as a potent virus killer. Others claim it helps cure diarrhea and fights off bladder and urinary track

infections. European ski lodges often serve blueberry soup as a cold remedy.

Broccoli is one of the first vegetables found to have anti cancer properties and is still considered among the most potent. The sulforaphane in broccoli is said to stimulate the body to produce an enzyme that kills potential carcinogens. Other vegetables in the cruciferous family, such as cabbage, cauliflower and brussel sprouts, also fight disease.

Eggplant contains two compounds used to stop convulsions: scopletin and scoparone. It is being investigated for its potential use in the treatment of epilepsy. Studies show this vegetable also binds up cholesterol in the intestines so that it isn't absorbed into the blood stream where it can clog arteries.

Grapes possess high levels of caffeic acid, which has been found to prevent cancer in animals, and flavonoids, which may prevent blood clots. Several dietary surveys have found that snacking on grapes lowers the incidence of gum disease.

Oranges, lemons and limes have vitamin C, bioflavonoids and an abundance of limonene. These help the body fight cancers of the lung, cervix, stomach, and esophagus by reducing cholesterol and boosting enzymes thought to break down carcinogens and stimulates cancer killing immune cells.

Pineapples are high in the mineral manganese, which research suggests helps build strong bones and prevents osteoporosis. A single cup of pineapple juice provided 50% of the recommended daily amount of vitamin C; fresh pineapple contains brome lain, an enzyme that helps digestion by breaking down protein.

HEART
CENTER
of Greater Waterbury

GROCERY SHOPPING

Do you want to control your cholesterol? Read food labels and buy foods low in saturated fat and low in cholesterol. Here is a shopping list:

- Whole wheat, rye or pumpernickel bread
- Soft tortillas (corn, or whole wheat)
- Hot and cold cereals, except granola or muesli
- Fruits (any fresh, canned, dried or frozen without added sugar)
- Vegetables (any fresh, frozen or low-salt canned without cream or cheese sauce)
- Fresh or frozen juices, without added sugar
- Fat- free or 1% milk
- Cheese (with 3 grams of fat or less per serving)
- Low-fat or non-fat yogurt
- Lean cuts of meat (eye of round beef, top round, sirloin, pork tenderloin)
- Lean or extra lean ground beef
- Chicken or turkey (remove skin)
- White meat fish
- Tuna (light meat canned in water)
- Peanut butter (reduced fat)
- Eggs, egg whites, egg substitutes
- Low-fat cookies or angel food cake
- Low fat frozen yogurt, sherbet
- Popcorn, pretzels, baked tortilla chips
- Vegetable oil (canola, olive, corn, peanut, sunflower)
- Nonstick cooking spray
- Sparkling water, tea, lemonade

WATERBURY HOSPITAL Saint Mary's HOSPITAL UConn Health Center

HEART
CENTER
of Greater Waterbury

10 STEPS TO SMARTER FOOD SHOPPING

You came, you shopped. But then you got home form the supermarket and started unloading fatty snack items and deli meats. What went wrong? You fell back into the habit of shopping like an average American rather than a person with a dietary purpose. In an enticing palace of eating designed to lead you astray, here's how to stay on track.

1. **Make a list** - Before you shop, write down what you need – to reduce the chances of buying what you don't.

2. **Limit your trips** – Make your shopping list long so you have to make only one or two trips to the store per week. Besides being more efficient, this provides less opportunity to make less impulse purchases.

3. **Avoid shopping on an empty stomach** – When you're hungry, you're more likely to grab high-fat snacks and desserts.

4. **Follow the walls** – Limit browsing to the perimeter of the store, where you'll find the freshest, most healthful foods: raw produce, low-fat dairy products, fresh lean meats and fish. Venture into the interior isles only when you're after specific foods such as pasta and dried beans, to avoid picking up extra items not included in your diet plan.

5. **Pay attention to portions** – Those cookies look great – and hey, eating them only costs you 75 calories. But check the serving size: 1 cookie. Eating "them", say three cookies – brings your calorie count up to 225.

6. **Ignore pictures** – Golden sunshine glows on heaps of freshly harvested grains – and image of good health which signifies nothing. Look at the side of the box instead for the facts, and choose foods that are high in fiber and low in fat and calories.

7. **Grade your grains** – Want high fiber bread? Look for the words "whole grain" or "stone ground" on the label. Breads labeled simply "wheat" – even if the are brown in color – may not contain whole grains. True whole grain bread contains at least 2 grams of fiber.

8. **Watch the language** – Beware of foods labels "no sugar added" – the wording is carefully chosen, because the product may be loaded with natural sugar. You'll find the real story on the label under "Sugars".

9. **Add some spice to your life** – Instead of creamy condiments, load up on such spices as basil, chives, cinnamon, cumin, curry, garlic, horseradish, nutmeg, oregano, paprika, parsley and Tabasco sauce. They're very low in carbohydrates, fat, protein and calories.

10. **Keep your eye on the cashier** – You're waiting in line, nothing to do – a captive audience. It's no accident that supermarkets pile their impulse items next to the registers. Keep a couple of items from your basket in your hands. It'll stop you from reaching for the candy bars.

DIET TIPS FOR LOWER CHOLESTEROL

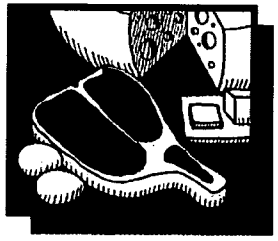
FOR MEAT AND PROTEIN FOODS,

CHOOSE:

- ❑ Fish and shellfish
- ❑ Chicken and turkey without skin
- ❑ Ground turkey—only 15% fat
- ❑ Lean, well-trimmed beef, veal, lamb, and pork, with very little marbling
- ❑ Small servings of meat, seafood, and poultry—7 ounces or less per day
- ❑ Meatless protein occasionally—dried beans, lentils, split peas, peanut butter, tofu—instead of meat protein
- ❑ Only 2 egg yolks per week (including those used in baked products and mixed dishes)

LIMIT:

- ❑ Large servings of shrimp
- ❑ Fried chicken, duck
- ❑ Fatty ground meat
- ❑ Liver and organ meats
- ❑ Prime, heavily marbled cuts of meat
- ❑ Bacon, sausage, high-fat deli meats



FOR MILK, CHEESE, AND DAIRY PRODUCTS,

CHOOSE:

- ❑ Skim or 1% low-fat milk only
- ❑ Low-fat milk, evaporated skim milk, or nonfat dry milk powder in place of cream
- ❑ Frozen yogurt, ice milk, sherbet, or sorbet instead of ice cream
- ❑ Low-fat or nonfat yogurt
- ❑ Low-fat cheeses—1% cottage cheese, skim-milk ricotta, skim-milk mozzarella, skim-milk American cheese products

LIMIT:

- ❑ Any milk containing more than 1% fat (whole, 2%)
- ❑ Cream, half & half, nondairy creamer
- ❑ Ice cream, whipped cream, nondairy whipped toppings
- ❑ Whole-milk yogurt, sour cream
- ❑ Whole-milk cheeses—Cheddar, American, Swiss, Muenster, cream cheese, Brie

FOR FRUITS AND VEGETABLES,

CHOOSE:

Several servings of these low-fat, high-nutrition foods daily:

- ❑ Raw, steamed, boiled, baked, or stir-fried vegetables
- ❑ Vegetables seasoned with herbs, lemon juice, or a small amount of margarine

LIMIT:

- ❑ Coconut—the only fruit high in saturated fat
- ❑ Deep-fat-fried vegetables
- ❑ Cream sauce, cheese sauce, or butter on vegetables

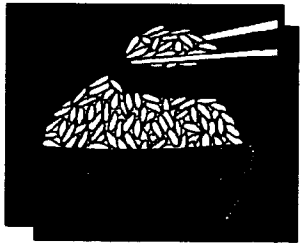
FOR BREADS AND CEREALS,

CHOOSE:

- ❑ Plain breads, English muffins, bagels
- ❑ Plain pasta, rice
- ❑ Hot or cold cereal with no added fat
- ❑ Low-fat snack foods—pretzels, air-popped popcorn, rice cakes, Scandinavian flatbread crackers, melba toast
- ❑ Low-fat baked goods—angel food cake, fruit cookies, graham crackers, gingersnaps, fortune cookies

LIMIT:

- ❑ High-fat baked goods—donuts, Danish pastry, croissants
- ❑ Fried rice, crispy chow mein noodles
- ❑ Granolas with coconut or coconut oil added
- ❑ High-fat chips, cheese crackers, butter crackers
- ❑ High-fat cakes, cookies, pies



FOR HIGH-FAT FOODS,

CHOOSE:

- ❑ Margarine or diet margarine made with liquid safflower, corn, or sunflower oil
- ❑ Cooking oils high in monounsaturated fatty acids, such as olive and peanut oils, or oils high in polyunsaturates, such as safflower, sunflower, corn, and soybean oils
- ❑ Salad dressings and diet dressings made without saturated oils
- ❑ Nut snacks in moderation. (Although the fat in these foods is primarily unsaturated, they are high in total fat and calories.)

LIMIT:

- ❑ Butter or margarines made with partially hydrogenated oil
- ❑ Lard, meat fat, hydrogenated or partially hydrogenated solid vegetable shortening; products made with coconut or palm oil
- ❑ Salad dressings made with sour cream or cheese
- ❑ Chocolate—high in saturated fat



HEART CENTER
of Greater Waterbury

0143
09/15/08

HEART CENTER of Greater Waterbury
Advanced Cardiac Care. Close to Home.

Spring 2007

THE BEAT GOES ON

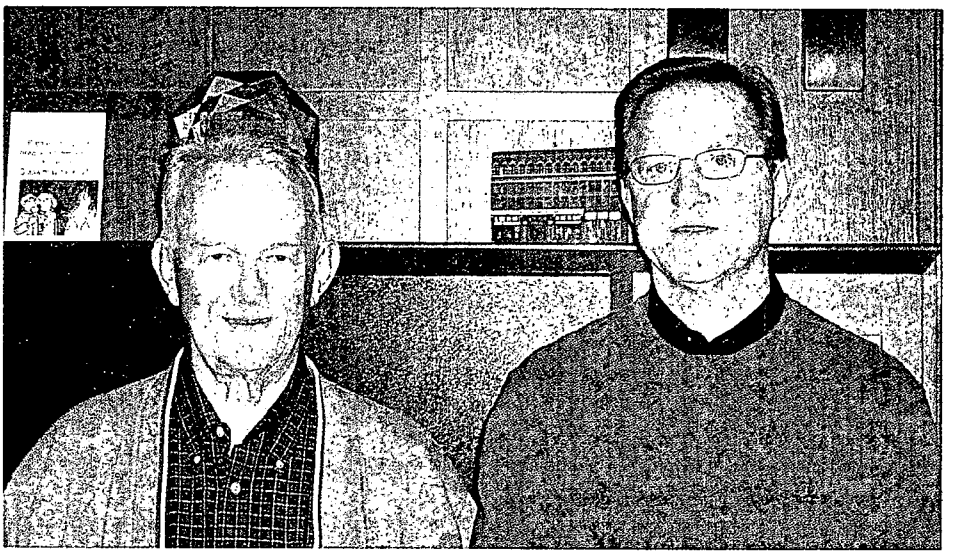
Message from the Executive Director



Loraine C. Shea
Executive Director,
Heart Center of
Greater Waterbury

February has traditionally been the month associated with hearts, whether it is the colorful cut out hearts on a greeting card or the quick beating heart of one in love. And every year since 1963, February has been declared American Heart Month. During February all of us are urged to increase our awareness of cardiovascular disease and ways to prevent it. In this edition of "The Beat Goes On" we feature information on diagnostic procedures, tips for coping after a heart attack and the personal stories of two of your neighbors. These former patients at Saint Mary's Hospital and Waterbury Hospital are just two of the hundreds of lives in the Greater Waterbury Community that the Heart Center has improved with its excellent cardiac care and ongoing heart health education. Enjoy the issue!

To learn more about Heart Health, log on to our website www.hcogw.org.



Michael McCormack of Woodbury (left) and Jim Zukauskas of Waterbury. Both men had successful heart surgery last October—Michael at Waterbury Hospital, and Jim at Saint Mary's Hospital.

Saving Lives in Waterbury

When people think of receiving top notch health care, they might think they have to travel to a distant city. Now, thanks to the efforts of Saint Mary's Hospital and Waterbury Hospital, advanced cardiac care is available close to home. The two local hospitals have teamed up with the University of Connecticut Health Center to create the Heart Center of Greater Waterbury. Since the program began in July of 2005, literally hundreds of people have received a standard of care that had never been available in this area before.

Michael McCormack of Woodbury is but one example of a very satisfied patient. His internist, Dr. Michael Trager, discovered an irregular heartbeat while performing a routine EKG. McCormack, who had a family history of heart disease, was shocked to find that the left side of his heart was completely blocked. Because of this dangerous condition, cardiologist Dr. Michael Malinics prescribed immediate surgery to correct the condition. "On October 10 I played golf," he said. "On October 11 I was in the hospital having a catheterization." Following successful bypass surgery at Waterbury Hospital, McCormack is now in the midst of a cardiac rehab program, an integral component of the Heart Center program.

Jim Zukauskas of Waterbury has a similar story. Zukauskas, a postal

continues on pg. 3

IN THIS ISSUE

2 The Road Back: Life After a Heart Attack
2 Upcoming Events
4 Picturing Your Heart



Upcoming Events

To register for any of these sessions call **203-575-5573.**

Heart Center of Greater Waterbury Support Group
March 5, 2007 1 p.m.
Harold Leever Regional Cancer Center
1075 Chase Parkway
Waterbury, CT

"Hypertension: What is it and what can I do about it?"
This program will be offered at three different locations and will present an overview of the information necessary to improve your blood pressure through diet, exercise and medication.

February 28, 2007 1 p.m.
Saint Mary's Wolcott Walk-In Center
503 Wolcott Rd.
Wolcott, CT

March 1, 2007 11 a.m.
Be Well Center of Waterbury Hospital at the Brass Mill Center
Waterbury, CT

March 8, 2007 11 a.m.
Be Well Center of Waterbury Hospital at the Brass Mill Center
Waterbury, CT

March 13, 2007 3:30 p.m.
Saint Mary's Naugatuck Walk-In Center
Cross Point Plaza
Naugatuck, CT



THE ROAD BACK: LIFE AFTER A HEART ATTACK

Every year, nearly 1 million Americans survive a heart attack. If you're one of them, you may be facing not only physical but also emotional challenges. You may feel fearful, angry, or depressed at times. You may wonder how you'll ever get back to "normal" life. In fact, the real road to recovery doesn't lead back; it leads forward, to a new and healthier life.

How You Can Get There

Your recovery plan may include both medication and lifestyle changes.

Keep yourself on track with these tips:

- Remember that the changes you're making will benefit you for the rest of your life.
- Share your feelings with people you trust. Your doctor can recommend a counselor or support group.
- Always take any medication as prescribed.
- Tell your doctor about any physical symptoms or problems immediately.

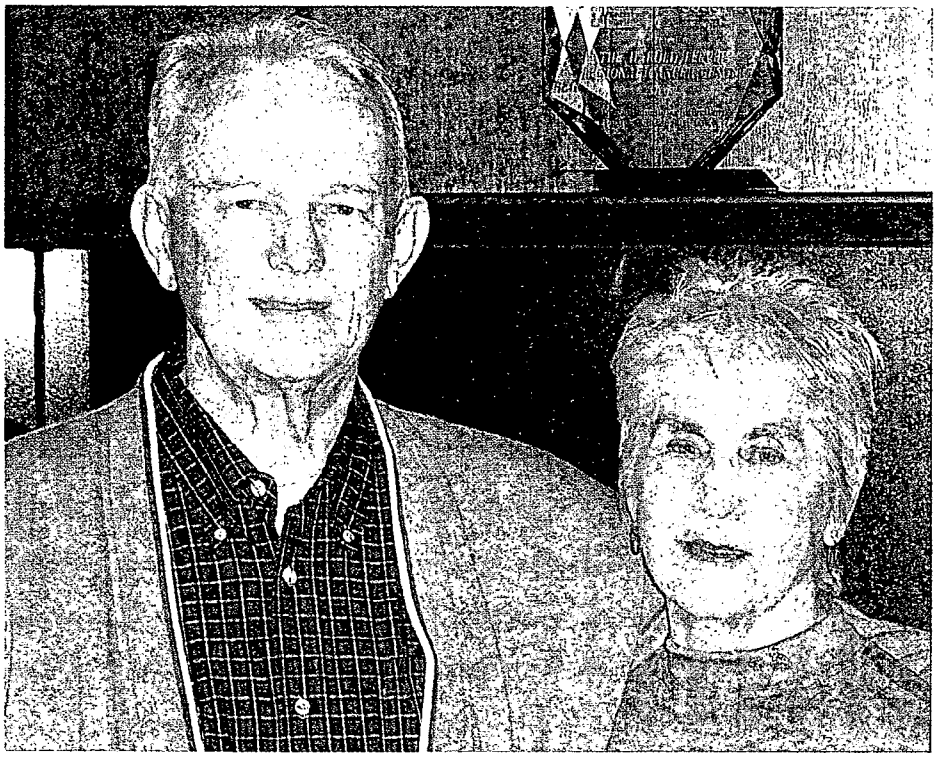
How Others Can Help You

Here's what friends and family can do to be a positive part of your recovery:

- Encourage you in your new habits by joining you in exercising, for example, or sharing heart-healthy recipes.
- Avoid smoking around you.
- Visit with a counselor or support group.
- Learn heart attack warning signs—chest pain; shoulder, neck, or arm pain; dizziness, sweating, or nausea; or shortness of breath. ●

If your community group is interested in Heart Health Education, call 203-575-5573.

Saving Lives in Waterbury *continued from pg.1*



Michael McCormack and his wife Evelyn McCormack.

worker, had open heart surgery in October. Because his procedure was elective, he was able to choose his surgeon to do his procedure. And that's when he met Dr. Paul Preissler. "I have nothing but praise for this gentleman," said Zukauskas. "He is smart, confident, and compassionate. After talking with him, I knew he was the surgeon for my needs. He literally saved my life."

Zukauskas was a patient at Saint Mary's Hospital, where he was cared for in the Cardiovascular Unit, or CVU. Both Saint Mary's Hospital and Waterbury Hospital utilize a model of care called "one stop post-op," which ensures that a patient receives all of his or her care in a single unit, instead of moving from place to place during the hospitalization. "No other hospital in Connecticut utilizes this model for cardiac care," according to Loraine Shea, Executive Director of the Heart Center. "The theory is that by keeping patients with the same medical team, any issues or complications will be picked up quickly and the patient will ultimately have a shorter stay."



Jim Zukauskas.

"The cardiovascular unit at Saint Mary's was great," according to Zukauskas. "Everyone had a private room. The people were right there giving us constant care. They were very professional, sincere, compassionate and genuinely concerned about my well being and progress. I told my girlfriend that I believed my nurse, a gentleman named Julius, was wonderful." Zukauskas was pleased that he didn't need to leave the area to receive this level of care. "I think it's fabulous," he said, "I'm not sure the public is aware of these qualified physicians and the programs available at these two hospitals."

Mr. McCormack also gave Waterbury Hospital high grades. "Now that Waterbury Hospital has the heart program, it's excellent," says McCormack. "We live in Woodbury so it was really convenient for us—my wife could come right over. It's very comforting to know that we have such a great team of experts within twenty minutes of our house. It's awesome."

If you're concerned about your heart health, be sure to talk with your primary care physician or your cardiologist about the cardiac services available at the Heart Center of Greater Waterbury. ●

If you are recovering from a heart related procedure, you may be interested in the Heart Center's Support Group. See the Upcoming Events on page 2.

0146
09/15/08

HEART CENTER of Greater Waterbury

Heart Center of Greater Waterbury
P.O. Box 2153
Waterbury, CT 06722

Non-Profit Org
U.S. Postage
PAID
Heart Center Of
Greater Waterbury



Start Your Day the Heart-Healthy Way—with a Hug

You're eating a low-fat diet. You exercise regularly. You don't smoke. So, what's missing from this heart-healthy regimen? Hugs, say researchers.

Some recent studies of couples show that a caring hug can help lower blood pressure and heart rate, especially during stressful moments.

The researchers suggest that a hug each morning might help protect you and your partner's hearts in ways that no pill can.

Critical Care Nurse, Vol. 24, No. 3

THE BEAT GOES ON

The Beat Goes On is published by the Heart Center of Greater Waterbury. The newsletter provides general health information, and is not intended to provide personal medical advice, which should be sought from a physician. © 2007 Printed in U.S.A.

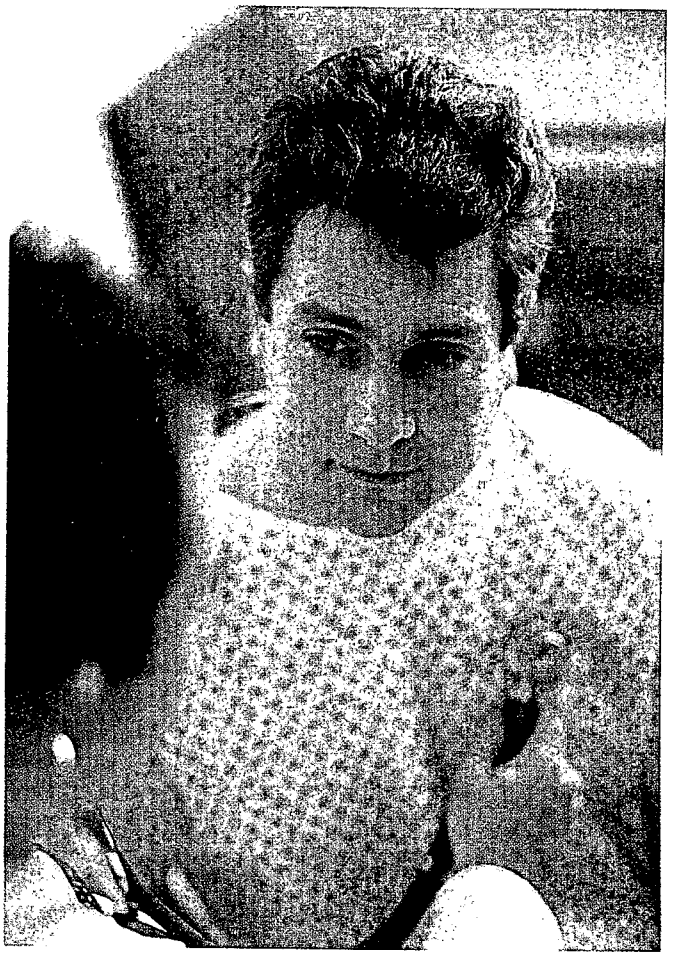
Loraine Shea, Executive Director, Heart Center of Greater Waterbury

6032M

Picturing Your Heart

To obtain diagnostic X-rays of your heart or arteries—called a coronary angiogram—your doctor may recommend a common procedure called cardiac catheterization. From start to finish, it takes one to several hours. A long, thin tube called a catheter will snake through the artery in your neck, groin, or arm to your heart, guided by X-ray photography. Here's what to expect:

- You'll probably be told not to eat or drink anything for six to eight hours beforehand.
- A mild sedative will be given to help you relax, but you'll need to stay awake to follow instructions; you may even be able to watch the procedure on a monitor the doctor uses to see the motion of your blood.
- A small area of your neck, groin, or arm will be shaved, cleaned, and anesthetized, and a tiny incision—the size of a pencil point—is made to insert the catheter.
- A dye injected through the catheter will show your heart and coronary arteries. These X-ray pictures will indicate how your heart is working and, if an artery is blocked or narrowed, the pictures will pinpoint the exact location. ●



WATERBURY HOSPITAL

Saint Mary's HOSPITAL

UConn Health Center

0147
09/15/08

HEART CENTER of Greater Waterbury
Advanced Cardiac Care. Close to Home.

Summer 2007

THE BEAT GOES ON

Message from the Executive Director



Lorainc C. Shea
Executive Director,
Heart Center of
Greater Waterbury

As you read this issue of "The Beat Goes On," the Heart Center of Greater Waterbury approaches its second anniversary. For nearly two years your community hospitals have been providing advanced cardiac services and have saved more than 1,500 hearts. In addition to the quality cardiac care services provided at Saint Mary's Hospital and Waterbury Hospital, this newsletter serves as a reminder to you that keeping your heart healthy is important to your overall well-being. In this issue you will learn the warning signs of a heart attack, understand how smoking impacts your cardiac health, and increase your knowledge about cholesterol lowering drugs.

Keeping you informed and keeping you healthy is our ultimate goal. Enjoy the issue and have a heart-healthy summer!

Freedom From Smoking

A Real Team Effort



In April, the Heart Center of Greater Waterbury (HCGW), through grant dollars from the American Heart Association (AHA), teamed up with the American Lung Association (ALA) to bring the second of three separate eight-week Freedom From Smoking Clinics to Waterbury.

"Smoking is one of the most common risk factors for heart disease," says Sandra Micalizzi, APRN, Community Outreach Nurse for HCGW. "The nicotine present in cigarette smoke causes decreased oxygen to the heart, increased blood pressure and heart rate, increased blood clotting, and damage to cells that line coronary arteries. All of these factors put undue strain on the work of your heart. Because Waterbury has not had a smoking-cessation program for some time now, we felt it was important to provide the resources that people needed to quit! We've been very fortunate to work with the American Lung Association on this program." Group facilitators from the ALA focus on the benefits of quitting and on techniques for managing stress, increasing motivation, overcoming cravings and for coping once the participant has quit. Since January, 60 community members have taken the first step toward improving overall health and well-being by taking advantage of this very comprehensive and proven program.●

To learn more about the Heart Center of Greater Waterbury and its services, log on to www.heartcentergw.org.

IN THIS ISSUE

2 Don't Stress Over Your Stress Test
3 Cholesterol Fighting Drugs
4 Chest Pain: When Is It a Heart Attack?

Upcoming Events

To register for any of these sessions, call Sandra Micalizzi, APRN, at **203-575-5573.**

"Cholesterol lab tests: What do they mean and what can I do about improving them?"
This program will be offered at three different locations and will present an overview of the different lab tests that are included in a lipid profile, what each test is for and ways to make heart-healthy changes to improve the numbers.

July 12, 2007 11 a.m.
Be Well Center of
Waterbury Hospital
at the Brass Mill Center
Waterbury, CT

July 18, 2007 1 p.m.
Saint Mary's Wolcott
Walk-in Center
503 Wolcott Rd.
Wolcott, CT

July 19, 2007 11 a.m.
Be Well Center of
Waterbury Hospital
at the Brass Mill Center
Waterbury, CT

July 24, 2007 3:30 p.m.
Saint Mary's Naugatuck
Walk-In Center
Cross Point Plaza
Naugatuck, CT

Heart Center of Greater
Waterbury Support Group
September 10, 2007
1 p.m.
Harold Leever Regional
Cancer Center
1075 Chase Parkway
Waterbury, CT



DON'T STRESS OVER YOUR STRESS TEST

There's no need to worry about an upcoming stress test. They are generally safe for most people. They also are one of the best ways to learn about your current heart health.

Putting Your Heart to Work

The most common stress test is an exercise electrocardiography (ECG), which measures your heart's electrical activity. This shows how well your heart functions while it's pumping hard. ECG results can help your doctor diagnose heart problems, develop the best treatment plan for you, and determine if current treatments are effective.

During an ECG, you walk on a treadmill with patches that contain electrodes attached to your skin. The test is painless, but some patients may experience symptoms, such as chest pain. Serious problems are rare. You will be monitored during and after the test to make sure you're doing OK.

If you are unable to exercise because of arthritis or other health problems, you can still have an ECG—without moving. In this case, you will be given a specific medicine to increase your heart rate.

Several other types of stress tests also are available. For example, women may benefit more from an exercise echocardiography, which involves taking an ultrasound of the heart during exercise.

Getting Ready for Your Test

There's no way to prep your heart for a stress test. But you can take some steps to help ensure that the test goes smoothly and safely:

- ♥ Don't eat or drink anything with caffeine, including coffee or chocolate, for several hours before the test.
- ♥ Ask your doctor if any of your medicines could present a problem. Some, including digoxin and beta-blockers, may affect test results.
- ♥ Dress in comfortable clothes and shoes.●

If your physician recommends a stress test, they can schedule it for you at the Outpatient Cardiology Departments at either of the two community hospitals: Saint Mary's Hospital (203-709-6361) or Waterbury Hospital (203-573-7264).

0149
09/15/08

WHAT ABOUT CHOLESTEROL FIGHTING DRUGS?



Henry Borkowski, MD, Medical Director,
Heart Center of Greater Waterbury,
answers your questions on cholesterol lowering drugs

Q: What exactly is cholesterol?

Dr. Borkowski: Cholesterol is a substance both made by the body and consumed in food products that come from animals. Primarily, it travels in the blood as two compounds: low-density lipoproteins (LDL) and high-density lipoproteins (HDL).

In practice, HDL is often called the "good" cholesterol and LDL is called the "bad" cholesterol. The reason for this is that HDLs help transport cholesterol in the body to the liver, where the body then prepares to excrete it. LDLs, on the other hand, actually transport cholesterol from the liver to cells in the body. Once the body's cells have all of the cholesterol they need, the extra cholesterol can build up along blood vessel walls as plaque. People with high total cholesterol to HDL cholesterol ratios are at increased risk for heart disease because, in general, they are transporting more cholesterol to cells than they need.



Q: Are diabetics more at risk for high cholesterol?

Dr. Borkowski: For people who develop diabetes as adults, damage to blood vessels can be a major problem. Substances from fatty and sugar-based foods can build up inside vessels, restricting blood flow. Up to 80 percent of people with type 2 diabetes develop blocked arteries, which can cause a heart attack or stroke. Therefore, controlling cholesterol for diabetics is very important.

Q: What is the best way to keep cholesterol at a manageable level?

Dr. Borkowski: Decreasing cholesterol in an effort to reduce fatty buildup is important to prevent heart disease in all of us. Although diet and exercise are important in controlling cholesterol, more than 90 percent of patients cannot control their cholesterol with diet alone. Therefore, cholesterol lowering drugs also may be prescribed. The safest, most effective choices are the family of drugs called statins. Studies show that cholesterol lowering drugs reduce blood vessel problems in people with diabetes by about 25 percent.

Q: Are there side effects of statins?

Dr. Borkowski: Serious side effects from statins are extremely rare. However, you may need regular blood tests to monitor the effects of the drug if you have liver or muscle disease or take certain other drugs. Ask your doctor whether a statin is right for you.

Q: Who should take statins?

Dr. Borkowski: The most important message here is to consult with your physician for guidance. Whether you should take statins is determined by evaluating your age, gender, and good and bad cholesterol levels, as well as your risk factors for cardiovascular disease, including smoking, high blood pressure, and family history of heart disease. In addition, patients who already have heart disease, symptomatic carotid artery disease, peripheral arterial disease, or abdominal aortic aneurysms may require statin therapy.●

0150
09/15/08

HEART CENTER of Greater Waterbury
Heart Center of Greater Waterbury
P.O. Box 2153
Waterbury, CT 06722

Non-Profit Org
US Postage
PAID
Heart Center Of
Greater Waterbury



Chest Pain: When Is It a Heart Attack?

Many people know that chest pain could signal a heart attack. But chest pain can also indicate other health problems. When should you worry?

Prolonged chest pain is considered the telltale symptom of a heart attack. But it's not always simple to tell when a heart attack occurs.

Heart Attacks Vary

Some heart attack sufferers report severe chest pain, while others only feel some chest discomfort. And about one-third of heart attack sufferers do not feel any chest pain at all.

Other symptoms besides chest pain are also common during heart attacks. These include:

- ♥ Left arm pain
- ♥ Pain that radiates to the neck or jaw
- ♥ Shortness of breath
- ♥ Nausea
- ♥ Dizziness
- ♥ Sweating

Certain people are more likely than others to have an atypical heart attack—or one that is characterized by symptoms other than chest pain. They include women, younger and older adults, and people who suffer from diabetes or high blood pressure.

Don't Wait to Act

It's vital to get prompt treatment for a heart attack. Whenever you or a loved one experience heart attack symptoms, it is important to get to medical care as soon as possible. These services are available close to home at both Saint Mary's Hospital and Waterbury Hospital; quality care where and when you need it.

If you know of a community group interested in a Heart Health educational program, contact the Heart Center at 203-575-1992.●



Even Light Smoking Can Jumpstart Heart Disease

Puffing just one or two cigarettes a day may be enough to harm your heart and blood vessels. One study involving 23 men found that smoking a pack or less a week seems to trigger early signs of heart disease. Ultrasound and other tests confirmed that light smoking damaged the lining of the blood vessels about as much as smoking a pack a day or more.

Journal of the American College of Cardiology, Vol. 39, No. 11

THE BEAT GOES ON

The Beat Goes On is published by the Heart Center of Greater Waterbury. The newsletter provides general health information, and is not intended to provide personal medical advice, which should be sought from a physician. © 2007 Printed in U.S.A.

Loraine Shea, Executive Director, Heart Center of Greater Waterbury

6032M

WATERBURY HOSPITAL

Saint Mary's HOSPITAL

UConn Health Center

HEART CENTER of Greater Waterbury
Advanced Cardiac Care. Close to Home.

Fall 2007

THE BEAT GOES ON

Message from the Executive Director



Loraine C. Shea
Executive Director,
Heart Center of
Greater Waterbury

The Heart Center of Greater Waterbury recently completed its second year of providing advanced cardiac services at both Saint Mary's Hospital and Waterbury Hospital. The Waterbury community can now receive routine and emergency cardiac services close to home. In addition to providing life saving services to over 1800 hearts, HCGW is committed to educating the community about heart related matters. In this issue we stress the importance of recognizing heart related symptoms early and seeking treatment quickly when needed.

In today's busy world, one of our top priorities should be our own health. Recognizing that you or a loved one may be having a heart related event and getting to your physician or the emergency room fast is important for appropriate treatment and overall outcomes. Stay informed and act fast. It may save another heart!

Minutes Matter...
During a Heart Attack



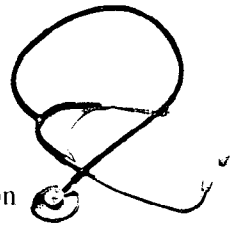
If you think you are having a heart attack, don't let any time pass before seeking assistance. To be most effective, treatments must be given within one hour after symptoms begin. That's why experts advise calling 911 as soon as symptoms are experienced. Emergency medical personnel can start treating you immediately, even before you get to the hospital.

Save Your Heart

The longer the blood supply to the heart is disrupted, the more damaged the heart becomes. A damaged heart can make it difficult to engage in everyday activities. According to a recent study in the *American Journal of Cardiology,* heart attack patients had a 16 percent greater risk of impaired heart function for every hour they delayed getting to the hospital.

Not All Heart Attacks Are the Same

Heart attacks vary widely from patient to patient. Some come on suddenly, accompanied by severe pain. Others are easy to confuse with less serious ailments.



The most common symptom in women and men is chest pain or discomfort. This discomfort is sometimes described as an uncomfortable pressure, fullness, squeezing, or pain in the center of the chest that lasts more than a few minutes. Sometimes the pain goes away and then comes back.

One study found that subjects expected chest discomfort to be severe. In reality, the intensity varies. Joseph Iannantuoni

(continued on pg. 3)

IN THIS ISSUE

2 AEDs: Portable Devices That Save Lives
2 Upcoming Events
4 Fall into Fitness with These Exercise Tips

Upcoming Events

To register for any of these sessions, call Sandra Micalizzi, APRN, at **203-575-5573.**

"Time is of the Essence: Symptoms of a Heart Attack"

This program will be offered at four different locations and will present an overview of warning signs of a heart attack, how they differ between men and women, and the importance of acting promptly.

November 7, 2007 11 a.m.
Wolcott Senior Center
Nichols Rd
Wolcott, CT

November 8, 2007 10 a.m.
Be Well Center of
Waterbury Hospital
at the Brass Mill Center
Waterbury, CT

November 13, 2007 3:30 p.m.
Saint Mary's Naugatuck
Walk-in Center
Cross Point Plaza
Naugatuck, CT

November 15, 2007 11 a.m.
The Federation,
Jewish Communities of
Western CT
444 Main St. N
Southbury, CT

Heart Center of Greater
Waterbury Support Group
November 5, 2007 1 p.m.
Harold Leever Regional
Cancer Center
1075 Chase Parkway
Waterbury, CT

AEDs: PORTABLE DEVICES THAT CAN SAVE LIVES WHEN MINUTES COUNT

Most people probably have seen TV images of patients getting "shocked" with paddles in an emergency room because their heart stops beating. But what happens when someone's heart stops at the mall? Nowadays, this person could have a higher chance of survival, thanks to automated external defibrillators (AEDs).

These portable devices are compact versions of equipment found in hospitals. AEDs deliver an electrical shock to help "restart" the heart. And they're so simple and safe that even people without medical training can use them.

Ideally, victims should receive the shock within five minutes after their heart stops, or what's called cardiac arrest. That's why some health organizations recommend that AEDs be available in public places, such as airports and sports arenas. These minutes can make a big difference. Studies have shown that an AED can more than double the chance of surviving cardiac arrest.

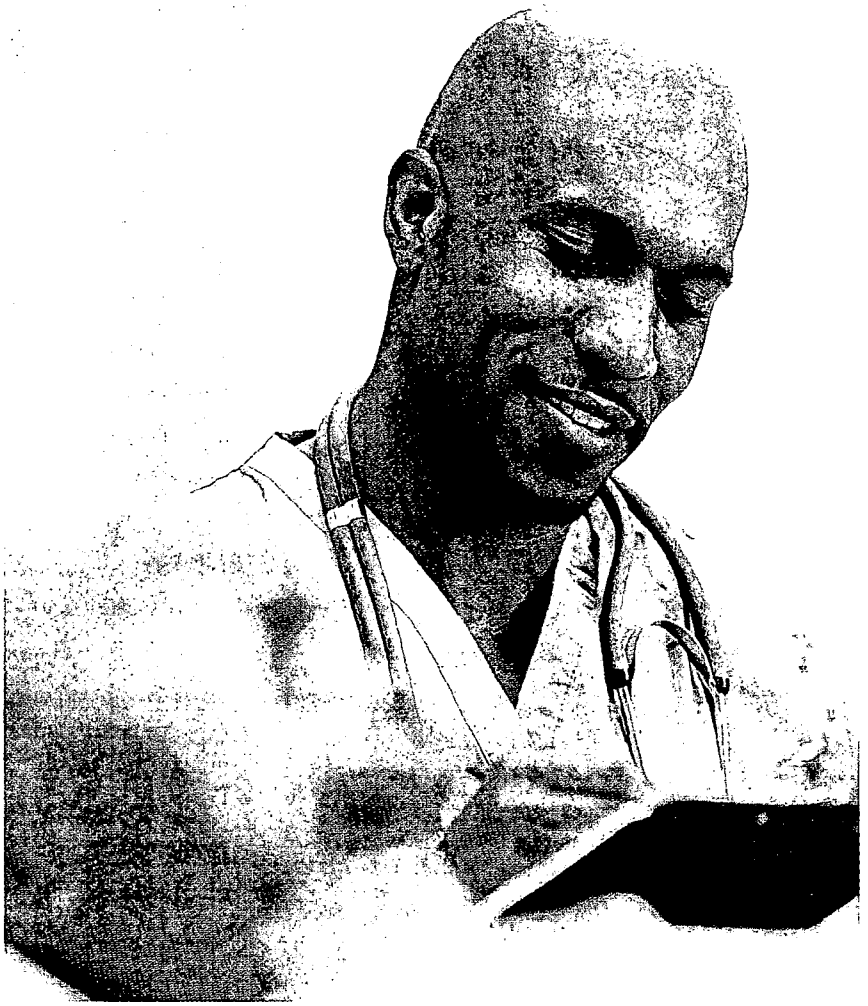
Today, many flight attendants, police officers, firefighters, and others take a short class on how to use AEDs. But people don't necessarily need to take a class to use one. Recent advances have made these devices safe and easy enough for almost anyone to use. Research has shown that AEDs are simple enough for even sixth-graders to operate. Several studies have shown that AEDs can tell with 100 percent accuracy whether a victim really needs a shock.

The National Institutes of Health and the American Heart Association are currently funding a large study of AEDs. Some experts think they may eventually become nearly as common in public places as fire extinguishers.●

To learn more about Heart Disease, log on to the Heart Center of Greater Waterbury website at **www.heartcentergw.org.**



0153
09/15/08



of Waterbury knows this firsthand. When he experienced some chest pressure in March 2007 he was encouraged by his wife to get to the Emergency Department. Because Mr. Iannantuoni had suffered a heart attack twenty-five years before with "crushing pain," this mild pressure did not concern him. Recognizing the symptoms and seeking treatment immediately assured that he was back to his normal routine within days.

Symptoms Differ for Women

In addition to chest discomfort, other symptoms are common. But these may differ between women and men. "Women need to understand that their symptoms may present very differently than their male counterparts," confirms Robin Cracco, RN, MSN, CEN, Director of Nursing for the Emergency Department at Saint Mary's Hospital. "Women are significantly more likely than men to complain of upper abdominal pain, shortness of breath, nausea, and fatigue which are not commonly thought of as symptoms of a heart attack."

Other symptoms of a heart attack include pain that spreads to the shoulders, neck, or arms, lightheadedness, dizziness, fainting, and sweating.

Recognize the Signs

The first step to getting fast treatment for a heart attack is to know the symptoms. For some, they are unsure if what they are experiencing is heart attack symptoms or heartburn. "Individuals may choose not to seek treatment if they believe their symptoms indicate heartburn," says Gail Snow, RN, Nursing Director of the Emergency Department at Waterbury Hospital. "It's important for our community to know that cardiac symptoms are treated as a cardiac problem until a definite diagnosis is determined. No one should be embarrassed about seeking treatment in the Emergency Room if they are unsure of what their symptoms mean. It is much better to be safe than sorry."

Other clues can help you distinguish heartburn from a heart attack. Heartburn often occurs after meals, particularly when lying down. Coughing and a bitter or sour taste in the back of the throat also may be present.

Typically, however, that's the extent of heartburn symptoms. Heart attacks, on the other hand, often involve a number of different symptoms in addition to chest pain.

Don't Delay Treatment

If you are having any type of chest related pain the important thing is to have it checked. Unfortunately, many Americans delay seeking treatment for a heart attack—by six hours or more. Women are especially prone to delay. Minutes do matter—don't wait to seek help. Call 911.●

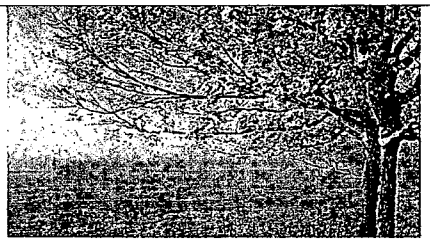
To learn more about early symptom recognition, plan on attending one our community based education sessions. See Upcoming Events on Page 2.

0154
09/15/08

HEART CENTER of Greater Waterbury

Heart Center of Greater Waterbury
P.O. Box 2153
Waterbury, CT 06722

Non-Profit Org.
U.S. Postage
PAID
Heart Center Of
Greater Waterbury



Fall into Fitness

with These Exercise Tips

Autumn usually brings a welcome cooldown from summer weather—and beautiful scenery to boot. Why wait for New Year's when the weather is likely to be less inspiring? Make a new-you exercise resolution right now: Resolve to enjoy the glories of autumn through simple, calorie-burning activities.

Tips for Autumn Activities

The best exercises for you are activities that you enjoy—and will keep doing. Aim for 30 minutes a day, most days of the week. These ideas can help you get started:

♥ **Walk everywhere.** Walk around your neighborhood to enjoy the fall colors and weather. Just a 10-minute walk after every meal adds up to 30 minutes a day. Walk the dog, walk with a friend, walk to the store from the farthest parking place in the lot.

♥ **Get out and garden.** Rake leaves, prune your plants, trim the hedges, and pick up trash from the yard. It all counts as exercise.

♥ **Put the "work" into your workout.** Who says spring cleaning can't happen in the fall? Wash the windows, wash and wax the car, sweep the sidewalks. When the work's done, run around with your kids in the yard or at the park. Showing young people that exercise is fun is one of the best gifts you can give them.●

If you know of a community group interested in a Heart Health educational program, contact the Heart Center at 203-575-1992.





Raghuraman Vidhun, M.D.

Welcome, Dr. Vidhun!

The Heart Center of Greater Waterbury welcomes Raghuraman Vidhun, M.D., to the team! Dr. Vidhun joined the practice of Cardiology Associates of Waterbury in July and is now providing Interventional Cardiology Services at both Saint Mary's Hospital and Waterbury Hospital. Dr. Vidhun trained at Saint Vincent Catholic Medical Center, Mount Sinai Hospital and Bronx VA Medical Center in New York City and received his medical degree from Rajah Muthiah Medical College and Hospital in India. He is Board Certified in Internal Medicine and Cardiovascular Medicine.

THE BEAT GOES ON

The Beat Goes On is published by the Heart Center of Greater Waterbury. The newsletter provides general health information, and is not intended to provide personal medical advice, which should be sought from a physician. © 2007 Printed in U.S.A.

Loraine Shea, Executive Director, Heart Center of Greater Waterbury

6032M

WATERBURY HOSPITAL

Saint Mary's HOSPITAL

UConn Health Center

HEART CENTER of Greater Waterbury
Advanced Cardiac Care. Close to Home.

Spring 2008

THE BEAT GOES ON

Message from the Executive Director



Loraine C. Shea
Executive Director,
Heart Center of
Greater Waterbury

In a month traditionally devoted to matters of the heart, we bring to you our spring issue of "The Beat Goes On." Although keeping informed about issues of the heart is a good idea all year round, February is especially dedicated to this purpose. This issue will focus on two of your neighbors who were diagnosed with Valvular Heart Disease. Although less common than Coronary Artery Disease, this type of heart condition may require significant treatment. Thanks to early recognition of symptoms and the excellent treatment provided by cardiac surgeons and the cardiac team at the Heart Center of Greater Waterbury at Saint Mary's Hospital and Waterbury Hospital, these local community members are home with their loved ones and back to full and active lives. Share this issue with someone close to your heart!



Dixie and Steve Lafo of Naugatuck. Steve had mitral valve repair surgery at Saint Mary's Hospital.

Repairing Heart Valves

When a stethoscope is held to your chest, your doctor is listening to the blood travel throughout the four chambers of your heart. Each of these chambers has a valve that acts like a door to allow the blood into and out of the chamber in the right way. When a heart valve is not functioning properly, the normal rhythm of blood flowing through the heart may cause significant health problems.

As a teenager, Steven Lafo of Naugatuck was diagnosed with a Mitral Valve Prolapse, sometimes called a "heart murmur." Until a sudden episode of shortness of breath brought him to the emergency room in October 2007, he had lived a "perfectly normal life." But when he saw his family doctor this time, the murmur had worsened and an echocardiogram was ordered. Ragu Vidhun, MD, Interventional Cardiologist at the Heart Center of Greater Waterbury, examined the test results and diagnosed a severe problem with the mitral valve. Steven had led an active and busy life, "so finding out that valve surgery was necessary was quite a surprise." His mitral valve repair surgery was performed at Saint Mary's Hospital by Cardiothoracic Surgeon Paul Preissler, MD, just days after the initial diagnosis. For Steven the surgery

(continued on pg. 3)

IN THIS ISSUE

2 Are Heart Palpitations Cause for Concern?
2 Upcoming Events
4 Diabetes and Heart Health—How They're Connected

0156
09/15/08

Upcoming Events



Heart Center of Greater Waterbury Support Group
March 3, 2008 1 p.m.
Harold Leever Regional Cancer Center
1075 Chase Parkway
Waterbury, CT
To register, call **203-575-5573**

"Sugar Tips: Prevention and Detection of Diabetes"
This series will be offered at two different locations and will present an overview of diabetes and methods of detection and prevention.

March 5, 2008
March 12, 2008
March 19, 2008
March 26, 2008
1 p.m. at
The Federation, Jewish Communities of Western CT
444 Main St. N
Southbury, CT
To register, call **203-575-5573**

April 2, 2008
April 16, 2008
April 23, 2008
April 30, 2008
11 a.m. at
The Highlands Health Care Center
745 Highland Ave.
Cheshire, CT
To register, call **203-575-5573**

IN A HEARTBEAT:

ARE PALPITATIONS CAUSE FOR CONCERN?

You've probably felt your heart race or experienced a fluttering feeling in your chest once or twice. For most people, these episodes of abnormal heartbeat, or arrhythmia, are harmless. For some people, however, such symptoms may signal atrial fibrillation—a serious arrhythmia that requires medical attention.

What Is Fibrillation?

Normally, the four chambers of the heart work like a well-timed machine. The two atria pump blood into the two ventricles, which then pump blood to the body. But during atrial fibrillation, the atria beat so rapidly and irregularly that they quiver. This causes blood to pool in the chambers and form clots—which may travel to the brain, resulting in a stroke.

Symptoms, Causes, and Risk Factors

The sensation of a fast and irregular heartbeat is a common symptom of atrial fibrillation. Other symptoms include dizziness, faintness, shortness of breath, and chest pain.

Often there is no known cause for atrial fibrillation. Men are at higher risk than are women, and the prevalence of the problem increases with age. These medical conditions can increase risk:

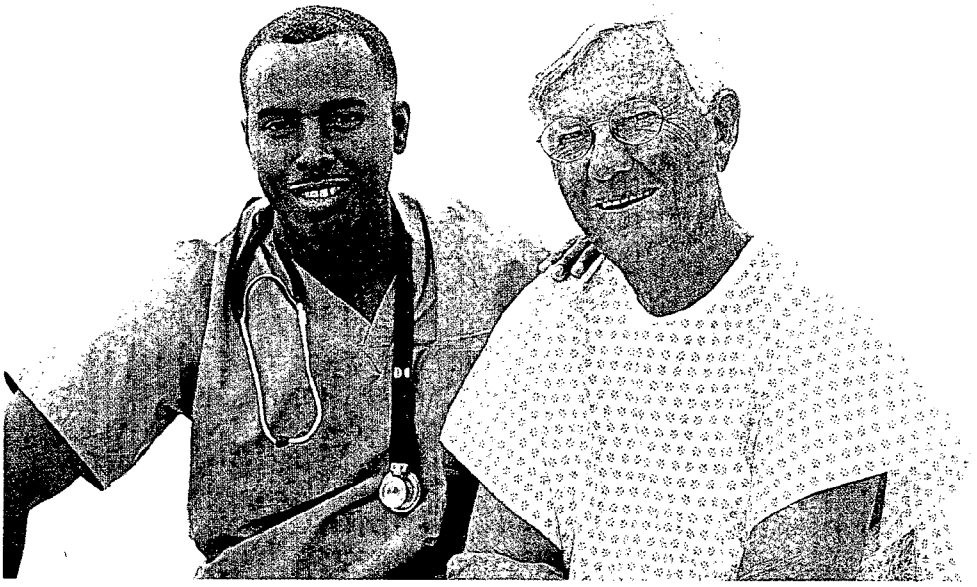
- ♥ Diabetes
- ♥ High blood pressure
- ♥ Congestive heart failure
- ♥ Heart disease

Diagnosis and Treatment

Experts recommend that you check with your doctor if you have any concerns about your heart rhythm or symptoms. To diagnose your condition, the doctor may order a painless test called electrocardiography that records the electrical activity of the heart.

If you have atrial fibrillation, your doctor may try to restore the normal rhythm of the heart by electrical stimulation. You may also need to take aspirin or another medication to reduce your risk of stroke.●

You can learn more about heart disease by logging on to the Heart Center of Greater Waterbury website at www.heartcentergw.org and clicking on "Heart Health Education."



0157
09/15/08



Joanne Pullaro, an RN and Case Manager at Waterbury Hospital, and a heart surgery patient.

helped him to return to a normal routine in just six weeks. Back to work by early December, Steven joined the Outpatient Cardiac Rehab Program at Saint Mary's Hospital to help improve his overall stamina. "I didn't know until Dr. Vidhun told me that I could have heart surgery at Saint Mary's Hospital. The care I received there was excellent. All the nurses were great."

There are several causes of heart valve problems, including small birth defects that have not been repaired, weakening or hardening of valves due to aging, and disease processes that may scar or damage a valve. In Steven's case, his mitral valve had weakened over time and was in need of repair.

There are also several types of valve dysfunction, each resulting in its own unique problem for the patient with valve disease. A heart valve with stenosis does not open enough to let enough blood pass through the chamber; a heart valve with regurgitation does not close correctly and may let blood leak into areas where it does not belong; and a heart valve with prolapse does not close properly, which can result in a small leak.

Joanne Pullaro, a Registered Nurse for 34 years at Waterbury Hospital, is well educated on heart disease. But after a vacation with her husband to Egypt, Joanne thought that she was just tired and coming down with a cold. She didn't immediately connect these symptoms to a Mitral Valve Prolapse diagnosis she had received as a young adult. She didn't make the connection until severe shortness of breath brought her to her family doctor, who recommended an echocardiogram and follow-up by her cardiologist. Working as a critical care nurse and more recently as a Case Manager on the Cardiovascular Unit, she knew where to turn when she learned that surgery for her valve disease was an option. "When I found out I needed valve surgery I had no doubt in my mind that I wanted to have it at Waterbury Hospital. I had all the confidence I needed in the skills of the surgeons and nursing staff. I recuperated quickly and have continued to work and travel."

The most common way to screen for issues with heart valves is by listening to the heart through the stethoscope. Although most murmurs are not indicative of cardiac disease, in some instances if a physician identifies a "murmur," it may be important in diagnosing undetected heart valve problems. Steven has relayed his heart surgery story to many of his friends and has been surprised by the number of people who tell him they were also diagnosed with a heart murmur. "I tell them to be sure to follow up with a cardiologist to get it checked regularly so you can avoid problems." Joanne also has advice for the patients she sees in the hospital: "Everyone is different but if the surgery is right for you, it can really help you to live a full and normal life. I felt so much better once the surgery was done."

For some people with Valvular Heart Disease, regular medical checkups and advice may be all that is needed. For others with more severe damage like Steven and Joanne, valve surgery was the treatment of choice.●

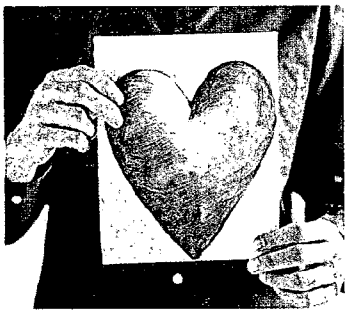
Go to www.heartcentergw.org to learn about the complete range of cardiac services at Saint Mary's Hospital and Waterbury Hospital.

0158
09/15/08

HEART CENTER of Greater Waterbury
Heart Center of Greater Waterbury
P.O. Box 2153
Waterbury, CT 06722

Non-Profit Org
U.S. Postage
PAID
Heart Center Of
Greater Waterbury

Every Heart Matters!



Please join us on Saturday March 15, 2008 at the Brass Mill Center from 10 a.m. to 2 p.m. at our "Every Heart Matters!" community health fair. Learn about cardiac health, diet and nutrition, and risk factors for cardiac disease such as diabetes. Stop by and visit the Heart Center staff for free blood pressure screenings and education related to your heart health. If you can't visit us that day, tune in to WATR radio AM 1320 for a live broadcast from the event. Hope to see you because we know...Every Heart Matters!

THE BEAT GOES ON

The Beat Goes On is published by the Heart Center of Greater Waterbury. The newsletter provides general health information and is not intended to provide personal medical advice, which should be sought from a physician. © 2008 Printed in U.S.A.

Loraine Shea, Executive Director, Heart Center of Greater Waterbury

6032M

Diabetes and Heart Health— How They're Connected

Diabetes is a lifelong disorder that can have serious effects on almost every part of the body, including the heart. In fact, one of the key concerns for people with diabetes is keeping their blood sugar under control to reduce their risks for complications, such as heart disease.

A Higher Risk of Heart Problems

People with diabetes are two to four times likelier than people without diabetes to have heart disease. In addition, people with diabetes have the same high risk for heart attack as people without diabetes who already have had a heart attack.

Keeping It Under Control

If you have diabetes, you can take steps to protect your heart. Experts offer these recommendations:

- ♥ Eat a healthy diet.
- ♥ Exercise. Aim for 30 minutes of activity on most days of the week.
- ♥ Don't smoke. Smoking doubles the risk of heart disease.
- ♥ Keep your blood sugar under control. You should get a hemoglobin A1c test at least twice a year.
- ♥ Control high blood pressure, and have it checked at every doctor's visit.



- ♥ Lose weight if you are overweight.
- ♥ Ask your doctor if you should take a low-dose aspirin daily to lower your risk for heart disease.●

See the Upcoming Events column on page 2 for information on a scheduled series of FREE seminars on prevention and detection of diabetes.

WATERBURY HOSPITAL
Saint Mary's HOSPITAL
UConn Health Center

Summer 2008

HEART CENTER
of Greater Waterbury
Advanced Cardiac Care.
Close to Home.

THE BEAT GOES ON

Message from the Executive Director



Loraine C. Shea
Executive Director,
Heart Center of
Greater Waterbury

The Heart Center of Greater Waterbury takes pride not only in the clinical care it has provided to more than 2,400 hearts since July, 2005, but also in its mission to serve the community with outreach and education related to heart health. In this issue of "The Beat Goes On" we feature one very special community outreach event that took place in March. Because keeping you healthy is what we are all about, you are invited to attend our monthly support group and other educational sessions offered in many of the surrounding communities. Visit our web site at www.heartcentergw.org or refer to your local newspaper for all of our presentations and events, which are free to the public. We look forward to meeting you and providing you with the information you need to stay heart-healthy.

Every Heart Matters!



Heart Center staff members Beth Grant, EP, and Denise Konnick, RN, with community member Ron Accousti.

On Saturday, March 15, 2008, every heart mattered! Several hundred greater Waterbury community members attended a free heart health fair at the Brass Mill Center that was organized and staffed by the Heart Center of Greater Waterbury.

"In addition to providing lifesaving advanced cardiac care at both Saint Mary's Hospital and Waterbury Hospital, the Heart Center is committed to community outreach and education," said Loraine Shea, the Heart Center's Executive Director. "We provided free screenings, because it's important for individuals to identify their risk factors for heart disease in an effort to prevent heart disease before it starts."

Staff from all areas of the Heart Center volunteered their time for this community event. They provided free screenings and insight into several risk factors for heart disease. With an emphasis on increasing knowledge and thus prevention of disease, Heart Center staff interacted with more than 200 community members. Blood pressure screenings and cholesterol screenings performed by Heart Center Nurses were among the services provided to local community members during the event. "It's important for people to know their numbers as it pertains to their own blood pressure and cholesterol. Without the screening, many people just don't realize how at risk they may be," offered Sandy Micalizzi, Community Outreach Nurse for the Heart Center. "Once you know your numbers you can take action if needed."

Healthy eating, exercise and body fat measurements were another focus of the event. Clinicians from Cardiac Rehab and Registered Dieticians provided information on healthy nutrition choices, diabetes education and

(continued on pg. 3)

IN THIS ISSUE

2 Upcoming Events
2 Keeping Triglyceride Levels in Check
4 Take Safer Exercise to Heart

Upcoming Events



"Hypertension: The Silent Killer—What Can I Do to Decrease My Numbers?"
This series will be offered at three different locations and will present an overview of how to manage hypertension through diet, exercise and medication. To register, call 203-575-5573.

August 20, 2008 1 p.m.
The Federation, Jewish Communities of Western CT
444 main St. N
Southbury, CT

August 27, 2008 11 a.m.
The Highlands Health Care Center
745 Highland Ave
Cheshire, CT

September 17, 2008 7 p.m.
Harold Leever Regional Cancer Center
1075 Chase Parkway
Waterbury, CT

Heart Center of Greater Waterbury Support Group
September 8, 2008 1 p.m.
Harold Leever Regional Cancer Center
1075 Chase Parkway
Waterbury, CT
To register, call
203-575-5573.

KEEPING TRIGLYCERIDE LEVELS IN CHECK

Triglycerides are usually measured in the same blood test that determines cholesterol. But, according to a recent survey by the National Lipid Association (NLA), fewer than four in 10 Americans were aware of this fact. Indeed, cholesterol gets most of the publicity. But, like harmful low-density lipoprotein (LDL) cholesterol, excessive triglycerides in your blood can clog your arteries, boosting the risk for heart disease and stroke, particularly in women.

In fact, most of the fat we eat is in the form of triglycerides. And triglycerides also form the biggest share of body fat. The National Heart, Lung, and Blood Institute recommends that triglyceride levels be below 150 mg/dL.

As with high cholesterol, you can have elevated triglycerides without any symptoms. And high triglycerides and high cholesterol usually coincide.

In contrast, a healthy lifestyle, including regular exercise and a balanced diet, can help keep triglycerides in check. For example, a recent study in *Diabetes Care* revealed that eating less meat and more low-fat dairy products, vegetables, fruits, and whole-grain cereals helped a group of overweight people with metabolic syndrome lose weight and lower their triglycerides.

If you have diabetes, be sure to keep your blood sugar controlled because high blood sugar elevates triglyceride levels. If you have a high triglyceride level, the same medication used to lower high cholesterol can bring it down. ●



maintaining or increasing activity levels for improved health.

Because the Heart Center is here in Waterbury for prevention as well as treatment of heart disease, the program has a huge commitment to community outreach and education.

Although this event reached out to large numbers in the community, there are smaller programs offered at various locations in the greater Waterbury area every week. "We are very fortunate to have a community outreach nurse on our staff," said Shea. "On any given day Sandy can be found in Wolcott, Prospect, Southbury, Waterbury or Naugatuck. Leaders at local churches, schools, civic groups and senior centers just call to put in a request to the Heart Center and Sandy sets a date and puts them on the community schedule, which is located on our website. She is out informing the public, getting community members to think about healthy lifestyles and acting as a link to the clinical services available." This heart health fair was an extension of the education already provided.

A tremendous day was had by all. But for Heart Center staff and physicians all were in agreement that the highlight of the event was reconnecting with former patients! Several community members who received cardiac services at Saint Mary's Hospital or Waterbury Hospital in the recent past reconnected with some of their caregivers at this community event. They expressed sincere gratitude for the ongoing services provided locally.●

To arrange a heart-healthy education presentation for your community group, call Sandy Micalizzi at 203-575-5573.



From top: Rose Cuffee, RN, and Doret Lindo; Denise Clark, RN, and Joanne Prasauckas, RN; Monica Giacomi, RN, and Paula Connolly, along with her daughters; and Diane Hardt, RN, and Margery Ruchenbach-Goad.

0162
09/15/08

HEART CENTER of Greater Waterbury
Heart Center of Greater Waterbury
P.O. Box 2153
Waterbury, CT 06722

Non-Profit Org
U.S. Postage
PAID
Heart Center of
Greater Waterbury

Eat Healthy Foods

Do you think that healthy foods are boring and have little flavor? Then try these simple, tasty foods that can help guard your heart health and possibly protect against some cancers, too.

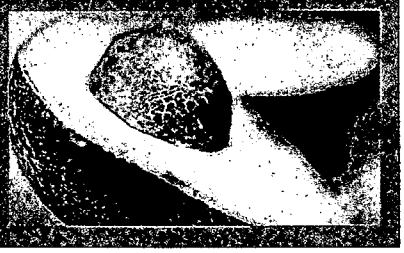
♥ Almonds. Eat them for a healthy snack. They're also a great addition to salads and stir-fry dishes.

♥ Avocados. Add to a salad or use for a dip or side dish.

♥ Garlic. This is a flavorful way to season food without adding fat.

♥ Soy. Sample its many forms, such as tofu, soy milk, and soy nuts.

♥ Fruits and vegetables. They're nature's gift of good health.



This Summer, Take Safer Exercise to Heart

Regardless of the time of year, regular exercise plays an important role in keeping yourself healthy, fit, and in good management of your coronary artery disease (CAD).

Heat Hazards

If your body is too hot for too long, you could develop heat stroke, a kind of heat-related illness that can be deadly. Having CAD raises your risk for heat stroke.

In addition, certain heart medicines called beta-blockers can make you more likely to get lightheaded in the heat. This type of heat-related illness is called heat syncope.

Use Caution When It's Warm Out

If you have CAD and have your doctor's OK to exercise, it's wise to approach summertime workouts with a little extra care.

Other Summer Exercise Tips

♥ Schedule outdoor activities when it's cooler: in the morning and evening.

♥ Keep an eye on weather reports so you can plan ahead. Walk in the mall or exercise along with a fitness video at home.

♥ When you're active, drink two to four glasses (16 to 32 ounces) of fluid every hour. Also, stay away from drinks with caffeine, which can make you lose more fluids.

♥ Stop and rest if exercising in the heat makes your heart pound and breathing difficult.

Also, be aware of the signs of heat-related illness: headache, dizziness, nausea, or confusion. If this happens, find an air-conditioned place to rest and have a drink. If you don't cool down quickly, call your doctor or get emergency help.

♥ To learn more about cardiac health, log on to www.heartcentergw.org.



THE BEAT GOES ON

The Beat Goes On is published by the Heart Center of Greater Waterbury. The newsletter provides general health information and is not intended to provide personal medical advice, which should be sought from a physician. © 2008 Printed in U.S.A.

Loraine Shea, Executive Director, Heart Center of Greater Waterbury

6032M

WATERBURY HOSPITAL
Saint Mary's HOSPITAL
UConn Health Center



For Your Heart For Your Life

Dr. Henry Borkowski, Jr.
Dr. Paul L. Preissler

Harold Leever Regional Cancer Center
1075 Chase Parkway
Waterbury, CT

Tuesday, May 13, 2008
5:30 P.M.—7:30 P.M.

This event will include information on:

- **Symptoms**
- **Diagnostic Testing**
- **Medication**
- **Treatments**
- **Procedures**
- **Open Heart Surgery**

This program is free and open to the public.

A light dinner will be served.

HEART CENTER
of Greater Waterbury

Attendees must R.S.V.P.
(203) 575-1992

This community education program is sponsored by the Heart Center of Greater Waterbury and made possible by grant dollars from the American Heart Association through the Margaret Hallden Fund at the Connecticut Community Foundation.

HEART CENTER
of Greater Waterbury

WATERBURY HOSPITAL · Saint Mary's HOSPITAL · UConn Health Center

THE HEART OF DIABETES – GETTING FIT AND FITTING IT IN

Kirsten Ward
MS, RCEP, CDE

Monday, October 1, 2007
5:30 P.M. – 7:30 P.M.

Harold Leever Regional Cancer Center
1075 Chase Parkway
Waterbury, CT

This program is sponsored by the Heart Center of Greater Waterbury and made possible by grant dollars from the American Heart Association through the Margaret Hallden Fund at the Connecticut Community Foundation. This event will include information on:

- How to decrease your risks of Cardiac Disease and Metabolic Syndrome
- How to improve your Heart Health
- Designing your own physical activity
- Recommended Guidelines for Physical Activity
- The impact of physical activity on preventing Type 2 Diabetes

This program is free and open to the public.
Complimentary dinner will be served.
R.S.V.P. Contact Sandra Micalizzi, APRN (203) 575-5573

May 2008

			1 Southmayd Home, Inc. 250 Columbia Blvd. Waterbury, CT 1:30 PM	2 Ask the Nurse Blood Pressure Screening Pallancino Center 30 West Main Street Waterbury, CT (203) 755-8745 11:00 AM TGIF Southbury Crown Plaza Southbury, CT 4:30 PM- 9:00PM	3	4
5 Heart Center Support Group Stroke Awareness Harold Leever Regional Cancer Center 1075 Chase Pkwy1st Flr Waterbury, CT 1:00 PM	6	7 Sugar Tips Prevention and Detection of Diabetes Saint Mary's Hospital Medical Conference Center 56 Franklin Street Waterbury, CT RSVP 575-5573 12:00 PM	8 Sugar Tips Prevention and Detection of Diabetes Southmayd Home, Inc. 250 Columbia Blvd. Waterbury, CT 1:30 PM Diabetes and Heart Disease Saint Thomas Church Main Street Thomaston, CT 6:00 PM	9 Sugar Tips Prevention and Detection of Diabetes St Vincent's Ferrer Church 1006 New Haven Road Naugatuck, CT 7:00 PM	10	11
12 Heart Update South Congregation Church Baldwin Street Waterbury, CT 1:00 PM	13 Stroke Awareness Saint Mary's Hospital Lobby 56 Franklin Street Waterbury, CT 8:00 -2:00PM Oakville Senior Center – VNA Health at Home 311 Falls Avenue Oakville, CT 11:00 AM Your Heart, Your Life 1075 Chase Parkway Waterbury, CT 5:30 PM – 7:30 PM RSVP 575-1992 5:30 PM – 7:30 PM	14 Senior Health Fair Calendar House 500 Pleasant Street Southington, CT 8:00 AM – 2:00 PM Nursing Consortium Naugatuck Community College 750 Chase Parkway Waterbury, CT RSVP 575-5573 4:30 PM -9:00 PM Sugar Tips Prevention and Detection of Diabetes Saint Mary's Hospital Medical Conference Center 56 Franklin Street Waterbury, CT RSVP 575-5573 12:00 PM	15 Stroke Awareness Waterbury Hospital Lobby 64 Robbins Street Waterbury, CT 12:00 PM Naugatuck Senior Center Health Fair Church Street Naugatuck, CT 8:00 AM – 2:00 PM	16 Sugar Tips Prevention and Detection of Diabetes St Vincent's Ferrer Church 1006 New Haven Road Naugatuck, CT 7:00 PM	17	18 Greater New Haven Heart Walk Lighthouse Point Park New Haven, CT Registration begins at 10:00 A.M. Walk begins at 11:00 A.M.
19 Prospect Senior Center Health Update 6 Center St., Prospect, CT (203) 575-5573 1:00 PM	20 Blood Pressure Screening Federation Jewish Community of Western CT 444 Main Street Southbury, CT 11:30 AM	21 Sugar Tips Prevention and Detection of Diabetes Saint Mary's Hospital Medical Conference Center 56 Franklin Street Waterbury, CT RSVP 575-5573 12:00 PM	22 Sugar Tips Prevention and Detection of Diabetes Southmayd Home, Inc. 250 Columbia Blvd. Waterbury, CT 1:30 PM Healthy Eating Watermark 611 East Hill Road Southbury, CT 3:00 PM	23 Sugar Tips Prevention and Detection of Diabetes St Vincent's Ferrer Church 1006 New Haven Road Naugatuck, CT 7:00 PM	24	25
26 Memorial Day	27	28 Blood Pressure Screening Wolcott Senior Center 211 Nichols Road Wolcott, CT 10:30 AM Sugar Tips Prevention and Detection of Diabetes Saint Mary's Hospital Medical Conference Center 56 Franklin Street Waterbury, CT RSVP 575-5573 12:00 PM	29 Sugar Tips Prevention and Detection of Diabetes Southmayd Home, Inc. 250 Columbia Blvd. Waterbury, CT 1:30 PM Senior Health Fair Mt. live Senior Center Pearl Street Waterbury, CT 10:00 Am – 12:00 PM	30 Heart Healthy Living Flanders West 50 Darling Street Southington, CT RSVP 575-5573 10:00 AM Sugar Tips Prevention and Detection of Diabetes St Vincent's Ferrer Church 1006 New Haven Road Naugatuck, CT 7:00 PM	31	

February 2008

				1 Blood Pressure Screening Pallandino Center 30 West Main Street Waterbury, CT (203) 755-8745 11 AM	2	3
4 Heart Center Support Group Harold Leever Regional Cancer Center 1075 Chase Pkwy1st Flr Waterbury, CT 1 PM	5	6 Tips for a Healthy Heart Harold Leever Regional Cancer Center 1075 Chase Pkwy1st Floor Waterbury, CT 10:00 AM	7	8 Sugar Tips Prevention and Detection Southington Library Program Room 752 Main Street Southington, CT 10:00 AM	9	10
11	12 Oakville Senior Center – VNA Health at Home 311 Falls Avenue Oakville, CT 11 AM - 12PM	13	14 Heart Health Awareness Saint Mary's Hospital 56 Franklin Street 11:00 – 1:00 P.M. Waterbury Hospital 64 Robins Street Waterbury, CT 11:00 A.M. – 1:00 P.M.	15 Sugar Tips Prevention and Detection Southington Library Program Room 752 Main Street Southington, CT 10:00 AM	16	17
18 Prospect Senior Center 6 Center St., Prospect, CT (203) 575-5573 1:00 PM Oxford Senior Housing 100 Staun Circle Oxford, CT RSVP 888-1955 11:00AM	19 Federation Jewish Community of Western CT 444 Main Street Southbury, CT 11:30 AM	20	21	22 Sugar Tips Prevention and Detection Southington Library Program Room 752 Main Street Southington, CT 10:00 AM	23	24
25 Tips For a Healthy Heart YMCA 136 West Main Street Waterbury, CT 8:30 AM RSVP (203) 754-2181	26 Diabetes & Heart Disease Mt. Olive Senior Center 82 Pearl Street Waterbury, CT 10:00 AM RSVP 575-5573	27 Blood Pressure Screening Wolcott Senior Center 211 Nichols Road Wolcott, CT 10:30 AM Torrington Senior Housing Willow Street Torrington, CT 2:00 PM RSVP (860) 489-8591	28	29 Sugar Tips Prevention and Detection Southington Library Program Room 752 Main Street Southington, CT 10:00 AM		

APPENDIX 4.

Waterbury Healthcare Delivery System
Preliminary Integration Plan

Waterbury Healthcare Delivery System

Appendix 4

Preliminary Integration Plan

	Pre-Merger	I. Planning Through First 180 Days		II. Stabilization and Prioritized Integration		III. Consolidation and Optimization			
		Year 1				Years 2-5			
Major Activities		Q1	Q2	Q3	Q4	2	3	4	5
Estimate resource requirement pre and post-merger by department and year									
Evaluate all major purchased service contracts to determine synergies and potential changes to operations									
Evaluate risks and key contingencies									
Develop IT Integration Plan									
Evaluate current technologies, providers, and anticipated IT requirements									
Determine recommended IT integration solutions for all major administrative and clinical systems									
Conduct prioritized RFI/RFP process for major vendors									
Determine timing and financial implications of IT Integration Plan									
Complete Facility Master Plan									
Conduct a 10 year master facility plan assuming no major new hospital facility using merger integration assumptions									
Evaluate options									
Determine sequencing and estimated capital requirements									
Seek approval for master plan and begin implementation planning									
Develop Detailed Five Year Financial Plan									
Conduct operational benchmarking and develop labor and non-labor targets by department that tie to the operating plan									
Develop five year capital plan									
Develop a five year volume, operating expense, and revenue forecast based on known assumptions									
Develop Milestone Plan with Performance Targets									
Kick-off First 180 Days Action Teams									

DRAFT Plan

Excerpt - TWH SMH presentation to State of CT Commissioners, March 2008

Waterbury Healthcare Delivery System

Appendix 4

Preliminary Integration Plan

	Major Activities	Pre-Merger	I. Planning Through First 180 Days		II. Stabilization and Prioritized Integration		III. Consolidation and Completion			
			Year 1				Years 2-5			
			Q1	Q2	Q3	Q4	2	3	4	5
	Communications									
	Develop detailed communications plans and resource requirements									
	Internal									
	Key Stakeholders									
	External/Market									
	Human Resources/Change Management									
	Employee and labor relations transition									
	Payroll and benefit implications									
	Culture development									
	Hiring plan and training requirements									
	Finance									
	Integration of financials and balance sheet									
	Transition/plan for billing and AP									
	Detailed integration plan									
	Physician Integration									
	Determine credentialing issues and plan									
	Integrate governance and leadership									
	Evaluate implications for physician-hospital service line partnerships									
	Payor Contracting									
	Evaluate contracts and payors									
	Develop negotiation strategy and timeline									
	Evaluate implications									
II. Stabilization and Prioritized Integration										
	Kick-off Operations Integration Teams and Complete Design Process									
	Senior Management and Organization									
	Administrative and Support Services Integration									
	Patient Care and Ancillary Integration									
	Education Integration									

DRAFT Plan

Excerpt - TWH SMH presentation to State of CT Commissioners, March 2008

Waterbury Healthcare Delivery System

Preliminary Integration Plan

Appendix 4

Major Activities	Pre-Merger	I. Planning Through First 180 Days		II. Stabilization and Prioritized Integration		III. Consolidation and Optimization			
		Year 1				Years 2-5			
		Q1	Q2	Q3	Q4	2	3	4	5
Complete Design Integration Plans and Gain Approval									
Implement Short-Term Integration Recommendations									
Consolidation and Optimization									
Complete Facility Renovations									
Conduct RFP process for major vendors									
Secure financing and approvals									
Begin high priority renovations that will enable key consolidations									
Complete facility renovations/development									
Non-Clinical Consolidations									
Administrative Services									
Finance/HR/Accounting/Payroll									
Executive Offices/Administration									
Facilities and Support Services									
Clinical Consolidations									
Inpatient acute care									
Maternity and Neonatal									
Behavioral Health									
Cardiac Care Expansion									
Outpatient and Diagnostic Services									
Affiliate Operations									
IT Platform Alignment									
Financial Systems									
Clinical Systems									
HR/Other									
Medical Education Optimization									
Evaluate training programs at both institutions									
Determine optimal affiliation strategy and program size options									
Gain approval for recommended changes									
Implement optimized program plan									

DRAFT Plan

Excerpt - TWH SMH presentation to State of CT Commissioners, March 2008

Waterbury Healthcare Delivery System

Preliminary Integration Plan

Appendix 4

	Major Activities	Pre-Merger	I. Planning Through First 180 Days		II. Stabilization and Prioritized Integration		III. Consolidation and Optimization			
			Year 1				Years 2-5			
			Q1	Q2	Q3	Q4	2	3	4	5
Transaction Close										
	Comprehensive Due Diligence									
	Definitive Agreements									
	Legal and Anti-trust Filings									
	Stakeholder & Regulatory Approvals									
	Anti-trust Review									
	Licensure, Certifications & Contract Requirements									
	Transaction Financing									
	Process of Alienation									
	Secure Access to Capital									
I. First 180 Days										
	Establish Integration Structure and Manage Initial Transition									
	Establish Post-Merger Integration Structure and Process									
	Maintain joint Steering Committee and revise mandate									
	Establish process and secure integration support team									
	Conduct Detailed Operational and Financial Planning									
	Develop Integrated Strategic and Operating Plan									
	Revise market assessment									
	Develop volume growth assumptions									
	Validate service configuration, consolidation, and location assumptions									
	Validate human, facility, and capital requirements									
	Develop Operational Transition Plan									
	Evaluate opportunities for administrative service consolidation and potential operating model changes									
	Conduct interim and post-merger high level organizational plans									

DRAFT Plan

Excerpt - TWH SMH presentation to State of CT Commissioners, March 2008

APPENDIX 5.i.a.

2004 ACC/AHA Guideline Update for Coronary Artery Bypass Graph Surgery

ACCF/AHA/SCAI 2007 Update of the Clinical Competence Statement on Cardiac Interventional Procedures, an update of the 1998 Clinical Competence Statement

ACC/AHA/SCAI 2005 Guideline Update for PCI

"Quality Measurement in Adult Cardiac Surgery:Part 1--Conceptual Framework and Measure Selection

1996 Guidelines for Standards in Cardiac Surgery-American College of Surgeons

Electronic Mail from Society of Thoracic Surgeons

Medical Literature:

"Volume-outcome relationship for coronary artery bypass grafting in an era of decreasing volume"- *Archives of Surgery*

"Volume-outcome relationship for coronary artery bypass grafting in an era of decreasing volume-invited critique"- *Archives of Surgery*

APPENDIX 5.i.a. (con't)

"The CABG surgery volume-outcome relationship: Temporal trends a selection effects in California, 1998-2004"-*Health Research& Educational Trust*

"Limitations of hospital volume as a measure of quality of care for coronary artery bypass graft surgery"-*Annals of Thoracic Surgery*

"The case against volume as a measure of quality of surgical care"- *Annals of Thoracic Surgery*

"Is hospital procedure volume a reliable market of quality for coronary artery bypass surgery? A comparison of risk and propensity adjusted operative and midterm outcomes"- *Annals of Thoracic Surgery*

"Procedural volume as a marker of quality for CABG surgery"- *JAMA*

"Early efficacy of CABG care delivery in a low procedure-volume community hospital: operative and midterm results"- *BMC Surgery*

"Volume and outcome of coronary bypass graft surgery: Are more or less the same?"- *Canadian journal of cardiology*

"Procedural Volume as a Marker of Quality for CABG Surgery"- *JAMA*

Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION

American Heart Association®
Learn and Live℠

ACC/AHA 2004 Guideline Update for Coronary Artery Bypass Graft Surgery

Circulation 2004;110;e340-e437
Circulation is published by the American Heart Association. 7272 Greenville Avenue, Dallas, TX 72514
Copyright © 2004 American Heart Association. All rights reserved. Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circ.ahajournals.org

An erratum has been published regarding this article. Please see the attached page or:
http://circ.ahajournals.org/cgi/content/full/circulationaha;111/15/2014-a

Subscriptions: Information about subscribing to Circulation is online at
http://circ.ahajournals.org/subscriptions/

Permissions: Permissions & Rights Desk, Lippincott Williams & Wilkins, a division of Wolters Kluwer Health, 351 West Camden Street, Baltimore, MD 21202-2436. Phone: 410-528-4050. Fax: 410-528-8550. E-mail:
journalpermissions@lww.com

Reprints: Information about reprints can be found online at
http://www.lww.com/reprints

Downloaded from circ.ahajournals.org by on August 4, 2008

0175
09/15/08

© 2004 by the American College of Cardiology Foundation and the American Heart Association, Inc.

ACC/AHA 2004 Guideline Update for Coronary Artery Bypass Graft Surgery

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Update the 1999 Guidelines for Coronary Artery Bypass Graft Surgery)

Developed in Collaboration With the American Association for Thoracic Surgery and the Society of Thoracic Surgeons

WRITING COMMITTEE MEMBERS

Kim A. Eagle, MD, FACC, FAHA, *Co-chair*
Robert A. Guyton, MD, FACC, FAHA, *Co-chair*

Ravin Davidoff, MB, BCh, FACC, FAHA
Fred H. Edwards, MD, FACC, FAHA
Gordon A. Ewy, MD, FACC, FAHA
Timothy J. Gardner, MD, FACC, FAHA
James C. Hart, MD, FACC
Howard C. Herrmann, MD, FACC, FAHA
L. David Hillis, MD, FACC
Adolph M. Hutter, Jr., MD, MACC, FAHA
Bruce Whitney Lytle, MD, FACC
Robert A. Marlow, MD, MA, FAAFP
William C. Nugent, MD
Thomas A. Orszulak, MD, FACC

TASK FORCE MEMBERS

Elliott M. Antman, MD, FACC, FAHA, *Chair*
Sidney C. Smith, Jr., MD, FACC, FAHA, *Vice Chair*

Joseph S. Alpert, MD, FACC, FAHA†
Jeffrey L. Anderson, MD, FACC, FAHA
David P. Faxon, MD, FACC, FAHA
Valentin Fuster, MD, PhD FACC, FAHA
Raymond J. Gibbons, MD, FACC, FAHA†‡
Gabriel Gregoratos, MD, FACC, FAHA†
Jonathan L. Halperin, MD, FACC, FAHA
Loren F. Hiratzka, MD, FACC, FAHA
Sharon Ann Hunt, MD, FACC, FAHA
Alice K. Jacobs, MD, FACC, FAHA
Joseph P. Ornato, MD, FACC, FAHA

†Former Task Force Member
‡Immediate Past Chair

This document was approved by the American College of Cardiology Foundation Board of Trustees in March 2004 and by the American Heart Association Science Advisory and Coordinating Committee in June 2004.

When citing this document, the American College of Cardiology Foundation requests that the following citation format be used: Eagle KA, Guyton RA, Davidoff R, Edwards FH, Ewy GA, Gardner TJ, Hart JC, Herrmann HC, Hillis LD, Hutter AM Jr, Lytle BW, Marlow RA, Nugent WC, Orszulak TA. ACC/AHA 2004 guideline update for coronary artery bypass graft surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Update the 1999 Guidelines for Coronary Artery Bypass Graft Surgery). American College of Cardiology Web Site. Available at: http://www.acc.org/clinical/guidelines/cabg/cabg.pdf.

Copies: This document is available on the World Wide Web sites of the American College of Cardiology (www.acc.org) and the American Heart Association (www.my.americanheart.org). Single copies of this document are available by calling 1-800-253-4636 or writing the American College of Cardiology Foundation, Resource Center, at 9111 Old Georgetown Road, Bethesda, MD 20814-1699. Ask for reprint number 71-0280. To obtain a reprint of the Summary Article published in the September 1, 2004, issue of the *Journal of the American College of Cardiology* and the August 31, 2004, issue of *Circulation*, ask for reprint number 71-0281. To purchase bulk reprints (specify version and reprint number): Up to 999 copies, call 1-800-611-6083 (US only) or fax 413-665-2671; 1000 or more copies, call 214-706-1789, fax 214-691-6342, or e-mail pubauth@heart.org.

Permissions: Multiple copies, modification, alteration, enhancement, and/or distribution of this document are not permitted without the express permission of the American College of Cardiology Foundation. Please direct requests to copyright_permissions@acc.org.

TABLE OF CONTENTS

1. PREAMBLE and INTRODUCTION....e341
1.1. Preamble....e341
1.2. Introduction....e342

2. GENERAL CONSIDERATIONS AND BACKGROUND.e343

3. OUTCOMES....e345
3.1. Hospital Outcomes....e345
3.1.1. Introduction....e345
3.1.2. Predicting Hospital Mortality....e345
3.1.3. Morbidity Associated With CABG: Adverse Cerebral Outcomes....e347

Downloaded from circ.ahajournals.org by on August 4, 2008

3.1.4. Morbidity Associated With CABG: Mediastinitis....e350
3.1.5. Morbidity Associated With CABG: Renal Dysfunction....e350
3.1.6. Posthospital Outcomes....e352
3.2. Comparison of Medical Therapies Versus Surgical Revascularization....e352
3.2.1. Overview....e353
3.2.2. Location and Severity of Stenoses....e355
3.2.2.1. Left Main Disease....e355
3.2.2.2. Three-Vessel Disease....e355
3.2.2.3. Proximal LAD Disease....e356
3.2.2.4. LV Function....e356
3.2.2.5. Symptoms/Quality of Life....e357
3.2.2.6. Loss of Benefit of Surgery....e358
3.2.2.7. Summary....e358
3.3. Comparison with Percutaneous Techniques....e359
3.3.1. Overview of Randomized Trials....e359
3.3.2. Results of Randomized Trials....e361
3.3.2.1. Acute Outcome....e361
3.3.2.2. Long-Term Outcome....e361
3.3.2.3. Special Subsets....e363
3.3.2.4. Results from Nonrandomized Trials and Registries....e364
3.3.2.5. Conclusions....e364

4. MANAGEMENT STRATEGIES....e364
4.1. Reduction of Perioperative Mortality and Morbidity.e364
4.1.1. Reducing the Risk of Brain Dysfunction After Coronary Bypass....e366
4.1.1.1. Type 1 Neurological Injury....e366
4.1.1.1.1. Aortic Atherosclerosis and Macroembolic Stroke....e366
4.1.1.1.2. Atrial Fibrillation and Postoperative Stroke....e368
4.1.1.1.3. Recent Anterior MI, LV Mural Thrombus, and Stroke Risk.e369
4.1.1.1.4. Recent Antecedent Cerebrovascular Accident....e369
4.1.1.1.5. CPB Time and Neurological Risk....e369
4.1.1.1.6. Carotid Disease and Neurological Risk Reduction....e369
4.1.1.2. Type 2 Neurological Injury....e372
4.1.1.2.1. Reducing the Risk of Microembolization....e372
4.1.1.2.2. Cerebral Hypoperfusion and Neurological Outcome....e372
4.1.1.2.3. Potentiators of Adverse Neurological Outcome....e372
4.1.2. Reducing the Risk of Perioperative Myocardial Dysfunction....e373
4.1.2.1. Myocardial Protection for the Patient With Satisfactory Preoperative Cardiac Function....e373
4.1.2.2. Myocardial Protection for Acutely Depressed Cardiac Function....e373
4.1.2.3. Protection for Chronically Dysfunctional Myocardium....e373
4.1.2.4. Cardiac Biomarker Elevation and Outcome....e374
4.1.2.5. Adjuncts to Myocardial Protection....e374
4.1.2.6. Reoperative Patients....e374
4.1.2.7. Inferior Infarct With Right Ventricular Involvement....e375
4.1.3. Attenuation of the Systemic Sequelae of CPB.e375
4.1.4. Reducing the Risk of Perioperative Infection..e376
4.1.5. Prevention of Postoperative Arrhythmias....e377
4.1.6. Strategies to Reduce Perioperative Bleeding and Transfusion....e379
4.1.7. General Management Considerations....e381
4.2. Maximizing Postoperative Benefit....e381
4.2.1. Antiplatelet Therapy for SVG Patency....e381
4.2.2. Pharmacological Management of Hyperlipidemia....e381
4.2.3. Hormonal Manipulation....e382
4.2.4. Smoking Cessation....e382
4.2.5. Cardiac Rehabilitation....e383
4.2.6. Emotional Dysfunction and Psychosocial Considerations....e384
4.2.7. Rapid Sustained Recovery After Operation....e384
4.2.8. Communication Between Caregivers....e384

5. SPECIAL PATIENT SUBSETS....e384
5.1. CABG in the Elderly: Age 70 and Older....e384
5.2. CABG in Women....e387
5.3. CABG in Patients With Diabetes....e388
5.4. CABG in Patients With Pulmonary Disease, COPD, or Respiratory Insufficiency....e388
5.5. CABG in Patients With End-Stage Renal Disease....e390
5.6. Valve Disease....e390
5.7. Reoperation....e391
5.8. Concomitant PVD....e392
5.9. Poor LV Function....e393
5.10. Transplantation Patients....e393
5.11. CABG in Acute Coronary Syndromes....e394

6. IMPACT OF EVOLVING TECHNOLOGY....e395
6.1. Less-Invasive CABG....e395
6.1.1. Robotics....e397
6.2. Arterial and Alternate Conduits....e397
6.3. Percutaneous Technology....e399
6.4. Transmyocardial Revascularization....e400

7. INSTITUTIONAL AND OPERATOR COMPETENCE...e401
7.1. Volume Considerations....e401
7.2. Report Cards and Quality Improvement....e402
7.3. Hospital Environment....e403

8. ECONOMIC ISSUES....e404
8.1. Cost-Effectiveness of CABG....e404
8.2. Cost Comparison With Angioplasty....e404
8.3. Cost Reduction in Coronary Bypass....e405

9. INDICATIONS....e406
9.1. Introduction....e406
9.2. Clinical Subsets....e406
9.2.1. Asymptomatic or Mild Angina....e406
9.2.2. Stable Angina....e407
9.2.3. Unstable Angina/Non–ST-Segment Elevation MI....e407
9.2.4. ST-Segment Elevation MI....e408
9.2.5. Poor LV Function....e410
9.2.6. Life-Threatening Ventricular Arrhythmias....e410
9.2.7. CABG After Failed PTCA....e411
9.2.8. Patients With Previous CABG....e411

Appendix 1....e413

Appendix 2....e414

References....e415

1. PREAMBLE and INTRODUCTION

1.1. Preamble

It is important that the medical profession play a significant role in critically evaluating the use of diagnostic procedures

Downloaded from circ.ahajournals.org by on August 4, 2008

0177
09/15/08

and therapies in the management or prevention of disease states. Rigorous and expert analysis of the available data documenting relative benefits and risks of those procedures and therapies can produce helpful guidelines that improve the effectiveness of care, optimize patient outcomes, and favorably affect the overall cost of care by focusing resources on the most effective strategies.

The American College of Cardiology (ACC) and the American Heart Association (AHA) have jointly engaged in the production of such guidelines in the area of cardiovascular disease since 1980. This effort is directed by the ACC/AHA Task Force on Practice Guidelines, whose charge is to develop and revise practice guidelines for important cardiovascular diseases and procedures. Experts in the subject under consideration are selected from both organizations to examine subject-specific data and write guidelines. The process includes additional representatives from other medical practitioner and specialty groups where appropriate. Writing groups are specifically charged to perform a formal literature review, weigh the strength of evidence for or against a particular treatment or procedure, and include estimates of expected health outcomes when data exist. Patient-specific modifiers, comorbidities, and issues of patient preference that might influence the choice of particular tests or therapies are considered, as well as frequency of follow-up and cost-effectiveness. When available, information from studies on cost will be considered; however, review of data on efficacy and clinical outcomes will be the primary basis for preparing recommendations in these guidelines.

The ACC/AHA Task Force on Practice Guidelines makes every effort to avoid any actual or potential conflicts of interest that might arise as a result of an outside relationship or personal interest of a member of the writing panel. Specifically, all members of the writing panel are asked to provide disclosure statements of all such relationships that might be perceived as real or potential conflicts of interest. These statements are reviewed by the parent task force, reported orally to all members of the writing panel at the first meeting, and updated as changes occur. The relationships with industry information for the writing committee members is posted on the ACC (www.acc.org) and AHA (www.americanheart.org) World Wide Web sites with the full-length version of the update (Appendix 1), along with names and relationships with industry of the peer reviewers (Appendix 2).

These practice guidelines are intended to assist healthcare providers in clinical decision making by describing a range of generally acceptable approaches for the diagnosis, management, or prevention of specific diseases or conditions. These guidelines attempt to define practices that meet the needs of most patients in most circumstances. The ultimate judgment regarding care of a particular patient must be made by the healthcare provider and patient in light of all of the circumstances presented by that patient.

The ACC/AHA 2004 Guideline Update for CABG was approved for publication by the ACCF Board of Trustees in March 2004 and the AHA Science and Advisory Coordinating Committee in June 2004. The summary article, describing the major areas of change reflected in the update, is published in the August 31, 2004 issue of *Circulation* and the September 1, 2004 issue of the *Journal of the American College of Cardiology.* The full-text guideline is posted on the ACC (www.acc.org) and the AHA (www.americanheart.org) World Wide Web sites. These guidelines will be reviewed 1 year after publication and yearly thereafter and considered current unless the Task Force on Practice Guidelines revises or withdraws them from circulation.

Elliott M. Antman, MD, FACC, FAHA
Chair, ACC/AHA Task Force on Practice Guidelines

1.2. Introduction

The ACC/AHA Task Force on Practice Guidelines was formed to make recommendations regarding the appropriate use of diagnostic tests and therapies for patients with known or suspected cardiovascular disease. Coronary artery bypass graft (CABG) surgery is among the most common operations performed in the world and accounts for more resources expended in cardiovascular medicine than any other single procedure. Since the initial guidelines for CABG surgery were updated and published in 1991 (1), there has been additional evolution in the surgical approach to coronary disease while at the same time there have been significant advances in preventive, medical, and percutaneous catheter approaches to therapy.

The current Writing Committee was charged with updating the guidelines published in 1999 (1a). The Committee reviewed pertinent publications, including abstracts, through a computerized search of the English literature since 1999 and performed a manual search of final articles. Special attention was devoted to identification of randomized trials published since the original document. A complete listing of all publications covering coronary bypass surgery in the past 4 years is beyond the scope of this document. However, evidence tables were updated to reflect major advances over this time period. Inaccuracies or inconsistencies present in the original publication were identified and corrected when possible. Recommendations provided in this document are based primarily on published data. Because randomized trials are unavailable in many facets of coronary artery disease (CAD) treatment, observational studies and, in some areas, expert opinion form the basis for recommendations that are offered. In each section of the Indications (Section 9), the relative levels of evidence favoring the Class I, II, and III indications were noted.

All of the recommendations in this guideline update have been written in full sentences that express a complete thought, such that a recommendation, even if separated and presented apart from the rest of the document, would still convey the full intent of the recommendation. It is hoped that this will increase readers' comprehension of the guidelines. Also, the level of evidence, either an A, B, or C, for each recommendation is now provided.

Downloaded from circ.ahajournals.org by on August 4, 2008

0178
09/15/08

Classification of Recommendations and Level of Evidence are expressed in the ACC/AHA format as follows and described in more detail in Table 1.

Classification of Recommendations

Class I: Conditions for which there is evidence and/or general agreement that a given procedure or treatment is beneficial, useful, and effective.

Class II: Conditions for which there is conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of a procedure or treatment.

Class IIa: Weight of evidence/opinion is in favor of usefulness/efficacy.

Class IIb: Usefulness/efficacy is less well established by evidence/opinion.

Class III: Conditions for which there is evidence and/or general agreement that a procedure/treatment is not useful/effective and in some cases may be harmful.

Level of Evidence

Level of Evidence A: Data derived from multiple randomized clinical trials or meta-analyses.

Level of Evidence B: Data derived from a single randomized trial, or nonrandomized studies.

Level of Evidence C: Only consensus opinion of experts, case studies, or standard-of-care.

The Committee consists of acknowledged experts in cardiac surgery, interventional cardiology, general cardiology, and family practice. The Committee included representatives from the American Academy of Family Physicians (AAFP) and the Society of Thoracic Surgeons (STS). Both academic and private practice sectors were represented. The document was reviewed by 3 outside observers nominated by the ACC, 3 outside reviewers nominated by the AHA, and outside reviewers nominated by STS and the Society of Cardiovascular Anesthesiologists. This document was approved by the American College of Cardiology Foundation's Board of Trustees and the American Heart Association's Science Advisory and Coordinating Committee, as well as endorsed by the American Association for Thoracic Surgery and the Society of Thoracic Surgeons.

These guidelines overlap several previously published ACC/AHA guidelines, including those for the management of acute myocardial infarction (MI), for the management of stable angina, for percutaneous coronary intervention (PCI), and for exercise testing. For each of these guidelines, an analysis of overlap or contradiction has been explored by the Committee with attempts to create consensus in each instance. Finally, it is acknowledged that no guideline can take into account all of the various parameters that must be part of the individual decision to recommend CABG for a single patient. However, this entire report is intended to provide a framework that healthcare providers can use in combination with other types of knowledge and patient preferences to make rational decisions about treatment.

2. GENERAL CONSIDERATIONS AND BACKGROUND

Surgical revascularization for atherosclerotic heart disease is one of the great success stories in medicine. Relief of angina after revascularization, improvement in exercise tolerance, and the realization of survival benefit have attended the operation since the early stages of development. The evolution of coronary surgery is a story of focused thought, dedication, courage, collaboration, and serendipity.

Alexis Carrel (1872 to 1944) understood the association between angina pectoris and coronary stenosis (2). Before World War I, he had developed a canine model of aortocoronary anastomosis using carotid arteries as a conduit. For his seminal work in the development of cardiovascular surgical techniques, he was awarded the Nobel Prize. Carrel's contributions lay fallow, as he had predicted, until a time when advances in technology would allow safe application to humans.

Carrel and the aviator Charles Lindbergh collaborated in the 1930s in developing a primitive heart-lung machine intended to allow direct cardiac operation. Lindbergh was driven to this project by the desire to save a family member dying of valvular heart disease. The project did not produce a clinically useful device, but it did make incremental progress toward the ultimate goal (3). Over a professional lifetime of intense dedication, John Gibbon developed a clinically useful cardiopulmonary bypass (CPB) technology and applied it successfully to a patient in 1953 (4).

With direct coronary operation awaiting advancing techniques, surgical efforts to relieve angina pectoris in the mid-20th century included suppression of metabolic stimulation through thyroidectomy and augmentation of noncoronary flow to the myocardium through creation of pericardial or omental adhesions. Attempts to create an artificial collateral by implantation of the internal mammary artery (IMA) into the myocardium, the Vineberg procedure, met with limited success (5).

Coronary surgery moved into the modern era in the 1950s. It is not entirely clear to whom credit should be given for the first coronary bypass. The first direct surgical approach to the coronary circulation in a patient was likely performed by William Mustard in 1953 in Toronto, who used a carotid-to-coronary bypass. The patient did not survive the operation.

The first clinical use of the IMA to graft a coronary vessel appears to have been in response to an intraoperative misadventure. William Longmire applied the technique of coronary endarterectomy in a series of patients in 1958. A right coronary artery disintegrated during one of these operations, and an IMA was placed as a direct graft to restore flow. In retrospect, the surgeon thought it to be a good operation (2).

Downloaded from circ.ahajournals.org by on August 4, 2008

Table 1. Applying Classification of Recommendations and Level of Evidence

"Size of Treatment Effect"

"Estimate of Certainty (Precision) of Treatment Effect"

	Class I *Benefit >>> Risk* Procedure/Treatment SHOULD be performed/administered	Class IIa *Benefit >> Risk* *Additional studies with focused objectives needed* IT IS REASONABLE to perform procedure/administer treatment	Class IIb *Benefit ≥ Risk* *Additional studies with broad objectives needed; Additional registry data would be helpful* Procedure/Treatment MAY BE CONSIDERED	Class III *Risk ≥ Benefit* *No additional studies needed* Procedure/Treatment should NOT be performed/administered SINCE IT IS NOT HELPFUL AND MAY BE HARMFUL
Level A *Multiple (3-5) population risk strata evaluated** *General consistency of direction and magnitude of effect*	• Recommendation that procedure or treatment is useful/effective • Sufficient evidence from multiple randomized trials or meta-analyses	• Recommendation in favor of treatment or procedure being useful/effective • Some conflicting evidence from multiple randomized trials or meta-analyses	• Recommendation's usefulness/efficacy less well established • Greater conflicting evidence from multiple randomized trials or meta-analyses	• Recommendation that procedure or treatment not useful/effective and may be harmful • Sufficient evidence from multiple randomized trials or meta-analyses
Level B *Limited (2-3) population risk strata evaluated** *Limited consistency of direction and magnitude of effect*	• Recommendation that procedure or treatment is useful/effective • Limited evidence from single randomized trial or non-randomized studies	• Recommendation in favor of treatment or procedure being useful/ effective • Some conflicting evidence from single randomized trial or non-randomized studies	• Recommendation's usefulness/efficacy less well established • Greater conflicting evidence from single randomized trial or non-randomized studies	• Recommendation that procedure or treatment not useful/effective and may be harmful • Limited evidence from single randomized trial or non-randomized studies
Level C *Very limited (1) population risk strata evaluated** *Considerable inconsistency of direction and magnitude of effect*	• Recommendation that procedure or treatment is useful/effective • Only expert opinion, case studies, or standard-of-care	• Recommendation in favor of treatment or procedure being useful/ effective • Only diverging expert opinion, case studies, or standard-of-care	• Recommendation's usefulness/efficacy less well established • Only diverging expert opinion, case studies, or standard-of-care	• Recommendation that procedure or treatment not useful/effective and may be harmful • Only expert opinion, case studies, or standard-of-care
Suggested phrases for writing recommendations †	should is recommended is indicated is useful/effective/beneficial	is reasonable can be useful/effective/ beneficial is probably recommended or indicated	may/might be considered may/might be reasonable usefulness/effectiveness is unknown /unclear/uncertain or not well established	is not recommended is not indicated should not is not useful/effective/beneficial may be harmful

*Data available from clinical trials or registries about the usefulness/efficacy in different sub-populations, such as gender, age, history of diabetes, history of prior MI, history of heart failure, and prior aspirin use.

†In 2003, the ACC/AHA Task Force on Practice Guidelines developed a list of suggested phrases to use when writing recommendations. All recommendations in the CABG guideline update have been written in full sentences that express a complete thought, such that a recommendation, even if separated and presented apart from the rest of the document (including headings above sets of recommendations), would still convey the full intent of the recommendation. It is hoped that this will increase readers' comprehension of the guidelines and will allow queries at the individual recommendation level.

0180
09/15/08

Michael DeBakey and Edward Garrett had a similar experience with a left anterior descending (LAD) coronary endarterectomy in 1964 (6). This situation was salvaged by an aortocoronary saphenous vein graft (SVG). The patient did well and had a patent aortocoronary SVG when restudied 8 years later. This experience was subsequently recorded and recognized as the first successful clinical aortocoronary SVG. An aortocoronary SVG operation by David Sabiston at Duke in 1962, involving an anastomotic end-to-end technique done without the use of CPB, was the first planned saphenous vein operation but was complicated by an early fatal outcome (7,8).

Mason Sones showed the feasibility of selective coronary arteriography and amassed a large library of cineangiograms that were studied in depth by Rene Favaloro (9). Sones and Favaloro formed an innovative team that demonstrated the efficacy and safety of SVG interposition and aortocoronary SVGs for single-vessel, left main, and multivessel coronary disease. An explosive growth in the application of these techniques ensued, such that within a decade, coronary bypass operation became the most frequent surgical procedure in the United States.

Recognition of the value of the IMA (also known as the internal thoracic artery) as a conduit came slowly. V.I. Kolessov, working in the 1960s at the Pavlov Institute in Leningrad, described a series of patients in whom the IMA was used for coronary revascularization without the aid of routine arteriography or CPB (10,11). Frank Spencer developed extensive experimental experience with the IMA to the coronary circulation in canine models. After preliminary animal and cadaveric work with microscopic methods, George Green brought this technique to successful clinical application. Floyd Loop and colleagues at the Cleveland Clinic incorporated the IMA into the coronary operation in a large series of patients and subsequently published the landmark article demonstrating the powerful survival benefit afforded by use of the IMA for LAD coronary distribution revascularization (12).

The 1970s, the first full decade of CABG, helped to define its appropriate role relative to medical therapy. Coronary bypass was found to consistently relieve angina and improve the quality of life in symptomatic patients. Three large, prospectively randomized, multicenter trials, The Coronary Artery Surgery Study (CASS), The Veteran's Administration Coronary Artery Bypass Trial, and the European Coronary Artery Bypass Trial, were conducted. These trials and several smaller studies helped to define subsets of patients likely to benefit from coronary bypass surgery in terms of prolongation of life and specifically identified patients with more advanced disease as those most appropriate for application of the operation for survival benefit. In addition to patients with triple-vessel disease and left main disease, patients with ischemic left ventricular (LV) dysfunction were found to benefit from the operation relative to medical therapy. These results led to the application of coronary bypass to progressively sicker patients in the 1980s.

Improvements in operative techniques and new technologies have allowed increasingly difficult patients to be approached with success. Improvements in cardiac anesthesia have paralleled improvements in operative techniques. Operation on complex patients became routine as sophisticated perioperative monitoring techniques, such as Swan-Ganz pulmonary artery catheters and intraoperative transesophageal echocardiography (TEE), were applied to specific problem situations. Anesthetic techniques, CPB technology, and most important, methods of myocardial protection were refined and successfully applied to specific problem situations. Close collaboration between the surgeon, the anesthesiologist, the perfusionist, and the intensive care team has been critically important to these advances. These refinements, discussed in Section 6, have led to an expected 30-day mortality of less than 1% in patients receiving elective coronary bypass who are less than 65 years of age and who have no severe LV dysfunction or congestive heart failure (CHF). Even in otherwise uncomplicated patients aged less than 65 years and with an ejection fraction (EF) of 0.25 to 0.35, first-time coronary bypass has an operative mortality risk of less than 5%.

In addition to improvements in short-term outcomes, evolving technology has contributed to improved long-term results. The widespread use of the IMA, the use of other arterial conduits, long-term antiplatelet therapy, and lipid management are discussed in later sections of these guidelines. Progress has also been significant in the moderation of perioperative morbidity. Central nervous system (CNS) injury, the systemic insults of CPB, infection, and bleeding are addressed in subsequent discussions. Finally, the application of CABG without CPB and through limited incisions has presented the prospect of further reductions in perioperative morbidity.

3. OUTCOMES

3.1. Hospital Outcomes

3.1.1. Introduction

As the clinician and the patient consider the decision for CABG, an understanding of probable immediate outcomes (events that occur during the immediate hospitalization or within 30 days of operation) is of paramount importance. In particular, it is important to be able to predict the hospital mortality of the procedure and the risk of the major complications of coronary bypass, including cerebrovascular accidents, major wound infection, and renal dysfunction.

3.1.2. Predicting Hospital Mortality

Class IIa

It is reasonable that statistical risk models be used to obtain objective estimates of CABG operative mortality. ***(Level of Evidence: C)***

Downloaded from circ.ahajournals.org by on August 4, 2008

The risk of death with CABG has been the focus of numerous studies in the last 2 decades. Although early reports were useful in correlating patient factors with outcomes such as in-hospital mortality (13), they were inadequate in their ability to risk stratify (14,15). Subsequently, a number of large single-center and multicenter cardiac surgical databases were established (13,16,17). From these databases, risk stratification models were created to better understand the variation in institutional and surgeon performance and to provide a more accurate risk prediction of mortality for patients facing CABG. Although all data sets identified patient and disease characteristics that consistently predicted mortality, the inclusion or exclusion of certain variables, variations in definitions of the same variables, and institutional and regional differences in practice styles have made it difficult to compare results across data sets. A review of 7 large data sets, representing more than 172 000 patients who underwent surgery between 1986 and 1994, was carried out to find the predictive power of certain preoperative variables (18). Seven core variables (i.e., urgency of operation, age, prior heart surgery, sex, LVEF, percent stenosis of the left main coronary artery, and number of major coronary arteries with more than 70% stenosis) were found to be predictive of mortality after CABG in all 7 data sets. Variables relating to the urgency of operation, age, and prior coronary bypass surgery were found to have the greatest predictive power, while variables describing coronary anatomy had the least predictive power. Besides these 7 core variables, 13 "level 1" variables were identified that, when added to the core variables, had a modest influence on the predictive capability of the model. These level 1 variables included the following: height; weight; PCI during index admission; recent (less than 1 week) MI; history of angina, ventricular arrhythmia, CHF, or mitral regurgitation (MR); comorbidities including diabetes, cerebrovascular disease, peripheral vascular disease (PVD), and renal dysfunction; and creatinine level. While the level 1 variables carry predictive power, their addition beyond these 7 core variables has been found to have a minimal impact on predictability (18).

While Jones and others have attempted to develop a common risk stratification language, general application of risk stratification models across populations must be done with caution. Although it may be possible to generalize the relative contribution of individual patient variables, rules must be calibrated to regional mortality rates and should be updated periodically to maximize accuracy (19,20). Table 2 compares the relative risk of the 7 core variables identified by Jones et al (18) as being most predictive of mortality as reported by 6 data sets.

Age has consistently predicted mortality after CABG (16,21), with advancing age associated with higher mortality. Assuming that age less than 65 years carries a relative risk of 1, Tu et al (22) found that the relative risk increased to 2.07 for patients between 65 and 74 years old and to 3.84 for those older than 75 years. Despite this increased short-term risk of mortality after CABG treatment, long-term results remain encouraging. When patients less than 50 years of age are compared with those 70 years and older and are matched by age to a population that did not undergo CABG, the older patients experience a longer hospitalization and higher hospital mortality, although their long-term survival more closely matches the general population compared with their younger counterparts. While elderly patients face an increased likelihood of morbidity after CABG and a particularly high incidence of stroke compared with the general population (23,24), age itself should not exclude a patient from being offered treatment with CABG, assuming that there is no prohibitive comorbidity. A careful quality of life and longevity assessment should be made in the oldest age groups.

Sex also predicts early mortality after CABG, with females facing an increased risk. Reported relative risks have ranged from 1.5 to 2.0. Smaller body size (25), smaller diameter of coronary arteries (26), increased age, and comorbidity status (27) have all been suggested as explanations for this increased risk. Another study based on the STS national database shows that female gender is an independent risk factor of operative mortality in low- and moderate-risk subsets but not in high-risk populations (28). Despite the increased risk, long-term results appear similar to those of males (29).

Having had previous open heart surgery adds considerable risk for patients having subsequent coronary artery surgery. The relative risk of early mortality appears to be around 3.0 compared with first-time CABG patients (16). An additional factor that further increases risk in this subset appears to be whether reoperation is carried out within 1 year of the primary operation (30). Despite the significant increased risk, long-term results after reoperative CABG are encouraging (31).

Coronary artery surgery in the presence of or immediately after an acute MI is controversial. Despite optimistic reports of low mortality if the operation is carried out within 6 hours of the onset of chest pain (32), many authors have found this approach to carry excessive mortality (33-35). Fibrinolytic therapy and/or PCI appears to be the preferable first-line therapy in the presence of an evolving MI. CABG surgery is reserved for patients with evidence of ongoing ischemia despite these interventions, or it may be performed coincident with repair directed at mechanical complications of infarction (i.e., ventricular septal defect or papillary muscle rupture). It also may benefit patients with shock complicating a recent acute MI, as demonstrated in the Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock (SHOCK) trial (35a).

The presence of comorbidities is also related to survival after CABG. Though not identified by Jones et al (18) as a core variable, treated diabetes (36), the presence of PVD (37), renal insufficiency (38), and COPD have all been shown to have a negative impact on outcome after CABG.

An intraoperative variable that seems to have both a short-term and a long-term impact on survival is the use of the

Downloaded from circ.ahajournals.org by on August 4, 2008

0182
09/15/08

Table 2. Relative Mortality Risk: Core CABG Variables for 6 Data Sets

	NNE(13)	VA(718)	STS(16)	NYS(23)	CC(12)	AGH(383)
No. of patients	3055	12 712	332 064	57 187	4918	1567
Year of publication	'92	'92	'97	'94	'97	'96
Years included	'87-'89	'87-'90	'90-'94	'89-'92	'93-'95	'91-'92
Type	Vol reg	Man nat	Vol nat	Man state	SI	SI
Database variables						
Age/y	1.04	1.04	1.1	1.0	1.05	NA
Sex, F	1.2	NA	1.5	1.5	1.63	1.48
Prior heart surgery	3.6	3.2	3.0	3.7	1.72	1.39
			3.5 (Mult reops)			
LMD (70%)	NA	NA	1.3	1.43 (>90%)	NA	NA
No. of diseased vessels						
1	1	NA	1.0	NA	NA	NA
2	1.3	NA	1.0	NA	NA	NA
3	1.6	NA	1.2	NA	NA	NA
Urgency of operation*						
Elective	1	1.0	1.0	1.0	1	1
Urgent	2.1	2.4	1.2	1.42 (USA)	NA	3.5
Emergent	4.4	3.8	2.0	4.0	5.07	7.14
Salvage	NA	NA	6.7	NA	NA	29.9
Ejection fraction						
0.6		NA	...	1.0 (>40%)	NA	...
0.50-0.59		NA	...	...	NA	...
0.40-0.49		NA	...	...	NA	...
0.30-0.39		NA	...	1.6	NA	2.89 (<30%)
0.20-0.29		NA	...	2.2	NA	...
<0.20		NA	...	4.1	NA	...

NNE indicates Northern New England Cardiovascular Disease Study Groups; VA, Veterans Affairs cardiac surgical database; STS, Society for Thoracic Surgery national cardiac surgical database; NYS, New York State cardiac surgery reporting systems; CC = Cleveland Clinic; AGH = Allegheny General Hospital; LMD, left main disease; Vol, voluntary; reg, regional; Man, mandatory; nat, national; state, single state; SI, single institution; NA, not available; and mult reops, multiple reoperations.

The relative risk coefficient for age indicates the additional mortality risk per year of age greater than 50 years.

*Urgent indicates patients are required to stay in the hospital but may be scheduled and operated on within a normal scheduling routine; Emergent, ongoing refractory cardiac compromise, unresponsive to other forms of therapy except for cardiac surgery; and Salvage, ongoing cardiopulmonary resuscitation en route to

IMA as a bypass conduit. Loop, Lytle, and others have reported that use of the IMA is an independent predictor of survival 10 to 20 years after CABG (39,40). Hospital mortality after CABG has also been reported to be lower when the IMA is used (41,42).

In summary, early mortality after CABG is associated particularly with advancing age, poor LV function, and the urgency of operation. Additional coronary anatomic and comorbid conditions further influence risk. If overall risk for an institution or region is known, then a general estimate for the individual patient can be rendered preoperatively by using mathematical models, as illustrated in Table 3 and Figure 1. This application may find utility as patients and their physicians weigh the potential benefits versus risks of proceeding with bypass surgery.

3.1.3. Morbidity Associated With CABG: Adverse Cerebral Outcomes

Class I

Significant atherosclerosis of the ascending aorta mandates a surgical approach that will minimize the possibility of arteriosclerotic emboli. ***(Level of Evidence: C)***

Neurological abnormalities after CABG are a dreaded complication. The reported incidence ranges from 0.4% to nearly 80%, depending on how the deficit is defined (43-45). Neurological derangement after CABG has been attributed to hypoxia, emboli, hemorrhage, and metabolic abnormalities (46,47). Despite the many advances made in cardiac surgery, postoperative stroke remains a problem.

Postoperative neurological deficits have been divided into 2 types: type 1 deficits are those associated with major, focal

Downloaded from circ.ahajournals.org by on August 4, 2008

0183
09/15/08

Table 3. Preoperative Estimation of Risk of Mortality, Cerebrovascular Accident and Mediastinitis

For use only in isolated CABG surgery

Directions: Locate outcome of interest, e.g., mortality. Use the score in that column for each relevant preop variable; then sum these scores to get the total score. Take the total score and look up the approximate preoperative risk in the table below.

Patient or Disease Characteristic	Mortality score	CVA score	Mediastinitis score
Age 60-69	1.5	1.5	1
Age 70-79	2.5	2.5	1.5
Age ≥80	6.5	3	2
Female sex	2	1.5	
Obesity (BMI 31-36)			2
Severe obesity (BMI ≥ 37)			4.5
Diabetes	1	1.5	1.5
COPD	2		2
PVD	1.5	1.5	
Dialysis	4	2	3
Creatinine ≥ 2	2	2	
MI ≤7 days	1.5		
Prior CABG	2.5		
EF < 40%	2	1.5	1.5
3-Vessel disease	1.5		
LM 50-89%	1.5		
LM ≥ 90%	2		
WBC >12K	2.5		
Urgent surg.	2	1.5	2
Emergency surg.	5	3.5	2
Total Score			

Preoperative Risk

Total Score	Mortality %	CVA %	Mediastinitis %
0	0.2	0.4	0.3
1	0.2		0.3
2	0.3	0.6	0.4
3	0.3	0.9	0.5
4	0.5	1.3	0.7
5	0.7	1.4	0.9
6	1.0	2.0	1.3
7	1.3	2.7	1.7
8	1.8	3.4	2.5
9	2.3	4.2	3.2
10	3.0	5.9	4.2
11	4.0	7.6	5.6
12	5.3	≥10.0	≥7.3
13	6.9		
14	8.8		
15	11.5		
16	14.1		
17	18.7		
18	≥23.0		

Calculation of Mortality Risk: An 80-year-old female, with an EF less than 40% who is having elective CABG surgery, has had no prior CABG surgery and has no other risk factors. Her total score = 6.5 (age greater than or equal to 80) + 2 (female sex) + 2 (EF less than 40%) = 10.5. Since her total score equals 10.5, round up to 11; her predicted risk of mortality = 4.0%.

Definitions:

Obesity: Find the approximate height and weight in the table below to classify the person as obese or severely obese. **Obesity:** BMI 31-36. **Severe obesity:** BMI greater than or equal to 37.

Example: A patient is 5'7" and weighing 200 lbs. is classified obese. If the patient weighed 233 lbs. or more, he/she would be classified severely obese.

Height (feet and inches)	Weight (lbs.) Obesity BMI 31-36	Weight (lbs.) Severe Obesity BMI≥37	Height (feet and inches)	Weight (lbs.) Obesity BMI 31-36	Weight (lbs.) Severe Obesity BMI ≥37
5'0"	158-186	≥187	5'8"	203-239	≥240
5'1"	164-192	≥193	5'9"	209-246	≥247
5'2"	169-199	≥200	5'10"	215-254	≥255
5'3"	175-205	≥206	5'11	222-261	≥262
5'4"	180-212	≥213	6'0"	228-268	≥269
5'5"	186-219	≥220	6'1"	235-276	≥277
5'6"	191-225	≥226	6'2"	241-283	≥284
5'7"	198-232	≥233	6'3"	248-291	≥292

Diabetes: Currently treated with oral medications or insulin.

COPD (chronic obstructive pulmonary disease): treated with bronchodilators or steroids.

PVD (peripheral vascular disease): Cerebrovascular disease, including prior CVA, prior TIA, prior carotid surgery, carotid stenosis by history or radiographic studies, or carotid bruit. Lower-extremity disease including claudication, amputation, prior lower-extremity bypass, absent pedal pulses or lower-extremity ulcers.

Dialysis: Peritoneal or hemodialysis-dependent renal failure.

MI less than 7 days: The development of a) new Q wave on EKG or b) new ST-T changes with a significant risc (defined locally) in CPK with positive (defined locally) isoenzymes.

EF less than 40% (left ventricular ejection fraction): The patient's current EF is less than 40%.

WBC greater than 12K (white blood cells greater than 12000): Use the patient's last preoperative measurement of WBC taken before the procedure.

Urgent: Medical factors require patient to stay in hospital to have operation before discharge. The risk of immediate morbidity and death is believed to be low.

Emergency: Patient's cardiac disease dictates that surgery should be performed within hours to avoid unnecessary morbidity or death.

Data set and definitions for dependent variables:

The regression models that generated the scores for these prediction rules were based on 14971 patients receiving isolated CABG surgery between 1999 and 2002. The dependent variables and observed event rates are as follows: inhospital mortality (2.5%); cerebrovascular accident, defined as a new focal neurologic event persisting at least 24 hours (1.6%); and mediastinitis during the index admission defined by positive deep culture and/or gram stain and/or radiographic findings indicating infection and requiring reoperation (1.0%).

Northern New England Cardiovascular Disease Study Group 4/03.
BMI indicates body mass index; CVA, cerebrovascular accident; LM, left main; TIA, transient ischemic attack; EKG, electrocardiogram.

Downloaded from circ.ahajournals.org by on August 4, 2008

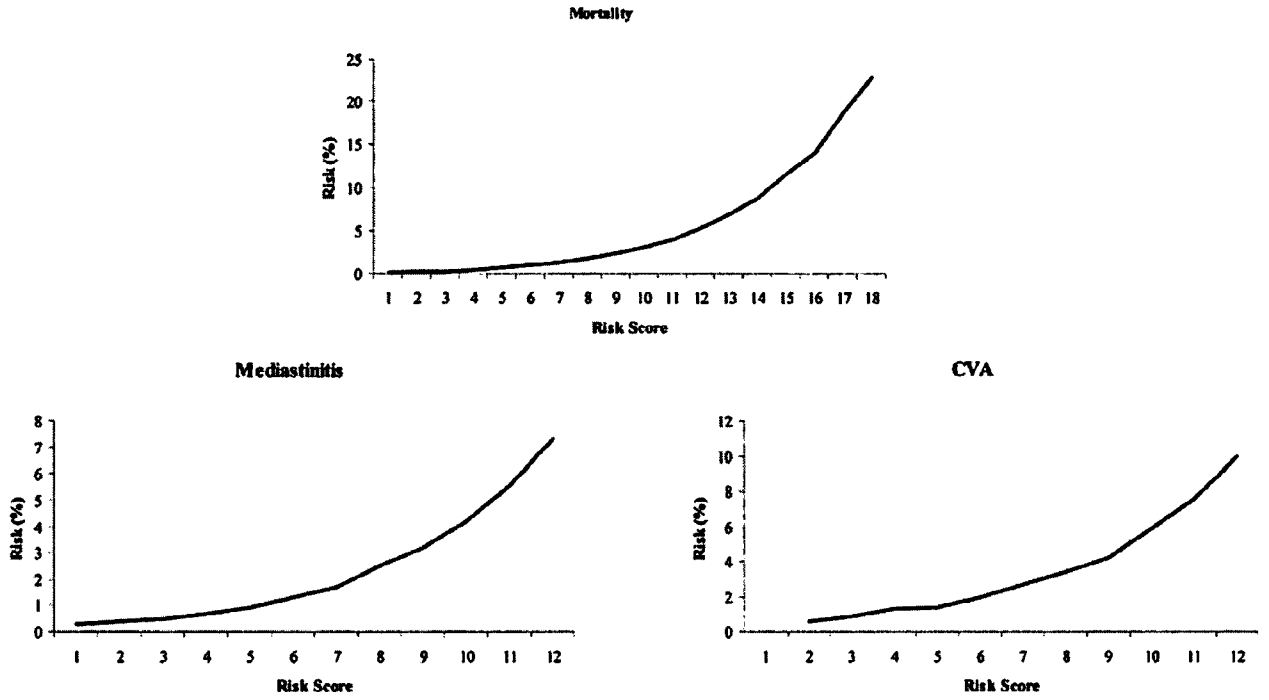


Figure 1. Event curves. For calculation of risk score, see Table 3.

neurological deficits, stupor, and coma; type 2 deficits are characterized by deterioration in intellectual function or memory. Roach et al (48) reported on a multi-institutional prospective study aimed at determining the true incidence of both stroke (type 1 deficits) and encephalopathy (type 2 deficits) after CABG. In this study, 2108 patients operated on at 24 institutions were observed for signs of neurological dysfunction after CABG. Adverse cerebral outcomes occurred in 129 patients (6.1%) and were evenly distributed between type 1 (3.1%) and type 2 (3.0%) deficits. The influence of these complications included a 21% mortality for those with type 1 deficits and a 10% mortality for those with type 2 deficits. In addition, patients with neurological complications had, on average, a 2-fold increase in hospital length of stay and a 6-fold likelihood of discharge to a nursing home.

Independent risk factors were identified for both type 1 and type 2 deficits (48). Predictors of both types of cerebral complications included advanced age, especially age greater than or equal to 70 years, and a history or the presence of significant hypertension. Both of these variables have previously been reported to be associated with adverse cerebral outcomes after CABG (49,50).

Predictors of type 1 deficits included the presence of proximal aortic atherosclerosis as defined by the surgeon at the time of surgery (odds ratio [OR] 4.52), a history of prior neurological disease (OR 3.19), use of the intra-aortic balloon pump (IABP; OR 2.60), diabetes (OR 2.59), a history of hypertension (OR 2.31), a history of unstable angina (OR 1.83), and increasing age (OR 1.75 per decade). Perioperative hypotension and the use of ventricular venting were also weakly associated with this type of outcome.

Proximal aortic atherosclerosis has been reported to be the strongest predictor of stroke after CABG, supporting the theory that liberation of atheromatous material during manipulation of the aorta is the main cause of this complication (49). Although palpation of the aorta has traditionally been used by surgeons to identify patients with atheromatous disease of the ascending aorta and to find "soft spots" for cannulation or cross-clamping, the use of ultrasound has been suggested as a more accurate means of assessing the aorta (51). Duda et al (51) have suggested that once aortic atherosclerosis is identified, alternative strategies to prevent mobilization of aortic atheroma should be considered, including techniques such as groin or subclavian placement of the aortic cannulas, fibrillatory arrest without aortic cross-clamping, use of a single cross-clamp technique, modifying the placement of proximal anastomoses, or all-arterial revascularization in cases of severe aortic involvement. Other authors recommended ascending aortic replacement under circulatory arrest as the best means of minimizing this complication (52,53).

A history of previous neurological abnormality or the presence of diabetes is also a predictor of type 1 CNS complications. These are likely markers for patients with marginal cerebral blood flow, alterations in CNS vasomotor autoregulatory mechanisms, or diffuse atherosclerosis. The need for an IABP is likely correlated with a higher risk of atheromatous emboli and is often required in patients with systemic hypoperfusion, each of which may cause stroke after CABG.

Downloaded from circ.ahajournals.org by on August 4, 2008

The fact that use of an LV vent—or other devices that have potential for introducing air into the arterial circulation—has been associated with stroke suggests air emboli as the cause and argues for meticulous technique when placing these devices to prevent this complication.

Factors predictive of type 2 neurological deficits include a history of alcohol consumption, dysrhythmia (including atrial fibrillation), hypertension, prior CABG, PVD, or CHF. Because aortic atherosclerosis is not a strong predictor of type 2 complications, encephalopathic changes may be related not only to microemboli but also to the brain's microcirculation. Type 2 complications are more likely to occur after periods of hypotension or inadequate perfusion.

Off-pump coronary artery bypass (OPCAB) avoids both aortic cannulation and cardiopulmonary bypass. Accordingly, one would expect postoperative neurological deficits to be reduced in patients undergoing OPCAB. Three randomized controlled trials (54-56) have not firmly established a significant change in neurological outcomes between OPCAB patients and conventional CABG patients. Each trial demonstrates problems inherent with small patient cohorts, differing definitions, and patient selection. At this point, there is insufficient evidence of a difference in neurological outcomes for patients undergoing OPCAB compared with those undergoing conventional CABG (57).

Individual patient counseling regarding postoperative stroke risk represents an important opportunity to assist patients as they weigh the risks and benefits of elective CABG. Although postoperative stroke rates may vary between hospitals or regions, if local rates are known, then these may be used to assist the patient in appreciating the general risk of this dreaded complication. Strategies to reduce the risk of postoperative neurological complications are discussed in depth in Section 4.1.1.

3.1.4. Morbidity Associated With CABG: Mediastinitis

Deep sternal wound infection has been reported to occur in 1% to 4% of patients after CABG and carries a mortality rate of nearly 25% (58,59). Studies have consistently associated obesity and reoperation with this complication, while other risk factors such as use of both IMAs, duration and complexity of operation, and the presence of diabetes have been reported inconsistently. Most studies examining deep sternal wound infection have been single-center, retrospective reviews, and variation in wound surveillance techniques and the definition of deep sternal wound infection limit comparisons.

Obesity is a strong correlate of mediastinitis after CABG (60). In one report of 6459 patients undergoing CABG at a single institution, Milano et al (61) found obesity to be the strongest independent predictor of mediastinitis (OR 1.3). In a prospective multi-institutional study, the Parisian Mediastinitis Study Group also found obesity to carry the greatest association with the development of postoperative mediastinitis (OR 2.44) (62). The mechanism by which obesity leads to this complication is poorly understood but is likely multifactorial. Perioperative antibiotics may be poorly distributed in adipose tissue, skin folds present a special challenge in maintaining sterility, and large regions of adipose tissue serve as an ideal substrate for bacteria and represent a clinical challenge for diagnosis when early infection occurs.

Another patient characteristic that has been associated with postoperative mediastinitis is the presence of diabetes (55,57), especially in patients requiring regular insulin (58). In addition to the microvascular changes seen in diabetic patients, elevated blood glucose levels may impair wound healing. The use of a strict protocol aimed at maintaining blood glucose levels less than or equal to 200 mg/dL by the continuous, intravenous infusion of insulin has been shown to significantly reduce the incidence of deep sternal wound infection in patients with diabetes (58a,314).

Prior cardiac surgery is another factor associated with the development of mediastinitis (61-63). Reoperation requires additional dissection, necessitates longer operative and/or perfusion times, produces more bleeding, and results in a higher likelihood of needing transfusion, variables that have all been linked to this complication.

Operator-dependent variables may also contribute to the development of deep sternal wound infection. These include the use of both IMAs for bypass conduits and excessive use of electrocautery for hemostasis (61,320). No studies have found the use of a single IMA to be predictive of mediastinitis. Two reports identified the use of both IMAs to be an independent predictor (62,62a), while several others have shown no correlation with the development of mediastinitis (58,61). Because the use of both IMAs may predispose to devascularization of the sternum, it seems likely that this technique promotes infection, especially when combined with other risk factors such as diabetes and/or obesity.

In summary, deep sternal wound infection after CABG is an expensive and potentially lethal complication that appears to have a multifactorial etiology. Strategies to reduce the incidence of this complication include meticulous aseptic technique, keeping perfusion times to a minimum, avoidance of unnecessary electrocautery, appropriate use of perioperative antibiotics, and strict control of blood glucose levels during and after operation. Each of these is discussed in greater depth in Section 4.1.4.

3.1.5. Morbidity Associated With CABG: Renal Dysfunction

The first major multicenter study of renal dysfunction after CABG surgery was published in 1998 (64). This study of 2222 patients who underwent myocardial revascularization with CPB defined postoperative renal dysfunction (PRD) as a postoperative serum creatinine level of greater than or equal to 2.0 mg/dL or an increase in the serum creatinine level of greater than or equal to 0.7 mg/dL from preoperative to maximum postoperative values. PRD occurred in 171 (7.7%) of the patients studied; 30 of these (18%, or 1.4% of

Downloaded from circ.ahajournals.org by on August 4, 2008

0186
09/15/08

all study patients) required dialysis. The mortality rates were 0.9% among patients who did not develop PRD, 19% in patients with PRD who did not require dialysis, and 63% among those who required dialysis.

Several preoperative risk factors for PRD were identified, including advanced age, a history of moderate to severe CHF, prior CABG, type 1 diabetes mellitus, and preexisting renal disease (preoperative creatinine levels greater than 1.4 mg/dL). The risk of PRD in patients less than 70 years of age nearly tripled with 1 preoperative risk factor and increased further with 2 risk factors. A detailed analysis of the impact of these preoperative risk factors for PRD for 3 age groups is presented in Table 4 (64). These findings allow identification of high-risk patients for PRD and a general estimation of the risk for PRD for an individual patient. The reported risk for patients with moderate renal dysfunction is consistent with previous reports from smaller, single-center studies (65-67).

Although data from large, multicenter studies are not available, it is reasonable to conclude that patients with more advanced, chronic, preoperative renal failure (but without end-stage renal disease [ESRD]) would have an even higher incidence of PRD requiring dialysis. Because their kidneys have a greater reduction in functioning nephrons than those in patients with lesser degrees of renal failure in the study cited above, they would be more vulnerable to the maldistribution of renal blood flow, an increase in renal vascular resistance, and the decreases in total renal blood flow and glomerular filtration rate that occur during CABG surgery (68-70). This conclusion has been supported by a study of 31 patients who underwent CABG with a baseline serum creatinine level greater than or equal to 1.6 mg/dL in the 6 months before surgery and who did not require preoperative dialysis (71). The mean age of the patients was 71 years, and nearly 80% were males. The hospital mortality was 19%, and 26% of surviving patients required chronic dialysis. Among 19 patients with a creatinine level greater than or equal to 2.6 mg/dL, 42% of survivors required chronic hemodialysis, whereas none of the surviving patients with a creatinine level less than or equal to 2.6 mg/dL required chronic dialysis. This study suggests that patients greater than 70 years old with a creatinine level greater than or equal to 2.6 mg/dL are at extreme risk for dialysis dependency after CABG, and alternative options for coronary management should be strongly considered.

The importance of perioperative renal function is emphasized by a report that correlated acute renal failure sufficient to require dialysis and operative mortality after cardiac surgery (72). The 42 773 patients who underwent CABG or valvular heart surgery at 43 Department of Veterans Affairs medical centers between 1987 and 1994 were evaluated to determine the association between acute renal failure suffi-

Table 4. Risk of Postoperative Renal Dysfunction (PRD) After Coronary Artery Bypass Graft Surgery

No. of Risk Factors	Combinations of Preoperative Risk Factors for PRD				Risk of PRD in Various Clinical Strata Depending on Risk Factors and Age		
	CHF	Reop	DM	Creat greater than 1.4	Greater than 70 years	70 to 79 years	Greater than or equal to 80 years
0	-	-	-	-	1.9% (n=909)	7.0% (n=330)	11.8% (n=68)
1	-	-	-	+	5.0% (n=80)	18.4% (n=76)	12.5% (n=16)
	-	-	+	-	5.9% (n=68)	4.8% (n=81)	*
	-	+	-	-	6.2% (n=130)	14.3% (n=56)	25.0% (n=4)
	+	-	-	-	7.6% (n=144)	12.3% (n=73)	29.4% (n=17)
2	-	-	+	+	22.2% (n=9)	0% (n=7)	*
	-	+	-	+	20.0% (n=25)	30.8% (n=13)	*
	-	+	+	-	37.6% (n=8)	33.3% (n=3)	*
	+	-	-	+	47.4% (n=19)	7.7% (n=26)	44.4% (n=9)
	+	-	+	-	25.9% (n=27)	18.2% (n=11)	*
	+	+	-	-	31.6% (n=19)	7.1% (n=14)	*
3	-	+	+	+	100% (n=1)	100% (n=1)	*
	+	-	+	+	8.3% (n=12)	25% (n=4)	*
	+	+	-	+	*	33.3% (n=9)	*
	+	+	+	-	33.3% (n=3)	*	*
4	+	+	+	+	50.0% (n=2)	*	*

CHF indicates prior congestive heart failure; Reop, redo coronary bypass operation; DM, type 1 diabetes mellitus; Creat greater than 1.4, preoperative serum creatinine level greater than 1.4 mg/dL.; n, observed number of patients within each clinical stratum; -, risk factor absent; and +, risk factor present.

*Insufficient patient numbers, number is less than five.

Reprinted with permission from Mangano et al. Ann Intern Med 1998;128:194-203 (64).

Downloaded from circ.ahajournals.org by on August 4, 2008

Table 5. Multivariate Analysis Predictors of Late Overall Mortality and Late Cardiac Mortality

Predictor	Risk Ratio	95% CI	*P*
Late overall mortality			
Diabetes	2.94	1.81-4.77	<0.001
Advancing age	1.1	1.06-1.13	<0.001
Reduced EF	1.03	1.01-1.04	<0.007
No IMA	1.22	0.75-1.99	0.423
Late cardiac mortality			
Diabetes	1.73	2.40-9.32	<0.001
Advancing age	1.08	1.04-1.13	<0.001
Reduced EF	1.05	1.02-1.08	<0.001
No IMA	1.78	0.83-3.79	0.138

CI indicates confidence interval; EF, ejection fraction; IMA, internal mammary artery.

cient to require dialysis and operative mortality. This degree of acute renal failure occurred in 460 (1.1%) patients. Overall, operative mortality was 63.7% in these patients, compared with 4.3% in patients without this complication. Acute renal failure requiring dialysis was independently associated with early mortality after cardiac surgery, even after adjustment for comorbidity and postoperative complications.

3.1.6. Posthospital Outcomes

The extensive application of CABG has been a consequence of its effectiveness in the relief of angina and prolongation of survival in certain subsets. The 1999 Guidelines provided data that allow a general understanding of expectation after CABG (1). In a heterogeneous group of patients, survival at 5 years was 92% and at 10 years was 81%. Freedom from angina was 83% at 5 years and 63% at 10 years. The previous guidelines provided equations for predicting patient-specific outcomes, including freedom from unfavorable events, in a comparison of coronary bypass surgery versus medical treatment. These detailed predictive instruments remain appropriate for use and are not presented here. While a discussion of the comparative benefits of CABG versus medical therapy appears in Section 3.2, a brief description of the factors that influence the long-term results of the operation is appropriate here.

The predictors of long-term survival after CABG have been analyzed in a number of studies. In an analysis of 23 960 patients from 1977 to 1994 from Emory University, advanced age, EF, presence of diabetes, number of diseased vessels, and sex were significant multivariate predictors of survival, while angina class, hypertension, history of MI, renal dysfunction, and CHF were other important factors identified by univariate analysis (Table 5) (73). Other studies have identified predictors for the recurrence of angina and for postoperative MI (Table 6). Importantly, untoward events after coronary bypass tend to increase in frequency between 5 and 10 years after the operation, apparently coincident with the gradual occlusion of vein grafts. Approximately 50% of vein grafts are closed by 10 years after operation.

The delayed return of angina and the fact that approximately half of the survivors of CABG eventually die of cardiac-related causes identifies the "Achilles heel" of the procedure: late vein-graft atherosclerosis and occlusion. The most important surgical gain has been verification of excellent late patency with IMA grafts (74). From this encouraging result with the use of a single arterial graft has sprung the arterial arborization of today, with reports of multiple and "complete" arterial grafting (75-78). This is discussed further in Sections 4.2. and 6.2.

3.2. Comparison of Medical Therapies Versus Surgical Revascularization

Since the 1991 Guidelines, relatively little clinical trial information comparing medical with surgical treatment of CAD has been published. However, longer follow-up of

Table 6. Multivariate Analysis Predictors of Anginal Recurrence, Late MI, and Any Cardiac Event

Predictor	Risk Ratio	95% CI	*P*
Anginal recurrence			
Female sex	1.81	1.22-2.69	0.003
Obesity	1.69	1.21-2.19	0.002
Preoperative hypertension	1.54	1.87-2.19	0.015
No IMA	2.47	1.49-4.10	<0.001
Late MI			
Diabetes	3.39	1.81-6.34	0.001
Single IMA	2.31	1.15-4.67	0.019
Any cardiac Event			
No IMA	2.88	1.48-5.15	<0.001

Downloaded from circ.ahajournals.org by on August 4, 2008

Table 7. Limitations of Randomized Trials in View of Current Practice

Patient Selection	Surgical Factors	Medical/Nonsurgical Therapy
Patients less than or equal to 65 years of age	Only 1 trial used arterial grafts (CASS) (in only 14% of patients)	Lipid-lowering therapy not used or standard
Only 1 trial included women (CASS)	Newer modalities of cardioprotection not used	Aspirin not widely used
Predominantly low-risk, stable patients	Minimally invasive, off-bypass techniques not used	Beta-blockers used in only half of patients
	Aspirin not routinely given early postoperatively	ACE inhibitor not used
		Coronary angioplasty not widespread

CASS indicates Coronary Artery Surgery Study; ACE, angiotensin-converting enzyme.

patients enrolled in the earlier, major randomized trials has solidified the appropriate indications for surgical treatment.

The traditional stratification of patients has been based on the extent of CAD (i.e., number of vessels with anatomically significant disease and whether or not the major epicardial obstruction is proximal) in association with the extent of LV dysfunction (determined by a simple measure of global LVEF). The major end point of the studies has been survival. The major randomized trials studied patients between 1972 and 1984, at which time the predominant medical therapy was the use of beta-blockers and nitrates.

There are several important limitations of the randomized trials in view of current practice (Table 7). In the ensuing years, calcium channel blockers have been added, particularly for symptomatic patients. The use of aspirin has become more widespread in all patients with CAD. The role of 3-hydroxy-3-methylglutaryl coenzyme A reductase inhibitors and other lipid-lowering agents has now been recognized as important in reducing recurrent ischemic events. Angiotensin converting enzyme inhibitors are now used routinely, particularly in patients with symptomatic heart failure after acute myocardial infarction or those with LV systolic dysfunction. It is hoped that these agents will be used equally in patients treated with medications alone and in patients after CABG surgery, whose revascularization therapy is complemented by appropriate medical treatment to reduce ischemic complications. The contribution of advances in surgical revascularization techniques cannot be fully assessed. The potential value of arterial conduits for revascularization, particularly the IMA, cannot be evaluated from these early randomized studies, yet their use is now routine in CABG surgery. There are also no prospective, randomized studies comparing the more recent off-bypass or minimally invasive surgical approaches to medical therapy. Finally, the randomized trials oversimplify the designation of 1-, 2-, and 3-vessel disease. Several reports show that prognosis is also critically related to the location of lesions within vessels, not simply the number of vessels involved (9,18).

3.2.1. Overview

There were 3 major randomized trials (79-81) and several smaller ones (82-84). These studies addressed similar clini-

Table 8. Total Mortality at 5 and 10 Years

Trial	No. of Patients Randomized		5-Year Mortality			10-Year Mortality		
	CABG	Medical Treatment	CABG	Medical Treatment	Odds Ratio (95% CI)	CABG	Medical Treatment	Odds Ratio (95% CI)
VA (79)	332	354	58	79	0.74 (0.50–1.08)	118	141	0.83 (0.61–1.14)
European (81)	394	373	30	63	0.40 (0.26–0.64)	91	109	0.72 (0.52–0.99)
CASS (80)	390	390	20	32	0.60 (0.34–1.08)	72	83	0.84 (0.59–1.19)
Texas	56	60	10	13	0.79 (0.31–1.97)	23	25	0.97 (0.46–2.04)
Oregon	51	49	4	8	0.44 (0.12–1.56)	14	14	0.94 (0.39–2.26)
New Zealand	51	49	5	7	0.65 (0.19–2.20)	15	16	0.94 (0.38–2.31)
New Zealand	50	50	8	8	1.00 (0.34–2.91)	17	16	1.15 (0.50–2.65)
Total	1324	1325	135 (10.2%)	210 (15.8 %)	0.61 (0.48–0.77) P less than 0.0001	350 (26.4 %)	404 (30.5 %)	0.83 (0.70–0.98) P equals 0.03

CABG indicates coronary artery bypass graft; CI, confidence interval; VA, Veterans Administration; CASS, Coronary Artery Surgery Study.
P values for heterogeneity across studies were 0.49, 0.84, and 0.95 at 5, 7, and 10 years, respectively. Reprinted with permission from Elsevier Science, Inc. (Yusuf et al. The Lancet 1994;344:563-70) (85).

Downloaded from circ.ahajournals.org by on August 4, 2008

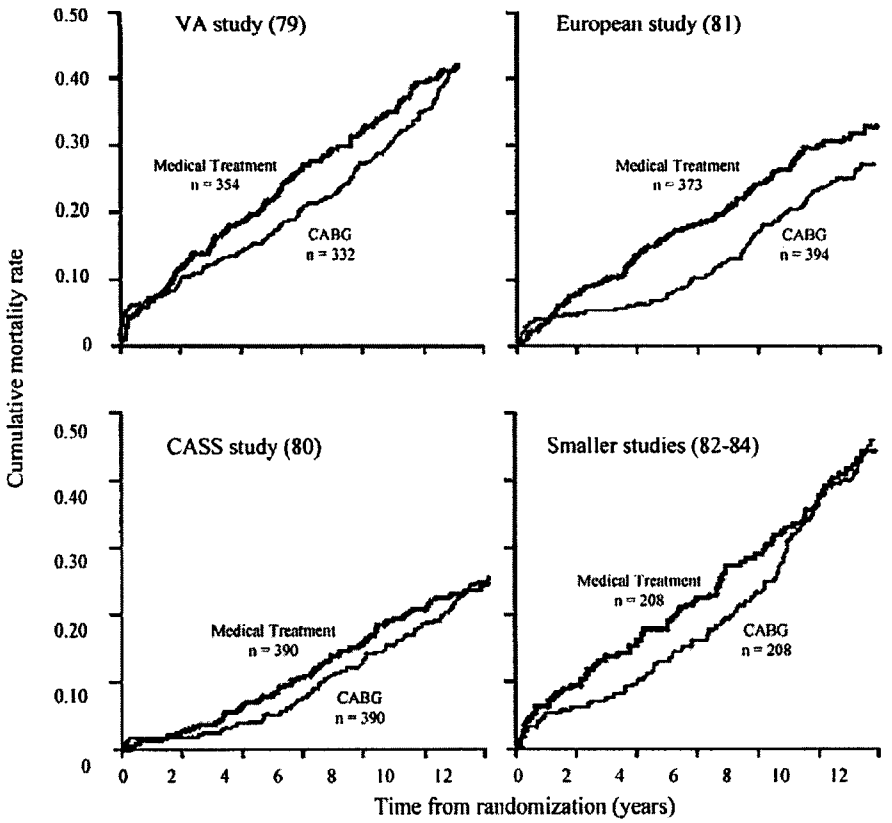


Figure 2. Survival curves of the 3 large studies and several small studies combined. VA indicates Veterans Administration; CABG, coronary artery bypass graft surgery; CASS, Coronary Artery Subject Study. Reprinted with permission from Elsevier Science, Inc. (Yusuf et al. The Lancet. 1994;344:563-70) (85).

cal questions and, as shown in Figure 2 and Figure 3, had similar outcomes. Much of the primary patient information for the 2649 patients enrolled in these randomized trials has been combined in a collaborative meta-analysis, which has facilitated comparison of outcomes at 5 and 10 years of follow-up (Table 8) (85). Extension of survival is a useful measure to compare different treatment strategies and can be adjusted for patient characteristics (Figure 4). Across all patients, the improvement in survival with CABG compared with medical treatment is 4.3 months at 10-year follow-up (*P* equals 0.003). In patients with left main disease, the survival benefit is 19.3 months. Subset analyses for other subgroups show statistical benefit for those with 3-vessel disease, and in those with 1- or 2-vessel disease including LAD CAD. Relative risk reductions were similar with abnormal or normal LV function. However, a similar relative risk reduction is associated with a greater absolute survival benefit in the high-risk population with depressed LV function. The survival benefit of CABG surgery for individuals with 1- and 2-vessel disease without LAD involvement is small, particularly in the setting of normal LV function. A higher clinical risk score, more severe angina, and a positive exercise test are associated with a greater prolongation of survival after CABG surgery than with medical therapy at 5 and 10 years (Table 8) (85). Two clinical scoring systems have been used. The Veterans Administration trial used the clinical variables of angina class, history of hypertension, and MI as well as the degree of ST-segment depression at rest. The Coronary Artery Bypass Graft Surgery Trialists' Collaboration (85) developed a stepwise logistic regression analysis-based risk score that included clinical and angiographic variables as well as EF (Tables 8-10) (85). Patients can be stratified according to these clinical criteria and by using these scoring systems. There was little survival benefit in those with a low risk (1% annual mortality) but increasingly significant survival extension in those at moderate (annual mortality of 2.5%) or high (annual mortality of 5%) risk.

The randomized trials provide robust results for the populations studied. However, there are important limitations in generalizing the results of these studies to most patients with coronary disease because of the way patients were selected for the randomized studies. Specifically, the mean age of randomized patients was 50.8 years, there were very few patients greater than 65 years, 96.8% were male, and only 19.7% had an LVEF less than 0.50 (85). The challenge of choosing a therapeutic option in patients with CAD is that the clinical course is highly variable, and the "average"

Downloaded from circ.ahajournals.org by on August 4, 2008

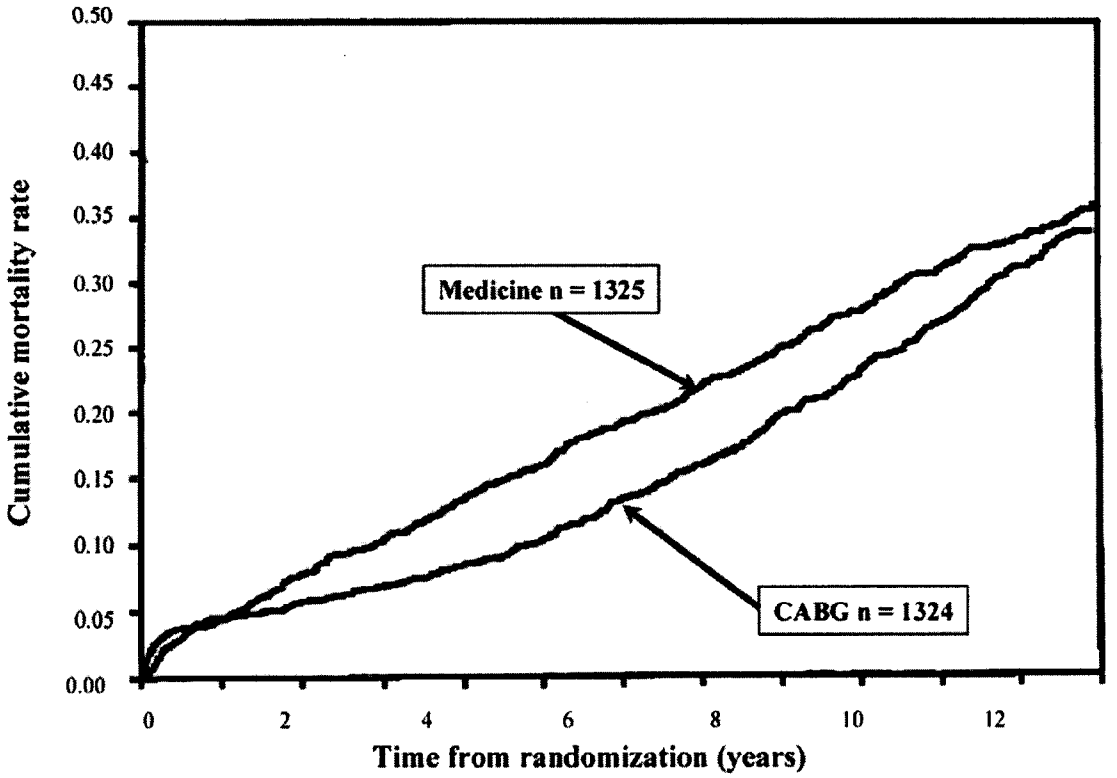


Figure 3. Cumulative total mortality from all studies. CABG indicates coronary artery bypass graft. Modified with permission from Elsevier Science, Inc. (Yusuf et al. The Lancet. 1994;344:563-70) (85).

patient does not fit perfectly into 1 of the groups studied. The large registries (86-88) and other studies (89-91) provide useful confirmatory information in support of the clinical trials and, if interpreted with appropriate caution, can help in the subsets not well studied in the randomized trials. The following discussion combines information from randomized and nonrandomized trials in which the directional trends are consistent with the randomized information.

3.2.2. Location and Severity of Stenoses

3.2.2.1. Left Main Disease

The benefit of surgery over medical treatment for patients with significant left main stenosis is little argued. All of the trials define significant left main stenosis as being greater than 50% diameter stenosis as judged by contrast angiography. The median survival for surgically treated patients is 13.3 years versus 6.6 years in medically treated patients (92,93).

Left main equivalent disease, defined as severe (greater than or equal to 70%) diameter stenosis of the proximal LAD and proximal left circumflex disease, appears to behave similarly to true left main disease. Median survival for surgical patients is 13.1 years versus 6.2 years for medically assigned patients (92). However, there are few randomized or randomizable patients with this anatomy. By 15 years, there is less survival benefit for patients assigned to surgery. It is estimated that if all medical patients survived 15 years, 65% would eventually have surgery (85). At 15 years, cumulative survival in the CASS registry for patients with left main equivalent disease was 44% for surgical patients and 31% for the medical group (92,94,95).

3.2.2.2. Three-Vessel Disease

Significant CAD is defined variably in the major studies. CASS originally reported results with significant stenosis defined as greater than or equal to 70%. The Veterans Administration and European studies used 50% as the cutoff for significant stenosis, and when the studies were combined for the meta-analysis (85), the 50% criterion defined significant disease for all vessels. For the purposes of this guideline, unless otherwise specified, the term significant will indicate greater than 50% reduction in visual stenosis.

The outcome of patients with 3-vessel CAD assigned to surgical or medical treatment is similar at the 10-year follow-up to that reported earlier in randomized trials. The more severe the symptoms, the more proximal the LAD CAD, and the worse the LV function, the greater is the benefit from surgery (81,85,96-100). In patients with 3-vessel disease, the relative risk reduction for surgery at 5 years is 42% and at 10 years is 24%, with an increase in survival of 5.7 months at 10-year follow-up (85). The definitions of single-, double-, and triple-vessel disease in these guidelines are

Downloaded from circ.ahajournals.org by on August 4, 2008

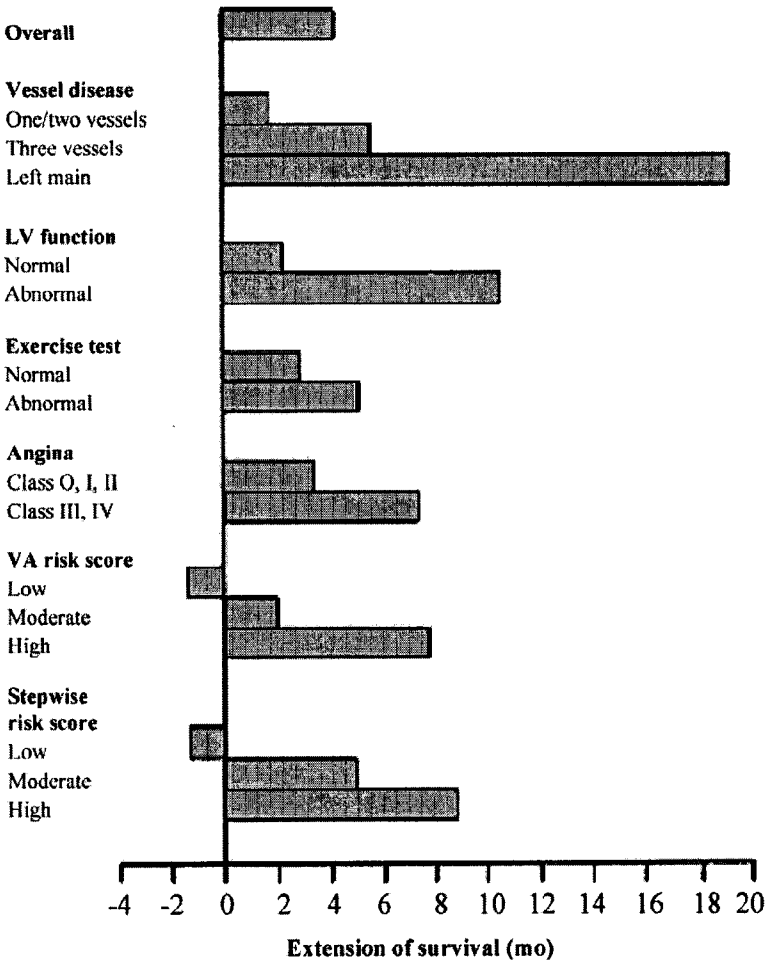


Figure 4. Extension of survival after 10 years of follow-up in various subgroups of patients, from a meta-analysis of 7 randomized studies. LV indicates left ventricular; VA, Veterans Administration. Reprinted with permission from Elsevier Science, Inc. (Yusuf et al. The Lancet. 1994;344:563-70) (85).

those from the Bypass Angioplasty Revascularization Investigation (BARI) (101,102).

3.2.2.3. Proximal LAD Disease

Proximal LAD CAD (greater than 50% stenosis) is an important contributor to outcome. In patients with proximal LAD disease, the relative risk reduction of CABG is 42% at 5 years and 22% at 10 years. In LAD disease without proximal involvement, the relative risk reduction is 34% at 5 years and 10% at 10 years. In the presence of depressed LV function, the absolute benefit of surgery is greater because of the risk of this population (81,103).

3.2.2.4. LV Function

LV systolic function remains an important predictor of which patients are likely to benefit from surgery (97-99,104). In patients with a normal EF, surgical revascularization generally provides little survival benefit. In patients with mild to moderately depressed function, the poorer the LV function, the greater is the potential benefit of surgery (97-99,105,106). The relative benefit is similar, but there is greater absolute benefit because of the high-risk profile of these patients. It is important to note that the randomized trials did not include patients with an LVEF less than 0.35. Thus, many of the patients operated on today were not well represented in the randomized trials.

A major growth in our understanding of the potential reversibility of chronic systolic dysfunction among patients with CAD has occurred in the past few years. Systolic dysfunction that is a result of chronic hypoperfusion ("hibernating") and not a result of infarction can now be identified noninvasively by positron emission tomographic scanning, radioisotope imaging, or dobutamine echocardiography. Patients with large areas of myocardial viability may benefit from revascularization. Small, observational studies of patients with hibernating myocardium who are undergoing coronary revascularization have shown functional and perhaps survival benefit, especially when LV function is particularly poor. This is discussed further in Section 5.9.

Downloaded from circ.ahajournals.org by on August 4, 2008

Table 9. Subgroup Results at 5 Years

Subgroup	Overal Numbers		Mortality Rates %		Ratio (95% CI)	*P* for CABG Surgery vs Medical Therapy
	Deaths	Patients	Surgical	Medical		
No. of diseased vessels						
1	21	271	5.4	9.9	0.54 (0.22–1.33)	0.18*
2	92	859	9.7	11.7	0.84 (0.54–1.32)	0.45*
3	189	1341	10.7	17.6	0.58 (0.42–0.80)	<0.001*
Left main artery	39	150	15.8	36.5	0.32 (0.15–0.70)	0.004*
No LAD disease						
1 or 2 Vessels	50	606	8.3	8.3	1.05 (0.58–1.90)	0.88
3 Vessels	46	410	7.7	14.5	0.47 (0.25–0.89)	0.02
Left main artery	16	51	18.5	45.8	0.27 (0.08–0.90)	0.03†
Overall	112	1067	8.6	12.3	0.66 (0.44–1.00)	0.05
LAD disease present						
1 or 2 Vessels	63	524	9.2	14.6	0.58 (0.34–1.01)	0.05
3 Vessels	143	929	12	19.1	0.61 (0.42–0.88)	0.009
Left main artery	22	96	12.8	32.7	0.30 (0.11–0.84)	0.02‡
Overall	228	1549	11.2	18.3	0.58 (0.43–0.77)	0.001
LV function						
Normal	228	2095	8.5	13.3	0.61 (0.46–0.81)	<0.001
Abnormal	115	549	16.5	25.2	0.59 (0.39–0.91)	0.02§
Exercise test status						
Missing	102	664	13.1	17.4	0.69 (0.45–1.07)	0.1
Normal	60	585	9	11.6	0.78 (0.45–1.35)	0.38
Abnormal	183	1400	9.4	16.8	0.52 (0.37–0.72)	<0.001
Severity of angina						
Class I, II	178	1716	8.3	12.5	0.63 (0.46–0.87)	0.005
Class III, IV	167	924	13.8	22.4	0.57 (0.40–0.81)	0.001

CI indicates confidence interval; CABG, coronary artery bypass graft; LAD, left anterior descending coronary artery; and LV, left ventricular.
*Includes only (79,80).
†Excludes (81).
‡Excludes (81-84).
§Excludes (80).
Reprinted with permission from Elsevier Science, Inc. (Yusuf et al. The Lancet. 1994;344:563-70) (85).

There are few data regarding optimal choices for women. The higher early surgical mortality needs to be weighed against the lessons derived from the predominantly male subjects (107), and this as well as other subsets will be discussed in Section 5.

It is important to note that the randomized trials did not include patients with an LVEF less than 0.35. Thus, many of the patients operated on today were not well represented in the randomized trials. Results are anticipated from the Surgical Treatment for Ischemic Heart Failure (STICH) study that is a randomized, multicenter trial of medical therapy versus CABG for patients with heart failure, LVEF less than 0.35, and coronary artery disease amenable for CABG.

3.2.2.5. Symptoms/Quality of Life

More attention has been paid to improvement in symptoms and quality-of-life measurements. The findings from randomized trials for these outcomes parallel those of the survival data. Apart from its effect on survival, CABG is potentially indicated for 2 symptom-based indications: to alleviate symptoms of angina pectoris over and above medical therapy and to reduce the incidence of nonfatal outcomes such as MI, CHF, and hospitalization. CABG is considered to improve or to relieve angina pectoris in a much broader group of patients than the subgroups in which it has been found to improve survival. Registry studies have suggested a favorable impact on late MI among highest-risk subsets, such as patients with 3-vessel disease and severe angina pectoris. However, in the pooled data from the randomized trials (85), no overall beneficial impact of CABG on subsequent MI could be demonstrated. This may reflect an early increase in MI perioperatively in patients undergoing CABG surgery balanced by fewer MIs in the long term.

At 5 years, patients treated surgically used less antianginal medicines, with 63% of patients completely symptom-free compared with 38% of medically assigned patients (96). At 10 years, however, these differences were no longer significant. Patients treated surgically and medically used similar amounts of long-acting nitrates and beta-blockers, with 47% of surgical patients asymptomatic compared with 42% of

Downloaded from circ.ahajournals.org by on August 4, 2008

0193
09/15/08

Table 10. Subgroup Analysis of 5-Year Mortality by Risk Stratum

	Deaths, n	Patients, n	Medical Treatment Mortality Rate, %	Odds Ratio (95% CI)	*P* for CABG vs Medical Treatment
Risk strata derived by risk score*					
Lowest tertile	23	406	5.5	1.18 (0.51–2.71)	0.70
Middle tertile	90	930	11.5	0.63 (0.39–1.01)	0.05
Highest tertile	153	849	23	0.50 (0.35–0.72)	0.001
Risk strata by stepwise risk score†					
Lowest tertile	52	783	6.3	1.17 (0.66–2.07)	0.60
Middle tertile	85	784	13.9	0.55 (0.34–0.88)	0.01
Highest tertile	157	783	25.2	0.54 (0.37–0.77)	0.001

CI indicates confidence interval; CABG, coronary artery bypass graft.

*Veterans Administration-type risk score = (0.70 × presence of Class III/IV angina) + (0.37 × history of hypertension) + (0.83 × ST-segment depression at rest) + (0.39 × history of myocardial infarction).

†Stepwise risk score = (0.015 × age) + (0.56 × presence of Class III/IV angina) + (0.35 × history of myocardial infarction) + (0.62 × abnormal ejection fraction) + (0.53 × proximal lesion greater than 50% in the left anterior descending coronary artery) + (0.29 × right coronary artery lesion greater than 50%) + (0.43 × history of diabetes) + (0.37 × history of hypertension).

Modified with permission from Elsevier Science, Inc. (Yusuf et al. The Lancet. 1994;344:563-70) (85).

medical patients. Recreational status, employment, frequency of CHF, use of other medicines, and hospitalization frequency were also similar between the groups (108-115).

At 10 years, the frequency of angina and other quality-of-life measurements were similar between surgically and medically treated groups. Those who have multivessel disease and who receive complete revascularization are less symptomatic, and symptom benefit is most apparent in patients with severe angina and LV dysfunction (EF less than 0.35) (108,110-116). Perhaps because of the symptomatic relief associated with surgical revascularization, the "crossover" from medical treatment to surgery may be of greater significance in improving quality of life. Medically assigned patients who had persistent angina despite medical therapy were able to undergo surgical revascularization and thus obtain relief of symptoms.

3.2.2.6. Loss of Benefit of Surgery

The meta-analysis based on individual patient data from all of the available randomized trials indicates a gradually increasing reduction in mortality over the first 5 to 7 years when coronary surgery is compared with medical therapy. After this period, at about the 10- to 12-year follow-up, there is a tendency of the survival curves to converge. This diminished continued benefit has been shown in the individual studies as well and is likely due to a combination of factors. First, it is inevitable in studies with long-term follow-up that survival curves of various treatment groups will eventually merge. This result has to do with the reduced life expectancy of patients with coronary disease, regardless of treatment.

Second, there is an increased event rate in late follow-up of surgically assigned patients because of the progression of native and graft disease, with a disproportionate increase in late surgical mortality. Finally, crossover to surgery of medically assigned patients is important. Thus, high-risk, medically assigned patients may gain the "benefit" of surgery even when assigned to medical therapy. The crossover rate at 10 years is between 37% and 50%, and this may contribute to the better survival and improved quality of life in such "medically assigned" patients.

3.2.2.7. Summary

CABG improves long-term survival in a broad spectrum of patients at moderate to high risk with medical therapy. Although a relative risk reduction of around 40% can be expected overall in comparison with medical therapy, absolute benefits are proportional to the expected risk with medical therapy. As such, absolute benefit is greatest among those at highest risk with medical therapy (5-year mortality greater than 20%). Clinical and angiographic markers of risk, including severity of CAD, LV dysfunction, and myocardial ischemia, can identify patients in various risk strata.

Downloaded from circ.ahajournals.org by on August 4, 2008

3.3. Comparison With Percutaneous Techniques

Although PTCA was initially used only for the treatment of single-vessel CAD, advances in technique, equipment, and experience have resulted in its expanded use for patients with multivessel disease. In general, PTCA is less invasive and requires a shorter hospitalization and recovery time than does bypass surgery. However, the disadvantages of PTCA as initial therapy for coronary disease include restenosis of treated lesions and, compared with CABG, a lesser ability to revascularize all lesions in patients with multivessel disease. Clinical trials comparing PTCA and CABG have further defined the relative advantages and disadvantages of these treatments.

3.3.1. Overview of Randomized Trials

Nine randomized, clinical trials comparing PTCA and CABG have been published (Table 11). Before discussing the results of these trials, it is important to consider what we can expect to learn from them. A comparative trial must be large enough to have sufficient statistical power to detect a difference in survival, the usual primary end point. If no difference is observed between CABG and PTCA, it can be concluded that the treatments are equivalent only if trials are large enough to reliably detect or exclude relative differences in mortality of around 20% and include a large number of patients in whom CABG has been shown to improve prognosis. Because 600 deaths would be needed in the "control" group to exclude a relative risk difference of 20% with 90% power, trials with 4000 moderate- to high-risk patients per treatment arm would be needed. However, if a 30% risk difference is considered the smallest clinically important difference, trials of about 2000 patients in each group are required. Unfortunately, all of these trials excluded patients in whom survival had already been shown to be better with CABG when compared with medical therapy. Second, follow-up must be long enough (generally 4 to 5 years) to detect a survival advantage with either approach. Third, to reliably compare the 2 treatments, there must be a high rate of compliance with the original treatment allocation; if a substantial proportion of patients "cross over" (30% to 40% by 5 years), the ability to detect differences in survival decreases markedly. Finally, the patients enrolled in the trial must be similar to those not enrolled to allow generalization of the findings. All of the randomized trials fall short of 1 or more of these criteria. However, the largest of the 9 randomized trials, BARI, comes closest to fulfilling these criteria and will be discussed in detail (117).

In this trial, 1829 patients with multivessel disease were randomized at 18 centers to PTCA or CABG. The primary end point was all-cause mortality at 5 years, and predefined subgroup analyses were performed for the severity of angina, the number of diseased vessels, LV function, and lesion complexity. In addition, a separate analysis of diabetic patients was added partway through the trial. Baseline characteristics of the BARI study population included a mean age of 61 years, mean LVEF of 0.57, a 41% prevalence of 3-vessel disease, and 26% women; there were no significant differences between treatment groups. Revascularization was accomplished by PTCA in a mean of 2.4 lesions per patient, with a success rate of 88% for at least 1 lesion, and by CABG with a mean of 2.8 grafts per patient (82% with an IMA). Stents were not routinely employed (117). The average postprocedure length of stay was shorter with PTCA (3 versus 7 days). The rate of in-hospital Q-wave MI was higher for CABG than for PTCA (4.6% versus 2.1%, P less than 0.05), and 6.3% of PTCA patients required urgent CABG. At a mean follow-up of 5.4 years, there was no statistically significant difference in long-term survival or freedom from MI, but patients initially randomized to PTCA had more hospitalizations and required more repeat revascularization procedures (Table 11). Thirty-one percent of patients initially assigned to PTCA underwent CABG during the trial (117). Compared with the other randomized comparisons, overall mortality in BARI was higher owing to the inclusion of older patients, more women, and more patients with multivessel disease and other comorbidities. This difference underscores the importance of comparing the methodology of these trials before discussing their conclusions.

The most important limitation of all of the randomized trials relates to the ability to generalize the conclusions. The findings are not applicable to all patients with multivessel coronary disease for 2 reasons. First, only around 5% of screened patients with multivessel disease were enrolled in the trials (118,119). In the BARI trial, more than 25 000 patients with multivessel coronary disease by diagnostic angiography were screened for eligibility. About 50% of these patients were ineligible because of left main disease, insufficient symptoms, or other reasons. One third of the remaining patients (4110) had multivessel disease suitable for both PTCA and CABG, and only half of these (7% of those screened) were enrolled in the randomized trial (120). Second, examination of the Emory Angioplasty versus Surgery Trial (EAST) registry suggests that physician judgment may be an important determinant of outcome that is eliminated by a randomized design. In this registry of 450 eligible patients who refused randomization, survival was slightly better than in the 392 randomized patients despite similar baseline features (121). This may reflect physician judgment, as CABG was utilized more often in patients with 3-vessel disease and PTCA more often in patients with 2-vessel disease (121).

The age range (mean age varied from 56 to 61 years) and sex distribution (around 20% female) were similar in most trials, although the Medicine, Angioplasty, or Surgery Study (MASS) trial had 42% women (122). All of the randomized trials excluded patients with low EFs and those for whom CABG was known to provide a survival advantage. Six trials included only patients with multivessel disease and 2, only single-vessel disease (MASS, Lausanne); the Randomized Intervention Treatment of Angina (RITA) trial included both (Table 11). Several trials were conducted in

Downloaded from circ.ahajournals.org by on August 4, 2008

Table 11. CABG vs PCI: Randomized Controlled Trials

	Trial (Ref)	Age, y (% Female)	CAD	N	Acute Outcome% Death: CABG PCI	Acute Outcome% QW-MI:CABG PCI	Acute Outcome% Hosp CABG	Late Outcome, % Death	Late Outcome, % QW-MI	Late Outcome, % Angina	RR% Total/PCI/CABG	Primary End Point	Primary End Point, %	F/U, y
PTCA Trials	BARI	61 (26%)	MV	1829	1.3	4.6	N/A	15.6¶	19.6	N/A	8/7/1	D	15.6¶	8§
	(117)				1.1	2.1	6.3	19.1¶	21.3	N/A	54/34/31		19.1¶	
	EAST	61 (26%)	MV	392	1	10.3	N/A	17	19.6	12	13/13/1	D+MI+T	27.3	8‖
	(119)				1	3.0†	10.1	21	16.6	20†	54/41/22		28.8	
	GABI	N/A (20%)	MV	359	2.5	8	N/A	6.5	9.4	26	6/5/1	A	26	1
	(776)				1.1	2.3†	8.5	2.6	4.5	29	44/27/21		29	
	Toulouse	67 (23%)	MV	152	1.3	6.6	N/A	10.5	1.3	5.3	9/9/0	A	5.2	5
	(778)				1.3	3.9	3.9	13.2	5.3	21.1†	29/15/15		21.1†	
	RITA	57 (19%)	SV+	1011	1.2	2.4	N/A	3.6	5.2	21.5	4/3/1	D+MI	8.6	2.5‡
	(126)		MV*		0.8	3.5	4.5	3.1	6.7	31.3†	31/18/19		9.8	
	ERACI	58 (13%)	MV	127	4.6	6.2	N/A	4.7	7.8	3.2	6/3/3	D+MI+A+RR	23	3
	(132)				1.5	6.3	1.5	9.5	7.8	4.8	37/14/22		53†	
	MASS	56 (42%)	SV	142	1.4	1.4	N/A	N/A	N/A	2	0/0/0	D+MI+RR	3	3
	(122)		(LAD)		1.4	0	11	N/A	N/A	18	22/29/14		24†	
	Lausanne	56 (20%)	SV	134	0	0	N/A	1.5	1.5	5	3/3/0	D+MI+RR	7.6	2‡
	(134)		(LAD)		0	0	2.9	0	2.9	6	25/12/13		36.8†	
	CABRI	60 (22%)	MV	1054	1.3	N/A	N/A	2.7	3.5	10.1	9/6/1	D	2.7	1
	(143)				1.3	N/A	N/A	3.9	4.9	13.9†	36/21/18		3.9	
STENT Trials	SoS	61 (21%)	MV	988	N/A	N/A	N/A	2	8	21	6/4/1	RR	6	1
	(139)							5†	5	34†	21†/13/9		21†	
	ERACI II	62 (21%)	MV	450	N/A	N/A	N/A	8	6	8	5/0/0	D+MI+CVA+RR	19	1.6
	(780)							3†	3[b]	15†	17†/0/5		23	
	ARTS	61 (24%)	MV	1205	N/A	N/A	N/A	3	5	10	4/3/1	D+MI+CVA+RR	12	1
	(137)							3	6	21†	21†/16/7		26†	
	AWESOME	67 (N/A)	MV	454	N/A	N/A	N/A	N/A	N/A	N/A	N/A	D	21	3
	(140)												20	
	SIMA	59 (21%)	SV	121	N/A	N/A	N/A	4	4	5	0/0/0	D+MI+RR	7	2.4
	(141)							2	5	9	24†/13/6		31†	
	LEIPZIG	62 (25%)	SV	220	N/A	N/A	N/A	2	5	21	8/8/0	D+MI+RR	15	0.5
	(781)							0	3	38†	29/25/4		31†	

CABG indicates coronary artery bypass graft; PCI, percutaneous coronary intervention; CAD, coronary artery disease; QW, Q wave; MI, myocardial infarction; Hosp CABG, required CABG after PCI and before hospital discharge; RR, repeated revascularization; F/U, follow-up; BARI, Bypass Angioplasty Revascularization Investigation; EAST, Emory Angioplasty Surgery Trial; GABI, German Angioplasty Bypass-surgery Investigation; RITA, Randomized Intervention Treatment of Angina; ERACI, Estudio Randomizado Argentino de Angioplastia vs Cirugia; MASS, Medicine, Angioplasty, or Surgery Study; CABRI, Coronary Angioplasty versus Bypass Revascularization Investigation; SoS, the Stent or Surgery Trial; ERACI II, Coronary Angioplasty with Stenting vs Coronary Artery Bypass in patients with MV disease; ARTS, Arterial Revascularization Therapies Study; AWESOME, Angina with Extremely Serious Operative Mortality Evaluation; SIMA, Stenting vs Internal Mammary Artery; LEIPZIG, Stenting vs Minimally Invasive Bypass Surgery; MV, multivessel; D, death; T, thallium defect; A, angina; SV, single vessel; and LAD, left anterior descending coronary artery.

*Included total occlusion.

†*P* is less than 0.05 comparing CABG and PCI cohorts.

‡Planned 5-year follow-up (interim results).

§Primary end point and mortality at 8 years, other end points at 5 years.

‖Primary end point and mortality at 8 years, other end points at 3 years. Statistically significant.

Downloaded from circ.ahajournals.org by on August 4, 2008

single centers, whereas RITA, the German Angioplasty Bypass-surgery Investigation (GABI), the Coronary Angioplasty versus Bypass Revascularization Investigation (CABRI), and BARI were multicenter. The CABRI and EAST trials permitted incomplete revascularization, whereas the others had a goal of complete revascularization. CABRI and RITA included vessels with total occlusion, accounting for the lower success rate of PTCA; the success rate for these vessels in RITA was only 48%. Asymptomatic patients were excluded from GABI, and the extent of coronary disease also varied widely. Three-vessel disease was present in only 12% and 18% of RITA and GABI subjects, respectively, and present in greater than 40% of BARI and Estudio Randomizado Argentino de Angioplastia vs Cirugia (ERACI) patients. The incidence of diabetes mellitus varied from 10% to 12% (Toulouse, Goy, ERACI, GABI, and CABRI) to greater than 20% (EAST and BARI).

Finally, the trials used different primary end points and follow-up periods. Neither CABG nor PTCA has been shown to reduce the risk of subsequent nonfatal MI, and therefore inclusion of such an end point would dilute relative differences and decrease the likelihood of detecting differences. End points included survival (BARI), freedom from angina (GABI and Toulouse), freedom from death and MI (RITA), and other combinations including symptoms, stress thallium defects, and repeated revascularization (Table 11). Most required Q waves and a clinical event to define an MI, but EAST included "silent" MIs as well. Follow-up ranged from 1 to 5 years, and only MASS required angiography in all patients (122). Overall, all of the trials except BARI were underpowered and lacked sufficient follow-up.

3.3.2. Results of Randomized Trials

3.3.2.1. Acute Outcome

Despite the differences in design and follow-up, the results of randomized trials comparing PTCA and CABG have been similar. Procedural complications including death (1% to 2%) and Q-wave MI (up to 10%) were low for both procedures but tended to be higher with CABG (Table 11). A statistically significant increase in MI rate was present only in GABI and EAST and in 2 meta-analyses including many of the trials (118,123). For patients initially randomized to PTCA, CABG was needed during the initial hospitalization for 6% (range 1.5% to 10%) and was performed in close to 20% by 1 year (123).

The cost and length of stay were lower for PTCA than for CABG. In BARI, the cost of PTCA was 50% of that for CABG, but over time this was nearly equal (124,125). The lengths of stay in RITA were 4 and 12 days for PTCA and CABG, respectively (126). Patients having PTCA returned to work sooner and were able to exercise more at 1 month (127). The extent of revascularization achieved with CABG was higher than with PTCA (117,119). In the EAST trial, the percentage of revascularizable segments successfully treated was 99% for CABG versus 75% for PTCA (119). When the comparison was limited to severe and physiologically important lesions, the extent of early revascularization was similar, although this analysis includes the patients who crossed over from PTCA to CABG (119,128).

3.3.2.2. Long-Term Outcome

There was no significant difference in survival in 8 of the 9 randomized trials that compared PTCA and CABG at follow-up periods ranging from 1 to 8 years (Table 11). BARI was the largest trial with the longest follow-up. The combined end point of cardiac mortality and MI was similar at 5 years with both treatments (129). An update of the BARI trial results with a mean follow-up of 7.8 years has now demonstrated a survival advantage in the overall study (84.4% with CABG versus 80.9% with PTCA, P equals 0.043), due to a marked survival benefit in the study subjects with diabetes who were treated surgically (76.4% versus 55.7% with PTCA, P equals 0.0011) (130). Longer follow-up analyses of EAST and ERACI have not demonstrated any differences in mortality (131,132).

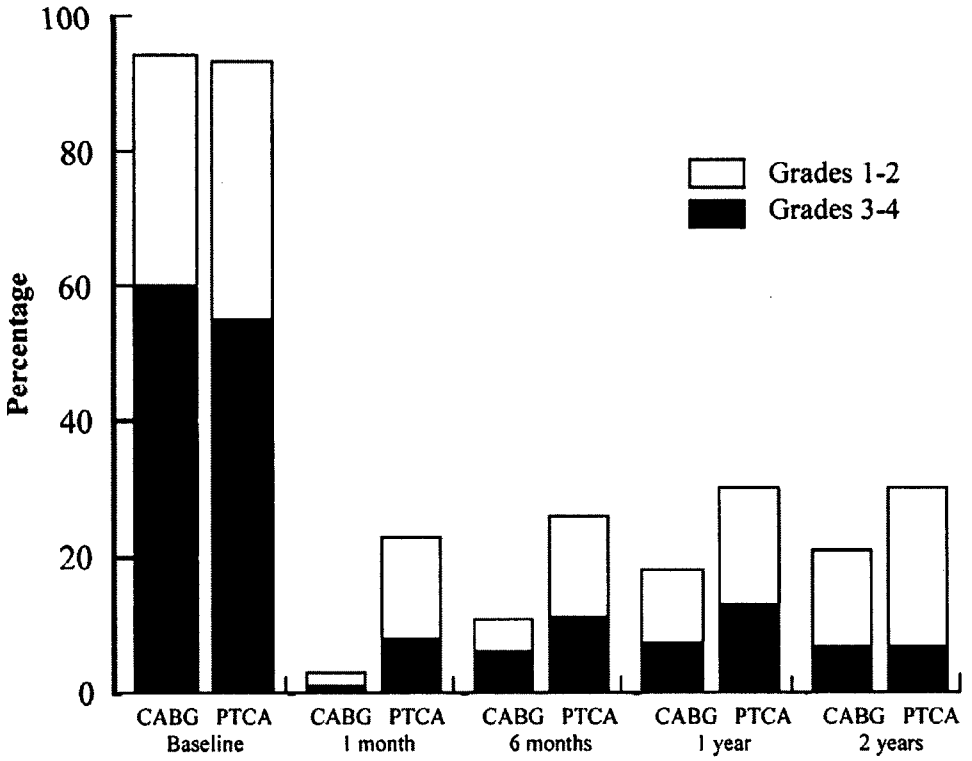
None of the trials or meta-analyses were able to demonstrate a difference in Q-wave MI or the combined end point of death and MI (Table 11) (118,123). Most trials found that CABG resulted in greater freedom from angina, and the difference from PTCA was statistically significant in EAST, Toulouse, RITA (Figure 5), and CABRI. Exercise time at 2.5 years was assessed in RITA and favored patients initially treated by PTCA (191 versus 171 minutes) (126). Large thallium defects (assessed in EAST) were slightly more common in PTCA patients at 3 years (119). The relative risk for angina with PTCA tended to be higher early but decreased with longer follow-up (123) (Figure 5).

The most striking difference between the treatments was in the need for subsequent procedures. The rate was 4- to 10-fold higher for PTCA in every trial (Table 11). Three trials (Lausanne, MASS, and ERACI) that included repeated revascularization as part of the primary, composite end point demonstrated a statistically significant reduction in events with CABG (122,133,134). Eight percent of CABG patients required additional revascularization within 5 years in BARI, compared with 54% of PTCA patients (117). Additional procedures were needed earlier in PTCA patients and included PTCA only (23.2%), CABG only (20.5%), or both (10.8%) (117).

Several studies have compared quality of life and cost with various revascularization strategies (124,127,135,136). In RITA, physical activity and employment were similar for both procedures after 3 years (127). A BARI substudy including 52% of enrollees found that functional status assessed by the Duke Activity Index improved more with CABG early on but was equivalent by 5 years (124). Emotional health and employment were also similar in this study and others (124,127,135). The early cost benefit of PTCA decreased during follow-up owing to the more frequent need for repeated procedures and hospitalization such that, over the long term, PTCA approached the cost of

Downloaded from circ.ahajournals.org by on August 4, 2008

0197
09/15/08



Prevalence of angina (Canadian Cardiovascular Society Classification) over time.

Patient numbers were:

	Time (mo)				
Group	*0*	*1*	*6*	*12*	*24*
CABG	498	482	480	401	237
PTCA	509	491	491	433	310

Figure 5. Freedom from angina in the Randomized Intervention Treatment of Angina (RITA) trial. Reprinted with permission from Elsevier Science, Inc. (The Lancet. 1993;341:573-80) (126).

CABG (123,124,135,136). There appeared to be a greater cost benefit to PTCA in patients with 2-vessel disease (124). In BARI, it was estimated that the slight survival advantage of CABG would cost $26 117/year of added life (124).

Comparison with stents

Since the previous update of these guidelines, several trials comparing stents with CABG in patients with multivessel disease have been initiated. The Arterial Revascularization Therapies Study Group (ARTS) trial enrolled 1205 patients with multivessel coronary disease in whom a cardiac surgeon and interventional cardiologist agreed that they could achieve a similar extent of revascularization. In this randomized comparison, there was no difference at 1 year in the combined rate of death, MI, and stroke between the 2 revascularization strategies (137). However, repeat revascularization rates were higher with stenting (16.8% versus 3.5% with surgery), with a net cost savings of $2973 per patient favoring the stent approach. In diabetic patients (n equals 198), the difference in repeat revascularization rates was even more disparate (22.3% with stents versus 3.1% with CABG), although overall event-free survival was similar (138) (Table 11).

Similar results were reported by the Stent or Surgery (SoS) trial investigators. The trial randomized 988 patients with multivessel disease (57% 2-vessel; 42% 3-vessel) to revascularization with PCI (78% received stents) or CABG (81% with pedicled left IMA graft). The primary end point of repeat revascularization occurred in 21% of PCI patients versus 6% of CABG patients at a median follow-up of 2 years (hazard ratio equals 3.85, P less than 0.0001). Freedom from angina was also better with surgery (79% versus 66%). Mortality was higher in the PCI group, but this was influenced by a particularly low surgical mortality and a high rate of noncardiovascular deaths in the PCI group (139).

Downloaded from circ.ahajournals.org by on August 4, 2008

In the Angina with Extremely Serious Operative Mortality Evaluation (AWESOME) study, 454 patients at 16 VA hospitals with high-risk features for adverse outcome with surgery were randomized to either CABG or PCI. High-risk characteristics included prior open-heart surgery, age greater than 70 years, ejection fraction less than 0.35, MI within 7 days, and IABP. Stents were used in 54% of PCI patients. Survival was similar (79% with CABG and 80% with PCI) at 36 months (140). Finally, in the Stenting versus Internal Mammary Artery (SIMA) trial, 121 patients with isolated proximal LAD coronary artery disease were randomly treated with stenting or CABG (using the IMA). At 2.4 years of follow-up, there were no differences in the rates of death, MI, functional class, medications, or change in quality of life. Repeat revascularization was required more often (31% versus 7%) in the stent group (141). Overall, 6 trials have now been published comparing CABG with PCI using stents in single or multivessel disease. Compared to the earlier trials with balloon angioplasty, stent usage and left IMA revascularization rates have increased. The results in terms of death, MI, and stroke are similar in the more recent trials; however, the disparity in the need for repeat revascularization, which favors surgery, has narrowed (Table 11).

3.3.2.3. Special Subsets

The BARI trial prespecified 4 subsets for analysis. The primary end point of survival did not differ in these subgroups based on severity of angina, extent of disease, LV function, and lesion complexity (117). However, 3-year cardiac mortality was higher with PTCA in several high-risk groups (in unstable angina and non–ST-elevation MI (NSTEMI), PTCA 8.8% versus CABG 4.9%; in CHF, PTCA 27.7% versus 16.4% with CABG) (129). The ERACI trial included a high proportion (83%) of patients with unstable angina, and there was no difference in survival at 1 year (133).

Data from fibrinolytic trials suggesting an adverse effect of diabetes mellitus on PTCA outcome prompted the addition of treated diabetes mellitus as a subgroup for analysis partway through the BARI trial (117,142). This subgroup of 353 patients (19% of total) was more likely to be women or members of minorities and belong to a lower socioeconomic class. They also had more severe heart disease and comorbidities, but their in-hospital complications were similar to those in patients without diabetes and were also higher for CABG than for PTCA (143).

All-cause mortality and cardiac mortality were both higher in patients with diabetes treated with PTCA (34.7% versus 19.1% and 20.6% versus 5.8%, respectively) (Figure 6) (142). This benefit of CABG was confined to patients receiving IMA grafts, which may reflect a selection bias or the low numbers of patients not receiving IMA grafts. A similar result with regard to patients with diabetes was found in a post hoc analysis of 122 patients with diabetes in CABRI (143), but no difference was found for patients with diabetes in EAST (119).

A separate meta-analysis of the randomized trials for single-vessel disease has also been performed (123). As

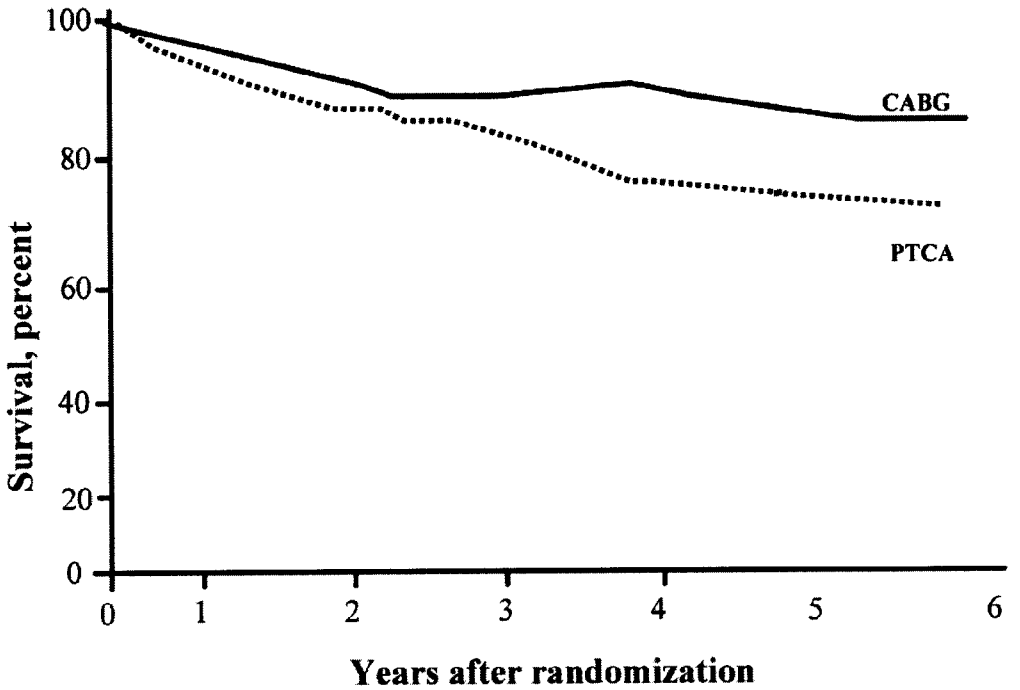


Figure 6. Improved survival with coronary artery bypass graft surgery (CABG) versus percutaneous transluminal coronary angioplasty (PTCA) in patients with diabetes mellitus. Results from the Bypass Angioplasty Revascularization Investigation (BARI) showing that patients with multivessel coronary disease who were being treated for diabetes at baseline had a significantly better survival after coronary revascularization with CABG (solid curve) than with PTCA (dashed curve) ($P = 0.003$). Modified with permission from Circulation. 1997;96:1761-9 (142).

Downloaded from circ.ahajournals.org by on August 4, 2008

expected, the overall risk for events was less than in patients with multivessel disease. Although the risk of death and MI was lower with CABG, this finding should be interpreted with caution, since no such difference was found for multivessel disease. The need for late CABG was lower in patients with single-vessel disease, and there was less difference in angina frequency (123).

3.3.2.4. Results From Nonrandomized Trials and Registries

Much of the debate relating to the finding for a survival advantage of CABG in treated patients with diabetes is based on the results of nonrandomized trials and registries. Treated patients with diabetes in the BARI registry who refused randomization and selected their form of revascularization did not fare worse with PTCA (144). In a retrospective cohort study comparing PTCA and CABG for patients with diabetes with multivessel disease and similar age, sex, EF, and severity of angina, there was also no difference in survival after 6 years (145). However, in one comparison of CABG and PTCA in a nonrandomized, observational database, patients with diabetes requiring insulin had a lower long-term survival after treatment with multivessel PTCA (146). Limitations of this conclusion include the unknown adequacy of glucose control and the absence of a survival advantage for CABG when patients in the randomized trials are pooled and in other, nonrandomized registries (147).

The majority of patients in the randomized trials had angina. A small trial that demonstrated improved outcomes with revascularization compared with medical therapy in patients with asymptomatic ischemia also examined the relative benefits of the type of revascularization (148). In this nonrandomized trial, CABG provided superior relief of exercise-induced as well as ambulatory ischemia compared with PTCA (149).

A more compelling report was published by Hannan et al (150), which described a 3-year survival analysis of the 30000 patients enrolled in the New York State PTCA registry compared with that of 30000 patients in the CABG registry from 1993 to 1995. As opposed to the randomized trials, this large experience showed a survival benefit for patients receiving CABG when proximal LAD stenosis was greater than 70%, regardless of whether 1-, 2-, or 3-vessel disease was present (Figure 7) (Table 12) (150). Patients with 3-vessel disease not involving the proximal LAD also fared better with CABG than with PTCA. Patients with 1-vessel disease without severe proximal LAD stenosis had better survival with PTCA. Several potential limitations of this experience deserve comment. Unmeasured differences in patient severity not accounted for in the risk-adjustment method could have affected the conclusions. Similarly, physicians' choice of treatment may have been based on unmeasured patient factors. Finally, coronary stents were utilized in just 11.8% of the PCI patients.

3.3.2.5. Conclusions

For patients included in the randomized trials, CABG provided better relief of angina with a lower need for subsequent procedures. Initial complications are higher with CABG, as are the cost and length of hospitalization. Patients may return to work sooner after PCI but are subsequently hospitalized more often, thus generating similar overall long-term costs. Randomized trials do not show any difference in late death or rate of MI, except in patients with treated diabetes mellitus, for whom CABG may be superior. Conversely, data from large registries, particularly those of New York State, suggest that patients with severe, proximal LAD stenosis and/or 3-vessel disease may achieve improved survival with CABG. Patients with 1-vessel disease not involving severe proximal LAD disease may do better with PCI.

Several important caveats and limitations to these conclusions must be discussed. Since completion of the trials, the influence of new technology, particularly on PCI, has been considerable. Intracoronary stents are now used in 70% or more of PCIs and have reduced the need for both urgent CABG and subsequent procedures by as much as 50% (151). Continuing advances in PCI and stent designs, the use of brachytherapy (local radiation), and drug-eluting stents have further reduced the need for repeat procedures. Medical management of atherosclerosis, both before and after revascularization, has continued to evolve, with greater use of beta-blockers and inhibitors of the renin-angiotensin-aldosterone system after MI and the introduction of statins and other lipid-lowering agents. The ability to select patients for revascularization procedures by using a methodology that can separate scarred from viable myocardial segments will undoubtedly alter the outcomes from these procedures. Other changes in patient management that may influence these conclusions include the use of platelet glycoprotein IIb/IIIa inhibitors and/or direct thrombin inhibitors during percutaneous interventions, the more frequent use of IMA grafts, and the emergence of less-invasive surgical approaches.

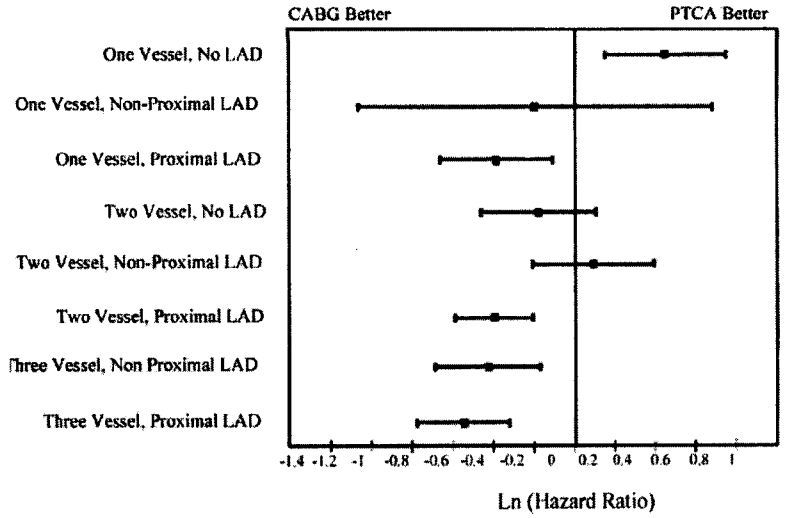
It is likely that during the progress of their disease, many patients will benefit from a combined application of percutaneous and surgical techniques, taking advantage of the low morbidity of percutaneous methods and the established long-term benefit of surgical revascularization with arterial conduits.

4. MANAGEMENT STRATEGIES

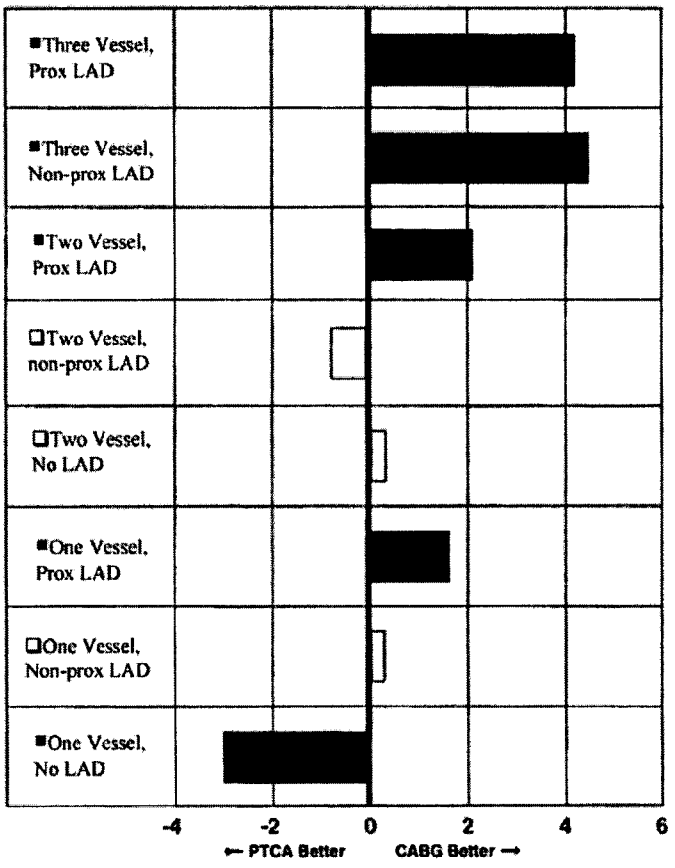
4.1. Reduction of Perioperative Mortality and Morbidity

One of every $10 spent on surgical treatment of coronary disease is related to a complication, a sum of 1 billion dollars annually in the United States (152). Careful evaluation of patient characteristics should lead to proper risk stratification and the identification of areas for risk neutralization. Some risk factors that at first appear immutable may in fact be markers or surrogates for conditions that can be modified. The incremental incorporation of new advances can lead to coronary bypass results that are superior to those of the past. The following discussion formalizes this mind-set of risk

Downloaded from circ.ahajournals.org by on August 4, 2008



Panel A



Panel B

Figure 7. Panel A: 95% Confidence interval for ln (adjusted hazard ratio) of PTCA patient death: CABG patient death within a 3-year period (excluding patients with myocardial infarction less than 24 hours before the procedure). For the sample size within each anatomic cohort, see Table 11. **Panel B:** Differences in adjusted percent survival at 3 years: percent CABG survival minus percent PTCA survival. Solid bars show statistically significant differences. Prox indicates proximal; LAD, left anterior descending coronary artery; PTCA, percutaneous coronary angioplasty; CABG, coronary artery bypass graft. Reprinted with permission from Elsevier Science, Inc. (Hannan et al. J Am Coll Cardiol. 1999;33:63-72) (150).

Downloaded from circ.ahajournals.org by on August 4, 2008

Table 12. Three-Year Survival by Treatment in Each Anatomic Subgroup

Coronary Anatomy Group		Patients, n	Survival		*P*
			Observed, %	Adjusted, %	
1-Vessel, no LAD	CABG	507	89.2	92.4	0.003
	PTCA	11,233	95.4	95.3	
1-Vessel, nonproximal LAD	CABG	153	95.8	96.0	0.857
	PTCA	4130	95.7	95.7	
1-Vessel, proximal LAD	CABG	1917	95.8	96.6	0.010
	PTCA	5868	95.5	95.2	
2-Vessel, no LAD	CABG	1120	91.0	93.0	0.664
	PTCA	2729	93.4	92.6	
2-Vessel, nonproximal LAD	CABG	850	91.3	92.3	0.438
	PTCA	2300	93.3	93.1	
2-Vessel, proximal LAD	CABG	7242	93.5	93.8	<0.001
	PTCA	2376	92.8	91.7	
3-Vessel, nonproximal LAD	CABG	1984	90.1	90.3	0.002
	PTCA	660	86.7	86.0	
3-Vessel, proximal LAD	CABG	15,873	90.1	90.3	<0.001
	PTCA	634	88.2	86.1	

LAD indicates left anterior descending coronary artery; CABG, coronary artery bypass graft; and PTCA, percutaneous transluminal coronary angioplasty.

Comparative observed and adjusted 3-year survival of patients treated with PTCA or CABG in various anatomic subgroups.
Reprinted with permission from Elsevier Science, Inc. (Hannan et al. J Am Coll Cardiol. 1999;33:63-72) (150).

neutralization to maximize the margin of safety for coronary bypass.

4.1.1. Reducing the Risk of Brain Dysfunction After CABG

One of the most devastating complications of coronary bypass surgery is perioperative stroke. In addition to patient morbidity and mortality, there are indirect costs through lost productivity; the direct economic cost of a stroke ranges from $90 000 to $228 000 over a patient's life span (153-155). Postoperative stroke is the second most common cause of operative mortality (after low cardiac output state) (156). The incidence of stroke after coronary operation is related to increased age (53,157-159) (Figure 8A), which parallels the accelerated involvement of the aorta and great vessels with atherosclerotic plaque (156) (Figure 8B). Age per se is less important than atherosclerosis, which plays a role in at least two thirds of adverse events after coronary bypass.

As discussed in Sections 4.1.1.1 and 4.1.1.2, post-CABG neurological events can be classified into type 1 injuries, which are predominantly focal stroke, transient ischemic attack, and fatal cerebral injuries, and type 2 events, which reflect a more global/diffuse injury, with disorientation or immediate (and usually reversible) intellectual decline.

4.1.1.1. Type 1 Neurological Injury

Type 1 injury occurs in 3.1% of patients, is responsible for a 21% post–coronary bypass mortality rate, 11 days in the intensive care unit, 25 days in hospital, at least an additional $10 266 in hospital boarding charges, and a cost of 5 to 10 times the in-hospital charge for rehabilitative and outpatient support (51,148).

4.1.1.1.1. Aortic Atherosclerosis and Macroembolic Stroke. The surgeon's identification of an atherosclerotic ascending aorta is the single most significant marker for an adverse cerebral outcome after coronary bypass operations (OR 4.5, *P* less than 0.05) (48), reflecting the role of aortic atheroembolism as the cause of ischemic stroke (161-165). Since the early days of the operation,

Downloaded from circ.ahajournals.org by on August 4, 2008

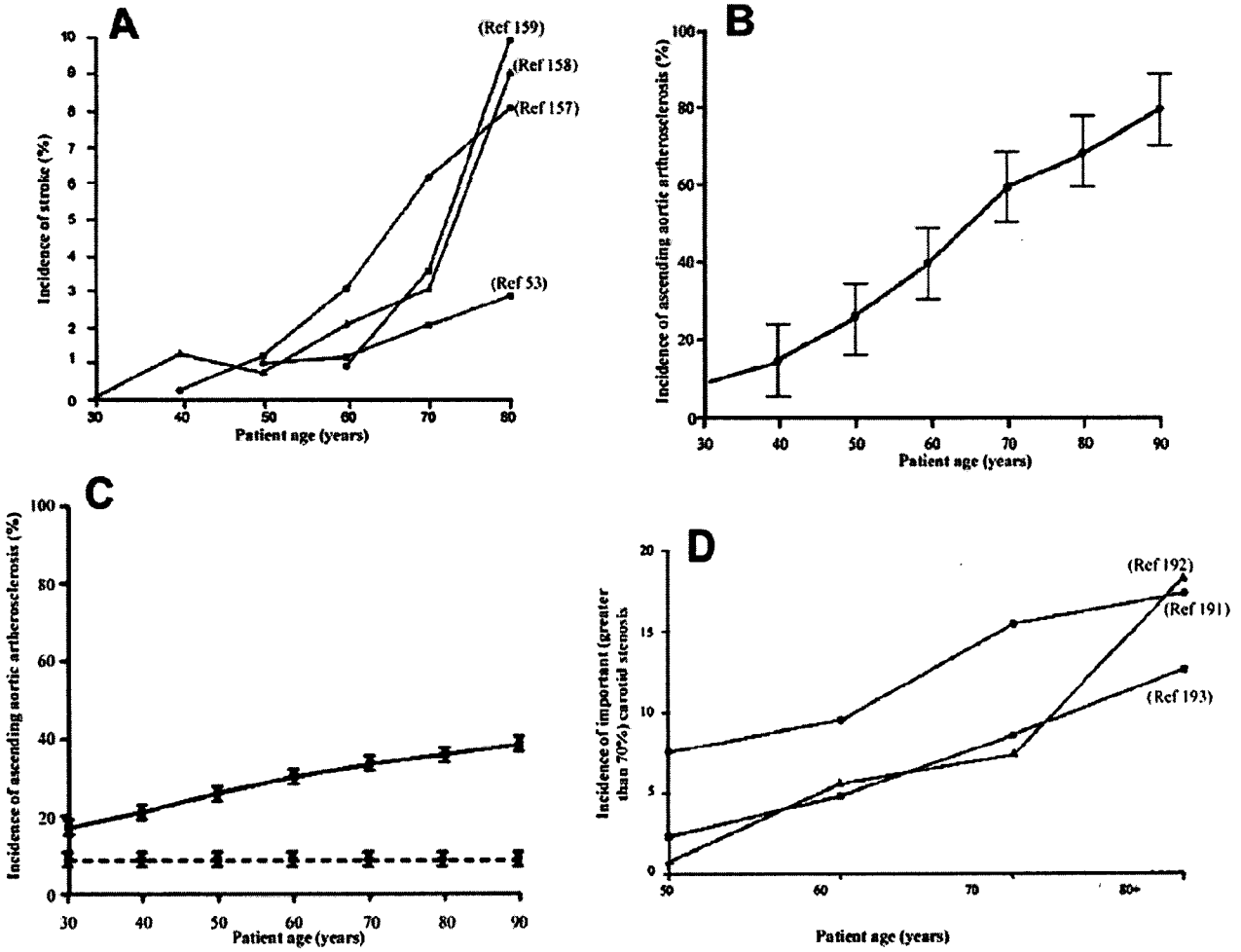


Figure 8. A: Incidence of permanent, focal, central nervous system injury after coronary bypass is strongly correlated with increasing age. **B:** Ascending aortic atherosclerosis is a powerful marker of increased risk for perioperative stroke in the coronary bypass population and increases directly with age. **C:** Strong correlation between perioperative atheroembolism and the degree of atherosclerotic involvement of the ascending aorta. The solid line represents severe atherosclerotic involvement the interrupted line, lesser involvement. **D:** Extracranial cerebrovascular disease is a significant contributor to stroke after coronary bypass and is strongly correlated with age, suggesting a population for aggressive preoperative screening. Panels B and C are reprinted with permission from Elsevier Science, Inc. (Blauth et al. J Thorac Cardiovasc Surg.1992;103:1104-11) (169).

atheroemboli and calcific debris have been detected in the cerebral circulation in patients dying after coronary bypass surgery (166). Since the average age of patients having coronary bypass is increasing, perioperative atheroembolism from aortic arch plaque is also increasing and is likely responsible for 1 in 3 strokes after coronary bypass (167). This risk is particularly increased in patients beyond 75 to 80 years old (49) (Figures 8B and 8C). Most perioperative cerebral atheroembolization likely arises intraoperatively from manipulation of the ascending or transverse aorta during cannulation, clamping, or placement of proximal anastomoses or from the shear effect of the flow from the aortic cannula (168,169,170). Preoperative, noninvasive testing for detection of the high-risk patient has limited sensitivity. Computed tomography identifies most severely involved aortas but underestimates mild to moderate involvement compared with echocardiography (163,171). TEE is useful for examination of the aorta, and although evaluation of the ascending aorta was somewhat limited by the intervening trachea (159) with earlier monoplane techniques, multiplane TEE technology allows good visualization of the aorta. However, the intraoperative assessment of ascending aortic atheroma by epiaortic imaging (in which the imaging probe is placed directly on the aorta) is superior to both TEE and direct palpation (160).

TEE identification of mobile arch atheroma in patients undergoing CABG was associated with a 33% stroke rate versus 2.7% in patients with nonmobile plaque (P equals

Downloaded from circ.ahajournals.org by on August 4, 2008

0.01) (172). Intraoperative palpation is notorious for its underestimation of the high-risk aorta (160). Palpation detected only one third of atherosclerotic lesions identified by epivascular echocardiography (171). The aortic pattern with the highest risk is the protruding or mobile aortic arch plaque, and this eludes intraoperative palpation in 80% of cases (173). Intraoperative epivascular ultrasound represents an important advance and is now used in many centers for intraoperative diagnosis and stroke risk reduction (171,174). The technique is highly sensitive and specific for identification of the high-risk aorta.

An aggressive approach to managing patients with severely atherosclerotic ascending aortas identified by intraoperative epiaortic ultrasound imaging appears to reduce the risk of postoperative stroke (53,175). Twelve hundred of 1334 consecutive open heart surgery patients (88% with coronary disease) underwent screening with intraoperative epivascular ultrasound. These findings led to a change in intraoperative technique in 19.3% of patients. In patients with 3 mm or less of aortic wall thickening, standard techniques were used. When the aorta demonstrated a greater than 3-mm thickening, the cannulation, clamp, or proximal sites were changed, or a no-clamp fibrillatory arrest strategy (176) was used. For high-risk patients with multiple or circumferentially involved areas or those with extensive mid-ascending aortic involvement, the ascending aorta was replaced under hypothermic circulatory arrest. The 27 high-risk patients had no strokes and a mortality rate of just 3%. Among patients with a moderately to severely involved aorta treated with the less-radical approaches, the incidence of stroke was 6.3%. When epivascular ultrasound showed no or mild atherosclerotic disease, the stroke incidence was low, 1.1% (53,176).

In a smaller study of epivascular echo-directed management, 195 consecutive coronary patients undergoing CABG were compared with a control group of the previous consecutive 165 patients for whom only the surgeon's palpation was used to evaluate the aorta. Ten percent of the epivascular group had the intraoperative technique modified versus 3% of the control group. The most common change in operative approach was use of a no-clamp, cold fibrillatory arrest technique. Three percent of the control group had strokes compared with none of the epivascular echo-managed group (P less than 0.02) (51).

With a no-clamp technique, the surgeon may completely revascularize the heart with standard in situ IMA and aortically based SVGs, typically constructing a single, proximal anastomosis during a brief period of total circulatory arrest on a safe area of the aorta. Alternatively, the surgeon may use an all-in situ arterial revascularization approach, or SVGs may be grafted onto the in situ IMA by using an end vein to side artery anastomosis (167,177).

Preoperative risk assessment may identify a small population of patients with such extensive aortic atherosclerosis and poor outlook that the benefit from coronary bypass would appear to be very small. This population is difficult to define, but a starting point may include patients with aortic plaques 4 mm or more or with certain morphologies that are associated with only a 20% chance at 4 years of freedom from peripheral embolism, MI, recurrent stroke, or death (165). This risk, along with an extremely high perioperative risk, would argue for nonoperative treatment. However, if the cardiac risk of medical therapy is high (5-year mortality greater than 20%), alternative forms of revascularization should be considered. These include off-pump bypass surgery; minimally invasive direct CABG (MID-CAB) without CPB, with or without concomitant PCI; and exclusive percutaneous revascularization. These techniques may provide the benefit of revascularization in such high-risk patients while minimizing the perioperative risk of stroke. There are few randomized trials that examine the specific impact of CPB on stroke incidence, but 1 randomized study showed a comparable stroke rate in patients without CPB (off-pump) versus those on-pump (56). These patients were not stratified according to high-risk aortic disease, so the relative value of off-pump surgery in such patients remains unknown.

4.1.1.1.2. Atrial Fibrillation and Postoperative Stroke.

Class IIa

In post-CABG atrial fibrillation that is recurrent or persists more than 24 hours, warfarin anticoagulation for 4 weeks is probably indicated. *(Level of Evidence: C)*

Chronic atrial fibrillation is a hazard for perioperative stroke as a result of cardiac thromboembolism. Intraoperative surgical manipulation or spontaneous resumption of sinus rhythm early in the postoperative period may be associated with embolism of a left atrial clot. One potential approach to reduce atrial fibrillation-associated embolism is the performance of preoperative TEE. Absence of a left atrial clot would suggest that the operation may proceed with acceptable risk. If a left atrial clot is identified, 3 to 4 weeks of anticoagulation, restudy, and then subsequent operation is a rational approach if the clinical situation allows this. Unfortunately, few clinical trial data are available to assist physicians in the best management for this situation.

New-onset postoperative atrial fibrillation occurs in 30% of patients undergoing CABG (178-180), with the peak incidence on the second to third postoperative day (181). It is associated with a 2- to 3-fold increase in postoperative risk for stroke (182,183). Patients at risk for postoperative atrial fibrillation have been identified and include those with COPD, proximal right CAD, prolonged cross-clamp time, atrial ischemia, advanced age, and withdrawal of beta-blockers. Identifying at-risk patients and directing treatment to these patients (see Section 4.1.5) appears to be effective in reducing the incidence of post-CABG atrial fibrillation and thus the morbid complication of postoperative strokes associated with this arrhythmia. Minimally invasive and off-

Downloaded from circ.ahajournals.org by on August 4, 2008

pump beating-heart procedures may also reduce the incidence of postoperative atrial fibrillation (184,185).

The role of anticoagulation in patients who develop post-CABG atrial fibrillation is unclear. In general, an aggressive anticoagulation and cardioversion philosophy may reduce the neurological complications associated with this arrhythmia. However, the risks of pericardial bleeding and tamponade have to be weighed with early use of full anticoagulation. Early (within 24 hours of onset of atrial fibrillation) attempts at cardioversion can probably be safely performed without anticoagulation. However, if the arrhythmia persists beyond this time, it may be advisable to use intravenous heparin while cardioversion is attempted. In certain patients, TEE can be used to exclude left atrial appendage thrombus and help to direct cardioversion. In such patients, it is generally recommended that anticoagulation be used after the cardioversion (186). If the atrial fibrillation persists, anticoagulation with warfarin on an outpatient basis is probably indicated when the benefit of anticoagulation in selected patients (186a-c) exceeds the risk of bleeding in the postoperative interval in the judgment of the surgical team. Further attempts at cardioversion are determined by the individual patient profile (187).

4.1.1.1.3. Recent Anterior MI, LV Mural Thrombus, and Stroke Risk.

Class IIa

Long-term (3 to 6 months) anticoagulation is probably indicated for the patient with recent anteroapical infarct and persistent wall-motion abnormality after CABG. *(Level of Evidence: C)*

Class IIb

In patients having a recent anterior MI, preoperative screening with echocardiography may be considered to detect LV thrombus, because the technical approach and timing of surgery may be altered. *(Level of Evidence: C)*

The patient with a recent anterior MI and residual wall-motion abnormality is at increased risk for development of an LV mural thrombus and its potential for embolization. Keren et al (188) identified LV thrombus in 38 of 124 anterior-infarct patients (31%) and in none of 74 patients with inferior infarcts (*P* less than 0.001). Early fibrinolytic therapy was not uniformly protective against LV thrombus, and 30% occurred after discharge. Such patients are at risk for systemic embolization of the LV clot, and the risk is highest in the first few weeks after the acute infarct. Preoperative screening with echocardiography may demonstrate the clot and alter the technical approach and perhaps the timing of surgery. Also, long-term (3 to 6 months) anticoagulation is probably recommended for the patient with persistent anterior wall-motion abnormalities after coronary bypass. LV thrombus may recur in patients receiving short-term (2 months or less) anticoagulation. Apical akinesis at 10 days after infarction was a strong predictor for subsequent thrombus formation, which conferred an increased risk for subsequent stroke (189).

4.1.1.1.4. Recent Antecedent Cerebrovascular Accident.

A recent, preoperative cerebrovascular accident presents another situation in which delaying the operation may reduce the perioperative neurological risk. Evidence of a hemorrhagic component to the cerebrovascular accident, based on the results of a computed tomography scan, identifies those patients at particular risk for extension of the neurological damage due to heparinization and CPB (189). It is generally believed that a delay of 4 weeks or more is prudent if coronary anatomy and symptoms permit.

4.1.1.1.5. CPB Time and Neurological Risk.

Increased time on CPB is closely correlated with adverse neurological outcome, emphasizing the need for an organized, expeditious operation. On average, patients without postoperative neurological events have shorter pump times than those who develop postoperative stroke and/or type 2 deficits (190).

4.1.1.1.6. Carotid Disease and Neurological Risk Reduction.

Class IIa

1. **Carotid endarterectomy is probably recommended before CABG or concomitant to CABG in patients with a symptomatic carotid stenosis or in asymptomatic patients with unilateral or bilateral internal carotid stenosis of 80% or more. *(Level of Evidence: C)***
2. **Carotid screening is probably indicated in the following subsets: age greater than 65 years, left main coronary stenosis, peripheral vascular disease, history of smoking, history of transient ischemic attack or stroke, or carotid bruit on examination. *(Level of Evidence: C)***

Extracranial carotid disease is significantly associated with a type 1 adverse neurological outcome (*P* equals 0.001) (48). Hemodynamically significant carotid stenoses are associated with as many as 30% of early postoperative coronary bypass strokes (158). Strokes caused by carotid disease are particularly devastating, since they often occur on the second to ninth postoperative day in the midst of an apparently smooth recovery (159). The trend for coronary surgery to be performed in an increasingly elderly population underscores the importance of the issue (Figure 8D) (169,191-193). The prevalence of significant carotid disease in the current cardiac surgery population reflects the diffuse nature of the atherosclerotic process: 17% to 22% of patients have 50% carotid stenosis, and 6% to 12% have 80% carotid stenosis (191,194). Perioperative stroke risk is 2% when carotid stenoses are less than 50%, 10% when stenoses are 50% to 80%, and 11% to 18.8% in patients with stenoses greater

Downloaded from circ.ahajournals.org by on August 4, 2008

than 80% (53,195). Although the patient with untreated, bilateral, high-grade stenoses or an occluded carotid artery and contralateral high-grade stenosis is rare, such patients have a 20% chance of stroke (196,197).

Conversely, the leading cause of short- and long-term risk for patients having surgical treatment of carotid disease is the associated coronary disease (198-201). CABG is the most effective treatment for many of these patients. Provided that the surgical team has acceptable results with endarterectomy, prophylactic carotid endarterectomy is superior to conservative therapy for prevention of stroke in symptomatic or asymptomatic patients with high-grade carotid stenoses (202-204).

With proper teamwork, carotid endarterectomy for high-grade stenosis preceding or coincident with a coronary operation can be associated with a low risk for short- and long-term adverse neurological sequelae (114,196,198,205) (Figure 9). Carotid endarterectomy done before or concomitant with coronary bypass carries a low mortality (3.5%), reduces early postoperative stroke risk to less than 4%, and confers a 10-year rate of freedom from stroke of 88% to 96% (196,205,206). Special interest in this problem among caregivers and careful collaboration between the carotid and coronary surgical teams are keys to success. Stroke and mortality rates after carotid endarterectomy also are inversely related to institutional volume (207,208).

The absence of symptoms referable to carotid disease is not reassuring because a carotid stenosis of 75% in an *asymptomatic* patient is an independent predictor of stroke risk immediately after CABG (OR of 9.87, *P* less than 0.005) (158,159). The presence or absence of a cervical bruit is poorly predictive of a high-grade stenosis even in the setting of known symptomatic carotid disease (sensitivity 63%, specificity 61%) (209).

A prospective examination of preoperative carotid duplex scans in 1087 open-heart surgical patients aged 65 or older defined the markers associated with important (80%) carotid stenosis: female sex, PVD, previous transient ischemic attack or stroke, smoking history, or left main disease (*P* less than 0.05) (191). If all patients with at least 1 of these risk factors were screened, 95% of those with an 80% stenosis would be detected and 91% of those with a 50% stenosis would be detected. Unfortunately, this would lead to screening in 85% of patients aged 65 years or older. This example illustrates the correlation of carotid stenosis with age and suggests that the lower limit of age at which carotid screening will be cost-effective is not yet known. For safety and simplicity, many centers screen all of those aged 65 or older. The strong association between left main disease and carotid stenosis argues that left main patients should be screened at any age. Similarly, those with a previous transient ischemic attack or stroke should receive carotid screening independent of age. Preoperative CNS symptoms suggestive of vertebrobasilar artery insufficiency should lead to evaluation by magnetic resonance angiography to allow informed consideration of management options.

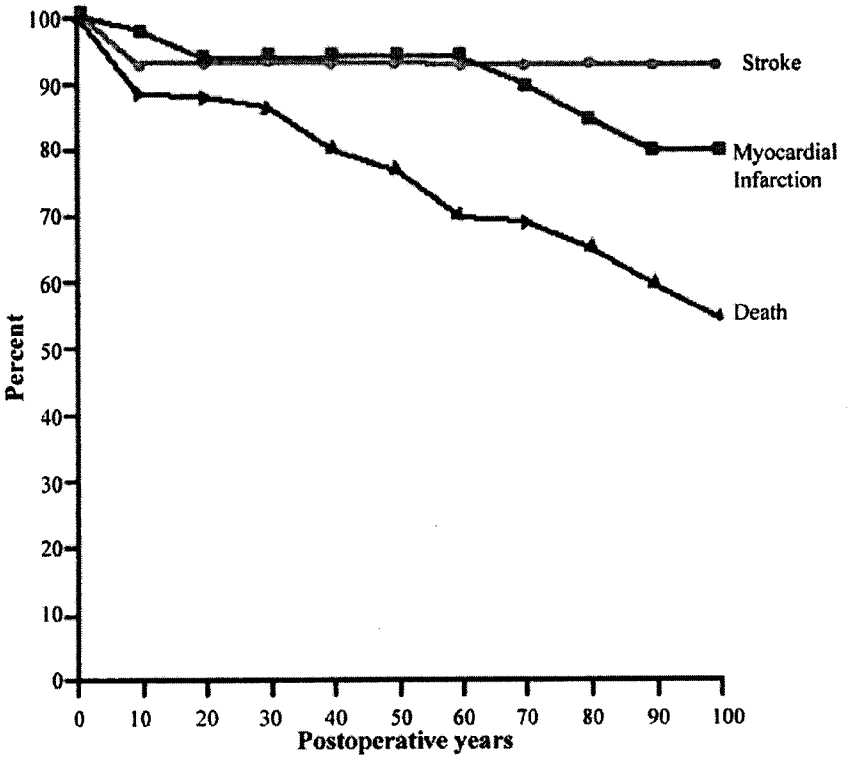


Figure 9. Contemporaneous surgical treatment of carotid and coronary disease is associated with an excellent long-term outcome. The gap shows freedom from stroke, myocardial infraction, and death over time. Reprinted with permission from Akins et al. Ann Thorac Surg. 1995;60:311-7) (205).

Downloaded from circ.ahajournals.org by on August 4, 2008

When surgical treatment of concurrent carotid and coronary disease is planned, the procedures may be done in either a combined (same operative setting, carotid to precede coronary revascularization) or *staged* fashion. The *staged* approach is most commonly used, particularly in patients with noncritical coronary anatomy. Postoperative care is rendered in a telemetry setting, with aggressive monitoring and treatment to prevent postoperative myocardial ischemia. CABG follows in 1 to 5 days with the use of standard techniques. The superiority of the combined versus staged approach has not been established by prospective trials. Thus, current tactics are best left to local team policies and preferences based on careful examination of team outcomes. An individualized, patient-specific, *selective* approach with the decision based on symptoms and the relative severity of extracranial cerebrovascular disease and coronary disease appears prudent and is used in many institutions. The results of these approaches in a collation (198) of 7 published series, each with 100 patients, published from the mid-1980s to the mid-1990s had an overall mortality rate of 4%, with permanent neurological deficit in 3.4% of patients.

Some observational series have suggested that *combined* carotid/coronary operations carry a higher risk for in-hospital stroke and mortality compared with patients in the same institution having a *staged* procedure (210). These studies may be confounded by selection bias toward recommending *combined* operations in patients with more advanced carotid and coronary disease. Contrariwise, a recent, single-center series in which a *combined operation for all patients* with concurrent carotid and coronary disease was used suggested this approach to be safe and to have low overall resource requirements (205). However, another multicenter study suggested a considerably higher risk (191a). Thus, some uncertainty remains, underscoring the need for prospective appropriately-controlled, randomized study of this method (191b,191c).

Stroke risk appears to be increased when the so-called *reverse-staged* procedure is used. In this strategy, the coronary bypass precedes the carotid endarterectomy by 1 day during the same hospitalization. A prospective, randomized trial that evaluated this approach demonstrated an increased risk of stroke (14% versus 2.8%, *P* less than 0.05) when carotid operation followed rather than preceded (2.8%, *P* less than 0.05) CABG, whereas mortality rates were similar (211). It is generally accepted that cerebral revascularization should precede coronary revascularization when significant carotid disease is known, except in the uncommon situation of the true emergency CABG patient, in whom carotid endarterectomy should then closely follow the heart operation.

Most workers in the field have focused on in-hospital neurological outcomes for treatment of combined carotid and coronary disease. Multicenter trials have shown an advantage of surgical over medical management for significant carotid stenosis in either symptomatic or asymptomatic patients (202,212-214). These data argue for an aggressive surgical approach in this population and demand a longer-range vision. The long-term outlook for combined treatment of carotid and coronary disease is shown in Figure 9. The above-suggested strategy for carotid disease management in the setting of CABG is in concordance with the *Guidelines for Carotid Endarterectomy: A Multidisciplinary Consensus Statement From the Ad Hoc Committee, American Heart Association [Special Report]* (215). The success of this long-term strategy is predicated on assembling a team that can achieve excellent near-term carotid and coronary surgical results (207,208,215-217).

Summary

Epivascular echocardiographic detection of ascending or transverse aortic atherosclerosis and modification of operative technique hold great promise for significant stroke risk

Table 13. Proven Management Strategies to Reduce Perioperative and Late Morbidity and Mortality

Timing	Class Indication	Intervention	Comments
Preoperative			
Carotid screening	IIa	Carotid duplex ultrasound in defined population	Carotid endarterectomy if stenosis greater than or equal to 80%
Perioperative			
Antimicrobials	I	Prophylactic antimicrobials	See Table 14
Antiarrhythmics	I	Beta-blockers to prevent postoperative atrial fibrillation	Propafenone or amiodarone are alternatives if contraindication to beta-blocker (see Table 15)
Postoperative			
Antiplatelet agents	I	Aspirin to prevent early vein-graft attrition	Ticlopidine or clopidogrel are alternatives if contraindications to aspirin
Lipid-lowering therapy	I	Cholesterol-lowering agent plus low-fat diet if low-density lipoprotein cholesterol greater than 100 mg/dL	3-Hydroxy-3-methyglutaryl/ coenzyme A reductase inhibitors preferred if elevated low-density lipoprotein is major aberration
Smoking cessation	I	Smoking cessation education, and offer counseling and pharmacotherapies	

Downloaded from circ.ahajournals.org by on August 4, 2008

0207
09/15/08

reduction. In the current era, important concurrent carotid and coronary disease should be suspected, sought by screening, and, when found, managed surgically (Table 13). This strategy neutralizes the short-term risk of treatment of either disease alone and enhances long-term quality and length of life for the patient with generalized atherosclerosis.

4.1.1.2. Type 2 Neurological Injury

Type 2 neurological complications have been identified in a percentage of patients after CABG and are associated with increases in postoperative time in the ICU, length of stay, hospital costs, and the need for postdischarge transfer to rehabilitation or extended-care facilities (48,218). Newman identified abnormal neurocognitive function in 53% of CPB-CABG patients at the time of hospital discharge. Six months after surgery, abnormalities could be identified in 24% of patients, which suggests some reversibility of the injury in some patients. However, they were able to measure cognitive decline in 42% of patients at 5 years. The strongest predictor of late decline was the presence of an abnormality early after CABG (218).

Abnormal neurocognitive function is frequently present preoperatively in the CABG population (219). There is a further decline in neurocognitive function after any major operation in this population, but this decline is likely worse and more persistent after operations employing CPB (220).

4.1.1.2.1. Reducing the Risk of Microembolization. Microembolization is a major contributor to postoperative cerebral dysfunction after CABG (221,222). Transcranial Doppler examination of the middle cerebral artery of patients on extracorporeal circulation suggests that most emboli occur during surgical manipulation (clamping, cannulation) of the ascending aorta (221,223,224). Many of these emboli appear to be gaseous, either derived from the oxygenator or entrained directly from the ambient atmosphere. Postmortem examination of the brains of patients dying soon after CPB has shown diffuse, small, capillary-arteriolar dilatations (225). These vacuolated vascular abnormalities have also been seen after catheter manipulation of the ascending aorta, suggesting an atheroembolic etiology. Fat droplets in shed mediastinal blood, which can be returned to the pump circuit via cardiotomy suction, may contribute (226). Small gaseous emboli could also be responsible for the findings. Neuroanatomists have postulated that these could impair circulation and lead to the neurocognitive decline seen after CPB.

The number of microemboli delivered during CPB is correlated with the postoperative neurocognitive decline seen immediately and 8 weeks after CPB (221). The use of a 40-micron arterial-line filter in the heart-lung machine circuit appears to be protective. Type 2 neurological outcomes may be further reduced by routine use of the membrane oxygenator rather than the less-expensive bubble oxygenator, which is still used selectively in the United States (190,227,228). The return of shed mediastinal blood to the CPB circuit via the cardiotomy suction system may increase the microembolic load to the brain. Some centers avoid cardiotomy suction and simply discard shed blood. Alternatively, shed blood may be scavenged and red blood cells returned after washing and centrifugation via cell-saving devices (226).

Some have believed that off-pump bypass surgery may reduce the incidence of type 2 neurological injury because ascending aortic cannulation and cross-clamping are avoided (229). Reports have demonstrated mixed results (54,56). In patients with significant ascending aortic atheromatous disease, it would seem prudent to consider an off-pump and "no touch" aortic technique. Inflow to graft conduits can be achieved via in situ left or right IMAs, the right gastroepiploic artery, or innominate and subclavian arteries.

4.1.1.2.2. Cerebral Hypoperfusion and Neurological Outcome. Intraoperative electroencephalographic monitoring can detect electrical patterns suggestive of cerebral hypoperfusion and allow real-time intraoperative correction. Decreases from 29% to 44% to 4% to 5% in postoperative neurocognitive and neuropsychological dysfunction (type 2) have been demonstrated by intraoperative electroencephalographic monitoring (230,231). However, the level of training necessary for interpretation of the electroencephalogram and the poor suitability of current technology for the operating room currently preclude its general clinical use for detection of hypoperfusion. Also, the electrical changes associated with microembolization and macroembolization are at the limits of resolution. The limitations cited reinforce the importance of strategies to prevent embolization.

Cerebral blood flow during CPB is kept relatively constant over a wide range of systemic arterial pressures with the alpha-stat extracorporeal circulation acid-base management technique. The incidence of persistent, postoperative neurocognitive deficits at 2 months with the use of this technique is significantly less compared with the alternative (pH-stat) technique (27% of patients versus 44%, P equals 0.047) (232).

4.1.1.2.3. Potentiators of Adverse Neurological Outcome. If neuroprotective mechanisms fail, there are strategies to minimize damage to the marginally perfused cerebral tissue, which has the potential for recovery. Cerebral hyperthermia potentiates the damage of an acute neurological injury. In the evolution of warm-heart surgery, some centers used techniques that had the potential for intraoperative cerebral hyperthermia. Techniques that have the patient "drift" on CPB toward ambient temperatures (34°C to 35°C or lower) rather than immediate warming (to maintain strict normothermia) allow an improved margin of neurological safety (233-236). During rewarming, arterial return blood temperature should be below 38°C. Hyperglycemia may also amplify the impairment caused by

Downloaded from circ.ahajournals.org by on August 4, 2008

an acute neurological event, emphasizing the importance of meticulous perioperative glucose monitoring and control (236).

Cerebral edema that may be present in patients immediately after extracorporeal circulation (237) may also potentiate CNS damage. Efforts to reduce the potential for brain swelling include maintenance of an unobstructed pathway for venous drainage to the CPB reservoir while on the pump. Anti-inflammatory strategies for CPB may reduce interstitial edema and are discussed subsequently, but pulsatile perfusion does not appear to be protective (238-240).

4.1.2. Reducing the Risk of Perioperative Myocardial Dysfunction

Most modern myocardial protection techniques allow the patient undergoing CABG to leave the operating room without a significant perioperative decrement in myocardial performance. Ideally, the surgeon is familiar with the broad range of myocardial protection principles that allow the adaptation of technique to accommodate varying patient presentations (241,242). There is no substitute for a well-orchestrated, technically sound, expeditious operation to minimize risk.

4.1.2.1. Myocardial Protection for the Patient With Satisfactory Preoperative Cardiac Function

The wide latitude of techniques associated with excellent results for the majority of patients undergoing CABG is testimony to the fact that there is no "ideal" or universally applicable myocardial protection technique (243). The greater the myocardial functional reserve in the patient population studied, the more difficult it is to demonstrate differences in myoprotective techniques. A variety of studies, including prospective trials, confirm the safety of many variations of cardioplegic arrest, which is the most widely used method for intraoperative myocardial protection. A single-center trial of cold crystalloid versus warm blood cardioplegia in 1001 patients undergoing elective CABG demonstrated a low perioperative MI rate (1.4% warm versus 0.8% cold, *P* not significant [NS]), IABP use (warm 1.4% versus cold, 2.0%, NS), and mortality (1.0% warm versus 1.6% cold, NS) with either technique (241). Advances in the understanding of myocardial and endothelial metabolism, temperature management, chemical/electrolyte composition, sanguineous or asanguineous delivery media, substrate enhancement, control of conditions of reperfusion, and delivery route have all led to important incremental advances in patient outcome (244-247). Certain techniques, however, offer a wider margin of safety for special patient subsets.

4.1.2.2. Myocardial Protection for Acutely Depressed Cardiac Function

Class I

Blood cardioplegia should be considered in patients undergoing cardiopulmonary bypass accompanying urgent/emergency CABG for acute MI or unstable angina. ***(Level of Evidence: B)***

In contrast to the patient with normal myocardial function, it is easier to demonstrate benefit from specialized protocols (248,249) in the patient with an acutely injured ventricle. One multicenter study of emergency CABG for patients with acute coronary occlusion (some with cardiogenic shock) demonstrated that controlled, surgical reperfusion with prompt, vented CPB and substrate-enhanced sanguineous cardioplegic technique led to a 96.1% survival, which approaches that seen in low-risk, elective CABG series (250). Preoperative regional wall-motion abnormalities improved after bypass in 87% of these patients despite an average of greater than 6 hours from infarct to revascularization.

Another observational study compared consecutive patients receiving cold crystalloid cardioplegia with a warm blood technique that did not include substrate enhancement in emergency CABG after failed angioplasty. There was a significant *reduction in MI* with the sanguineous technique (65% infarcts with crystalloid versus 26% for blood, *P* less than 0.007) (251). Multivariate analysis confirmed normothermic blood cardioplegia as an independent predictor of freedom from infarct in this study (*P* less than 0.005). Prospective, randomized trials have shown a *survival benefit* for patients treated with blood cardioplegia compared with crystalloid cardioplegia in the setting of urgent revascularization for unstable angina. In one trial, the operative mortality (0% versus 5%), incidence of MI (4% versus 13.5%), and low-output syndrome (10% versus 19%) were favorably reduced in patients receiving blood cardioplegia versus crystalloid (252). Multivariate analysis confirmed that crystalloid cardioplegia (*P* equals 0.008) was a significant, independent predictor of postoperative morbidity compared with warm-blood cardioplegia (253).

4.1.2.3. Protection for Chronically Dysfunctional Myocardium

Class IIa

Blood cardioplegia is probably indicated in patients undergoing cardiopulmonary bypass accompanying CABG in the presence of a chronically dysfunctional left ventricle. ***(Level of Evidence: B)***

Severe LV dysfunction is an important risk factor for patients undergoing CABG (254). Efforts to document reduction of risk in this cohort are confounded by incomplete data on the prevalence of reversible ischemic systolic dysfunction (hibernating myocardium) and the contribution of improved function from revascularization of myocardium as opposed to myocardial protection strategies (255). There is an emerging consensus, however, that for the chronically impaired ventricle, there is an added margin of safety provided by blood cardioplegic techniques (255-257). Its theoretical advantages include superior buffering capacity, rheo-

Downloaded from circ.ahajournals.org by on August 4, 2008

0209
09/15/08

logical considerations at the capillary level, and free-radical control when compared with crystalloid cardioplegia.

4.1.2.4. Cardiac Biomarker Elevation and Outcome

Class IIb

Assessment of cardiac biomarkers in the first 24 hours after CABG may be considered, and patients with the highest elevations of creatine kinase–MB (greater than 5 times upper limits of normal) are at increased risk of subsequent events. *(Level of Evidence: B)*

The importance of elevation of cardiac biomarkers in the first 24 hours after CABG has been controversial because some degree of elevation of creatine kinase–MB (CK-MB) is very common. New Q-wave MI after CABG occurs in 2% to 4% of patients and is associated with adverse outcome (258-260). However, up to 90% of individuals have some elevation of CK-MB (261). It has now been demonstrated that marked elevation of CK-MB (5-10 times upper limits of normal) is associated with an adverse prognosis. Increased risk of death and repeat MI in the first 30 days after CABG correlates with progressive increases in CK-MB elevation, with the worst outcome in those with levels greater than 5 times normal (262). Six-month (263) and 1-year (262) mortality also correlate with postoperative CK-MB elevation. Poorer outcomes, including heart failure and death, at an average of 3 to 5 years also appear to correlate with early cardiac biomarker elevation (261,264).

The prognostic value of troponins after CABG is not as well established, but available studies have suggested that troponin T is more discriminatory than CK-MB in predicting early complications (265). For patients with elevated biomarkers after CABG, it is particularly important that attention be given to optimal medical therapy, including the use of beta-blockers, angiotensin converting enzyme (ACE) inhibitors, antiplatelet agents, and statins in eligible individuals.

4.1.2.5. Adjuncts to Myocardial Protection

Class IIa

The use of prophylactic intra-aortic balloon pump as an adjunct to myocardial protection is probably indicated in patients with evidence of ongoing myocardial ischemia and/or patients with a subnormal cardiac index. *(Level of Evidence: B)*

The use of prophylactic IABP as an adjunct to myocardial protection may decrease mortality and overall resource utilization in certain high-risk patients. A retrospective evaluation of 163 consecutive patients with an LVEF less than or equal to 0.25 demonstrated a 4-fold reduction in 30-day mortality in patients treated with IABP. Thirty-day mortality was 2.7% in patients who received a prophylactic IABP placed preoperatively versus 11.9% for patients not receiving a balloon (P less than 0.005). IABP use was also associated with a shorter hospital stay and lower hospital charges (266). A randomized trial confirmed the benefit of preoperative IABP support in high-risk patients (35a). Placement of the IABP immediately before the operation afforded similar protection to that accompanying placement the day before CABG (267,268). In patients with severe PVD, a higher threshold for balloon use is required given the high complication rate in this patient group.

Appreciation of the role of the activated leukocyte in the genesis and exacerbation of myocardial reperfusion injury has led to strategies to remove leukocytes from the coronary blood flow. Clinical studies of leukocyte depletion have shown significant benefit to myocardial performance in the hypertrophied LV and in those with acute or chronic ischemia (269-273). However, leukocyte depletion as an adjunct to myocardial protection/reperfusion strategies has yet to achieve widespread recognition and use among surgeons; therefore, no consensus statement is appropriate at this point.

The long-term survival benefit afforded by use of the IMA is well recognized (12,274). Less appreciated is the reduction in immediate, operative mortality associated with the use of the mammary artery as opposed to saphenous vein revascularization. Its use may thus be considered an adjunct to myocardial protection. Its use should be encouraged in the elderly (275,276), the urgent/acutely ischemic patient (277), and other subgroups that previously were thought not to receive its immediate and long-term benefit. The large CABG database available to the STS (42) was analyzed for the influence of use of the IMA on operative mortality. Use of the IMA was associated with reduced operative mortality in all subgroups analyzed with regard to age (P less than 0.005), sex (P less than 0.005), priority of operation (P less than 0.005), normal (P less than 0.01) or reduced (P less than 0.005) LV function, presence of diabetes (P less than 0.005), obese patients (P less than 0.005), history of previous infarct (P less than 0.005), previous PTCA (P less than 0.001), and any pattern of coronary anatomy (P less than 0.005). Multivariate analysis also confirmed use of the IMA as an independent predictor of operative survival (P less than 0.0025). When risk factors were combined, the only groups found to have similar operative mortality between use/nonuse of the IMA were elective and nonelective *reoperative* patients greater than 70 years of age. Arterial conduits are discussed in more detail in Section 6.2.

4.1.2.6. Reoperative Patients

For patients undergoing repeat CABG surgery who previously have had a left IMA-to-LAD graft, a concern has been the accidental transection of the graft during sternotomy. However, one report from a high-volume center showed that experienced surgeons rarely encountered this complication (less than 3%) (278). The risk of death or serious myocardial dysfunction related to atheroembolism from patent, diseased SVGs is low in the current era and is attributable to recogni-

Downloaded from circ.ahajournals.org by on August 4, 2008

tion of the problem and careful operative techniques by experienced surgeons who encounter an increasing percentage of reoperative candidates in their practices (278). A risk-reducing strategy in this situation is the use of retrograde delivery of cardioplegia. This procedure allows early exclusion of atherosclerotic SVGs from the coronary circulation, as they are no longer needed to deliver cardioplegia.

4.1.2.7. Inferior Infarct With Right Ventricular Involvement

Class IIa

After infarction that leads to clinically significant right ventricular dysfunction, it is reasonable to delay surgery for 4 weeks to allow recovery. *(Level of Evidence: C)*

Right ventricular (RV) failure secondary to an ischemic RV (either infarction or stunning) presents a particularly hazardous situation (279). The prototypical patient has an occluded right coronary artery proximal to the major RV branches and presents with an inferior MI with or without recognized RV failure (280,281a,282-284). Angiography may demonstrate that the coronary anatomy is best treated surgically, but the opportunity for maximal benefit of an emergency operation (initial 4 to 6 hours) has often passed. There is substantial risk in operating after this small window of opportunity but before the recovery of RV function, which usually occurs at 4 weeks after injury (285). During this postinfarct month, the RV is at great risk for severe postoperative dysfunction, which often requires extraordinary levels of perioperative pharmacological and mechanical support and has a very high mortality. The nonsurgical postinfarction patient can most often be supported with pacing, volume loading, and judicious inotropic administration (286). In the surgical setting, the RV takes on different characteristics. There is loss of the pericardial constraint immediately on exposing the heart, which results in acute dilatation of the dysfunctional RV. The RV often fails to recover in this setting, even when state-of-the-art myocardial protection schemes and revascularization are employed (287). The parallel effects of RV dilatation and dysfunction on LV diastolic and systolic function are magnified and may be associated with the need for high levels of support, inability to close the chest owing to cardiac dilation, need for ventricular assist devices, prolonged convalescence, transplantation, or death (286a). In the acute setting, the potential risk of further RV injury must be weighed against the potential benefit of additional myocardial salvage. If early PCI of the right coronary artery is indicated, it should be performed (35a).

The best defense is an index of suspicion and recognition of the RV dysfunction by physical examination (281,288) electrocardiography (right precordial leads), echocardiography, or radionuclide-gated blood pool study (285,288-290). A successful early PCI may allow recovery of an infarcted RV in as few as 3 days (285).

4.1.3. Attenuation of the Systemic Sequelae of CPB

Extracorporeal circulation elicits a diffuse inflammatory response that is attended by a transient, multisystem organ dysfunction that may prolong convalescence (291,292). Numerous strategies have been shown to blunt this counterproductive immune response (291). Preoperative corticosteroid administration is inexpensive and appears to be efficacious. Corticosteroid administration has favorable effects on the systemic inflammatory response associated with extracorporeal circulation. Glucocorticoid, when given before CPB, reduces complement activation and the levels of proinflammatory cytokines (293-297). Compared with placebo, patients receiving glucocorticoid are less febrile postoperatively, have higher cardiac indexes, require less inotropic and volume support, and spend less time in the ICU (298-302).

Although there is no demonstration of an increased risk for infection in studies to date, it may be prudent to avoid the use of steroids in diabetic patients because the studies were not powered to detect modest increases in infection risk (301). The proper timing and duration of administration in this application are incompletely resolved; there is evidence that steroid delivery more in advance of an insult is more efficacious (303). Preoperative corticosteroid administration is inexpensive and appears to reduce the systemic inflammatory response associated with CPB with little downside risk. Current understanding supports liberal prophylactic use in patients undergoing extracorporeal circulation (293).

Aprotinin, a serine protease inhibitor known for its hemostatic characteristics, also attenuates complement activation and cytokine release during extracorporeal circulation. There appears to be an emerging role for its prophylactic use as an anti-inflammatory agent in patients undergoing CPB. There was a significant reduction in length of stay and hospital charges when aprotinin therapy was applied to a high-risk cardiac surgical population (291). By virtue of its effects on coagulation, aprotinin appears to reduce the need for transfusion after repeat CPB. However, there are insufficient data at present to make a strong recommendation for the routine use of this relatively expensive drug (293,297,304).

Perioperative leukocyte depletion through hematologic filtration may benefit patients by improving pulmonary function. One study suggested that low-risk patients benefit from a strategy of leukocyte depletion during CPB in conjunction with leukoreduction of homologous blood products (305-308). Although the literature does support the routine use of arterial-line filters to minimize microembolization in extracorporeal circulation, there is no current consensus on the value of selective leukocyte filtration for the CPB circuit. Although blood-surface interface modifications for the CPB circuit have also been shown to decrease markers of inflammation, translation into clinical benefit in terms of reduced morbidity, mortality, or resource utilization has been equivocal. The concern over thrombotic complications tempered enthusiasm among cardiac surgeons (291,309-313). Surface

Downloaded from circ.ahajournals.org by on August 4, 2008

0211
09/15/08

modification such as heparin-bonded circuitry for extracorporeal circulation holds promise for reduction of the systemic inflammatory response to CPB, but at present the evidence is sufficiently conflicting that firm recommendations are not at hand.

4.1.4. Reducing the Risk of Perioperative Infection

Class I

1. **Preoperative antibiotic administration should be used in all patients to reduce the risk of postoperative infection.** ***(Level of Evidence: A)***
2. **In the absence of complicating circumstances, a deep sternal wound infection should be treated with aggressive surgical debridement and early revascularized muscle flap coverage.** ***(Level of Evidence: B)***

Class IIa

The risk for deep sternal wound infection is reduced by aggressive control of perioperative hyperglycemia by using a continuous, intravenous insulin infusion (314). ***(Level of Evidence: B)***

Multiple opportunities exist to reduce infection risk in patients undergoing CABG. Interval reporting to individual surgeons of their respective wound infection rates leads to risk reduction through discipline in adherence to sterile operative techniques. Skin and nasopharyngeal Gram-positive organisms are the leading cause of the most threatening complication: deep sternal wound infection or mediastinitis. Skin preparation with topical antiseptics (315,316), clipping rather than shaving the skin (318,319), avoidance of hair removal (62), reduction of operating room traffic, laminar-flow ventilation, shorter operations, minimal electrocautery (320), avoidance of bone wax (321), use of double-gloving barrier techniques for the operating team (322-326), and routine use of an easily constructed pleuropericardial flap (327) have all been shown to be of value in reducing postoperative infection (314).

Several newer strategies that are easily integrated into practice deserve consideration. Diabetes mellitus afflicts 1 of 5 patients undergoing CABG and is an independent risk factor for wound infection (328). The risk for deep sternal wound infection is reduced by aggressive control of perioperative hyperglycemia (glucose levels greater than 150 to 180 mg/dL) by using a continuous intravenous regular insulin infusion (0.9% deep sternal wound infection) versus intermittent subcutaneous insulin treatment (1.9%, *P* equals 0.04) (314).

Homologous blood transfusions after CABG are correlated in a dose-related fashion to increased risk for viral and bacterial infections, increased length of stay, antimicrobial use, and mortality through transfusion-related immunomodulation (329,330). A retrospective study of 238 patients undergoing CABG demonstrated this immunosuppressive effect of transfusion. Wound and remote infections occurred in 4% of patients who received less than or equal to 2 U of red blood cells, in 7% of those transfused with 3 to 5 U, and in 22% of those having received greater than or equal to 6 U (329). Leukodepletion strategies have been shown to blunt the immunosuppressive effect of blood transfusion in surgical patients (330). The dose-related effect of blood transfusion on increased infection risk has been known for general surgical and orthopedic operations and is thought to be caused by the accompanying leukocytes in the red blood cell transfusion (331). A single-center prospective trial of 3 transfusion protocols in 914 patients undergoing cardiac surgery showed a significant reduction for patients receiving leukocyte-depleted blood (17.9%) as opposed to nonfiltered blood (23.5%, *P* equals 0.04) for all infections (respiratory, urinary tract, bacteremia, and wound) (330). Most striking was the reduction in 60-day mortality in transfused patients having received filtered blood: transfused/nonfiltered patient mortality was 7.8%; transfused/filtered at the time of donation, 3.6%; and transfused/filtered at the time of transfusion, 3.3% (*P* equals 0.019) (330). The reduction in the postoperative rate of noncardiac causes of death (i.e., multisystem failure) in leukocyte-depleted/transfused patients compared with patients receiving nonfiltered blood was highly significant (*P* equals 0.001) (330). Leukodepletion can be accomplished by regional blood banks at the time of donation or at the bedside at time of transfusion by using a relatively inexpensive in-line transfusion filter.

Preoperative antibiotic administration reduces the risk of postoperative infection 5-fold (332). Prophylactic antimicrobial efficacy is dependent on adequate drug tissue levels before microbial exposure (333,334). Multi-institutional studies suggest that many centers, including those with training programs in cardiothoracic surgery, are not consistent in delivering or teaching effective use of perioperative antibiotics.

The cephalosporin class of antimicrobials is currently the agent of choice for prophylaxis of infection for coronary operations. There is a trend toward superior efficacy with cefuroxime compared with the other cephalosporins, but this difference does not reach statistical significance (Table 14) (334-338). Institution- or surgeon-specific selection is appropriate within this class (335). Data suggest that a 1-day course of intravenous antimicrobials is as efficacious as the traditional 48-hour (or longer) regimen (339-342). There is little evidence that prolonging (greater than 2 days) the antimicrobial prophylaxis even in high-risk patients provides any benefit (343). A 1-day course of antimicrobial prophylaxis is safe and effective (344). There are insufficient data to suggest that aminoglycosides add substantial benefit to the antimicrobial prophylactic regimen (335). Usual cephalosporin pharmacokinetics mandates administration within 30 minutes of incision and redosing if the operation exceeds 3 hours (335,345).

Antimicrobial selection is a moot point if the agent is not delivered during the optimal 30- to 60-minute window just before incision. The beneficial effect is negated if the drug is

Downloaded from circ.ahajournals.org by on August 4, 2008

Table 14. Prophylactic Antimicrobials for Coronary Artery Bypass Graft Surgery

Antibiotic	Equivalent Efficacy IV Dosing Regimen Dose and Interval	Cost per Dose	Comments
Cefuroxime	1.5 g preoperatively 1.5 g after CPB 1.5 g Q12×48	$6.33/1.5 g	First-line agents; low toxicity; pharmacokinetics vary; shorter prophylaxis duration less than 24 h may be equally efficacious for cefuroxime
Cefamandole, cefazolin	1 g preoperatively 1 g at sternotomy 1 g after CPB 1 g Q6×48 (Initial dose to be given 30-60 minutes before skin incision)	$6.27/g $0.90/g	
Vancomycin	1 g Q12/h/until lines/tubes out At least 2 doses (During 30-60-minute infusion timed to end before skin incision)	$5.77/g	Reserved for penicillin-allergic; justified in periods of methicillin-resistant *Staphylococcus* species outbreaks; vancomycin-resistant *Enterococcus* problem is on horizon; more likely to require vasopressor agent perioperatively

CPB indicates cardiopulmonary bypass. Data derived from References 334 and 336-338.

given after incision. This is a major issue. A multi-institutional study, including those with cardiothoracic training programs, confirmed the suboptimal use of prophylactic antimicrobials. In 1994, only 23% of the institutions studied had a system that assured proper administration of prophylactic antimicrobials in the generous 2-hour period just before incision for patients undergoing CABG. One year later, compliance was even worse at 20% (346). A practical, fail-safe guideline to assure proper timing is the administration of the cephalosporin by the anesthesiologist after induction but before skin incision. Then the surgeon confirms administration before the scalpel is in hand (334,347). Surgeons should be familiar with the pharmacokinetics of their preferred cephalosporin to modify initial and subsequent dosing based on patient size and duration of operation. This knowledge can favorably influence plasma, sternal, and soft-tissue bacteriocidal activity for the individual patient.

If preventive strategies fail, prompt recognition of deep sternal wound infection or mediastinitis is critical. Morbidity and mortality for deep sternal wound infection or mediastinitis have decreased over the past 20 years for several reasons. Aggressive surgical debridement and early vascularized muscle flap coverage are key to reducing the cost, length of stay, and mortality (348,349). A prospective trial has lessened debate on proper management of the deeply infected sternotomy incision. Treatment by wound exploration, sternal rewiring, and drainage failed in 88.2% of patients compared with high success in patients treated initially with muscle flap closure (350).

4.1.5. Prevention of Postoperative Arrhythmias

Class I

Preoperative or early postoperative administration of beta-blockers in patients without contraindications should be used as the standard therapy to reduce the incidence and/or clinical sequelae of atrial fibrillation after CABG. *(Level of Evidence: B)*

Class IIa

1. **Preoperative administration of amiodarone reduces the incidence of postcardiotomy atrial fibrillation and is an appropriate prophylactic therapy for patients at high risk for postoperative atrial fibrillation who have contraindications to therapy with beta-blockers. *(Level of Evidence: B)***
2. **Digoxin and nondihydropyridine calcium-channel blockers are useful for control of ventricular rate but at present have no indication for prophylaxis. *(Level of Evidence: B)***

Class IIb

Low-dose sotalol can be considered to reduce the incidence of atrial fibrillation after CABG in patients who are not candidates for traditional beta-blockers. *(Level of Evidence: B)*

Postoperative atrial fibrillation increases the length of stay after CABG up to 5 days (351), increases the charges by as much as $10 055 (351), and is associated with a 2- to 3-fold increase in postoperative stroke (182,183).

Downloaded from circ.ahajournals.org by on August 4, 2008

0213
09/15/08

Table 15. Pharmacological Strategies for Prevention of Atrial Fibrillation After Coronary Artery Bypass Graft Surgery

Treatment	Timing	Dose/Route	AF Incidence, %	Comments	Evidence (Reference)
Frontline strategies					
Resumption of patient's preoperative beta blocker	Postoperative resumption	Same as preoperative	Beta-blocker stopped 38.1% Continued 17.1%; P= 0.02	Resumption of beta-blocker reduced AF by 45%	randomized trial (782)
			Beta-blocker stopped 28%; Continued 6%; P= 0.01	Nearly 5-fold decrease in incidence; if no longer needed after revascularization, may taper as outpatient	randomized trial (783)
• Beta blockers (propranolol prototypical)	Postoperative initiation (10±7 h postoperatively)	5 mg Orally 4 times per day	Control 23%; Propranolol 9.8%; P=0.02	Reduced AF by 43%; inexpensive, low dose	randomized trial (784)
• Almost all beta blockers evaluated	Postoperatively	Varies	Significantly reduced versus placebo	Odds ratio 0.17; confidence interval 0.03–0.98 in favor of beta blocker over controls in meta-analysis	randomized trial (785,786) metanalysis (355)
Atenolol	Preoperatively (begun 72 h before operation)	50 mg Orally twice a day	Control 37%; Atenolol 3%; P=0.001	Excellent option if preoperative phase practical	metanalysis (355)
Sotalol	Preoperatively through postoperatively	160 mg AM of operation, then 160 mg BID PO	Control 29% Sotalol 10%	Class III properties; sotalol not tolerated in 10% of patients	randomized trial (787)
Magnesium sulfate	Postoperatively	Continuous IV infusion for a total of 178 mEq over first 4 postoperative days	Control 28%; Mg supplement 14%; P =0.02	Goal is normal serum magnesium: =1 mmol/L, < 2 mEq/L, which is usually low after cardiopulmonary bypass	prospective trial (788)
Alternative/niche strategies					
Amiodarone	Preoperatively through postoperatively	600 mg Orally daily for 7 days preoperatively; then 200 mg PO daily postoperatively; stop at discharge; total = 4.8 g	Control 53%; Amiodarone 25%; P=0.003	Mixed group of coronary and valve patients, explaining very high AF incidence	prospective trial (356)
Amiodarone	Postoperatively	300 mg Intravenous bolus; then 1.2 g over 24 h for 2 days; then 900 mg every 24 h for 2 days, for a total of 4.5 g	Control 21%; Amiodarone 5%; P=0.05	Coronary bypass patients only in this study	prospective trial (789)
Propafenone	Postoperatively	300 mg Orally twice a day for 7 days	Propafenone 12%; Atenolol 11%; P=NS	Propafenone offers a less negative inotropic option for poor left ventricular function population	prospective trial (354)
Triiodothyronine (T3)	Intraoperative	0.8 mcg/kg IV after cross-clamp then IV infusion 0.113 mcg/kg/hr × 6hr	Control 46%; T3 24%; P = 0.009	All patients in this study had depressed LV function	randomized trial (790)

Continued on Next Page

Downloaded from circ.ahajournals.org by on August 4, 2008

0214
09/15/08

Treatment	Timing	Dose/Route	AF Incidence, %	Comments	Evidence (Reference)
Strategies not clearly efficacious for prophylaxis					
digoxin	Preoperative	oral	Control 17.6%; Digoxin 14.2%; *P* = NS	Doesn't significantly reduce AF but does control ventricular rate for AF	prospective trials (791,792)
				digoxin = 139/min control = 161/min *P* = 0.02	metanalysis (355)
Calcium channel blockers • verapamil	Postoperative	oral	Control 18.2%; Verapamil 18.2%; *P* = NS	Does not significantly reduce AF but does control ventricular rate if AF established: verapamil = 131/min; control = 155/min; *P* = 0.002	prospective trials (793-795) metanalysis (355)

The causal and temporal relationship among atrial fibrillation after CABG, the incidence of new left atrial thrombus, and the potential for embolism and stroke remains ill-defined. However, if atrial fibrillation after CABG persists into a second day, warfarin anticoagulation with a goal of an international normalized ratio (INR) of 2.0 to 3.0 should be considered (352).

Withdrawal of beta-blockers in the perioperative period doubles the incidence of postoperative atrial fibrillation after CABG. One series showed that 40 of 105 patients who had withdrawal of beta-blockers developed postoperative atrial fibrillation compared with 18 of 105 patients who had early postoperative reinstitution of beta-blocker (*P* equals 0.02). Virtually every study of beta-blockers administered for the purpose of reducing postoperative atrial fibrillation has shown benefit. Most trials have examined the initiation of prophylaxis in the postoperative period. There appears to be an even greater benefit if beta-blockers are begun before operation. For example, in 1 controlled trial, atenolol started 3 days before operation led to a reduction of atrial fibrillation from 37% in the control group to 3% in the atenolol group (*P* equals 0.001) (Table 15) (353,354).

Low-dose sotalol can also be considered effective for reduction of atrial fibrillation after CABG. In a prospective, double-blind, randomized, placebo-controlled study, the placebo group had an incidence of supraventricular arrhythmias of 43% compared with 26% for sotalol (*P* equals 0.0012, or a 43% reduction) (355).

Amiodarone administered beginning 1 week before surgery reduces the incidence of postcardiotomy atrial fibrillation (53% with placebo to 25% with amiodarone, *P* equals 0.003), reduces hospital costs ($26 000 to $18 000, *P* equals 0.03), and shortens the length of stay (8 to 6.5 days, *P* equals 0.04) (356). This represents another option for patients undergoing elective CABG who have contraindications to beta-blocker therapy.

The Atrial Fibrillation Suppression Trial (AFIST) was a prospective study of patients aged 60 years or older (average age 73 years) undergoing open-heart surgery who were randomized to oral amiodarone therapy or placebo given in addition to beta-blockers (357). Patients received up to a total of 3 grams of oral amiodarone in divided doses 1 to 4 days before to surgery and continued 400 mg by mouth twice a day for 4 days after surgery. The patients who were given amiodarone had a lower frequency of any atrial fibrillation (22.5% versus 38.0%; *P* equals 0.01), symptomatic atrial fibrillation (4.2% versus 18.0%, *P* equals 0.001), cerebrovascular accidents (1.7% versus 7.0% *P* equals 0.04), and postoperative ventricular tachycardia (1.7% versus 7.0%) (357).

Digoxin and nondihydropyridine calcium channel blockers (verapamil has been the most extensively studied) are useful for control of ventricular rate but have no consistent benefit for prophylaxis of supraventricular arrhythmias after CABG (Table 15) (355). Currently, preoperative or early postoperative administration of beta-blockers is considered standard therapy to prevent atrial fibrillation after CABG except in patients with active bronchospasm or marked resting bradycardia.

4.1.6. Strategies to Reduce Perioperative Bleeding and Transfusion

Despite the increasing safety of homologous blood transfusion, patients and their families are often far more concerned

Downloaded from circ.ahajournals.org by on August 4, 2008

about transfusion risk than MI, stroke, or death after CABG. Well-publicized cases of transmission of viral illness with transfusion after cardiac operation in the early 1980s have sensitized the North American population. A study of donors who passed current blood donor screens but subsequently seroconverted suggests a current risk for donation of blood during an infectious period of 1/493 000 for human immunodeficiency virus, 1/641 000 for human T-cell lymphotrophic virus, 1/103 000 for hepatitis C virus, and 1/63 000 for hepatitis B virus (358).

Cardiac surgical patients account for 10% of blood transfusions in the United States (359). Twenty percent of patients having cardiac operations use 80% of the blood products attributed to cardiac surgical use. Several of the short-term, deleterious effects of transfusion were discussed in the section on reducing infection (360). Predisposing risk factors for transfusion after CABG include advancing age, lower preoperative red blood cell volume, preoperative aspirin therapy, priority of operation, duration of CPB, recent fibrinolytic therapy, reoperative CABG, and differences in heparin management (361-367). Institutional protocols with thresholds for transfusion lead to an overall reduction in the number of units transfused and the percentage of patients receiving any blood (368).

Aspirin, a very common preoperative medication in patients undergoing CABG, decreases platelet aggregation and increases postoperative blood loss. The magnitude of this effect has been confirmed in prospective, controlled trials (369). Preoperative aspirin is associated with increased risk for transfusion, prolonged wound closure time, and an increase in early reoperation for bleeding (370). The value of aspirin in the treatment of acute coronary syndromes will often outweigh the increased risk for perioperative bleeding should coronary bypass be indicated early in the course of the acute event. In certain patients in an appropriate clinical setting, including chronic stable angina, low-risk plaque morphology, and others, cessation of aspirin and other platelet inhibitors 7 to 10 days before elective cardiac operation appears prudent to decrease the risk of postoperative bleeding and transfusion. For clopidogrel, the recommendation is to discontinue the agent 5 or more days before surgery when the clinical situation will permit it (see Section 5.11).

Aprotinin, a serine protease inhibitor with antifibrinolytic activity, significantly decreases postoperative blood loss and transfusion requirements (both units and number of patients) in high-risk, patients undergoing primary CABG, those on aspirin, and in particular the population undergoing reoperative bypass (371,372). Aprotinin does not appear to decrease early graft patency after coronary bypass despite its benefit in reducing postoperative bleeding and need for blood transfusion (373,374). Mechanical strategies to reduce the need for homologous blood have been only marginally successful.

Both epsilon-aminocaproic acid and an analogue, tranexamic acid, have antifibrinolytic activity. Both have been demonstrated to decrease mediastinal drainage after cardiac operation (375-378). Demonstration of a reduction in transfusion requirements has been inconsistent, however (376). Although these agents are relatively inexpensive, the data are insufficient to recommend their routine use. In contradistinction to aprotinin, the safety regarding the thrombotic potential including graft patency issues is unresolved (374,379). The concept of risk stratification for transfusion requirements has been validated (380) and offers a more rational approach to risk reduction strategies seeking to minimize blood requirements (380).

Efforts to synthesize multiple blood-conservation methods have proven successful in reducing transfusion (381). The most fully evolved protocol using multiple mechanical and pharmacological means achieved a remarkable series of 100 consecutive, selected patients undergoing CABG without transfusion (382). Intrinsic to this strategy was the concept of varying risk for transfusion and an individualized, algorithm-driven approach for the patient undergoing elective CABG. Models for prediction of the need for transfusion postoperatively allow shepherding of resources and application of risk-neutralizing strategies to those more likely to benefit (383). Comparison was made with a consecutive series of concurrent patients with the same transfusion criteria. The multi-modality conservation patients had no transfusion compared with 38% of the concurrent control group who received an average of 2.2 plus or minus 6.7 U of blood. Mediastinal drainage for the conservation group was half that of the control group (370 plus or minus 180 versus 660 plus or minus 270 mL, P equals 0.001) (382). Costs were similar between groups. The liberal use of aprotinin (69% of patients), exclusion of anemia patients, and minimal hemodilution appear to be the keys to these results.

Prehospitalization autologous blood donation can be effective. If a patient has no exclusionary criteria (hemoglobin less than 12, heart failure, unstable angina, left main disease, or symptoms on the proposed day of donation) and can achieve 1 to 3 U of donated blood over 30 days before operation, the risk of homologous transfusion is significantly lowered (12.6% versus 46% in a non-preadmission donor control group, P equals 0.001). An alternative or additional method of pre-CPB blood "donation" is the removal of blood from the patient in the operating room immediately before CPB. This blood is then set aside, not exposed to the CPB circuitry, and then reinfused into the patient after the patient is disconnected from CPB. This donation immediately before CPB yielded a significantly higher platelet and hemoglobin count in 1 study (P less than 0.01) compared with similar postoperative levels in patients who did not undergo harvesting of blood immediately before CPB. In this study, this technique translated into a 6-fold decrease in the percentage of patients requiring transfusion (10% transfusion rate in pre-CPB donors versus a 65% transfusion rate in non–pre-CPB donors, P less than 0.01) (384).

A multicenter, prospective study of recombinant human erythropoietin given over a 5-day course failed to demonstrate a significant reduction in transfusion requirement,

Downloaded from circ.ahajournals.org by on August 4, 2008

although a significant rise in preoperative hemoglobin (*P* less than 0.05) was noted (385).

A randomized, placebo-controlled trial demonstrated no advantage of iron supplementation for restoration of red blood cell mass after coronary bypass, but the patients receiving iron did have significantly more gastrointestinal complaints (379,384).

Autotransfusion has had a generally favorable effect on decreasing allogeneic blood use, but concerns about stimulation of fibrinolysis with reinfusion of shed mediastinal blood prevent unequivocal recommendations on its use, particularly in routine low-risk patients (386).

4.1.7. General Management Considerations

Acuteness of operation is an important determinant of operative morbidity and mortality. The need for an emergent or even urgent operation can often be forestalled by appropriate pharmacological therapy, placement of an IABP, or even percutaneous revascularization of "culprit" stenoses. In each instance, the benefit of temporizing therapy must be weighed against the risk of waiting and the risk of the therapy used to achieve delay. A discussion of this strategy as applied to the acute coronary syndrome is presented in Section 5.11. Smoking cessation and improvement of chronic bronchitis before elective coronary operation lessen the risk for perioperative pulmonary complications (305). Preoperative pulmonary edema is a particularly hazardous situation, as extracorporeal circulation will worsen the lung water and predispose the patient to prolonged, postoperative mechanical ventilatory support. Ideally, the operation is deferred until resolution of the edema is accomplished. Obesity is an independent risk factor for perioperative respiratory failure, sternal and leg wound complications, perioperative MI, and arrhythmias (387). If the patient's coronary anatomy and clinical course permit, a concerted effort at weight reduction is appropriate and operation is deferred.

4.2. Maximizing Postoperative Benefit

4.2.1. Antiplatelet Therapy for SVG Patency

Class I

Aspirin is the drug of choice for prophylaxis against early saphenous vein graft closure. It is the standard of care (Table 13) and should be continued indefinitely given its benefit in preventing subsequent clinical events. ***(Level of Evidence: A)***

Aspirin significantly reduces vein graft closure through the first postoperative year. A demonstrable effect on arterial graft patency has not been demonstrated. Aspirin administration before operation offers no improvement in subsequent vein graft patency compared with early postoperative initiation (370). Fail-safe mechanisms should exist to ensure prompt postoperative initiation of aspirin therapy. Prospective controlled trials have demonstrated a graft patency benefit when aspirin was started 1, 7, or 24 hours after operation (388-390). The benefit of postoperative aspirin on SVG patency is lost when started greater than 48 hours after surgery (391). Dosing regimens ranging from 100 to 325 mg daily appear to be efficacious. As the graft recipient coronary artery luminal diameter increases, SVG patency rates improve and the advantage of aspirin over placebo is reduced (392). Aspirin, given early after CABG (within 48 hours) has been shown to significantly reduce subsequent mortality, MI, stroke, renal failure, and bowel infarction (393).

Ticlopidine is efficacious (394) but offers no advantage over aspirin except as an alternative in the truly aspirin-allergic patient. Life-threatening neutropenia is a rare but recognized side effect. When ticlopidine is used, white blood cell count should be periodically monitored in the early months after initiating treatment. Clopidogrel offers the potential for fewer side effects compared with ticlopidine as an alternative to aspirin for platelet inhibition. The incidence of severe leukopenia is rare and similar to that of aspirin in a controlled trial (395). Indobufen is a reversible inhibitor of platelet cyclooxygenase, in contradistinction to aspirin, so platelets recover function within 24 hours of cessation of the drug. It appears to be as effective as aspirin for saphenous graft patency over the first postoperative year but with fewer gastrointestinal side effects (396).

Dipyridamole adds nothing to the aspirin effect for saphenous graft patency (370). Warfarin has shown no consistent benefit in maintaining saphenous graft patency (397) and may be associated with an increased risk for bleeding compared with antiplatelet therapy for this application (398). Whether the combination of aspirin and clopidogrel is superior to aspirin alone is not yet resolved.

In summary, aspirin is the drug of choice for prophylaxis against early saphenous graft thrombotic closure. Perioperative use and/or administration of aspirin within 48 hours of operation should be the standard of care (Table 13) and should be continued indefinitely, given its benefit in the secondary prevention of subsequent clinical events.

4.2.2. Pharmacological Management of Hyperlipidemia

Class I

All patients undergoing CABG should receive statin therapy unless otherwise contraindicated. ***(Level of Evidence: A)***

There is little question that patients with known atherosclerotic disease, including patients undergoing CABG for coronary atherosclerosis, should receive lipid-lowering therapy. If there is no contraindication, statin (3-hydroxy-3-methylglutaryl coenzyme A reductase inhibitor) therapy is recommended as initial therapy to lower the low-density lipoprotein cholesterol (LDL-C). How low should the LDL-C be lowered? The Adult Treatment Panel III of the National Cholesterol Education Program (NCEP) continues to recommend that the LDL-C goal should be less than 100 mg/dL

Downloaded from circ.ahajournals.org by on August 4, 2008

0217
09/15/08

(399). This recommendation as applied to the CABG patient is supported by the Post Coronary Artery Bypass Graft Trial Investigators. Angiographic progression of atherosclerotic vein-graft disease was significantly retarded by lovastatin (with the occasional addition of cholestyramine to achieve the individualized lipid-lowering goal). Patients having aggressive cholesterol lowering (achieved LDL-C less than 100 mg/dL) had disease progression in 29% of saphenous grafts over an average 4-year follow-up compared with 39% in the moderate treatment group (achieved LDL-C less than 140 mg/dL) (*P* less than 0.001) (397). The aggressively treated group had a lower repeated revascularization rate over the course of the study compared with the moderate treatment cohort: 6.5% versus 9.2% (29% lower, *P* equals 0.03).

The Heart Protection Study, which prospectively studied 20536 patients in a double-blind trial of simvastatin 40 mg daily versus placebo, showed significant benefit of statin therapy even in individuals with LDL-C less than 100 mg/dL (400). Thus, either the LDL-C goal of 100 mg/dL is too high (studies are under way to compare the effect of an LDL-C–lowering goal of 100 mg/dL versus 70 mg/dL) or the pleomorphic benefits of statin therapy are present regardless of the LDL-C level. Based upon the results of the PROVE-IT trial, the NCEP has recently recommended an LDL-C goal of less than 70 mg/dL in patients deemed to be at very high risk (399a). Because patients are more likely to continue on statin therapy begun in the hospital (401), it is recommended that statin therapy be continued or started during hospitalization for CABG surgery.

If the patient is on statin therapy and the LDL-C goal has been reached prior to CABG surgery, attention should be directed to elevated triglycerides and low high-density lipoprotein cholesterol (HDL-C). These dyslipidemias, especially when combined with an elevated fasting glucose, central obesity, and hypertension, constitute the cardiovascular metabolic syndrome, a syndrome that along with diabetes, is associated with excess cardiovascular mortality and morbidity. These patients should be treated with diet, weight control, daily exercise, and drug therapy designed to increase HDL-C and decrease triglycerides. The recommendations of ATP-III should serve as a guideline (399). Those patients with the insulin resistance syndrome or diabetes often need additional therapy with ACE inhibitors or angiotensin receptor blockers to protect their renal function.

Patients with a strong family history of coronary disease and patients undergoing CABG surgery with completely normal or low lipid levels without recent illness or lipid-lowering therapy should be screened for elevated novel risk factors such as homocysteine, lipoprotein(a), hs–C-reactive protein, and fibrinogen (402).

4.2.3. Hormonal Manipulation

Class III

Initiation of hormone therapy is not recommended for women undergoing CABG surgery. *(Level of Evidence: B)*

Although more than 30 observational studies have shown a reduced mortality for coronary disease in postmenopausal women on hormone replacement therapy, hormone therapy (HT) is no longer recommended for women undergoing CABG surgery.

The Heart and Estrogen/Progestin Replacement Study (HERS) randomized postmenopausal women less than 80 years of age with CAD to placebo (1a,405) or estrogen/progestin HT (1a,397). Forty-two percent of the patients underwent CABG surgery (405). The primary end point was nonfatal MI and CAD deaths. The patients were followed up for 4.1 years. There was no statistical difference in the primary end points, but there were more cardiovascular disease deaths in the patients receiving HT (71 versus 58). There were significantly more patients with deep vein thrombosis (*P* equals 0.004) and any thromboembolic events (*P* equals 0.002) in the women receiving HT.

The reason for the marked discrepancy between the observational studies and this large controlled trial probably relates to the fact that although HT does offer long-term protection from cardiovascular disease, it increases the risk of clotting. Therefore, patients with MI undergoing PCI or CABG surgery should not be started on HT. Patients on HT should have therapy discontinued if undergoing surgery or prolonged bed rest secondary to an illness such as a stroke.

4.2.4. Smoking Cessation

Class I

1. **All smokers should receive educational counseling and be offered smoking cessation therapy after CABG. *(Level of Evidence: B)***
2. **Pharmacological therapy including nicotine replacement and bupropion should be offered to select patients indicating a willingness to quit. *(Level of Evidence: B)***

Smoking is the single most important cause of preventable premature mortality in the United States (406). There is strong evidence from the CASS that smoking cessation after coronary bypass is rewarded by less recurrent angina, improved function, fewer hospital admissions, maintenance of employment, and improved survival (84% survival for quitters versus 68% for persistent smokers at 10 years for those randomized to operation) (*P* equals 0.018) (407). Cessation of smoking after coronary bypass improves the postoperative survival of successful quitters to that of post-bypass patients who have never smoked; persistent smokers have significantly more MIs and reoperations (408). As expected, smoking leads to angiographically detected deterioration over time: only 39% of smokers' saphenous grafts are disease-free at 5 years compared with 52% of nonsmokers (409).

Failure to attempt cessation and recidivism are the difficult issues. Treatment individualized to the patient is crucial. Smoking is an addictive disorder and should be treated as

Downloaded from circ.ahajournals.org by on August 4, 2008

such and not as an indication of self-destructiveness or weak willpower (410).

Depression is an important complicating factor in smoking and may account for a significant number of cessation failures (411,412). Behavioral treatments alone are not as effective as drug therapy (413).

The nicotine transdermal patch is effective in smoking cessation treatment. The average cost per year of life saved ranges from $965 to $2360 (406). A transdermal nicotine patch in conjunction with a behavioral modification program sustained continuous abstinence for 20% of patients receiving the patch versus 9% for those receiving behavioral modification alone (414). Nicotine gum added to transcutaneous patch therapy significantly increased abstinence rates above that of the active patch alone at 52 weeks (415).

A sustained-release form of the antidepressant bupropion is effective for smoking cessation in a dose-related fashion. The agent reduces the nicotine craving and anxiety of smokers who quit. Three hundred milligrams per day led to a 44% smoke-free rate at 7 weeks and 23% at 1 year, double that of the placebo group (P less than 0.001) (412). The results at 1 year parallel those seen with nicotine replacement strategies. As with any drug, the patient started on bupropion should be monitored for adverse side effects.

In summary, all smokers should receive educational counseling and be offered smoking cessation therapy, including pharmacological therapy if appropriate, after coronary bypass (Table 16) (416). Pharmacological therapy including nicotine replacement and bupropion should be offered to patients indicating a willingness to quit.

Table 16. Smoking Cessation for the Primary Care Clinician

Strategy 1. Ask—systematically identify all tobacco users at every visit.
- Implement an office-wide system that ensures that for EVERY patient at EVERY clinic visit tobacco-use status is queried and documented.

Strategy 2. Advise—strongly urge all smokers to quit.
- In a clear, strong, and personalized manner, urge every smoker to quit.
- Ask every smoker if he or she is willing to make a quit attempt at this time.

Strategy 3. Assist—aid the patient in quitting.
- Help the patient with a quitting plan.
- Encourage nicotine replacement therapy or bupropion except in special circumstances.
- Give key advice on successful quitting.
- Provide supplementary materials.

Strategy 4. Arrange—schedule follow-up contact
- Schedule follow-up contact, either in person or via telephone.

From the ACC/AHA 2002 Guideline Update on the Management of Patients With Stable Angina that was modified from Fiore MC, Bailey WC, Cohen JJ, et al. Smoking Cessation. Clinical Practice Guideline Number 18. AHCPR publication No. 96-0692. Rockville, MD: Agency for Health Care Policy and Research, Public Health Service, U.S. Department of Health and Human Services, 1996.

4.2.5. Cardiac Rehabilitation

Class I

Cardiac rehabilitation should be offered to all eligible patients after CABG. *(Level of Evidence: B)*

Cardiac rehabilitation including early ambulation during hospitalization, outpatient prescriptive exercise training, family education (417), and sexual counseling (418) have been shown to reduce mortality (419,420). Cardiac rehabilitation beginning 4 to 8 weeks after coronary bypass and consisting of 3-times-weekly educational and exercise sessions for 3 months is associated with a 35% increase in exercise tolerance (P equals 0.0001), a slight (2%) but significant (P equals 0.05) increase in HDL-C, and a 6% reduction in body fat (P equals 0.002) (421). Exercise training is a valuable adjunct to dietary modification of fat and total caloric intake in maximizing the reduction of body fat while minimizing the reduction of lean body mass (422). A significant hurdle appears to be *initiation* of rehabilitation. In a prospective study of recruitment for a comprehensive cardiac rehabilitation program for patients having just undergone coronary bypass, only 52 of 393 elected to participate. Participation was lower for women (26% of nonparticipants versus 12% of enrolled, P equals 0.02), unemployed patients (63% of those declining versus 45% of the participants, P equals 0.02), those with a lower income and educational level (both P equals 0.001), and those with a greater functional impairment (P equals 0.001) (423). If the barriers to enrollment can be overcome, benefits seem to accrue to all special groups studied. The benefits of cardiac rehabilitation extend to the elderly and to women (424,425). Despite the fact women have a generally higher risk profile and a relatively lower functional capacity than men at initiation of a rehabilitation period (426), there were similar compliance and completion rates, and women achieved a similar or greater improvement in functional capacity (women increased peak metabolic equivalents by 30%, men by 16%, P less than 0.001) (427). Medically indigent patients appear to have rehabilitation compliance and benefit rates on par with insured/private-pay patients if rehabilitation is initiated and appropriately structured (428).

In a long-range trial focused exclusively on a coronary bypass population, postoperative patients were randomized to standard posthospital care (n equals 109) or standard care plus rehabilitation (n equals 119). At 5 years, the groups were similar on measures of symptoms, medication use, exercise capacity, and depression scores. However, rehabilitated patients reported more freedom of physical mobility (Nottingham Health Profile, P equals 0.005), perceived better health (P equals 0.03), and a perceived better overall life situation (P equals 0.02). A larger proportion of the rehabilitated patients were working at 3 years (P equals 0.02). This difference disappeared with longer follow-up (429). Patients who sustained an infarct followed by coronary bypass had greater improvement in exercise tolerance after rehabilitation (change in exercise capacity 2.8 plus or minus 1.4 metabolic equivalents) than did those having infarct alone (0.8

Downloaded from circ.ahajournals.org by on August 4, 2008

plus or minus 2, *P* less than 0.02). Improvement was sustained to 2 years (430).

In addition to benefiting a sense of well-being, there is an economic benefit that accrues from participation in cardiac rehabilitation programs. During a 3-year follow-up (mean of 21 months) after coronary events (58% of events were coronary bypass operations), per capita hospitalization charges were $739 lower for rehabilitated patients compared with nonparticipants ($1197 plus or minus $3911 versus $1936 plus or minus $5459, *P* equals 0.022) (431).

After CABG, the patient is more likely to resume sexual activity and to a greater degree than is the patient postinfarct. Anticipatory and proactive advice by the physician or surgeon on the safety of resumption of sexual activity as the patient reengages in other daily activities is beneficial (432).

In summary, cardiac rehabilitation should be offered to all eligible patients after coronary bypass surgery.

4.2.6. Emotional Dysfunction and Psychosocial Considerations

The 2 most important independent psychosocial predictors of death in a multivariate analysis of elderly patients post-CABG are a lack of social participation and religious strength (433). Social isolation is associated with increased mortality and coronary disease (434), and successful treatment may improve outcomes (435). Depression is generally poorly recognized by the cardiac specialist (421). Mood for up to 1 year after coronary bypass is correlated most strongly with mood before coronary bypass. The prevalent opinion that depression is a common result of coronary bypass is challenged by several reports (436). Half of patients who were depressed before operation were not depressed afterward, and only 9% of patients experienced new depression postoperatively. The overall prevalence of depression at 1 month and 1 year was 33%, which was similar to that in reports of patients undergoing other major operations. Some have argued that preoperative screening simply sensitizes the healthcare team and family to postoperative mood problems, rather than there being a more direct pathophysiological association of coronary bypass and depression per se. Coronary disease and psychiatric disorders are highly prevalent and frequently concurrent. Anxiety and depression are often encountered around the time of coronary bypass operation. Anxiety may intensify the autonomic manifestations of coronary disease and complicate patient care. Realization of one's mortality, physical limitations, limitations of sexual activity, survival guilt after successful operation, and development of nihilism regarding modification of risk factors play a role in recovery. Denial has adaptive value during hospitalization and can enhance care, but its persistence in the early home convalescence may be counterproductive. Clinical depression is correlated with subsequent mortality (437).

Eighteen percent of patients are depressed after major cardiac events, including coronary bypass (421). Cardiac rehabilitation has a highly beneficial effect on these patients, whether moderately or severely depressed. In a prospective but uncontrolled study of 3 months of rehabilitation on measures of depression, anxiety, hostility, somatization, mental health, energy, general health, bodily pain, functional status, well-being, and a total quality of life score, patients were improved from 20% to 57% (*P* value for the scores ranged from 0.001 to 0.004) (421).

4.2.7. Rapid Sustained Recovery After Operation

Rapid recovery and early discharge, the "fast-track" approach, for the patient post-CABG should become the standard goal of care. The shortest postoperative stays in the hospital are followed by the fewest rehospitalizations (438). There is very little evidence of a rise in morbidity, mortality, or readmission rates in systems employing fast-track protocols. Longer initial hospitalizations generally are recognized not to prevent rehospitalizations. Prevention or prompt correction of noncardiac disorders allows rapid recovery after coronary operations. Important components of the fast-track system are patient selection, patient and family education, short-acting narcotic or inhalational anesthetic agents allowing early extubation and transfer from the intensive care setting, prophylactic antiarrhythmic therapy, dietary considerations, early ambulation, early outpatient follow-up by telephone, and a dedicated fast-track coordinator (439,440).

4.2.8. Communication Between Caregivers

A primary care physician frequently refers patients who undergo CABG to a cardiologist and/or surgeon. Maintaining appropriate and timely communication between treating physicians regarding care of the patient is crucial. The primary care physician's request for referral may well be verbal but should also be documented in writing and accompanied by relevant medical information. Ideally, the primary care physician follows the patient with the other treating physicians during the perioperative course in the hospital if circumstances and geography permit. The referral physician(s) needs to provide written reports of findings and recommendations to the primary care physician, including a copy of the discharge summary from the hospital. Discharge medications that are likely to be required for the long term should be clearly identified. The decision about the degree of responsibility for postoperative care and prevention strategies needs to be made by mutual agreement among the patient, the primary care physician, the cardiologist, and the surgeon in each individual case. The primary care physician can emphasize and continue to implement secondary prevention strategies, frequently begun by the cardiologist and surgeon, since most of these strategies involve lifestyle changes or pharmacological therapies over an extended period of time.

5. SPECIAL PATIENT SUBSETS

5.1. CABG in the Elderly: Age 70 and Older

The evolution in surgical techniques and changing demographics and patient selection for CABG surgery have led to

Downloaded from circ.ahajournals.org by on August 4, 2008

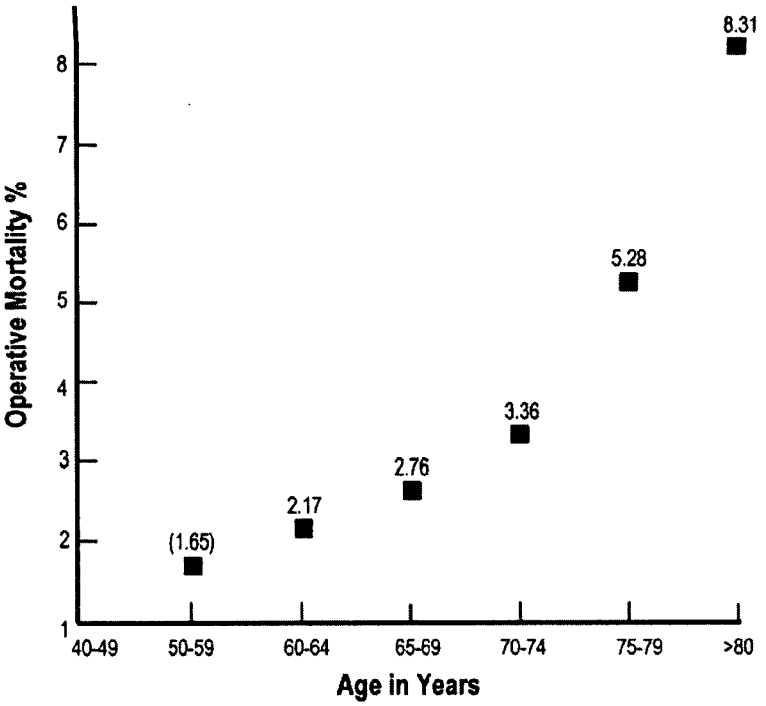


Figure 10. Operative mortality (%) for CABG in various age cohorts. Data derived from Hannan et al. Am Heart J. 1994;128:1184-91 (21).

its application in older and sicker patients with more complex disease (441). Nearly all reports during the past 10 years define "elderly" in the context of coronary surgery as age 70 years or older. However, the definition of elderly in the literature has gradually increased from 65 years or older to 80 years or older. The greatest increase in numbers has occurred in the oldest group, persons 85 years or older (442). This group has a higher incidence of left main disease, multivessel disease, LV dysfunction, and reoperation as the indication for surgery, and for many, concomitant valvular surgery. These patients generally have more comorbid conditions, including diabetes, hypertension, COPD, PVD, and renal disease. This combination of more advanced coronary disease and worse comorbidity leads to increased fatal and nonfatal complications. Higher rates of intraoperative or postoperative MI, low-output syndrome, stroke, gastrointestinal complications, wound infection, renal failure, and use of an IABP may occur (443,444). In Figure 10, operative mortality (%) is shown as a function of age. A near-linear slope increases abruptly at age 75. Similarly, in Figure 11 the OR for operative mortality is shown as a function of age (21). The effects of these factors on patient outcomes and institutional resources have significant implications for peer review, quality assurance screening, institutional reporting to external sources, and reimbursement (443).

Operative mortality in the elderly has ranged from 5% to 20% during the past 20 years for isolated CABG, averaging 8.9%. In a large study from Ontario, Canada, Ivanov et al (442) found a 34% reduction in risk-adjusted operative mortality (1982 to 1996) while confirming a time-related increase in the prevalence of older patients and an increase in the preoperative risk profile in these patients. They reported an overall mortality of less than 5% for elderly patients, with a 3% mortality for low- and medium-risk patients.

Preoperative predictors of hospital mortality and morbidity (30 days) in elderly patients include a near-linear relation to New York Heart Association (NYHA) class and/or reduced LVEF (particularly if less than 0.20). Other correlates of increased risk include increasing age; recent MI (less than 30 days), especially in the presence of unstable angina, left main disease, or 3-vessel disease; emergency or urgent coronary bypass; reoperation; reduced renal function; cerebrovascular disease; COPD; a smoking history; obesity; and female sex (21,445-452). A higher operative mortality occurs for all identified risk factors in patients aged 75 years or older than for those less than 65 years old. However, in particular, emergency surgery confers up to a 10-fold increase in risk (3.5% to 35%), urgent surgery a 3-fold increase (3.5% to 15%), hemodynamic instability a 3- to 10-fold increase, and an LVEF less than 0.20 up to a 10-fold increase (21,453,454). Predictors of postoperative low cardiac output syndrome are, in descending order of importance, LVEF less than 0.20, repeat operation, emergency operation, female sex, diabetes mellitus, age greater than 70 years, left main disease, recent MI, and/or 3-vessel disease (455). The greatest risk is in the acutely ill, elderly patient for whom the CABG operation may be the best of several high-risk options (456).

Downloaded from circ.ahajournals.org by on August 4, 2008

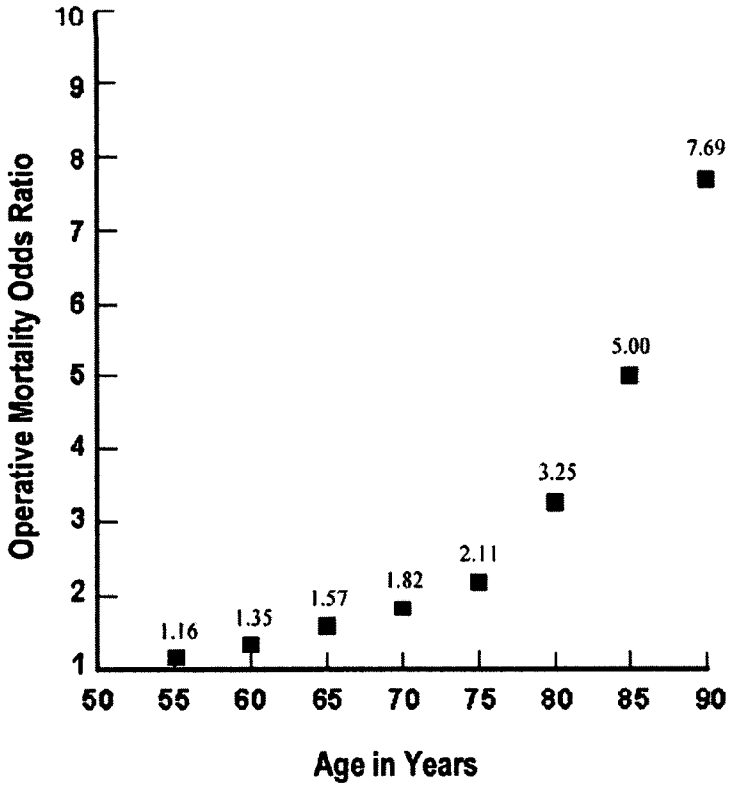


Figure 11. Operative mortality odds ratio (relative to odds for 50-year-old patients). Data derived from Hannan et al. Am Heart J. 1994;128:1184-91(21).

Operative factors that have been reported to adversely influence hospital mortality in the elderly include the use of bilateral IMA grafts, prolonged pump time and/or cross-clamp time, an increased number of grafts required, right IMA grafting, and any postoperative complication (448,449,457,458). Obesity has been identified as a risk factor for infection in patients receiving bilateral IMA grafts (457). Contrariwise, improved hospital mortality and long-term survival have been reported when the left IMA is used along with 1 or more vein grafts as opposed to vein grafting alone. Thus, use of the left IMA as a conduit appears to be a predictor of improved early and late survival (41,42,276,459). CABG without cardiopulmonary pump assistance may be advantageous in high-risk patients, particularly those with an LVEF less than 0.35 (460,461).

Postoperative atrial fibrillation is a particular problem in elderly patients undergoing CABG. Correlates of postoperative atrial fibrillation include age greater than 70 (especially age greater than 80), male sex, postoperative pulmonary complications, ventilation time greater than 24 hours, return to the intensive care unit, and use of the IABP. Atrial fibrillation contributes to a substantially prolonged hospital stay (9.3 plus or minus 19 versus 15.3 plus or minus 28 days) (351). Patients with preoperative chronic renal failure are at a particular risk, as they tend to be older and have additional comorbidity (71). Interventions to prevent atrial fibrillation are discussed in Section 4.1.5.

It should be emphasized that long-term survival and functional improvement can be achieved in the elderly patient despite severe cardiovascular disease and an urgent indication for surgery (462). The 5-year survival of such patients who recover from surgery is comparable to that of the general population matched for age, sex, and race (463,465). Preoperative variables that are correlated with poor long-term survival in elderly patients include the presence of atrial fibrillation, smoking, PVD, and poor renal function (low creatinine clearance). An unsatisfactory functional outcome has been influenced by hypertension, cerebrovascular insufficiency, and poor renal function (low creatinine clearance) (466).

Peterson et al (467) analyzed the Medicare database to assess long-term survival in patients 80 years and older and found it comparable to the general population of octogenarians. This group was hospitalized significantly longer than those aged 70 or younger (21.4 versus 14.3 days) and had a higher hospital mortality (11.5% versus 4.4%) and higher 3-year mortality (28.8% versus 18.1%). Hospital costs and charges were also higher. Similar findings are reported by others, with actuarial survival including hospital death at 80 months of 32.8% versus 37.6% for age-, sex-, and race-matched populations. These authors concluded that

Downloaded from circ.ahajournals.org by on August 4, 2008

advanced age alone should not be a contraindication to CABG if it had been determined that long-term benefits outweighed the procedural risk (465,467,468). Although hospitalization may be longer for elderly patients, physiological, psychological, and social recovery patterns through the first 6 weeks postoperatively have been reported to be similar to those of a younger age group (469). Age 70 and older is an independent risk factor for stroke after CABG, adversely affecting hospital mortality, prolonging the hospital stay, and negatively impacting late death (470).

In operations combining valve surgery and CABG, independent predictors for reduced late survival included NYHA Class IV, age greater than 70 years, male sex, decreased LVEF, extent of CAD and use of a small prosthetic valve, but not necessarily the presence of CAD per se (471-474).

In summary, the patient aged 70 years or older who may be a candidate for CABG surgery has, on average, a higher risk for mortality and morbidity from the operative procedure in a direct relation to age, LV function, extent of coronary disease, comorbid conditions, and whether or not the procedure is emergent, urgent, or a reoperation. Nonetheless, functional recovery and an improvement in quality of life may be achieved in the large majority of such patients.

The patient and physician together should explore the potential benefits of improved quality of life with the attendant risks of the procedure versus alternative therapy, taking into account baseline functional capacities and patient preferences. Age alone should not be a contraindication to CABG surgery if it is thought that long-term benefits outweigh the procedural risk (448,475-477).

5.2. CABG in Women

Early studies provided evidence that female sex was an independent risk factor for higher in-hospital mortality and morbidity than in males, but that long-term survival and functional recovery were similar to those in males undergoing CABG surgery (29,478-481). More recent studies have suggested that on average, women have a disadvantageous preoperative clinical profile that may account for much of this perceived difference. This includes the fact that women present for treatment at an older age, with poorer LV function, more frequently with unstable angina pectoris, NYHA Class IV heart failure, 3-vessel and left main disease, and more comorbid conditions including hypothyroidism, renal disease, diabetes mellitus, hypertension, and PVD (25,480-489). Based on these differences, it has been inferred that women may be under-referred or referred late for treatment and/or coronary angiography. These findings are not universal, as significant differences exist in clinical practice between institutions (481,482).

A variety of factors may account for the perception that female sex is an independent risk factor for in-hospital mortality and morbidity after CABG surgery. For example, Israeli women were reported to have a 3.2-fold higher hospital mortality than men, but women also received a higher number of SVGs, suggesting more diffuse disease. When this consideration was adjusted for, mortality was found to be similar (490). Others have argued that smaller coronary arteries in women may contribute to higher risk (26). IMA grafts have been reported to be used less often in women, possibly contributing to a higher mortality (25,486). Kurlansky et al (78) reported favorable results in 327 women with bilateral IMA grafts plus supplemental vein grafts, with a hospital mortality of 3% to 4%, low postoperative morbidity, excellent functional improvement, and enhanced long-term survival. Five-year survival of 90.5% and of 65.6% at 10 years was achieved, with 94% of patients reaching NYHA Class I and 4.5% NYHA Class II. Hammar et al (480) reported that when age and body surface area were taken into account, the relative operative risk between men and women became similar. Others have also found no differences in operative mortality, total postoperative morbidity, and ICU length of stay (491,492). Comparable findings were reported for coronary bypass surgery in black male and female patients (493).

However, analysis from the CASS registry found a higher operative mortality for women (493) as did Jaglal et al (494), even when comorbidities were adjusted for appropriately. They suggested that the excessive mortality was due to late treatment (494). Farrer et al (495) found that women had more severe symptoms with a similar severity of coronary disease as defined by angiography when compared with men, suggesting a referral bias with referral occurring later in the course of the disease. Whether these perceived biases are real and whether they are practitioner or patient related or have a biological explanation is not known. They serve as a challenge for future investigation (496).

Postoperative complications in women mirror those seen in all patients undergoing CABG surgery. These include MI, stroke, reoperation for bleeding, pulmonary insufficiency, renal insufficiency, sternal wound infection (perhaps related to obesity), CHF, rhythm other than normal sinus rhythm, and low cardiac output syndrome (25,78,490). Women appear particularly vulnerable to postoperative CHF, low cardiac output syndrome (25,29,482), and blood loss (485). Although postoperative depression is common in women and men, its occurrence in women has been reported to be more common (about 60%) and more commonly unrecognized (484). Nonetheless, at 6 months postoperatively, men and women report similar psychosocial recovery (100) (see Section 4).

In the CASS registry, although a higher operative mortality for women was found, the subsequent 15-year postoperative survival and benefits were similar to those for men. Greater absolute benefit was achieved in those with the highest risk in both male and female groups. For women, independent risk factors for poorer long-term survival included older age, prior MI, prior CABG, and diabetes mellitus (497).

Over time, changes in the clinical characteristics of women undergoing CABG mirror those of the changing characteristics of the general population. One study compared female

Downloaded from circ.ahajournals.org by on August 4, 2008

0223
09/15/08

patients operated on between 1974 and 1979 to a group receiving surgery between 1988 and 1999 and showed that operative mortality had increased from 1.3% to 5.8%. This rise was attributed to an older cohort of women, more emergency or urgent operations, an increased incidence of depressed LV function, diabetes mellitus, and more 3-vessel and left main disease, all suggesting that the female population undergoing coronary bypass surgery had changed (498). In another report, women aged 70 or older were found to be at no greater risk for operative mortality and postoperative complications than men of similar age (499).

Another study based on the STS national database examined more than 300 000 patients undergoing CABG after 1994. Women were found to have a significantly higher operative mortality for all risk factors examined even when normalized for size (body surface area). A logistic risk model was used to determine the net impact of all risk factors. The model showed that in risk-matched patients, female gender was an independent risk factor of operative mortality in low- and moderate-risk subsets but not in high-risk populations (28).

In conclusion, it appears that in-hospital mortality and morbidity and long-term survival are related more to risk factors and patient characteristics than to sex. Coronary bypass surgery should therefore not be delayed or denied to women who have the appropriate indications for revascularization.

5.3. CABG in Patients With Diabetes

Coronary artery disease is the leading cause of death among adult patients with diabetes and accounts for about 3 times as many deaths among patients with diabetes as among patients without diabetes (500). Not only is the frequency of acute MI increased in patients with diabetes (501,502) but also its treatment is more complicated than in the patients without diabetes. Patients with diabetes with acute MI, regardless of the level of control of their diabetes before hospital admission, exhibit significantly higher mortality and morbidity, with fatality rates as high as 25% in the first year after infarction in some series. Several factors contribute to this increase in mortality. The size of the infarct tends to be greater, and patients with diabetes have a greater frequency of CHF, shock, arrhythmias, and recurrent MI than do patients without diabetes. Similarly, patients with diabetes with unstable angina have a higher mortality than do patients without diabetes. A prospective study indicated a 3-month mortality of 8.6% and 1-year mortality of 16.7% in patients with diabetes versus 2.5% and 8.6%, respectively, in patients without diabetes (503).

CABG surgery in elderly patients with diabetes (age 65 or greater) has been reported to result in a reduction in mortality of 44% in CASS. The relative survival benefit of CABG versus medical therapy was comparable in patients with and without diabetes (503a). Nevertheless, a study from Sweden has indicated that patients with diabetes of all ages have a mortality rate during the 2-year period after CABG that is about twice that of patients without diabetes. Thirty-day mortality after CABG was 6.7% in patients with diabetes, and subsequent mortality between day 30 and 2 years was 7.8% compared with 3% and 3.6%, respectively, in patients without diabetes (504).

Despite increased morbidity and mortality after coronary revascularization, results from the BARI trial showed that patients with multivessel coronary disease who were being treated for diabetes at baseline had a significantly better survival after coronary revascularization with CABG than with PTCA (Figure 6) (117). In this study, patients were followed up for an average of 5.4 years. Better survival with CABG was due to reduced cardiac mortality (5.8% versus 20.6%, P equals 0.0003), which was confined to those patients receiving at least one IMA graft. Thus, although mortality after CABG surgery may be increased in patients with diabetes, CABG surgery when indicated appears to provide a better chance for survival than does medical therapy or PCI.

Large randomized trials have now reached 7 to 8 year follow-up (131,130). These updated studies generally show that 7 to 8 year survival is superior for patients with diabetes undergoing CABG compared with patients with diabetes undergoing PTCA (131,130). In the BARI trial, the protective effect of CABG was only seen in insulin-dependent patients with diabetes (505) who had an IMA graft (131). There was virtually no difference in survival among patients without diabetes.

Patients with diabetes who are candidates for renal transplantation may have a particularly strong indication for CABG surgery. Approximately 20% to 30% of these patients have significant CAD, which may be asymptomatic or unassociated with conventional cardiovascular risk factors (390,506). One study assessed the incidence of coronary disease via angiography (which was performed independently of the presence of risk factors or suggestive symptoms) in 105 consecutive dialysis patients with diabetes (390). Angiographic evidence of significant coronary disease was found in 38 (36%) patients, only 9 of whom experienced prior symptoms of angina. The degree of hypercholesterolemia, hypertension, and smoking history did not differ between those with and without documented coronary disease. Thus, noninvasive testing and, if indicated, cardiac catheterization should be performed before renal transplantation, because conventional clinical predictors of disease are unreliable and active intervention may improve patient outcomes (390,507). This approach is supported by a study that randomized 26 patients with greater than 75% stenosis in at least 1 coronary artery and relatively normal LV function to either revascularization or medical therapy with aspirin and a calcium channel blocker (506). Both the incidence of cardiovascular end points (2 of 13 versus 10 of 13) and mortality rate (0 of 13 versus 4 of 13) were lower in the revascularized patients.

5.4. CABG in Patients With Pulmonary Disease, COPD, or Respiratory Insufficiency

For many years, it has been recognized that patients undergoing cardiac surgery develop variable degrees of respirato-

Downloaded from circ.ahajournals.org by on August 4, 2008

ry insufficiency postoperatively. In these patients, higher concentrations of oxygen are required to achieve adequate arterial oxygen tension, primarily as a consequence of intrapulmonary shunting. Scattered regions of atelectasis and alveolar collapse may occur, resulting in some air spaces receiving pulmonary blood flow that are not being ventilated. Other contributing factors may occur. Impaired capillary endothelial integrity may be followed by an increase in interstitial fluid and alveolar edema. Anesthetic agents and vasodilators may affect pulmonary vasoconstriction. Other causes of gas exchange abnormalities after cardiac surgery include central effects from anesthesia and narcotics as well as CNS embolization of air or blood clots. Impairment of carbon dioxide elimination may develop from either a rise in alveolar dead space or a decrease in ventilatory drive from the effects of general anesthesia and/or narcotics. Inadequate tidal volume from neuromuscular weakness may occur. Changes in the mechanics of breathing may occur postoperatively as a result of inhalation anesthetics and/or muscle-paralyzing agents. Pain from the chest incision and thoracic or mediastinal chest tubes may result in diminished excursion of the chest and diaphragm. Obesity and rare phrenic nerve injury may also play a role (508). Postoperatively, early extubation is desirable, appears safe, and does not increase postoperative cardiac or pulmonary morbidity, especially if the total bypass time is less than 100 minutes (509,510). However, longer periods of mechanical ventilatory support postoperatively may be necessary in patients who develop acute adult respiratory distress syndrome or who have evidence of severe pulmonary insufficiency postoperatively. In such patients, ventilation with lower tidal volumes (6 mL/kg) should be considered (511).

Preoperatively, it is important to identify patients with significant restrictive or obstructive pulmonary disease. The former includes patients with pulmonary venous congestion, large pleural effusions, and a large, dilated heart compressing the lungs, all of which may result in a reduction of lung compliance. Restrictive lung disease is also found in patients with interstitial lung disease including pulmonary fibrosis, sarcoidosis, pneumoconiosis, and collagen vascular diseases. The most common cause of preoperative pulmonary dysfunction, however, is COPD. Patients with mild COPD and few or mild symptoms generally do well through cardiac surgery. However, patients with moderate to severe obstructive pulmonary disease who are undergoing coronary bypass grafting, especially those in an older age group, are at an increased risk for operative mortality and postoperative complications in relation to the severity of their degree of pulmonary dysfunction (445,512-514). Identification of these higher-risk patients is important because preoperative measures to improve respiratory function may diminish postoperative complications. These measures include the use of antibiotic therapy for lung infections, bronchodilator therapy, cessation of smoking, preoperative incentive spirometry, deep-breathing exercises, and chest physiotherapy. Such measures frequently permit patients with obstructive pulmonary disease to safely undergo cardiac surgery (512).

The parameter most commonly reported by authors in estimating the degree of pulmonary dysfunction is the forced expiratory volume in the first second (FEV_1). However, there is little consistency in the literature defining the level of abnormality for moderate to severe COPD, with values for FEV_1 ranging from less than 70% to less than 50% of the normal predicted value and/or an FEV_1 of less than 1.5 L. Others measure arterial oxygen tension and carbon dioxide tension. Any degree of hypercapnia above a normal range places the patient at least in a moderate-risk category (508,512,513), as does the need for oxygen at home before surgery. FEV_1 levels as low as 1.0 L would not necessarily disqualify a candidate for CABG surgery. Clinical evaluation of lung function is likely as important as most spirometric studies. This sentiment is reflected by Cohen et al (513), who compared 37 patients with COPD who were undergoing CABG surgery to 37 matched control patients without COPD. They defined COPD in clinical terms (i.e., age, smoking history, presence of preoperative arrhythmias, history of hospitalization for shortness of breath, and evidence of COPD on X-ray film). Those with COPD had lower values for FEV_1 (1.36 plus or minus 0.032 versus 2.33 plus or minus 0.49 L) and a lower arterial oxygen tension. This group had a significantly higher rate of preoperative atrial and ventricular arrhythmias. Postoperatively, they remained in the ICU longer, had a longer intubation period and more frequent reintubations, had more postoperative atrial and ventricular arrhythmias and complications, and remained in the hospital twice as long. By 16 months postoperatively, 5 of the COPD patients had died, with deaths related to arrhythmias. None was functionally improved after coronary bypass surgery. These investigators concluded that clinical COPD is a significant factor for morbidity and mortality, in large part due to more frequent postoperative arrhythmias. Subsequent long-term clinical benefits were significantly reduced (513). Kroenke et al (512) reported the results of 107 operations in 89 patients with severe COPD, defined as an FEV_1 less than 50% of predicted and an FEV_1 to forced vital capacity ratio of less than 70%. In this diverse group, 10 patients underwent CABG surgery. Pulmonary complications occurred postoperatively in 29% of all patients and were significantly related to the type and duration of surgery. Mortality clustered primarily around the time of CABG (5 of 10 patients) compared with only 1 death in 97 noncoronary operations. In this study, noncardiac surgery (as opposed to CABG) was accompanied by an acceptable operative risk in patients, even in the presence of severe COPD (512).

Severe, reversible, restrictive pulmonary function abnormalities, which appear not to be caused by advanced age or preexisting COPD, have been reported to follow coronary bypass surgery in the early postoperative period. In the early postoperative period, these changes may delay ventilator weaning in the first 72 hours, but full recovery is expected

Downloaded from circ.ahajournals.org by on August 4, 2008

(515). Wahl et al (515) compared pulmonary function in a group of patients older than age 70 with a group with COPD, defined as a ratio of FEV_1 to forced vital capacity of less than 70% and total lung capacity less than 80% of predicted, and a normal group in the preoperative and postoperative periods. All 3 groups demonstrated comparable decreases in FEV_1, total lung capacity, and forced vital capacity postoperatively. Partial recovery occurred by day 7 and returned to preoperative levels by 3 months (515). Similar findings were reported by Goyal et al (516) after CABG with saphenous veins, IMAs, or a combination. Others have reported more severe abnormalities of pulmonary gas exchange and pulmonary function through 72 hours postoperatively in patients receiving left IMA grafts, with normality returning by hospital discharge (517,518).

A history of COPD and greater than 2 days on a mechanical ventilator postoperatively have been reported as risk factors for nosocomial pneumonia in patients post-CABG (519) and have been documented as a risk factor for mediastinitis (520,521). Moderate to severe degrees of obstructive pulmonary disease preoperatively, whether defined by clinical or laboratory parameters, represent a significant risk factor for early mortality and/or postoperative morbidity in patients undergoing CABG. However, with careful preoperative assessment and treatment of the underlying pulmonary abnormalities, many patients may be successfully carried through the operative procedure.

5.5. CABG in Patients With End-Stage Renal Disease

Cardiovascular disease is the single best predictor of mortality in patients with end-stage renal disease (ESRD), as it accounts for almost 54% of deaths (522). The high rate of cardiac morbidity and mortality is occurring at a time when the prevalence of coronary disease is declining in the general population and is related in part to the changing nature of new patients being started on dialysis. At present, more than one third of such patients have diabetes mellitus, and the average patient age at initiation of dialysis is greater than 60 years. In addition to the foregoing, patients with ESRD usually have a number of other risk factors for cardiovascular mortality, including hypertension, LV hypertrophy, myocardial dysfunction, abnormal lipid metabolism, anemia, and increased plasma homocystine levels.

When indicated, patients on dialysis can be treated with CABG. The indications for CABG are similar to those in patients without ESRD with coronary disease. Coronary revascularization with CABG or PTCA is associated with better survival than is standard medical therapy in several specific settings. These include patients with a modest decrease in LV function, significant left main coronary disease, 3-vessel disease, and unstable angina (523). Although these patients also are at increased risk for operative morbidity and mortality, they are at even higher risk when treated with conservative medical management.

It should be noted that patients with chronic renal failure clearly differ in several respects from other patients who undergo surgical coronary revascularization. Patients with ESRD often have multiple comorbid disorders, including hypertension and diabetes mellitus, each with its own complications and associated impact on both short- and long-term survival (524). In addition, infection and sepsis have been identified as significant causes of morbidity and mortality in patients with ESRD undergoing cardiac surgical procedures (524). As a result of these factors and others such as perioperative volume and electrolyte disturbances, patients with chronic renal failure are at increased risk for complications after CABG.

Patients with ESRD have an increased risk with CABG. The Northern New England Cardiovascular Disease Study Group reported that after adjusting for known risk factors in multivariate analysis, dialysis-dependent patients with renal failure were 3.1 times more likely to die after CABG (adjusted OR 3.1, 95% confidence interval 2.1 to 4.7; P less than 0.001) (525). Dialysis-dependent patients with renal failure also had a substantially increased risk of postoperative mediastinitis (3.6% versus 1.2%) and postoperative stroke (4.3% versus 1.7%) (525). CABG surgery in patients on dialysis may be associated with an acceptable mortality, with a significant increase in the quality of life for long-term survivors.

In summary, coronary bypass grafting may be performed for selected patients with ESRD who are dialysis dependent, with increased but acceptable risks of perioperative morbidity and mortality. Early after revascularization, patients may expect relief from coronary symptoms with coincident improvement in overall functional status. However, long-term survival remains relatively limited in this patient population, suggesting a need for further investigations to establish the relative costs and benefits of revascularization in patients with dialysis-dependent ESRD.

5.6. Valve Disease

Class I

Patients undergoing CABG who have severe aortic stenosis (mean gradient greater than or equal to 50 mm Hg or Doppler velocity greater than or equal to 4 m/s) who meet the criteria for valve replacement should have concomitant aortic valve replacement. ***(Level of Evidence: B)***

Class IIa

1. **For a preoperative diagnosis of clinically significant mitral regurgitation, concomitant mitral correction at the time of coronary bypass is probably indicated.** ***(Level of Evidence: B)***
2. **In patients undergoing CABG who have moderate aortic stenosis and are at acceptable risk for aortic valve replacement (mean gradient 30 to 50 mm Hg or Doppler velocity 3 to 4 m/s) concomitant aortic valve**

Downloaded from circ.ahajournals.org by on August 4, 2008

0226
09/15/08

replacement is probably indicated. ***(Level of Evidence: B)***

Class IIb

Patients undergoing CABG who have mild aortic stenosis (mean gradient less than 30 mm Hg or Doppler velocity less than 3 m/s) may be considered candidates for aortic valve replacement if risk of the combined procedure is acceptable. ***(Level of Evidence: C)***

The coexistence of CAD and valvular disease will vary throughout the population, dependent on which disease initiates the patient's symptoms, their age, sex, and clinical risk factors. The incidence of aortic valve disease in patients undergoing CABG is much less than the incidence of CAD in patients undergoing valve replacement. In general, the incidence of CAD in patients with typical angina who are undergoing aortic valve replacement (AVR) is 40% to 50% and drops to about 25% in patients with atypical chest pain and to about 20% in those without chest pain (526-533). The incidence of CAD is generally less in patients with aortic regurgitation than aortic stenosis owing to the younger patient population presenting with aortic regurgitation (526-533). The incidence of CAD in patients with mitral stenosis is small, owing to the fact that this lesion is more frequently seen in middle-aged women.

There is a distinctive relationship between mitral regurgitation (MR) and CAD, especially when the mitral valve is structurally normal but functionally regurgitant. This MR is usually caused by ischemia. The quandary this presents is when the MR requires correction at the time of CABG. The question is easily answered if there are structural abnormalities in the mitral apparatus. Mitral repair is indicated in the majority of such circumstances, although occasional patients require valve replacement. The structurally normal mitral valve may be regurgitant due to reversible ischemia involving the papillary muscles, and the dilemma is, "When is it necessary to inspect the mitral valve for correction?" Intraoperative TEE has brought dramatic refinement to this question by providing a functional and quantitative assessment before and after CPB. When the MR is grade 1 to 2, this may decrease during anesthesia induction and/or with complete revascularization, thus eliminating the need to inspect the valve during cross-clamping of the aorta. An added finding by echocardiography or direct inspection at the time of operation is the presence of an enlarged left atrium, which generally signifies chronicity of the MR and adds justification to the consideration of mitral valve repair. This strategy is further assessed by a final post-CPB TEE in the operating room. If, under this circumstance, the MR is unacceptable, reinstitution of CPB can be performed and the MR corrected. For instance, if the MR is grade 3 to 4, it is necessary to inspect the valve and correct the mechanical lesion. It is important to stress that in this situation, it is imperative that an intraoperative TEE be performed to see whether the MR is grade 3 to 4, to assess the reparability of the valve, and to assess success of the repair. The study by Aklog and associates (534) concluded that CABG surgery alone for moderate ischemic MR leaves many patients with significant residual MR. These authors conclude that a preoperative diagnosis of moderate MR may warrant concomitant mitral annuloplasty (534).

For situations in which patients are undergoing mitral valve surgery and have "incidental" CAD and nonischemic mitral valve disease, the approach has been to perform CABG on vessels with greater than 50% stenosis at the same operation. There are far fewer data on this topic than that of AVR and CAD, but conventional wisdom has promoted this policy, and there have not been reports of significant increases in operative mortality.

The discussion of combined procedures revolves around overall operative risk, which is dependent on several variables. The most notable of these are age greater than 70 years, female sex, advanced NYHA class, poor LV function, and multiple valve procedures (535). There is also a difference in early and late mortality when the valve lesion is aortic versus mitral and when the mitral lesion is ischemic. The simple addition of MR to a coronary bypass without valve correction increases the operative mortality to 3% to 5%. The operative mortality of rheumatic mitral valve disease and CAD varies from 3% to 20% (536). The addition of a valve operation to CABG is also associated with a substantial increase in the risk of stroke (536a).

The results of combined aortic valve and coronary disease have led to the recommendation to graft obstructed vessels (greater than or equal to 50%) when an AVR is performed. The operative mortality for patients undergoing AVR who have ungrafted CAD approaches 10%, while those patients having AVR and concomitant CABG for CAD have an operative mortality approaching that of AVR alone (537). It is generally accepted that the risk of adding CABG to a valve replacement or repair will increase the operative mortality over that of an isolated valve procedure. The additional variables of age greater than 70 or 80 years and poor LVEF will further increase this risk.

Another aspect of this combined condition is the patient with prior CABG who now requires a valve replacement or repair. There is inconclusive evidence that the reoperative risk of late AVR after previous CABG is significantly increased. Sundt et al (538) stated that the operative risk for AVR alone was 6.3%, whereas the risk of AVR after previous CABG was 7.4%. Odell et al (539) found the risk of reoperative AVR with prior CABG to be 12%. A report from the same institution identified an operative risk of 3.7% (11 of 297) for isolated AVR (540). The discrepancy may be due to sample size, in that the article by Sundt et al reviewed 52 patients, whereas Odell et al reported on 145 patients undergoing reoperation for AVR with prior CABG.

5.7. Reoperation

Patients who have undergone CABG may present with recurrent ischemic syndromes and be considered for reoper-

Downloaded from circ.ahajournals.org by on August 4, 2008

0227
09/15/08

ation. The voluntary STS National Database has reported an incidence of reoperation of 8.6% to 10.4% in isolated bypass operations since 1987, and in centers experienced with reoperations, the percentage of isolated bypass operations constituting reoperations may be 20% to 25%. Reoperative candidates represent a distinct subgroup of bypass surgery patients. Segments of myocardium may be supplied by patent arterial grafts (at risk for damage during reoperation) or by atherosclerotic vein grafts. Vein graft atherosclerosis is a pathology that is different from native-vessel CAD and it is more prone to cause embolization and thrombosis. In addition, reoperative candidates are older and often have far advanced coronary and noncoronary atherosclerosis. Left ventricular function is commonly abnormal, and conduits to perform bypass grafts may be lacking (541).

The mortality rate for reoperation is greater than that for primary surgery, although in experienced centers that risk differential has narrowed with time. Advanced age, abnormal LV function, number of atherosclerotic vein grafts, the number of previous bypass operations, and emergency status are specific variables that have been consistently associated with an increased in-hospital risk associated with reoperation. Emergency operation, in particular, substantially increases the risk of reoperation. Third and fourth bypass operations are increasing in frequency and have all the difficulties associated with a second operation, only more so. They have been associated with an increased mortality rate, an increased risk of hospital complications, and increased cost (541).

However, despite the difficulties of reoperation, it is often the best treatment strategy for many patients with recurrent ischemic syndromes. No randomized studies comparing treatment options for patients with previous bypass surgery exist. However, an observational study of patients receiving coronary angiograms after bypass surgery has shown that for patients with late (greater than or equal to 5 years after operation) stenoses in vein grafts, there is a high risk of subsequent cardiac events and a relatively high risk of death. A subsequent observational comparative study showed that reoperation improved the survival rate and symptom status of patients with late vein graft stenoses, particularly if an atherosclerotic vein graft subtended the LAD coronary artery. Further studies have identified a positive stress test as a factor that incrementally defines a group of patients at high risk without repeat surgery. Percutaneous procedures have often been effective in the treatment of patients with native coronary stenoses but have been particularly ineffective in the treatment of atherosclerotic vein graft stenoses. These considerations combined with late survival rates after reoperation of 90% to 95% at 5 years, and more than 75% at 10 years, indicate that reoperation can be a sound form of treatment for patients with severe symptoms or survival jeopardy (541).

As the impact of vein graft atherosclerosis on graft failure was appreciated in the early 1980s, it appeared as though the need for coronary reoperation might become overwhelming, but a number of factors decrease the reoperation rate. One is the use of arterial grafts. Despite the lack of randomized data observational studies clearly indicate that use of the left IMA to LAD graft decreases reoperation rate. Studies also indicate that the strategy of bilateral IMA grafting may further decrease the reoperation rate. Second, vein graft failure may be delayed by pharmacological treatment. Early vein graft patency rates are clearly improved by perioperative treatment with platelet inhibitors, and the use of postoperative statin therapy decreases late vein graft failure rate and the incidence of late clinical events. Finally, the availability of percutaneous treatments may further delay the need for reoperation (541).

5.8. Concomitant PVD

The coexistence of CAD and PVD is well known. It is estimated that the prevalence of serious, angiographic CAD ranges from 37% to 78% in patients undergoing operation for PVD (542). CAD is the leading cause of both early and late mortality in patients undergoing peripheral vascular reconstruction (543). MI is responsible for about half of all postoperative deaths in patients undergoing abdominal aortic aneurysm resection (544,545), extracranial revascularization (199,546), or lower-extremity revascularization (545,547). Long-term survival after successful vascular reconstruction is limited by the high incidence of subsequent cardiac death (548). On the other hand, the presence of PVD is a strong, independent predictor of long-term mortality in patients with stable chronic angina (549). After successful myocardial revascularization, patients with PVD are at substantially increased risk for in-hospital (37) and long-term (550) mortality.

The importance of preoperative cardiac evaluation was demonstrated by Hertzer et al (543) in a study of 1000 patients with PVD: abdominal aortic aneurysm, cerebrovascular disease, or lower-extremity ischemia. All 1000 patients underwent coronary angiography. Severe, surgically correctable CAD was found in 25% of the patients; 34% of the patients suspected to have CAD on clinical grounds were found to have severe, surgically correctable CAD; 14% of the patients not suspected to have CAD were found to have severe, surgically correctable CAD. The early postoperative mortality rate after the peripheral vascular procedures was lower in patients who had preliminary CABG compared with those who did not. The long-term beneficial effect of preliminary CABG in patients undergoing peripheral vascular reconstruction was reported by Eagle et al (549) in their retrospective cohort analysis of 1834 patients with combined CAD and PVD. Nine hundred eighty-six patients received CABG and 848 patients were treated medically. In a mean follow-up of 10.4 years, 1100 deaths occurred and 80% were due to cardiovascular causes. The group treated with surgical coronary revascularization had significant survival benefits at 4, 8, 12, and 16 years compared with patients treated with medical therapy alone. Subgroup analysis suggested that the long-term survival benefits of surgical coronary

Downloaded from circ.ahajournals.org by on August 4, 2008

revascularization were particularly seen in patients with 3-vessel CAD and depressed LVEFs.

The predictive value of PVD for short- and long-term clinical outcomes of patients receiving CABG was also examined by the Northern New England Cardiovascular Disease Study Group (37,550). In-hospital mortality rates with CABG in patients with PVDs were 7.7%, a 2.4-fold higher incidence than in patients without PVD (3.2%). After adjusting for higher comorbidity scores associated with patients with PVD, patients with PVD were 73% more likely to die in hospital after CABG. The excess risk of in-hospital mortality associated with PVD was particularly notable in patients with lower-extremity occlusive disease (adjusted OR 2.03). The presence of cerebrovascular disease had a small but nonsignificant effect on CABG-related in-hospital deaths (adjusted OR 1.13).

Excess mortality rates in patients with PVD were due primarily to an increased incidence of heart failure and dysrhythmias rather than cerebrovascular accidents or peripheral arterial complications. The difference in mortality rate was also apparent at long-term follow-up. Five-year mortality after CABG was substantially higher in patients with PVD than in those without PVD, with a crude hazard ratio of 2.77 and an adjusted hazard ratio of 2.01 after multivariate adjustment for comorbid conditions. Significantly elevated adjusted hazard ratios occurred in patients with overt cerebrovascular disease, clinical and subclinical lower-extremity occlusive disease, abdominal aortic aneurysm, and combined PVDs. Asymptomatic carotid bruit or stenosis conferred a small, nonsignificant increased adjusted hazard ratio of 1.47. In summary, the presence of clinical and subclinical PVD is a strong predictor of increased in-hospital and long-term mortality rate in patients undergoing CABG.

5.9. Poor LV Function

See Section 9.2.5 for recommendations.

LV function is an important predictor of early and late mortality after coronary artery surgery. LV dysfunction is associated with an increased risk of perioperative and long-term mortality in patients undergoing coronary bypass surgery compared with patients with normal LV function. Both low EF and clinical heart failure are predictive of higher operative mortality rates with CABG (551). In 6630 patients who underwent isolated CABG surgery in the CASS registry, the average operative mortality was 2.3%, ranging from 1.9% in patients with an EF greater than or equal to 0.50 to 6.7% in patients with an EF less than 0.19 (552). An operative mortality of 6.6% in patients with an EF less than 0.35 in comparison with 2.6% in patients with an EF greater than 0.50 was reported (553). Compared with patients with an EF of 0.40 or higher, patients whose EF was less than 0.20 or between 0.20 and 0.39 had 3.4 and 1.5 times higher perioperative mortality rates, respectively (17). Reports of perioperative mortality rate varied widely, ranging from about 5% in excellent centers in patients of a younger age, with fewer symptoms, and having no comorbid conditions, to greater than 30% in patients who were older, with severe ventricular dysfunction, and having several comorbid conditions (551). A trend toward lower operative mortality rates in recent years compared with those in early years has been reported, perhaps due to better myocardial protection techniques and perioperative management in the contemporary period.

Analysis of patients with an EF less than 0.35 from the CASS registry showed 5-year survival rates of 73%, 70%, and 62% in patients with an EF from 0.31 to 0.35, 0.26 to 0.30, and less than 0.25, respectively (554). A comparison between surgically treated and medically treated groups revealed the greatest surgical benefit in patients with an EF of 0.25 or less. The medically treated patients had a 5-year survival rate of 43% compared with 63% for those treated with coronary bypass surgery. A comparison study of 5824 patients who underwent medical or surgical therapy for ischemic heart disease in the Duke University Cardiovascular Database showed that patients with the worst LV function (EF less than 0.35) had the greatest 10-year survival benefit from bypass surgery (46% versus 27%). Patients with an EF of 0.35 to 0.50 had a 10-year survival rate of 62% in the surgical group versus 50% in the medical group (87). Patients with severe LV dysfunction have increased perioperative and long-term mortality compared with patients with normal LV function. However, the beneficial effects of myocardial revascularization in patients with ischemic heart disease and severe LV dysfunction are clearly evident when compared with medically treated patients in terms of symptom relief, exercise tolerance, and long-term survival (87,551,555,556). Coronary artery bypass graft surgery is recommended in patients with severe multivessel disease and poor ventricular function but with a large amount of viable myocardium. Patient selection is crucial for achieving the beneficial effects of myocardial revascularization in this subset of patients and is discussed in Section 9.

5.10. Transplantation Patients

Cardiac transplantation is an accepted treatment for end-stage heart failure, with greater than 30 000 cardiac transplantations performed worldwide to date (557). Allograft CAD is the leading cause of death after the first year of transplantation (558-560). This type of occlusive CAD is diffuse, often rapidly progressive, and affects a substantial number of heart transplant recipients. The incidence of angiographic transplant vasculopathy is estimated at 40% to 45% at 3 to 5 years after transplantation with a yearly attrition rate of 15% to 20% (561,562). Angina pectoris is rarely the presenting symptom in patients with allograft CAD owing to the lack of afferent autonomic innervation, although partial reinnervation of the allograft can occur. Silent MI, heart failure due to loss of allograft function, and sudden cardiac death are the common signs of cardiac allograft vasculopathy (561). Analysis of coronary angiograms of affected cardiac allografts has revealed unique morphological features consisting of diffuse, concentric narrowing

Downloaded from circ.ahajournals.org by on August 4, 2008

0229
09/15/08

in middle and distal vessels with distal vessel obliteration and a paucity of calcium deposition (563). The underlying pathophysiology of allograft vasculopathy is largely unknown, but it is likely a common final pathway of a constellation of immunologic and nonimmunologic injuries, namely chronic rejection, cytomegalovirus infection, hyperlipidemia, and older donor age (563-565). Treatment of hyperlipidemia with pravastatin (566) or weekly LDL apheresis (567) has been reported to lower the incidence of coronary vasculopathy or even lead to regression. Currently, retransplantation is the only definitive therapy for advanced allograft vasculopathy. Good results have been reported with PCI and directional coronary atherectomy in selected patients with discrete and proximal coronary focal lesions (568-569a). In general, coronary bypass surgery is not an option because of the diffuse type of coronary disease in patients with cardiac allograft vasculopathy. Isolated cases of successful coronary bypass grafting have been reported (570,571). In a report of 5 patients who underwent CABG for cardiac allograft vasculopathy, 3 patients died during the perioperative period and 1 died at 50 days.

It is well known that ESRD is associated with an increased risk of CAD (572). The safety and efficacy of coronary bypass grafting were reported in 31 renal transplant patients who underwent isolated coronary bypass surgery (573). Perioperative mortality was 3.2%, and no renal allograft function was impaired. Overall, 1- and 5-year survival rates for patients undergoing open heart surgery were 88% and 85%, respectively (573). The safety and efficacy of CABG were also reported in a small series of 3 patients with transplanted livers, with no deaths or hepatic decompensation and good improvement of cardiac symptoms (574). (See Section 5.5. on ESRD.)

5.11. CABG in Acute Coronary Syndromes

Class I

If clinical circumstances permit, clopidogrel should be withheld for 5 days before performance of CABG surgery. *(Level of Evidence: B)*

The acute coronary syndromes represent a continuum from severe angina to acute MI. Various classifications are based on the presence or absence of Q waves associated with evidence for myocardial necrosis, the elevation or depression of ST segments on the electrocardiogram, and clinical definitions based on the pattern of angina. Historically, a clinical definition encompassing progressive, rest, and postinfarction angina and Q-wave and non–Q-wave MI has been used to examine the effects of surgery. More recent nomenclature defines the spectrum of acute coronary syndromes from unstable angina to non–ST-segment elevation MI (NSTEMI) to ST-segment elevation MI (STEMI). Where appropriate, we use the new classification in this document, recognizing, however, that many of the cited trials categorized the patient subgroups according to the older nomenclature.

The effectiveness of CABG for unstable angina was first demonstrated in a randomized Veterans Administration trial comparing medical therapy with CABG initiated in 1976 (575). Although there was no overall difference in survival between medically and surgically treated patients, an improvement in survival with CABG occurred in patients in the lowest tertile of EF (0.3 to 0.58) at 3, 5, and 8 years of follow-up (105), in those with 3-vessel disease (576), and in those with LV dysfunction presenting with electrocardiographic changes (577). At 5 years of follow-up, surgically treated patients had less angina and improved exercise tolerance and required fewer antianginal medications than did the medically treated patients (110). It is difficult to interpret the results of this study because surgical and medical therapies have both evolved substantially, including the routine use of modern techniques for myocardial preservation, arterial bypass conduits, aspirin, fibrinolytics, and PCI.

There have been no randomized trials specifically comparing CABG and PCI in patients with unstable angina and multivessel CAD. The BARI trial prespecified a comparison subgroup based on the severity of angina. In this trial, 7% of patients had unstable angina or NSTEMI. There was no difference in 5-year overall survival for these patients treated with either CABG (88.8%) or PTCA (86.1%, *P* equals NS) (117). However, there was an increased cardiac mortality in patients treated with PTCA (8.8%) compared with CABG (4.9%), and this difference was entirely due to a difference in outcomes in treated patients with diabetes (129).

Table 17. Factors Associated With Adverse Outcome During Coronary Artery Bypass Grafting for Unstable Angina

Factor (Reference)	Relative Risk of Mortality (Range)
Clinical	
Recent MI: less than 24 h (777), less than 48 h (585), less than 30 d (451)	2.1-1.8
Female (451,582,584,777)	1.4-1.7
Age (451,452,584,779)	2.9-5.3*
IDDM (779)	8.3†
Angiographic/hemodynamic	
No. of diseased vessels (582,584)	1.9-2.3 (EF 0.20-0.39)
LV dysfunction (451,452,584)	5.9-10.7 (EF less than 0.20)
Hypotension (452,777)	6.5-7.8
Surgical	
Aortic cross-clamp time (582,779)	2.25‡
Urgent surgery (584,777)	1.8-1.9
Bypass time (779)	...
IABP support (779)	4.1

MI indicates myocardial infarction; IDDM, insulin-dependent diabetes mellitus; LV, left ventricular; IABP, intra-aortic balloon pump; and EF, ejection fraction.

*Age greater than 70 years.

†Relative risk for perioperative MI.

‡Relative risk of major adverse outcome greater than or equal to 100 versus less than 100 minutes.

Downloaded from circ.ahajournals.org by on August 4, 2008

In contrast, EAST included a large proportion (60%) of randomized patients with Canadian Cardiovascular Society Class IV angina, and there was no difference in mortality at 3 years (119). Similarly, 59% of enrollees in RITA had rest angina, and this study demonstrated no significant differences in death or MI at 2.5 years of follow-up (126). There was a particularly high incidence of unstable angina (83%) in the small ERACI trial (133). These patients had mostly complex lesions (50% type B2 and 13% type C), which are associated with greater angioplasty complications (578). However, in-hospital mortality was higher with CABG (4.6% versus 1.5%), and 3-year survival and freedom from STEMI were similar for both forms of revascularization (133).

No studies have addressed the important subset of patients with unstable angina after prior CABG. The culprit lesion in these patients is often located in a vein graft, where both angioplasty and reoperative CABG have less success (412).

Several early studies performed before 1990 demonstrated an increased surgical mortality ranging from 4.6% to 7.3% in patients with unstable angina (414,579-581). More studies have confirmed this finding (582,583). In the series of Louagie et al (582), 474 patients admitted with prolonged rest angina and requiring surgery during the same hospitalization had an operative mortality of 6.8% and a perioperative MI rate of 7.2%, and 19% required placement of an IABP. A study examining early revascularization versus conservative therapy for patients with NSTEMI had a much higher 30-day surgical mortality (12%) in patients undergoing early CABG compared with those managed conservatively (5%) (418).

In patients with post-infarct angina, a higher mortality has been observed, particularly with early operation after STEMI (409,579,584). Braxton et al (585) compared 116 patients operated on within 6 weeks of MI with 255 patients without prior MI. Mortality was highest (50%) in 6 patients with STEMI undergoing surgery less than 48 hours after infarction versus 7.7% in 52 patients undergoing surgery 3 to 42 days after infarction and versus 2% to 3% when CABG was performed even later and in patients without prior infarction. Factors associated with adverse outcomes during CABG for unstable angina are listed in Table 17.

A new issue that has arisen concerns the risk of CABG in patients with acute coronary syndrome treated with new and more potent antithrombotic and antiplatelet therapies. Several studies have demonstrated a greater risk for postoperative hemorrhage in patients treated with low-molecular-weight heparin (586), abciximab (587), and clopidogrel (588). It is important to understand the pharmacokinetics of these agents to reduce the risk. For instance, no increased bleeding was observed when the short-acting glycoprotein IIb/IIIa inhibitor eptifibatide was discontinued at least 2 hours before bypass (589), when platelet transfusions were appropriately administered after abciximab (590), and when clopidogrel was withheld for 5 days before surgery (588). In some instances, the need for urgent surgery supercedes the risk.

The use of CABG for primary reperfusion during STEMI has largely been superseded by fibrinolysis and primary PTCA. Early coronary bypass for acute infarction may be appropriate in patients with residual ongoing ischemia despite nonsurgical therapy and if other conditions warrant urgent surgery, including left main or 3-vessel disease, associated valve disease, mechanical complications, and anatomy unsuitable for other forms of therapy.

In conclusion, CABG offers a survival advantage compared with medical therapy in patients with unstable angina and LV dysfunction, particularly in those with 3-vessel disease. Currently, there is no convincing survival advantage for surgery over PTCA in patients with unstable angina suitable for treatment with either technique. However, the risk of CABG in patients with unstable angina, postinfarction angina, early after non-STEMI, and during acute MI is increased several fold relative to patients with stable angina, although the risk is not necessarily higher than that of medical therapy for these patients.

6. IMPACT OF EVOLVING TECHNOLOGY

6.1. Less-Invasive CABG

Patients presenting for CABG are older, have more comorbid conditions, and as a group have a higher predicted risk of mortality than their historical predecessors. Despite these trends, clinical outcomes after CABG have continued to improve (591,592).

Before 1995, the vast majority of CABG procedures used a midline sternotomy incision, CPB, and global cardioplegic arrest. Cardiopulmonary bypass has adverse effects on many organ systems and elicits a systemic inflammatory response. Some have sought to minimize the invasiveness of CABG through the elimination of CPB or through the use of smaller incisions or both.

Coronary artery bypass graft surgery on a beating heart without CPB was first reported by Kolessov in 1967, who was technically challenged by the motion of the heart, and access to the posterior surface of the heart was not possible (10). The technique was largely abandoned in the United States after the refinement of CPB. However, CABG on a beating heart was still practiced in several countries, where much experience was accumulated (593,594). These procedures were primarily reserved for patients needing LAD or right coronary artery (RCA) bypass because techniques for safe access to the lateral and posterior wall arteries had not developed.

Single LAD bypass on the beating heart through a small anterolateral thoracotomy (MID-CAB) was reintroduced in the mid-1990s (595-597). Target coronary artery stabilization was initially achieved with pharmacologically induced bradycardia or intermittent temporary asystole, with small bolus infusions of adenosine. Early angiographic anastomotic patency rates were inferior to those achieved with conventional CPB-CABG and prompted the development of

Downloaded from circ.ahajournals.org by on August 4, 2008

various styles of mechanical stabilizers to limit target artery motion. Patency rates improved with experience and with the use of mechanical stabilization (598).

Surgeons uncommonly are referred patients with single-vessel LAD disease, but the results of MID-CAB fostered interest in the development of techniques for multivessel OPCAB. Building on the experience of Benetti and Bufolo, surgeons developed methods to safely access lateral wall and posterior wall vessels. With mechanical coronary artery stabilizers, devices for clearing the anastomotic field of blood, intracoronary shunts, and techniques and devices for cardiac positioning, many centers were able to report sizeable series in which the large majority of CABG procedures were achieved without CPB (599-602).

Several retrospective studies have suggested that OPCAB may reduce morbidity and/or mortality. Nearly all reports have demonstrated reductions in the need for transfusion of blood products, shorter ICU stays, and shorter postoperative lengths of stay. Some of these studies have also suggested that hospital costs are reduced (603-605).

Hernandez et al (606) reported on the experience of the Northern New England Cardiovascular Disease Study Group comparing 1741 OPCAB and 6126 contemporaneous CPB patients. The groups differed somewhat in preoperative risk factors, but their predicted risk of mortality was the same. They found no differences in crude rates of mortality, stroke, mediastinitis, or return to the operating room for bleeding. OPCAB patients had a reduced need for IABP support, less atrial fibrillation, and shorter median postoperative lengths of stay.

Magee et al (607) reviewed all multivessel CABG procedures from 2 large institutions from January 1998 through July 2000. They entered 8449 patients (1983 OPCAB, 6466 CPB) into a multivariate logistic regression analysis to evaluate the impact of CPB on mortality, independent of other risk factors known to affect mortality. They also used propensity scoring to computer match pairs of OPCAB and CPB patients in an attempt to remove selection bias from the analysis. CPB was associated with increased mortality compared with OPCAB by univariate analysis (CPB 3.5%, OPCAB 1.8 %) even though the OPCAB group had a higher predicted mortality. CPB was associated with increased mortality by multiple regression analysis (OR 1.79, 95% confidence interval 1.24 to 2.67). The combined computer-matched groups based on OPCAB-selection propensity score also demonstrated an increased risk of mortality for CPB (OR 1.9, 95% confidence interval 1.2 to 3.1).

Plomondon et al (608) reviewed CABG-only procedures from the Veterans Affairs Continuous Improvement in Cardiac Surgery Program records from October 1997 through March 1999. Nine centers were identified that had completed at least 8% of their CABG procedures as OPCAB and were designated as study hospitals. OPCAB patients (n equals 680) from these hospitals were then compared with CPB patients (n equals 1733) for mortality or morbidity. Predicted mortality was higher in the OPCAB group (OPCAB 4.4%; CPB 3.9%; *P* equals 0.0022), as was predicted morbidity (OPCAB 13.2%; CPB 11.9%; *P* equals 0.0008). OPCAB patients experienced lower mortality (OPCAB 2.7%; CPB 4.0%) and lower morbidity (OPCAB 8.8%; CPB 14%; *P* equals 0.001). Multivariable OR for OPCAB versus CPB groups, after risk adjustment for patient risk factors, were computed. For mortality, the OR for OPCAB was 0.56 (95% confidence interval, 0.32 to 0.93, *P* equals 0.033), and for morbidity the OR was 0.52 (95% confidence interval, 0.38 to 0.70, *P* less than 0.0001). Observed-to expected ratios for mortality and morbidity were less than 1.0 for OPCAB patients and more than 1.0 for CPB patients. The authors concluded that in centers experienced in beating heart coronary bypass, an off-pump approach for CABG was associated with lower risk-adjusted morbidity and mortality.

Cleveland et al (609) reported on the largest multicenter report to date. They retrieved data from the STS National Cardiac Surgery Database from a 2-year period of time (January 1998 through December 1999) and identified 126 centers experienced in OPCAB. There were 11 717 (9.9%) OPCAB patients and 106 423 (90.1%) CPB patients. The OPCAB patients were older, were more likely female, and were less likely to be diabetic than the CPB subjects. The OPCAB group also had more patients with preexisting COPD, dialysis-dependent renal failure, and cerebrovascular disease than the CPB group. The CPB patients were more likely to have 3-vessel disease, and more of them were in need of urgent or emergency CABG. Predicted mortality was similar (OPCAB 2.88%; CPB 2.87%). The observed risk-adjusted mortality in the OPCAB group was 2.31%, and that of the CPB group was 2.93% (*P* less than 0.0001). The risk-adjusted rate of major morbidity in the OPCAB group was 10.62% compared with 14.15% in the CPB group (*P* less than 0.0001). When complications were examined individually, the OPCAB group had fewer strokes (OPCAB 1.25%; CPB 1.99%; *P* less than 0.001), less postoperative renal failure (OPCAB 3.85%; CPB 4.26%; *P* equals 0.036), and fewer patients with postoperative cardiac arrest (OPCAB 1.42%; CPB 1.74%; *P* equals 0.010), and fewer patients returned to the operating room for bleeding (OPCAB 2.07%; CPB 2.80%; *P* less than 0.001). Additionally, in patients with pre-existing COPD or cerebrovascular disease, OPCAB patients were less likely to require prolonged mechanical ventilation or to have stroke or coma, respectively.

Three randomized, prospective trials have been reported comparing OPCAB and CPB CABG. None of these trials were large enough to demonstrate any differences in operative mortality or the occurrence of postoperative stroke.

Angelini et al (610) pooled data from 2 separate randomized trials. OPCAB patients were shown to have reduced morbidity (e.g., transfusion, chest infection). At midterm follow-up there were no differences between groups with regard to cardiac death or cardiac events.

van Dijk et al (611) randomized relatively low-risk patients (n equals 281) to OPCAB or CPB CABG. Completeness of revascularization was equivalent between groups. OPCAB patients required fewer intraoperative

Downloaded from circ.ahajournals.org by on August 4, 2008

transfusions and had lower levels of cardiac-specific enzyme release. At 1 month, no differences were noted in rates of cardiac death or cardiac-related events.

Puskas et al (612) randomized 201 patients to OPCAB or CPB CABG. No patients were excluded on the basis of coronary artery anatomy, LV dysfunction, or any comorbidity. Intended target vessels were identified and recorded preoperatively before randomization. OPCAB patients required fewer transfusions, had less release of cardiac-specific enzymes, had shorter times to extubation, had shorter ICU and postoperative lengths of stay, and had lower hospital costs. Levels of revascularization were identical between groups.

Patients with significant comorbidity have been reported to have been revascularized by OPCAB techniques. The elderly, patients with prior CABG, patients with left main CAD, and those with impaired myocardial, renal, or pulmonary function have all been reported to have been safely and effectively approached without CPB.

Larger randomized trials will be necessary to delineate which patients benefit from the avoidance of CPB and what the magnitude of that benefit actually is.

The third emerging technique in less-invasive cardiac surgery is the closed-chest, port-access, video-assisted CABG operation developed at Stanford, Calif (613). CPB and cardioplegia of a globally arrested heart are integral parts of this technology. Vascular access for CPB is achieved via the femoral artery and vein. A triple-lumen catheter with an inflatable balloon at its distal end is used to achieve endovascular aortic occlusion, cardioplegia delivery, and LV decompression. With CPB and cardioplegic arrest, CABG can be performed on a still and decompressed heart, through several small ports and with the aid of a videoscope. In comparison with the MID-CAB approach, the port-access technique allows access to different areas of the heart, thus facilitating more complete revascularization, and the motionless heart allows for accurate anastomosis. The proposed advantage of this approach compared with conventional CABG is the avoidance of median sternotomy, with the resultant diminished incisional pain and faster recovery. The potential morbidity of the port-access technique stems from the multiple port sites, limited thoracotomy, and groin dissection for femoral-femoral bypass. The short- and long-term safety, benefits, and efficacy of the minimally invasive port-access approach must be compared with the conventional operation in an appropriately controlled clinical trial. As in any new technology, vigorous scientific scrutiny must be applied before any conclusions can be made.

6.1.1. Robotics

Investigational work continues in the development of robotic coronary bypass. Closed-chest multiarterial bypass on the beating heart would offer the maximum benefit via the least invasive approach. CPB and thoracotomy would be avoided, and the durability of arterial CABG would be preserved.

Boyd et al (614) described 4 levels of robotically assisted coronary bypass currently being investigated.

1. Voice-activated robotic control of an intrathoracic camera placed through a port and used for video-assisted manual endoscopic harvesting of the IMA with standard endoscopic instruments. A manual beating heart anastomosis is then completed through a small thoracotomy.
2. Video-assisted port-access telerobotic conduit harvesting, in which the surgeon works from a computer-enhanced remote console to harvest the IMA with port-access telemanipulators (robotic arms). A manual beating heart anastomosis is then completed through a small thoracotomy.
3. Computer-assisted endoscopic coronary artery anastomoses in which the conduit is harvested manually via standard sternotomy and the coronary anastomosis is constructed on the arrested or beating heart from the computer-enhanced master console through telemanipulators passed via ports.
4. Totally endoscopic coronary bypass during which conduit harvesting and preparation, target coronary artery identification and preparation, vascular control, and the anastomosis are all accomplished from the computer-enhanced console via port-access telemanipulators without any chest incision.

Successful application of all 4 of these strategies has been reported from specialized centers (615-618). The major obstacle to a totally endoscopic CABG has been the technical difficulty in the construction of an accurate anastomosis. Considerable effort is under way to develop technology for a facilitated anastomotic device, perhaps avoiding the need for a sutured anastomosis. Robotically assisted coronary artery bypass must be considered a work in progress at this time.

6.2. Arterial and Alternate Conduits

Class I

In every patient undergoing CABG, the left IMA should be given primary consideration for revascularization of the LAD artery. ***(Level of Evidence: B)***

The benefits of bypass surgery are related to patent bypass grafts, and short- and long-term graft patency is associated with cardiac morbidity and mortality. The most commonly used bypass grafts have been the in situ IMA and segments of greater saphenous vein (SVG) used as aorta-to-coronary grafts. By the early 1980s, serial angiographic studies of vein grafts made it apparent that SVGs could develop intrinsic pathological changes, intimal fibroplasia and vein graft atherosclerosis, that were progressive and compromised long-term graft patency rates. Late vein graft patency rates ranged from 70% to 80% at 5 postoperative years to 40-60% at 10 postoperative years. Fortunately, similar serial studies

Downloaded from circ.ahajournals.org by on August 4, 2008

0233
09/15/08

showed that IMA grafts had early patency rates of greater than 90%, but more importantly, they showed that late attrition of IMA grafts is extremely uncommon, resulting in a late patency rate of in situ IMA grafts of 90% or more at 10 postoperative years. The clinical importance of the left IMA-to-LAD graft was emphasized by a long-term follow-up study that compared patients with left IMA-LAD grafts and supplemental vein grafts to patients receiving only vein grafts. The patients receiving left IMA-to-LAD grafts had a better survival rate, fewer reoperations, and fewer cardiac events at a 10-year follow-up.

In the modern era, it can be expected that vein graft patency rates will be improved over the earlier studies. Randomized trials have shown that perioperative treatment of patients with platelet inhibitors improves bypass graft patency rates at 1 postoperative year. Prospective angiographic studies from the BARI trial documented an 87% 1-year vein graft patency rate compared with 98% for IMA grafts. Furthermore, aggressive treatment with statins appears to decrease vein graft attrition rate. However, although the interventions have decreased vein graft failure, it has not been eliminated. The prospective study of SVG patency rates noted a 66% patency rate at 10 postoperative years.

If 1 IMA graft is good, might 2 be better? The use of the right IMA in addition to the left IMA (bilateral IMA, or BIMA, grafting) for bypass grafting has been employed as a surgical strategy since the early years of bypass surgery. Despite the apparent logic of using 2 grafts anticipated to have excellent long-term patency rates, evidence that BIMA grafting (or any other extension of arterial grafting) provides incremental clinical benefit over the left IMA-to-LAD graft in associated vein graft strategy (single IMA, or SIMA, grafting) has been difficult to document for a variety of reasons. First, there are no randomized studies concerning this issue. Second, too few institutions have used BIMA grafting to provide enough patients to allow detailed analysis. Third, survival rates after SIMA grafting are favorable for the first postoperative decade, meaning that particularly long-term follow-up studies are necessary to allow any differences to become apparent. Fourth, patient selection can confound the analysis of outcomes. In general, studies of BIMA grafting have excluded patients undergoing emergency operation and those with previous bypass surgery and have included decreased numbers of patients with diabetes. However, there are now several nonrandomized, risk-adjusted, comparative studies that show improved long-term outcomes for patients receiving BIMA grafts in terms of fewer reoperations and improved late survival rates. BIMA grafting has not become a routine strategy even for elective patients for multiple reasons, including increased operative difficulty, increased operative time, and the risk of wound complications. Most studies have shown an increase in the risk of wound complications with BIMA grafting, usually in patients with diabetes. The use of techniques for skeletonizing the IMAs during preparation, thus minimizing the decrement in sternal blood supply, may decrease the incidence of sternal complications, but even modern studies of BIMA grafting have shown an increased risk of wound complications in obese diabetic patients.

The use of the radial artery as a conduit for coronary bypass grafting was first reported by Carpentier et al (619) in 1973. Its use was quickly abandoned when occlusion rates up to 30% were reported (620,621). Interest in its use was revived in 1989 when radial artery grafts were found to be patent in patients who had undergone their coronary artery surgery 13 to 18 years earlier. The radial artery is a thick muscular artery with an average diameter of 2.5 mm and an average length of 20 cm. It is prone to spasm when mechanically stimulated, and perioperative calcium channel blockers or long-acting nitrates are often used to reduce this complication. The technique of minimal manipulation and en bloc dissection of the radial artery with its surrounding satellite veins and fatty tissue is thought to account for the superior results in experiences with radial artery grafting. Brodman et al (622) reported a 95% 12-week patency rate in 175 patients receiving 229 radial artery grafts (54 patients had bilateral radial artery grafts). Perioperative MI and mortality rates were similar to those of conventional bypass surgery. There was no reported hand ischemia, wound hematoma, or infection. A 2.6% incidence of transient forearm dysesthesia, which resolved over 1 day to 4 weeks after surgery, was reported. Acar et al (623) reported an 84% 5-year radial artery graft patency rate in 100 consecutive patients receiving the radial artery as a conduit for coronary revascularization. In the same group of patients, the left IMA graft patency rate was 90% at 5 years. Thus, the radial artery appears to be a safe and reliable arterial conduit for coronary revascularization on the basis of these early clinical experiences.

Use of the in situ right gastroepiploic artery as a conduit for CABG was first reported in 1987 (624,625). This artery can be harvested by extending the median sternotomy incision toward the umbilicus and dissecting the artery along the greater curvature of the stomach. A pedicle length of 15 cm or more can be achieved by mobilizing the artery to the origin of the gastroduodenal artery. It can be grafted to the right or circumflex coronary artery by routing it in a retrogastric fashion or to the LAD in an antegastric fashion. Early graft patency ranged from 90% to 100% (626-628), but long-term results have not been published. The inferior epigastric artery free graft has been used for CABG since 1990 (629,630). This artery can be harvested by retracting the rectus muscle via a paramedian incision. A length of 6 to 16 cm can be dissected from its origin from the external iliac artery (631). Short-term patency rates of up to 98% have been reported (632). Long-term results are not available.

Cryopreserved homologous SVGs and glutaraldehyde-treated homologous umbilical veins grafts have been used for clinical aortocoronary bypass surgery (633,634). Graft patency was reported to be only 50% at 3 to 13 months. These grafts should not be used unless other conduits are

Downloaded from circ.ahajournals.org by on August 4, 2008

unavailable. Similarly, the bovine IMA has been used, again with about 50% 1-year patency (635,636). Synthetic grafts that have been used for aortocoronary bypass include Dacron grafts and polytetrafluoroethylene grafts. Only a few successful cases of Dacron graft use have been reported, and these were in patients in whom the graft was used as an interposition between the ascending aorta and the proximal end of a coronary artery with resultant high flow (637-639). The patency of polytetrafluoroethylene grafts is also limited and has been reported to be about 60% at 1 year (640,641).

6.3. Percutaneous Technology

Technological improvements have had a great impact on PTCA and have included new medications and devices that have reduced both the acute and long-term complications of percutaneous coronary interventions. The most significant medication advance has been the introduction of new platelet inhibitors, which have reduced the incidence of MI and death during angioplasty and related interventions (642).

In the area of devices, intracoronary stents have reduced complications, including the need for emergency surgery, as well as the need for repeated interventions due to restenosis (643,644). New refinements in stent design and adjunctive pharmacological therapy are further improving patient outcomes after stenting (645). Directional coronary atherectomy has also been shown to reduce restenosis compared with conventional PTCA, but its role relative to stents is not yet clear (646). Several new devices, such as the transluminal extraction catheter (InterVentional Technologies, Inc., San Diego, CA) and the Angioget thrombectomy catheter (Possis Medical, Inc., Minneapolis, MN), that remove thrombus before intervention either have been approved for use or are undergoing investigation and may reduce complications in some high-risk subsets of patients. Rotational atherectomy or rotational ablation has expanded the types of lesions (eg, calcified or long lesions) that can be treated without surgery (647).

Restenosis remains the greatest weakness of PTCA and is being addressed by mechanical solutions such as stents and directional atherectomy, which improve the intimal lumen diameter, and by pharmacological interventions aimed at preventing intimal hyperplasia. Promising approaches included in this latter category are medications such as probucol and folate (648-650), gene therapy, and local radiation therapy (651-653). Finally, the balance between bypass surgery and PCI is being further altered as the promise of new technology offered by drug-eluting stents is realized (654).

After CABG surgery, failure of the SVG is a major cause of recurrent cardiac ischemia. Angiographic studies have shown that 16% to 31% of SVGs fail within 1 year (655-658), and within 10 years, about half of all vein grafts are totally occluded or have severe atherosclerotic disease (74,659,660). It is estimated that vein graft failure is responsible for recurrent angina at an annual rate of 4% to 9% in patients after aortocoronary artery bypass grafting (661-663). In these patients, repeated CABG surgery is a satisfactory option. However, in comparison with initial bypass surgery, reoperation is technically more challenging and is associated with higher perioperative morbidity and mortality as well as less symptomatic relief (664-666). As alternatives to repeated bypass surgery, various percutaneous techniques have been developed to treat stenotic vein grafts. These techniques include conventional balloon angioplasty and the use of newer interventional devices such as coronary stents and directional coronary atherectomy.

In general, the results of angioplasty in SVGs are less favorable than in native vessels, with less procedural success and a higher rate of restenosis. Several factors influence the clinical outcome of the procedure: age of the graft, location of the stenosis within the graft, and the discrete (versus diffuse) morphological features of the atherosclerotic plaques (667-670). In a randomized comparison with angioplasty, directional coronary atherectomy was associated with a higher initial success rate and fewer repeated target-vessel interventions at 6 months but more periprocedural complications, most notably distal embolization and NSTEMI (671,672).

Intracoronary stents are now commonly used in the management of SVG stenosis. A multicenter, prospective, randomized trial compared the effects of stent placement with those of balloon angioplasty on clinical and angiographic outcomes in patients with obstructive disease of SVGs (673). Compared with the balloon angioplasty group, stenting of vein graft lesions resulted in a higher rate of procedural efficacy (92% versus 69%) and a greater increase in luminal diameter immediately after the procedure (1.92 versus 1.21 mm) and at 6 months (0.85 versus 0.54 mm). The 6-month outcome in terms of freedom from death, MI, repeat bypass surgery, or revascularization of the targeted vessel was significantly better in the stent group (73% versus 58%). Although the difference in the rate of restenosis between the stent and angioplasty groups did not achieve statistical significance, it appears that stent placement has certain advantages over conventional balloon angioplasty in the initial and short-term angiographic and clinical outcomes. The use of a balloon-occlusion and aspiration device has been shown to reduce the risk of adverse cardiovascular events during SVG interventions by protecting the coronary circulation from distal embolization of atherosclerotic debris (674). More operator-friendly filter-type devices are under investigation and will likely become routine adjuncts for such procedures.

With the increasing use of MID-CAB for left IMA-to-LAD grafting, a combined strategy of MID-CAB and either balloon angioplasty or stent placement ("hybrid revascularization") to achieve complete revascularization in patients with 2-vessel disease has been used in some situations. PTCA is performed on the second diseased vessel, which has included the right coronary artery, the left circumflex artery, and the left main coronary artery. The reverse order

Downloaded from circ.ahajournals.org by on August 4, 2008

0235
09/15/08

of performing PTCA first with subsequent MID-CAB for the left IMA-to-LAD revascularization has also been described (675). The hybrid approach of MID-CAB and percutaneous intervention provides complete revascularization through limited incisions without CPB. It also provides a useful management modality for isolated patients who are at high risk for either procedure alone. This approach highlights the potential complementary role of surgery and PTCA in the management of CAD. However, long-term outcome data for patients undergoing hybrid procedures are not yet available. Also, if coronary stenting is performed, then aspirin and clopidogrel are indicated for at least 30 days, which may affect the timing of coronary surgery. Thus, the theoretical benefits of combining procedures must be matched by scientific proof of efficacy before this strategy is likely to become commonplace.

6.4. Transmyocardial Laser Revascularization

Class IIa

Transmyocardial surgical laser revascularization, either alone or in combination with CABG, is reasonable in patients with angina refractory to medical therapy who are not candidates for PCI or surgical revascularization. ***(Level of Evidence: A)***

Intracavitary arterial blood in the LV is only millimeters away from ischemic areas of myocardium. Indeed, communicating channels between the cavity and the myocardium occur in reptilian hearts and in fetal hearts during the first 7 weeks of gestation until the coronary arterial system develops. This network of communicating channels between the heart chambers and the coronary arteries, the myocardial sinusoids, the arterial-luminal and venous-luminal connections, were described in a study by Wearn et al in 1933 (676). Early attempts to use these connections to supply the ischemic myocardium included implantation of the left IMA directly into the heart muscle (677) and direct-needle acupuncture to the ischemic myocardium to create communicating channels (678,679). Sen and colleagues (678,679) used direct acupuncture and found that these acupuncture channels were protective from acute infarction after ligation of the LAD. These channels appeared to be open and endothelialized at 8 weeks but appeared to close within several months due to fibrosis and scarring secondary to local tissue injury. This technique was abandoned with the arrival of aortocoronary artery bypass surgery in the late 1960s.

Use of the carbon dioxide laser for transmyocardial revascularization was attempted in the early 1980s by Mirhoseini and coworkers (680,681). A high-energy laser beam was used to create channels from the epicardial to the endocardial surface of an arrested or beating heart, thus allowing oxygenated blood from the LV to perfuse the ischemic myocardium. Brisk bleeding from the channels due to ventricular perforation could be easily controlled with light epicardial pressure. It was postulated that a high-energy laser beam would minimize local tissue injury and prevent premature fibrotic closure of the newly created channels and thus lead to improved channel patency (682). Long-term channel patency on histological examination has been reported in animal experiments and in sporadic clinical case reports (682-684). The principal utility of transmyocardial laser revascularization (TMLR) is directed toward patients with severe angina pectoris refractory to medical therapy and who are unsuitable for surgical revascularization, PCI or heart transplantation. These patients often have diffuse small-vessel disease and are not appropriate candidates for another PCI or CABG. The use of TMLR for the management of cardiac allograft vasculopathy has also been reported (685,686).

The results of a multicenter trial with TMLR as the sole therapy for 200 patients with refractory, end-stage CAD and documented reversible ischemia was reported by Horvath and colleagues (687). The perioperative mortality rate was 9%. Postprocedure angina class according to the Canadian angina classification was significantly decreased from their preoperative status at 3, 6, and 12 months of follow-up. Hospital admissions for angina were decreased from an average of 2.5 admissions in the year before treatment to an average of 0.4 admissions in the year after treatment. The number of perfusion defects in the treated LV free wall was also significantly decreased as assessed by radionuclide perfusion scan or positron emission tomographic scan performed after TMLR. A multicenter randomized, prospective study comparing TMLR with continued medical management demonstrated improved event-free survival in 160 patients with symptomatic, end-stage CAD. In the TMLR group, 72% of patients improved by at least 2 angina classes, while 69% of patients in the medical therapy group had no change of angina class; the remaining 31% experienced greater angina. Survival free of death, unstable angina, or class IV angina at 6 months was 73% for the TMLR group versus 12% in the medical management group. Quality of life indexes also improved in the TMLR group.

Five prospective, controlled, randomized trials have been reported (689-693). In each study, TMLR patients demonstrated a statistically significant improvement in angina compared with patients treated with medical therapy alone. None of the trials demonstrated a significant survival benefit, and only 1 study found a significant improvement in myocardial perfusion (692). One of the studies (689) concluded that TMLR "cannot be advocated." This trial from the United Kingdom was the only one of the randomized studies that was not a multicenter study. Their recommendation came in spite of finding a statistically significant (P less than 0.001) improvement in angina for TMLR patients compared with patients receiving medical therapy without TMLR.

Subsequent studies have supported the initial findings of these early reports. Compared with medical therapy, there appears to be consistent and sustained improvement in angina class for at least the first year after TMLR (694-700). Thereafter, the beneficial effects of TMLR decline some-

Downloaded from circ.ahajournals.org by on August 4, 2008

what (694,695,699), but Horvath et al (694), in a follow-up study to the work cited above, reported that long-term efficacy commonly persists for 5 years. As experience accumulates, it appears that operative mortality is generally less than 5% (696,701,702). The most significant predictors of operative mortality are unstable angina (703) and compromised LV function (699).

7. INSTITUTIONAL AND OPERATOR COMPETENCE

7.1. Volume Considerations

Owing to the availability of hospital and physician-specific mortality data and because of the perceived economies of scale in consolidating complex medical procedures into regional centers, considerable attention has been directed to relating outcome after CABG to the number of procedures performed. Before 1986, administrative data sets were proposed as a means of risk adjustment to compare outcomes between hospitals of high and low volume (704,705). These studies found a relationship between mortality after CABG and the volume of procedures performed annually. A cutoff at about 200 cases defined high- and low-volume institutions. High-volume institutions were determined to have superior results. The ability of administrative data sets to accurately stratify risk has since been questioned, particularly because of their inability to distinguish preoperative comorbidity data from postprocedure complications data (706-708).

Since 1986, in response to these criticisms, primary cardiac surgical data sets have appeared with sufficient power to address this question. Hannan et al (709) reported that in New York State, after adjusting for case mix, the high-volume institutions that performed greater than 223 cases annually experienced significantly lower mortality than did institutions performing fewer than 223 cases annually, with a relative risk of 0.74 (0.56 to 0.94, 95% confidence interval). This same relationship was true for individual surgeon volumes, with high-volume surgeons performing more and low-volume surgeons performing fewer than 116 CABG procedures annually. These cutoff points were determined arbitrarily by being above or below the state median, based on data from only 1 year.

The relationship between in-hospital mortality rate and surgical volume was again explored in 1991, when the cutoff for institutional volume was defined at 200 cases annually, and the relative risk, while still significant, was reduced to 0.84 (0.66 to 1.07, 95% confidence interval) (710). This report represented data collected over 3 years (1989 to 1992). In addition to showing the protective effect of high-volume institutions, the study also showed considerable variation, particularly among the low-volume centers. A further analysis of this patient population revealed that a significant portion of the observed improvement found in the overall risk-adjusted mortality rates in New York State was a disproportionate improvement experienced by the low-volume institutions compared with the high-volume institutions. Hannan et al (710) postulated that this was due in part to the out-migration of older, low-volume surgeons and the in-migration of younger, better-trained surgeons. It is also of interest that the relationship between individual surgeon volume and outcome reported in 1989 and 1991 had disappeared.

The Department of Veterans Affairs Hospitals reported on 24 394 patients operated on between 1987 and 1992 (711). While there appeared to be a significant relationship between volume and mortality rate among the 43 hospitals examined, when adjusted for case mix the relationship disappeared. Again, low-volume hospitals had a higher variation in mortality rates compared with the high-volume institutions. This variation in outcome led the Department of Veterans Affairs to routinely review low-volume institutions (fewer than 100 cases annually).

A report of the STS National Cardiac Database reviewed 124793 patients operated on by more than 1200 surgeons in more than 600 institutions. Only in institutions performing fewer than 100 cases annually (n equals 18) was the observed mortality rate of 5.0% significantly higher than the expected rate of 3.0% (2.9% to 3.2%, 95% confidence interval) (712).

Dudley et al (713) reviewed the literature linking high and low volumes to better and worse outcomes for a variety of procedures including CABG. By relying on the highest-quality studies, they were able to assign ORs for adjusted in-hospital mortality comparing high-volume hospitals and low-volume hospitals (fewer than 500 cases annually). By applying this model to the California Office of Statewide Health Planning and Development Database, they projected that there were between 124 and 372 potentially avoidable deaths in the state of California in 1997. The authors cautioned against drawing too firm a conclusion from these findings because of the inherent limitations of observational data, the possibility of inadequate risk adjustment, and the absence of a direct cause and effect relationship between volume and outcome.

Birkmeyer et al (714) reviewed Medicare claims data for 6 cardiovascular and 8 cancer-related procedures. Although they found that a volume/outcome effect was seen in all 14 procedures studied, the degree of difference in adjusted in-hospital and 30-day mortality between very-low-volume (fewer than 230 cases annually) and very-high-volume hospitals (more than 849 cases annually) ranged from a high of 12% in pancreatic resections to a low of 0.2% for carotid endarterectomies. They found that the range of adjusted mortality rates for CABG between very-low- and very-high-volume hospitals was 1.3%, which suggests that the relationship was modest at best.

The question of whether high-volume institutions performed significantly better than did moderate-volume institutions was addressed in a study from Canada. The Adult Cardiac Care Network of Ontario suggested that concentrating CABG into high-volume regional centers has explained

Downloaded from circ.ahajournals.org by on August 4, 2008

0237
09/15/08

their low observed mortality rate and the lack of variation between centers (715). This observation was not confirmed in the STS report, as Clark (712) found no protective relationship in high-volume institutions (greater than 900 cases/y).

Criticism of these reports revolves primarily around the adequacy of case-mix adjustment and the limitations of observational studies. Sowden et al (716) performed a meta-analysis of studies relating volume to outcome and found that the stronger the relationship between volume and outcome, the less case mix was accounted for. They postulated that owing to the observational nature of these studies, confounding accounted for most of the difference between high and low volume, and as confounding was reduced by improved risk stratification, the volume-outcome relationship disappeared. Sowden et al (716) also found that the volume-outcome relationship diminished over time, suggesting that low-volume institutions had "improved" faster than had high-volume institutions.

In summary, studies suggest that survival after CABG is negatively affected when carried out in institutions that perform less than a threshold number of cases annually. Similar conclusions have been drawn regarding individual surgeon volumes. In states where reporting of outcomes is an accepted practice (e.g., New York State), the relationship between low volumes at either an institutional or individual level seems to have diminished over time. This observation strengthens the argument for outcome tracking and supports a posture of close monitoring of institutions or individuals that perform less than 100 cases annually. It must be remembered that these same studies also found a wide variation in risk-adjusted mortality rates in low-volume situations; ie, some institutions and practitioners maintained excellent outcomes despite relatively low volumes. Therefore, credentialing policies based on conclusions drawn from these data must be made with caution.

7.2. Report Cards and Quality Improvement

Mortality rates after CABG have declined since the 1987 release by the Health Care Financing Administration of hospital-specific mortality data. The Northern New England Cardiovascular Disease Study Group reported a 24% decline in regional mortality from 1987 to 1993 (13). Hannan et al (717) reported that the actual mortality rate in New York State declined from 3.52% in 1989 to 2.78% in 1992 while the risk-adjusted rate decreased from 4.17% to 2.45% during the same period. The STS National Cardiac Surgical Database reported that the risk-adjusted mortality rate for CABG declined from 3.76% to 3.50% between 1990 and 1994 (16).

There are numerous potential explanations for this reduction in mortality after CABG. Some authors suggest that the feedback of outcome data associated with either an organized or implicit effort at quality improvement has been principally responsible for this decline. O'Connor et al (13) reported that a combination of regular feedback of mortality data, associated with open discussion and visitation between competing cardiac surgical programs in Maine, New Hampshire, and Vermont, was directly responsible for the 24% reduction in mortality observed there. Hannan et al (717) reported that the simple fact that outcomes were tracked and reported back to institutions led implicitly to improvement efforts that accounted for the New York State decline in mortality rate. Grover et al (718) reported on a program of data feedback and regular audit of programs by members of the Audit Committee of the Veterans Affairs Cardiac Surgery Consultants Committee that led to a decrease in observed versus risk-adjusted mortality rates within the Veterans Administration cardiac surgical system. Omoigui et al (719), a group from the Cleveland Clinic, suggested that the reduction in mortality noted in New York State was caused by an out-migration of high-risk patients due to the increased scrutiny provoked by public release of mortality data. Despite this criticism, Hannan et al (717) found no consistent bias against selecting high-risk patients in the state of New York. Ghali et al (720) suggested that the reduction seen in both northern New England and New York State would have happened regardless of quality improvement efforts, as similar improvement was found in Massachusetts where there was neither a statewide, organized improvement effort nor dissemination of mortality data. Peterson et al (721) examined Medicare data on both the total amount of improvement and the ultimate risk-adjusted mortality rate and found that New York State and northern New England showed both the lowest overall mortality rates as well as the greatest improvements of any other state or region in the country.

Although it appears clear that outcome tracking has resulted in fewer deaths after CABG, Chassin (722) would suggest that it is the public dissemination of this information that has been responsible for driving that improvement. While the 1987 Health Care Financing Administration report of CABG mortality data received widespread media attention, most newspapers focused on outlier hospitals and thus provided little guidance to consumers (723). Peterson et al (721) concluded that reporting of outcomes, whether voluntary and anonymous (northern New England) or mandatory and public (New York State), coupled with initiatives in quality improvement is indeed effective in improving mortality rates after CABG.

Besides driving improvement efforts, many suggested that public reporting of mortality data would initiate market forces that would drive patients to high-volume "centers of excellence." Yet, when clinicians and patients in Pennsylvania (724,725) and clinicians in New York State (726) were asked to assess how much the statewide reporting of outcome data influenced their referral practices, surprisingly few admitted that these efforts had any effect at all (724,726). Shahian (727) found that in the State of Massachusetts, patients preferred hospital reputation, traditional referral patterns and geographic proximity over published outcomes as determinants for selecting a cardiac sur-

Downloaded from circ.ahajournals.org by on August 4, 2008

gical provider. Finlayson (728) studied a Veterans Administration population and found that patients anticipating high-risk surgical procedures would accept a 2-fold to 6-fold increase risk of mortality to receive their care close to home.

An excellent review of the impact of outcomes reporting on cardiac surgery has been provided by Shahian et al (729). Outcome reporting in the form of risk-adjusted mortality rates after CABG has been effective in reducing mortality rates nationwide. While distortion of data (gaming) and out-migration of patients have been reported, it is doubtful that these practices have had a meaningful effect on this improvement. However, public release of hospital and physician-specific mortality rates has not been shown to drive this improvement and has failed to effectively guide consumers or alter clinicians' referral practices.

7.3. Hospital Environment

The context within which coronary surgery is performed will ultimately influence the outcome experienced by patients. Because of the highly technical nature of the procedure and the narrow clinical margin of the patient population, strategies to ensure consistent care have evolved. These strategies include establishing specialized cardiac surgical centers (heart hospitals), forming multidisciplinary clinical teams within hospitals, and creating and implementing clinical pathways, care maps, algorithms, and protocols.

Appropriately implemented clinical guidelines have been shown to improve the processes of clinical care in 90% of cases and show measurable improvement of outcome in 20% of cases (730). Successful application of clinical guidelines require they be accompanied by unambiguous statement of purpose, that clinicians for whom they are intended have some role in their creation or implementation, and that forcing functions, such as clinical pathways, algorithms, or protocols, be tied to the guidelines (731,732).

Whereas clinical practice guidelines describe an ideal treatment strategy for a particular disease process, clinical pathways (a.k.a. critical pathways, care maps) represent the optimal sequence of timing of interventions for a particular diagnosis or procedure. Well-designed clinical pathways ensure care is delivered as prescribed by a practice guideline while optimizing resource utilization, minimizing chance of error, and allowing for the reinvention of these standards within the context of local culture. They are typically created for patient populations that are large in number, relatively homogeneous in appearance, and consume large amounts of resources and have thus been found ideal for the CABG population (732,733).

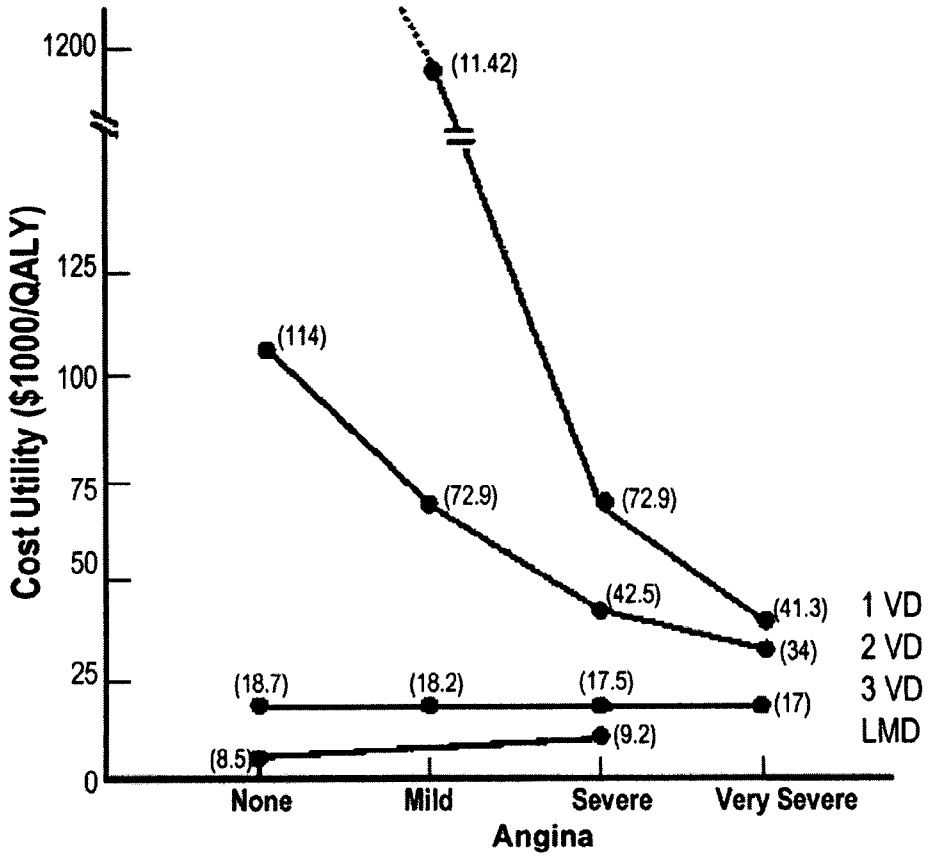


Figure 12. Cost utility. VD = vessel disease; LMD = left main disease; QALY=quality-adjusted life-year. Modified with permission from Elsevier Science Inc. (Kupersmith et al. Prog Cardiovas Dis. 1995;37:307-56) (734).

Downloaded from circ.ahajournals.org by on August 4, 2008

Table 18. Cost per Quality-Adjusted Life-Year ($/QALY) of Revascularization Compared With Medical Therapy*

CABG for left main stenosis, with or without angina	9000
CABG for 3VD with or without angina	18 000
CABG for 2VD with severe angina and LAD stenosis	22 000
CABG for 2VD with severe angina, no LAD disease	61 000
CABG for 2VD, no angina, with LAD stenosis	27 000
CABG for 2VD, no angina, no LAD disease	680 000
CABG for 1VD, severe angina	73 000
PTCA for 1VD, severe angina	9000
PTCA for LAD stenosis, mild angina	92 000

CABG indicates coronary artery bypass graft: 1, 2, or 3VD, 1-, 2-, or 3-vessel disease; LAD, left anterior descending coronary artery; and PTCA, percutaneous transluminal coronary angioplasty.

*Adjusted to 1993 dollars from multiple sources in a review by Kupersmith et al. Prog Cardiovas Dis. 1995;37:307-56 (734).

8. ECONOMIC ISSUES

8.1. Cost-Effectiveness of CABG

CABG represents a major investment for society, with an initial hospital cost of around $30 000 applied to more than 300 000 patients annually in the United States alone (around 10 billion dollars) (124). It is most appropriate to consider the cost of CABG surgery compared with other medical treatment modalities with regard to cost-effectiveness. Definitive data for such a comparison are sparse, and multiple assumptions must be made. The most reasonable system of analysis appears to be an estimation of the dollars spent per quality-adjusted life-year gained ($/QALY). In general, a cost-effectiveness of $20 000 to $40 000/QALY is consistent with other medical programs funded by society, such as hemodialysis and treatment of hypertension. A cost of less than $20 000/QALY would be considered particularly cost-effective, whereas a cost greater than $60 000/QALY would be considered expensive (734).

A widely quoted analysis of the cost-effectiveness of CABG surgery was compiled by Weinstein and Stason (735) in 1982 utilizing data gathered from the then-available randomized trials comparing medical therapy with coronary artery bypass. The cost of coronary bypass is relatively constant, whether it is conducted for left main disease or for single-vessel disease. Cost-effectiveness is excellent when the procedure is applied to patient subgroups for which the benefit in terms of survival or relief of symptoms compared with medical therapy is great (as it would be, for example, in a patient with severe angina and triple-vessel disease). The cost-effectiveness of CABG becomes inordinately poor, however, when the benefit in terms of survival is marginal and there are few symptoms in the preoperative patient. These conclusions are depicted in Figure 12, and examples are presented in Table 18. Cost-effectiveness for coronary bypass in patients with left main disease is exceptionally good at $9000/QALY. It is similarly quite attractive in patients with 3-vessel disease, at $18 000/QALY. If one considers the cost-effectiveness of coronary bypass in 2-vessel disease, Weinstein and Stason found that the presence or absence of LAD disease was very important. Because CABG surgery is particularly effective in relieving angina, its cost-effectiveness, even in patients with single-vessel disease, is not prohibitive if that patient has severe angina. In the patient without angina or with only mild angina, however, the cost of coronary bypass per QALY was prohibitive in this analysis, exceeding $100 000 for patients with 2-vessel or 1-vessel disease.

It is not surprising that coronary bypass surgery is cost-effective in exactly those groups of patients in whom survival and/or symptomatic benefit is demonstrable. Most important, within these subsets the cost-effectiveness of coronary bypass compares favorably with other generally accepted medical therapies.

8.2. Cost Comparison With Angioplasty

The cost-effectiveness of angioplasty is dependent on the preangioplasty symptoms of the patient in the same way that CABG surgery is so dependent, particularly in subgroups in whom revascularization cannot be shown to have a survival benefit compared with medical therapy (i.e., in single-vessel disease). Because it relieves angina, angioplasty for single-vessel-disease patients with severe angina is estimated to have a cost-effectiveness of $9000/QALY. In patients with only mild angina, however, angioplasty in the setting of LAD single-vessel disease is estimated to have a poor cost-effectiveness of $92 000/QALY (736).

A direct comparison of the cost of angioplasty and coronary bypass surgery for selected patients with multivessel disease (i.e., those patients for whom either therapeutic modality was considered appropriate) has been made in the randomized trials of angioplasty versus CABG. In general, the cost analyses of randomized trials have revealed that the initial cost of angioplasty is about 50% to 65% of the initial cost of bypass surgery. The incremental cost of repeated procedures during the follow-up period has led to a cumulative cost of angioplasty that approaches the cumulative cost of bypass surgery at 3 years. The EAST found that the 3-year inpatient cost of angioplasty was 94% of that of bypass surgery (135). The RITA trial, which included a large number of patients with single-vessel disease, found that the 2-year cumulative cost of angioplasty was 80% of the cost of coronary bypass (136). The BARI trial conducted a prospectively designed analysis of the comparative cost of the 2 procedures from a subgroup of the participating centers, comprising a total of 934 of the 1829 patients enrolled (124). The mean initial hospital cost of angioplasty was 65% of that of surgery, but after 5 years the cumulative cost of initial surgical therapy was only $2700 more than the cost of initial angioplasty (around a 5% difference). Because the surgical

Downloaded from circ.ahajournals.org by on August 4, 2008

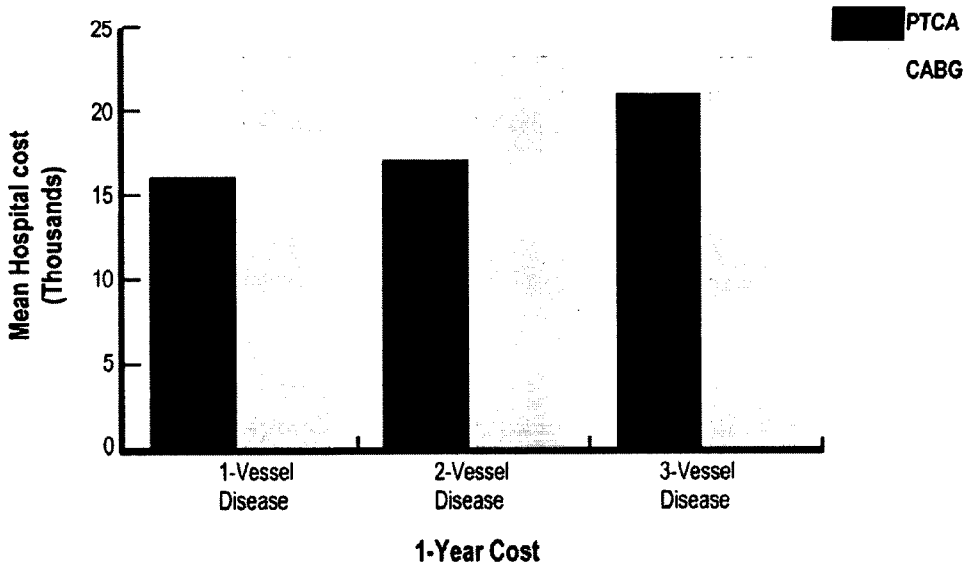


Figure 13. Percentage of 1-year costs for PTCA and CABG. PTCA indicates percutaneous transluminal coronary angioplasty; CABG, coronary artery bypass graft. Reprinted with permission from the Society of Thoracic Surgeons (Mark. Ann Thorac Surg 1996;61:S12-5) (737).

cohort had a higher overall 5-year survival, the cost of this survival benefit could be calculated. It was found to be $26 000/y of survival benefit for surgical therapy of 2- and 3-vessel disease (in patients for whom either angioplasty or surgery was considered appropriate initial therapy). As considered in the previous section, this incremental cost for double- and triple-vessel disease is within the range of costs for generally accepted therapies. It is notable that this cost of incremental benefit does not consider the benefit of coronary bypass in terms of relief of angina during the follow-up interval, which was demonstrated in each of these 3 trials (BARI, EAST, and RITA). If this factor were included, the cost-effectiveness of CABG for incremental benefit in these selected patients with multivessel disease ($/QALY) would be less than $26 000.

Previous considerations of both patient benefit and cost-effectiveness have suggested that angioplasty is less effective for patients with more advanced disease. Data gathered at Duke University have shown that there is a significant cost gradient for angioplasty as the extent of disease increases (related to repeated procedures whose incidence may be reduced by stents), which is not apparent for coronary bypass (Figure 13) (737).

The use of drug-eluting stents in percutaneous revascularization will require a re-evaluation of cost-effectiveness considerations. The initial procedure is considerably more expensive (equaling the cost of CABG in many patients with multivessel disease), but the recurring cost of reintervention for restenosis will be dramatically reduced. Cost-effectiveness will depend on pricing of stents, utilization rates of the more expensive stents, and efficacy. All of these factors are evolving rapidly.

8.3. Cost Reduction in Coronary Bypass

Estimates presented in the previous portion of this section suggest that coronary bypass has been cost-effective in the last 2 decades. Initiatives to decrease the length of stay by using clinical pathways and standardized fast-track protocols have reduced hospital costs. Indeed, the estimates made by Weinstein and Stason are distinctly dated: improvements in outcomes and shortened lengths of hospitalization are likely to have considerably improved the cost-effectiveness of CABG (and angioplasty) since 1982.

Studies from the 1980s suggested that by concentrating CABG procedures into high-volume institutions, the overall cost of providing coronary surgical revascularization would be reduced owing to efficiencies of scale (738-740). Shahian et al (741) studied this question and found no relationship between either hospital size or annual CABG case volume and cost of performing bypass surgery.

A major innovation has been the introduction of off-bypass CABG, which has reduced the postprocedure length of stay to between 2 and 3 days. In some centers, this has led to a total 3-month cost for single-vessel coronary bypass that is not significantly different from the total 3-month cost for angioplasty of single-vessel disease (742). Considering the favorable long-term patency of an IMA graft to the LAD, the cost reductions possible with off-bypass CABG may improve the relative cost-effectiveness of coronary bypass compared with either medical therapy or percutaneous techniques, particularly for symptomatic, proximal LAD disease.

Downloaded from circ.ahajournals.org by on August 4, 2008

9. INDICATIONS

9.1. Introduction

The CABG operation is indicated both for the relief of symptoms and for the prolongation of life. The 1991 Guidelines focused on survival relative to medical therapy as the pivotal recommendation for operation. In addition to extension of the length of life, this operation is an important therapeutic tool for the relief of disabling symptoms.

The 1991 Guidelines state that "the evidence is complete that the coronary artery bypass operation relieves angina in most patients." The results of the randomized trials of CABG versus PTCA have confirmed and extended this conclusion (743,744). Not only did CABG effectively relieve angina in the symptomatic patients enrolled in the randomized trials, but also freedom from angina and from antianginal medications was superior in the CABG cohorts compared with PTCA cohorts. Bypass surgery also relieved angina better than coronary stents in a randomized trial comparing the 2 forms of therapy (137).

The benefit realized from the use of CABG to relieve disabling symptoms must be balanced against the risk of the operation and tempered by the potential activity level of the individual patient. This risk may be very low in selected groups of patients. In a series of 1386 patients with single- and double-vessel disease aged less than 66 years, without CHF, and an EF greater than 0.35 from the early 1980s at Emory University, a hospital mortality of 0.07% (1 patient) was reported. Not only did these young, healthy patients have a very low risk, but their potential for renewal of an active lifestyle was exceptionally high. CABG in patients such as these for relief of disabling angina after failure of medical therapy is an attractive option, even if no survival benefit can be predicted. If, on the other hand, one were to consider a 78-year-old patient with limiting arthritis and Class II angina, then the potential benefit of CABG will be considerably less and the risk comparably greater. In this case, the attractiveness of PTCA or continued medical therapy as the appropriate therapy is enhanced.

Some caution must be expressed in the use of CABG for relief of symptoms. CABG treats the manifestations of CAD, not the disease process. As coronary disease progresses, therefore, angina often returns. The hazard function for return of angina is low for the first 5 years after operation and then begins to rise, seemingly related to late closure of bypass conduits. So long as the patient and the healthcare practitioner understand that angina may return after 5 to 10 years, the application of CABG for the relief of angina rather than for survival benefit is appropriate, particularly in low-risk patients. If preoperative symptoms are disabling, there is a high probability for a return to a fully functional lifestyle and, as discussed in Section 8, the procedure is cost-effective as well.

The second important recommendation for CABG after relief of symptoms, is prolongation of life. The randomized trials of CABG versus medical therapy have defined patient subsets whose survival is enhanced. These patients tend to be those with advanced coronary disease: notably left main disease and triple-vessel disease (or double-vessel disease including a proximal LAD stenosis) combined with LV dysfunction. The survival benefit of CABG was examined in detail in the 1991 Guidelines and will be applied to specific patient subgroups in the following sections.

The explosive growth of PCI in the last decade mandates a careful examination of CABG survival versus PCI survival. Large randomized trials generally show that 7 to 8 year survival is superior for patients with diabetes undergoing CABG compared with patients with diabetes undergoing PTCA (131,130). Among patients without diabetes, there appears to be little difference in survival.

Only short-term results of stent revascularization are available at this time; however, similar trends favoring surgery in patients with diabetes are emerging. Definitive conclusions regarding stent procedures await maturation of ongoing clinical trials.

9.2. Clinical Subsets

9.2.1. Asymptomatic or Mild Angina

Class I

1. **CABG should be performed in patients with asymptomatic or mild angina who have significant left main coronary artery stenosis.** ***(Level of Evidence: A)***
2. **CABG should be performed in patients with asymptomatic or mild angina who have left main equivalent: significant (greater than or equal to 70%) stenosis of the proximal LAD and proximal left circumflex artery.** ***(Level of Evidence: A)***
3. **CABG is useful in patients with asymptomatic ischemia or mild angina who have 3-vessel disease. (Survival benefit is greater in patients with abnormal LV function; e.g., EF less than 0.50 and/or large areas of demonstrable myocardial ischemia.)** ***(Level of Evidence: C)***

Class IIa

CABG can be beneficial for patients with asymptomatic or mild angina who have proximal LAD stenosis with 1- or 2-vessel disease. (This recommendation becomes a Class I if extensive ischemia is documented by noninvasive study and/or LVEF is less than 0.50.) ***(Level of Evidence: A)***

Class IIb

CABG may be considered for patients with asymptomatic or mild angina who have 1- or 2-vessel disease not involving the proximal LAD (If a large area of viable myocardium and high-risk criteria are met on noninvasive testing, this recommendation becomes Class I). ***(Level of Evidence: B)***

For patients with no symptoms or mild angina, the appropriateness of coronary bypass surgical therapy is based on

Downloaded from circ.ahajournals.org by on August 4, 2008

survival advantage therapy compared with nonsurgical therapy. The relative appropriateness of percutaneous versus surgical therapy is discussed in Section 3.3. To identify anatomic subsets in which coronary bypass is beneficial, definition of "important" coronary stenosis is necessary. For this and all subsequent sections, coronary stenosis will be defined as a 50% or greater reduction of lumen diameter. This is the degree of narrowing defined as important in the majority of randomized trials that have examined the relationship of coronary anatomy and survival after CABG. It is important to note that the level of angina in this category is not considered an indication for surgery. Moderate or severe angina would represent symptoms that many patients find unacceptable despite adequate medical therapy. Contrariwise, in this category, patients are either completely asymptomatic or have acceptable symptoms such that bypass surgery for symptom relief is not the issue.

The indication for bypass surgery in this category relates to the extent of coronary disease, the demonstration of objective signs or symptoms of this disease, and consideration for the risk of nonmedical therapy, which may include either bypass surgery or angioplasty. As stated in Section 3.2, the data on which these classifications are assigned are based on 3 randomized controlled trials, several smaller randomized trials, a subsequent meta-analysis of these data, and several observational studies. The limitations of these data are discussed in Section 3.2 and listed in Table 7.

9.2.2. Stable Angina

Class I

1. **CABG is recommended for patients with stable angina who have significant left main coronary artery stenosis.** ***(Level of Evidence: A)***
2. **CABG is recommended for patients with stable angina who have left main equivalent: Significant (greater than or equal to 70%) stenosis of the proximal LAD and proximal left circumflex artery.** ***(Level of Evidence: A)***
3. **CABG is recommended for patients with stable angina who have 3-vessel disease. (Survival benefit is greater when LVEF is less than 0.50.)** ***(Level of Evidence: A)***
4. **CABG is recommended in patients with stable angina who have 2-vessel disease with significant proximal LAD stenosis and either EF less than 0.50 or demonstrable ischemia on noninvasive testing.** ***(Level of Evidence: A)***
5. **CABG is beneficial for patients with stable angina who have 1- or 2-vessel CAD without significant proximal LAD stenosis but with a large area of viable myocardium and high-risk criteria on noninvasive testing.** ***(Level of Evidence: B)***
6. **CABG is beneficial for patients with stable angina who have developed disabling angina despite maximal noninvasive therapy, when surgery can be performed with acceptable risk. If angina is not typical, objective evidence of ischemia should be obtained.** ***(Level of Evidence: B)***

Class IIa

1. **CABG is reasonable in patients with stable angina who have proximal LAD stenosis with 1-vessel disease. (This recommendation becomes Class I if extensive ischemia is documented by noninvasive study and/or LVEF is less than 0.50).** ***(Level of Evidence: A)***
2. **CABG may be useful for patients with stable angina who have 1- or 2-vessel CAD without significant proximal LAD stenosis but who have a moderate area of viable myocardium and demonstrable ischemia on noninvasive testing.** ***(Level of Evidence: B)***

Class III

1. **CABG is not recommended for patients with stable angina who have 1- or 2-vessel disease not involving significant proximal LAD stenosis, patients who have mild symptoms that are unlikely due to myocardial ischemia, or patients who have not received an adequate trial of medical therapy and**
   a. **have only a small area of viable myocardium or** ***(Level of Evidence: B)***
   b. **have no demonstrable ischemia on noninvasive testing.** ***(Level of Evidence: B)***
2. **CABG is not recommended for patients with stable angina who have borderline coronary stenoses (50% to 60% diameter in locations other than the left main coronary artery) and no demonstrable ischemia on noninvasive testing.** ***(Level of Evidence: B)***
3. **CABG is not recommended for patients with stable angina who have insignificant coronary stenosis (less than 50% diameter reduction).** ***(Level of Evidence: B)***

For patients with stable angina, the recommenation for CABG is based both on the likelihood of improving survival and on the likelihood of relief of lifestyle-limiting symptoms. Based on the 3 large, prospective, randomized trials comparing medical with surgical therapy and multiple observational studies, the patient factors most influencing a decision to recommend CABG include the presence of severe proximal multivessel coronary disease, LV dysfunction, a strongly positive stress test, and comorbid conditions such as PVD and diabetes. Additional factors that are of critical importance relate to the perceived immediate risk of bypass surgery and the long-term prognosis, particularly whether the patient's potential improvement in longevity or quality of life due to a successful bypass operation justifies the short-term risk.

9.2.3. Unstable Angina/Non–ST-Segment Elevation MI (NSTEMI)

Class I

1. **CABG should be performed for patients with unstable angina/NSTEMI with significant left main coronary artery stenosis.** ***(Level of Evidence: A)***
2. **CABG should be performed for patients with unstable angina/NSTEMI who have left main equivalent: significant (greater than or equal to 70%) stenosis of the proximal LAD and proximal left circumflex**

Downloaded from circ.ahajournals.org by on August 7, 2008

artery. *(Level of Evidence: A)*

3. **CABG is recommended for unstable angina/NSTEMI in patients in whom revascularization is not optimal or possible, and who have ongoing ischemia not responsive to maximal nonsurgical therapy.** *(Level of Evidence: B)*

Class IIa

CABG is probably indicated for patients with unstable angina/NSTEMI who have proximal LAD stenosis with 1- or 2-vessel disease. *(Level of Evidence: A)*

Class IIb

CABG may be considered in patients with unstable angina/NSTEMI who have 1- or 2-vessel disease not involving the proximal LAD when percutaneous revascularization is not optimal or possible. (If there is a large area of viable myocardium and high-risk criteria are met on noninvasive testing, this recommendation becomes Class I.) *(Level of Evidence: B)*

Indications for coronary bypass surgery in this category relate not only to survival but also to the relief of symptoms. Thus, in general, all of the survival indications listed for the asymptomatic patient or the individual with stable angina apply. However, timing of surgery becomes a critical consideration. Some reports have suggested a high mortality after CABG in patients with acute unstable angina or NSTEMI and have shown that one of the independent predictors of mortality after coronary bypass surgery is the stability of the patient going to operation. Other investigators have not found this association (Section 5.11). In the patient in whom stabilization with aggressive medical therapy may be achieved, it is advisable to stabilize and reduce ongoing ischemia before proceeding to bypass surgery. In this regard, a small randomized trial demonstrated that insertion of an IABP 2 hours or more before CPB can reduce bypass time, intubation time, and length of stay, and improve postoperative cardiac output in high-risk patients (745).

9.2.4. ST-Segment Elevation MI (STEMI)

Class I

Emergency or urgent CABG in patients with STEMI should be undertaken in the following circumstances:

a. **Failed angioplasty with persistent pain or hemodynamic instability in patients with coronary anatomy suitable for surgery.** *(Level of Evidence: B)*
b. **Persistent or recurrent ischemia refractory to medical therapy in patients who have coronary anatomy suitable for surgery, who have a significant area of myocardium at risk, and who are not candidates for PCI.** *(Level of Evidence: B)*
c. **At the time of surgical repair of postinfarction ventricular septal rupture or mitral valve insufficiency.** *(Level of Evidence: B)*
d. **Cardiogenic shock in patients less than 75 years old with ST-segment elevation or left bundle-branch block or posterior MI who develop shock within 36 hours of MI and are suitable for revascularization that can be performed within 18 hours of shock, unless further support is futile because of patient's wishes or contraindications/unsuitability for further invasive care** *(Level of Evidence: A)*
e. **Life-threatening ventricular arrhythmias in the presence of greater than or equal to 50% left main stenosis and/or triple-vessel disease** *(Level of Evidence: B)*

Class IIa

1. **CABG may be performed as primary reperfusion in patients who have suitable anatomy and who are not candidates for or who have had failed fibrinolysis/PCI and who are in the early hours (6 to 12 hours) of evolving STEMI.** *(Level of Evidence: B)*
2. **In patients who have had an STEMI or NSTEMI, CABG mortality is elevated for the first 3 to 7 days after infarction, and the benefit of revascularization must be balanced against this increased risk. Beyond 7 days after infarction, the criteria for revascularization described in previous sections are applicable.** *(Level of Evidence: B)*

Class III

1. **Emergency CABG should not be performed in patients with persistent angina and a small area of myocardium at risk who are hemodynamically stable.** *(Level of Evidence: C)*
2. **Emergency CABG should not be performed in patients with successful epicardial reperfusion but unsuccessful microvascular reperfusion.** *(Level of Evidence: C)*

Although early coronary bypass surgery as a primary reperfusion strategy in patients suffering from a STEMI has been reported, the widespread use of intravenous fibrinolytic therapy for this purpose and more primary PCI has largely superceded early application of bypass surgery. Studies have shown that eventual infarct size and the subsequent risk of mortality and/or LV dysfunction are related to the time from the onset of symptoms until coronary reperfusion. Although, on average, coronary bypass surgery requires a longer time to establish coronary reperfusion than either of the nonsurgical techniques, modification of the conditions of reperfusion that is possible with surgical therapy may offer some benefit with regard to eventual infarct size relative to percutaneous or fibrinolytic therapy. Despite this potential benefit of reperfusion modification, coronary bypass is rarely performed for this indication except in special circumstances. The decision to perform surgery requires angiographic demonstration of adequate target vessels in the region of infarction and usually other regions as well. In most circumstances, early coronary bypass for acute infarction is appropriate only in patients with residual ongoing

Downloaded from circ.ahajournals.org by on August 4, 2008

ischemia despite nonsurgical therapy, be it fibrinolysis, PCI, or both. As with PCI, the risks of bypass operation in patients in the midst of a STEMI are substantially higher than are the risks in elective candidates.

To determine the benefits and liabilities of treatment of an acute MI with CABG requires accurately defining the topic. The definition of acute MI is the resultant ischemic muscle injury after reduction or interruption of the coronary artery blood supply. The obvious weakness in this definition is the variability of the tissue damage. This has been addressed by sub-classifying MIs into Q-wave and non–Q-wave types. A Q-wave infarction has been defined as ST-segment changes that progress to new Q waves in addition to a creatine phosphokinase (CPK)-MB isoenzyme elevation of greater than 10 IU/L. Non–Q-wave infarction is defined as ST-segment and T-wave abnormalities (generally NSTEMI) that do not progress to pathological Q waves but show abnormal elevations of CPK-MB isoenzyme of greater than 10 IU/L (585). The decision or appropriateness to recommend surgical revascularization in the face of an acute MI depends on the clinical symptoms and the presence of persistent ischemia despite maximum medical therapy. This is also the algorithm that is used to decide to proceed with catheter-based therapy. It appears that when there is a situation that is not amenable to medical or catheter-based therapy and persistent ischemia is present, CABG is indicated. This is presuming that there is no overwhelming contraindication against operation.

There are specific conditions that will warrant CABG in the face of an acute MI: the presence of left main stenosis, severe 3-vessel disease, associated valve disease (whether secondary to the MI or unrelated) (35a), and anatomy unsuitable for other forms of therapy. The literature is somewhat vague regarding the categories for surgical intervention. Some of the reports address STEMI versus NSTEMI while others address the proximity of MI to operation (i.e., less than 6 hours, 6 hours to 2 days, 2 to 14 days, 2 to 6 weeks, and greater than 6 weeks) or unstable angina versus evolving MI, mechanical complications, acute occlusions, and control patients. It is best to review these separately and try to identify a common recommendation and approach.

Braxton et al (585) studied the comparative effect of operating on patients with STEMI and NSTEMI versus a control group. Excluding the patients who require emergency operation for mechanical complications of an acute MI, the patients undergoing CABG within 48 hours of the STEMI had a significantly increased operative mortality which approached 50%. The data imply that for such patients, there is much to be gained by waiting more than 48 hours in most circumstances. The implication is also made study also suggested that symptomatic patients with a NSTEMI may undergo surgical revascularization at any time with no significant increase in mortality over elective patients (585). This is substantiated in an article by Goodman et al (583), wherein MI after fibrinolytic therapy was evaluated in relation to events with STEMI versus NSTEMI. The NSTEMI was more likely to be nonanterior, distally located, and have better global and regional LV function. In the setting of fibrinolysis after MI, patients with a NSTEMI were more likely to have early, complete, and sustained infarct-related artery patency and better LV function. This identification of anatomic and functional differences between STEMI and NSTEMI should also translate into operative risk for these 2 patient cohorts and verifies the worse operative risk with surgery in the early STEMI period.

Creswell et al (581) retrospectively reviewed 2296 patients who underwent CABG after an acute MI. A generalization that was made was that the operative mortality decreased as the time between the acute MI and operation increased. Patients who underwent operation less than 6 hours after MI had an operative mortality of 8.4% and those who underwent operation greater than 6 hours, 4.3% (P equals 0.02) (Table 19). Additional findings were that despite the urgency of operation, operative mortality was greater for those patients with a preoperative MI than those without an MI. It is important to note that when the independent risk factors of urgency of operation, increased patient age, renal insufficiency, number of previous MIs, and hypertension were adjusted for, the time interval between MI and CABG was not a significant predictor of death.

A third way to examine the impact of an MI on operative mortality was reported by von Segesser et al (579). In this series, 641 of 3397 patients had stable or unstable angina, respectively, and underwent CABG. These 641 patients were divided into 5 groups. Group A patients had unstable angina that involved the inclusion of 2 of 6 criteria including impending infarction, electrocardiographic ST-segment modifications, minimal increases in CPK values, prolonged angina at rest, angina resistant to intravenous medication, and postinfarction angina. Group B patients were sustaining an evolving MI defined as either a new electrocardiographic Q wave; electrocardiographic ST-segment modifications;

Table 19. Coronary Artery Bypass Graft Surgery Mortality After Acute Myocardial Infarction: Effect of Timing of Operation

Outcome	Less than 6 Hours	6-48 Hours	2-14 Days	2-6 Weeks	Greater than 6 Weeks	No MI
Op mort	9.1%	8.3%	5.2%	6.5%	2.9%	2.1%
Periop MI	9.1%	9.8%	2.8%	2.7%	4.0%	3.9%
Trans CVA	0.0%	3.0%	1.3%	0.4%	0.8%	0.8%
Perm CVA	9.1%	3.8%	2.9%	1.5%	2.3%	1.2%
AF	27.2%	40.9%	33.0%	39.1%	31.8%	30.7%

MI indicates myocardial infarction; Op mort, operative mortality; Periop, perioperative; Trans, transient; CVA, cerebrovascular accident; Perm, permanent; and AF, atrial fibrillation.

Downloaded from circ.ahajournals.org by on August 4, 2008

and CPK-MB values greater than 8% of total CPK, CPK greater than 3 times normal; CPK-MB greater than 10% of total CPK; or new LV dyskinesis on echocardiography or scintigraphy. Group C patients had mechanical complications of acute MI. Group D patients had an acute coronary occlusion (emergency post-PTCA or angiography), and Group E patients had stable class IV angina (control).

In this series, acute CABG in patients with unstable angina, evolving MI, and acute coronary occlusion demonstrated results comparable to those of CABG in the elective cohort. Late survival in these 3 cohorts was similar to that of the group with stable angina. The worst late survival was in those with mechanical complications, although it was acceptable. The conclusions of this investigation support acute revascularizations in unstable angina and selected patients after acute MI.

A review of other articles dealing with operation after acute MI (34,450,580,746) suggests that unless patients are in cardiogenic shock or have mechanical complications of acute MI, early CABG can be performed with little or no increase in risk of perioperative mortality.

Mechanical complications of acute MI include ventricular septal defect, MR secondary to papillary muscle infarction and/or rupture, and LV free-wall rupture (747-754). There is general agreement that cardiogenic shock associated with a mechanical complication of an MI warrants emergency operation to correct the defect as a life-saving procedure. Although there is less consensus as to the timing of operation for patients with ventricular septal defect or MR after acute MI with hemodynamic stability, most cardiac surgical centers proceed promptly to surgery.

There does not appear to be clear documentation of the best timing for stable patients with a mechanical complication. There has been the argument to delay operation to allow the friable tissue to "mature" and hold sutures; this invokes some Darwinian selection process and prompted Norell et al (747) to approach all of these types of problems acutely. Their results did not demonstrate a statistical difference between acute and subacute operation. It must be stated, however, that the numbers in many of these series were small or included patient enrollment extending over several decades while techniques, understanding of physiology, and philosophy have advanced.

9.2.5. Poor LV Function

Class I

1. **CABG should be performed in patients with poor LV function who have significant left main coronary artery stenosis.** ***(Level of Evidence: B)***
2. **CABG should be performed in patients with poor LV function who have left main equivalent: significant (greater than or equal to 70%) stenosis of the proximal LAD and proximal left circumflex artery.** ***(Level of Evidence: B)***
3. **CABG should be performed in patients with poor LV function who have proximal LAD stenosis with 2- or 3-vessel disease.** ***(Level of Evidence: B)***

Class IIa

CABG may be performed in patients with poor LV function with significant viable noncontracting, revascularizable myocardium and without any of the above anatomic patterns. ***(Level of Evidence: B)***

Class III

CABG should not be performed in patients with poor LV function without evidence of intermittent ischemia and without evidence of significant revascularizable viable myocardium. ***(Level of Evidence: B)***

As discussed in Section 5.9, increasing evidence suggests that chronic LV dysfunction due to viable but hibernating myocardium in patients with severe multivessel disease is relatively common. Furthermore, observational studies now support the notion that coronary bypass surgery can result in stabilization and often improvement in LV function in selected patients. Operation on a patient with poor LV function is particularly appropriate if the patient has signs or symptoms of intermittent ischemia and minimal or no CHF. On the other hand, if the patient has prominent signs and symptoms of CHF with minimal angina, the decision to operate should be based on objective evidence of hibernating myocardium (755). There should be demonstration of substantial regions of myocardial viability that would benefit from revascularization (756). Such areas must be perfused by coronary arteries of sufficient size and location to be reasonable targets for bypass surgery (757).

The concept of operating on patients with poor LV function for survival advantage comes from the randomized trials that suggested that patients with left main, 3-vessel, and 2-vessel disease and vessel disease involving the proximal LAD with concomitant LV dysfunction on average had a greater survival advantage compared with those on medical therapy. Although the randomized studies did not include large numbers of patients with EFs less than 0.30, subsequent observational data suggest that these patients, although having a higher immediate risk for bypass surgery, may achieve a greater long-term gain in terms of survival advantage, assuming that the concepts discussed above are applied (755-757).

9.2.6. Life-Threatening Ventricular Arrhythmias

Class I

1. **CABG should be performed in patients with life-threatening ventricular arrhythmias caused by left main coronary artery stenosis.** ***(Level of Evidence: B)***
2. **CABG should be performed in patients with life-threatening ventricular arrhythmias caused by 3-vessel coronary disease.** ***(Level of Evidence: B)***

Class IIa

1. **CABG is reasonable in bypassable 1- or 2-vessel disease causing life-threatening ventricular arrhythmias. (This becomes a Class I recommendation if the arrhythmia is resuscitated sudden cardiac death or**

Downloaded from circ.ahajournals.org by on August 4, 2008

sustained ventricular tachycardia.) ***(Level of Evidence: B)***

2. **CABG is reasonable in life-threatening ventricular arrhythmias caused by proximal LAD disease with 1- or 2-vessel disease. (This becomes a Class I recommendation if the arrhythmia is resuscitated sudden cardiac death or sustained ventricular tachycardia).** ***(Level of Evidence: B)***

Class III

CABG is not recommended in ventricular tachycardia with scar and no evidence of ischemia. ***(Level of Evidence: B)***

The benefits of CABG in patients with ventricular arrhythmias have been studied in survivors of out-of-hospital cardiac arrest and in patients with inducible ventricular tachycardia or fibrillation under electrophysiological study. In general, bypass surgery has been more effective in reducing episodes of ventricular fibrillation than ventricular tachycardia, because the mechanism of the latter arrhythmia usually involves reentry with scarred endocardium rather than ischemia.

In survivors of cardiac arrest who have severe and operable coronary disease, CABG surgery can suppress arrhythmia induction, reduce subsequent cardiac arrest, and result in a good long-term outcome (758-760). It is particularly effective when an ischemic cause of the arrhythmia can be documented, for instance, with exercise (761). However, because coronary revascularization may not alleviate all of the factors that predispose to ventricular arrhythmias, concomitant insertion of an implantable cardioverter-defibrillator may be necessary (762). Similarly, continued inducibility or clinical recurrence of ventricular tachycardia after CABG usually requires defibrillator implantation.

9.2.7. CABG After Failed PTCA

Class I

1. **CABG should be performed after failed PTCA in the presence of ongoing ischemia or threatened occlusion with significant myocardium at risk.** ***(Level of Evidence: B)***
2. **CABG should be performed after failed PTCA for hemodynamic compromise.** ***(Level of Evidence: B)***

Class IIa

1. **It is reasonable to perform CABG after failed PTCA for a foreign body in crucial anatomic position.** ***(Level of Evidence: C)***
2. **CABG can be beneficial after failed PTCA for hemodynamic compromise in patients with impairment of the coagulation system and without previous sternotomy.** ***(Level of Evidence: C)***

Class IIb

CABG can be considered after failed PTCA for hemodynamic compromise in patients with impairment of the coagulation system and with previous sternotomy. ***(Level of Evidence: C)***

Class III

1. **CABG is not recommended after failed PTCA in the absence of ischemia.** ***(Level of Evidence: C)***
2. **CABG is not recommended after failed PTCA with inability to revascularize due to target anatomy or no-reflow state.** ***(Level of Evidence: C)***

The decision to proceed with emergency bypass surgery after a failed PTCA procedure is a complex one. The interventional cardiologist and consulting cardiac surgeon must together decide when the procedure cannot be salvaged by percutaneous techniques, often in the acute setting of ischemia or infarction. Important considerations include the mechanisms of the failed procedure, the potential to correct this situation surgically, the extent of myocardium that is jeopardized, and the overall clinical status of the patient. Threatened compared with acute vessel closure poses a particularly challenging situation, since the physicians must balance further attempts at percutaneous salvage versus moving forward with surgery. Factors that influence the outcome of surgery include patient characteristics such as LV dysfunction, older age, and previous MI (763,764), as well as anatomic factors such as complex lesion characteristics, extent of multivessel disease, and the absence of collaterals (763-766). Finally, outcome also depends on the total ischemic time and may be adversely affected by a delay in transport to the operating room (763,764,767,768). Bypass surgery is clearly the procedure of choice in the setting of hemodynamic compromise or for retrieval of a foreign body, such as a fractured guidewire or undeployed stent in a crucial anatomic position.

Emergency bypass for failed PTCA is understandably associated with a higher rate of death and subsequent MI compared with elective bypass surgery (763,769). It is encouraging to observe the diminishing need for emergency bypass surgery in this situation, owing in large measure to the increasing use and availability of intracoronary stents (643,645). Among patients who require emergency bypass after a failed angioplasty in the current era, the rate of complications remains substantial (770-772). This probably reflects the increased severity of CAD and other comorbidities in patients currently treated with PTCA. Therefore, a coordinated approach and cooperative interaction between the cardiologist, cardiac surgeon, and anesthesia team are necessary to expedite resuscitation, transfer, and revascularization of patients with failed PTCA (773-775).

9.2.8. Patients With Previous CABG

Class I

1. **Coronary bypass should be performed in patients with prior CABG for disabling angina despite optimal nonsurgical therapy. (If angina is not typical,**

Downloaded from circ.ahajournals.org by on August 4, 2008

then objective evidence of ischemia should be obtained.) ***(Level of Evidence: B)***

2. **Coronary bypass should be performed in patients with prior CABG without patent bypass grafts but with Class I indications for surgery for native-vessel CAD (significant left main coronary stenosis, left main equivalent, 3-vessel disease).** ***(Level of Evidence: B)***

Class IIa

1. **Coronary bypass is reasonable in patients with prior CABG and bypassable distal vessel(s) with a large area of threatened myocardium by noninvasive studies.** ***(Level of Evidence: B)***
2. **Coronary bypass is reasonable in patients who have prior CABG if atherosclerotic vein grafts with stenoses greater than 50% supplying the LAD coronary artery or large areas of myocardium are present.** ***(Level of Evidence: B)***

Reoperation after previous CABG can be successfully performed, but the risk of hospital mortality is increased about 3-fold compared with the primary operation. Moreover, reoperation is associated with a diminished expectation for relief of symptoms and a diminished expectation for prolongation of life compared with the primary operation (see Sections 4.1.2 and 5.7). For this reason, reoperation is generally reserved for relief of disabling symptoms or for compelling evidence of potentially life-threatening areas of myocardium at risk objectively quantified by noninvasive studies. Because many of these patients have had previous myocardial damage, consideration of the consequences of infarction of an area of myocardium demonstrated to be at risk must be weighed against the cumulative effect of the current threatening situation combined with prior damage.

The existence of significant late stenoses (greater than or equal to 5 years after operation) representing atherosclerosis in vein grafts that are greater than 50% stenosed and that supply either the LAD coronary artery or large areas of myocardium represent a potential anatomic indication for operation.

For a patient with previous bypass surgery, percutaneous techniques can be effective in treating native-vessel stenoses and appear to be safe in treating early stenoses in vein grafts. However, the use of percutaneous techniques to treat late atherosclerotic stenoses in vein grafts has been much less successful.

An increasingly common situation is the presence of a functioning IMA graft to the LAD artery, with recurrent ischemia in other regions of the heart. The potential loss of this conduit consequent to a reoperation represents a major negative factor in the long-term therapy of that patient and is cause for additional caution in recommendation of a reoperation.

STAFF

American College of Cardiology

Christine W. McEntee, Chief Executive Officer

Katherine D. Doermann, Specialist, Knowledge Development

Kristina N. Petrie, MS, Research Analyst, Knowledge Development

American Heart Association

M. Cass Wheeler, Chief Executive Officer

Rose Marie Robertson, MD, FACC, FAHA, Chief Science Officer

Fernando Costa, MD, FAHA, Staff Scientist

Downloaded from circ.ahajournals.org by on August 4, 2008

APPENDIX 1. ACC/AHA Committee to Update the 1999 Guidelines for Coronary Artery Bypass Graft Surgery—Relationships With Industry

Committee Member Name	Research Grant	Speakers Bureau/ Honoraria	Stock Ownership	Consultant
Dr. Kim A. Eagle	Aventis Pfizer Blue Cross/Blue Shield	None	None	National Institutes of Health Sanofi
Dr. Robert A. Guyton	Medtronic, Inc. Qwest Medical, Inc. Chase Medical, Inc.	None	None	None
Dr. Ravin Davidoff	None	None	None	None
Dr. Fred H. Edwards	None	None	None	None
Dr. Gordon A. Ewy	None	Pfizer Merck GlaxoSmithKline Wyeth	None	None
Dr. Timothy J. Gardner	None	None	None	None
Dr. James C. Hart	Medtronic, Inc. CardioVations	Medtronic, Inc. Novare.	None	Medtronic, Inc St. Jude Medical CardioVations
Dr. Howard C. Herrmann	Johnson & Johnson Boston Scientific Pfizer Merck Millennium	Johnson & Johnson Pfizer	Johnson & Johnson	Johnson & Johnson Boston Scientific Merck
Dr. L. David Hillis	None	None	None	None
Dr. Adolph M. Hutter	None	None	None	None
Dr. Bruce Whitney Lytle	None	None	None	None
Dr. Robert A. Marlow	None	None	None	None
Dr. William C. Nugent	None	None	None	None
Dr. Thomas A. Orszulak	None	None	None	None

This table represents the relationships of committee members with industry that were disclosed at the initial writing committee meeting in March 2002 and updated in conjunction with all meetings and conference calls of the writing committee. It does not necessarily reflect relationships with industry at the time of publication.

Downloaded from circ.ahajournals.org by on August 4, 2008

0249
09/15/08

APPENDIX 2. External Peer Reviewers for the ACC/AHA 2004 Guideline Update for Coronary Artery Bypass Graft Surgery*

Reviewer Name**	Reviewer Category and Affiliation	Relationships With Industry
Dr. Robert H. Jones	Official Reviewer – ACC (Board of Trustees)	None
Dr. Edward H. Williams	Official Reviewer – ACC (Board of Governors)	None
Dr. Loren F. Hiratzka	Official Reviewer – ACC/AHA Task Force on Practice Guidelines	None
Dr. Irving L. Kron	Official Reviewer – AHA	None
Dr. Irvin B. Krukenkamp	Official Reviewer – AHA	None
Dr. E. Magnus Ohman	Official Reviewer – AHA	Stock Holder: Medtronic Research Grants: Berlex, Millennium, BMS, Sanofi-Synthelabo, Merck
Dr. John F. Butterworth	Organizational Reviewer – Society of Cardiovascular Anesthesiologists	None
Dr. Harry J. D'Agostino, Jr.	Organizational Reviewer – Society of Thoracic Surgeons	None
Dr. Constance K. Haan	Organizational Reviewer – Society of Thoracic Surgeons	None
Dr. Elliott M. Antman	Content Reviewer – ACC/AHA Task Force on Practice Guidelines	Research Grants: Bristol-Myers Squibb, Sanofi-Synthelabo, Millennium, Merck, Eli Lilly

This table represents the relationships of peer reviewers with industry that were disclosed at the time of peer review of this guideline. It does not necessarily reflect relationships with industry at the time of publication.
*Participation in the peer review process does not imply endorsement of the document.
**Names are listed in alphabetical order within each category of review.

Downloaded from circ.ahajournals.org by on August 4, 2008

REFERENCES

1. Kirklin JW, Akins CW, Blackstone EH, et al. Guidelines and indications for coronary artery bypass graft surgery: a report of the American College of Cardiology/American Heart Association Task Force on Assessment of Diagnostic and Therapeutic Cardiovascular Procedures (Subcommittee on Coronary Artery Bypass Graft Surgery). J Am Coll Cardiol 1991;17:543-89.

1a. Eagle KA, Guyton RA, Davidoff R, et al. ACC/AHA guidelines for coronary artery bypass graft surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Revise the 1991 Guidelines for Coronary Artery Bypass Graft Surgery). American College of Cardiology/American Heart Association. J Am Coll Cardiol 1999;34:1262-347. Available at: http://www.acc.org/clinical/guidelines/bypass/dirIndex.htm. Accessed November 4, 2002.

2. Shumacker HB. The Evolution of Cardiac Surgery. Bloomington, IN: Indiana University Press, 1992.

3. Lindbergh CA. An apparatus for the culture of whole organs. J Exp Med 1935;62:409-31 .

4. Gibbon JH. The development of the heart-lung apparatus. Am J Surg 1978;135:608-19.

5. Vineberg AM, Miller G. Internal mammary coronary anastomosis in the surgical treatment of coronary artery insufficiency. Can Med Assoc J 1951;64:204.

6. Garrett HE, Dennis EW, DeBakey ME. Aortocoronary bypass with saphenous vein graft. Seven-year follow-up. JAMA 1973;223:792-4.

7. Sabiston DC. David Coston Sabiston, Jr., MD: a conversation with the editor. Interview by William Clifford Roberts. Am J Cardiol 1998;82:358-72.

8. Mueller RL, Rosengart TK, Isom OW. The history of surgery for ischemic heart disease. Ann Thorac Surg 1997;63:869-78.

9. Favaloro RG. Critical analysis of coronary artery bypass graft surgery: a 30-year journey. J Am Coll Cardiol 1998;31:1B-63B.

10. Kolessov VI. Mammary artery-coronary artery anastomosis as method of treatment for angina pectoris. J Thorac Cardiovasc Surg 1967;54:535-44.

11. Effler DB. Vasilii I. Kolesov: pioneer in coronary revascularization. J Thorac Cardiovasc Surg 1988;96:183.

12. Loop FD, Lytle BW, Cosgrove DM, et al. Influence of the internal-mammary-artery graft on 10-year survival and other cardiac events. N Engl J Med 1986;314:1-6.

13. O'Connor GT, Plume SK, Olmstead EM, et al, for the Northern New England Cardiovascular Disease Study Group. A regional prospective study of in-hospital mortality associated with coronary artery bypass grafting. JAMA 1991;266:803-9.

14. Public Health Service, National Center for Health Statistics. Summary, National Hospital Discharge Survey. Hyattsville, MD: National Center for Health Statistics, 1987. US Dept of Health and Human Services, 1986:87-1250.

15. Tu JV, Sykora K, Naylor CD, for the Steering Committee of the Cardiac Care Network of Ontario. Assessing the outcomes of coronary artery bypass graft surgery: how many risk factors are enough? J Am Coll Cardiol 1997;30:1317-23.

16. Edwards FH, Grover FL, Shroyer AL, Schwartz M, Bero J. The Society of Thoracic Surgeons National Cardiac Surgery Database: current risk assessment. Ann Thorac Surg 1997; 63:903-8.

17. Hannan EL, Kilburn H, O'Donnell JF, Lukacik G, Shields EP. Adult open heart surgery in New York State: an analysis of risk factors and hospital mortality rates. JAMA 1990;264:2768-74.

18. Jones RH, Hannan EL, Hammermeister KE, et al, for the Working Group Panel on the Cooperative CABG Database Project. Identification of preoperative variables needed for risk adjustment of short-term mortality after coronary artery bypass graft surgery. J Am Coll Cardiol 1996;28:1478-87.

19. Weightman WM, Gibbs NM, Sheminant MR, Thackray NM, Newman MA. Risk prediction in coronary artery surgery: a comparison of four risk scores. Med J Aust 1997;166:408-11.

20. Orr RK, Maini BS, Sottile FD, Dumas EM, O'Mara P. A comparison of four severity-adjusted models to predict mortality after coronary artery bypass graft surgery. Arch Surg 1995;130:301-6.

21. Hannan EL, Burke J. Effect of age on mortality in coronary artery bypass surgery in New York, 1991-1992. Am Heart J 1994;128:1184-91.

22. Tu JV, Naylor CD, Kumar D, DeBuono BA, McNeil BJ, Hannan EL. Coronary artery bypass graft surgery in Ontario and New York State: which rate is right? Steering Committee of the Cardiac Care Network of Ontario. Ann Intern Med 1997;126:13-9.

23. Hannan EL, Kumar D, Racz M, Siu AL, Chassin MR. New York State's Cardiac Surgery Reporting System: four years later. Ann Thorac Surg 1994;58:1852-7.

24. Mickleborough LL, Walker PM, Takagi Y, Ohashi M, Ivanov J, Tamariz M. Risk factors for stroke in patients undergoing coronary artery bypass grafting. J Thorac Cardiovasc Surg 1996; 112:1250-8.

25. O'Connor GT, Morton JR, Diehl MJ, et al, for the Northern New England Cardiovascular Disease Study Group. Differences between men and women in hospital mortality associated with coronary artery bypass graft surgery. Circulation 1993;88:2104-10.

26. O'Connor NJ, Morton JR, Birkmeyer JD, Olmstead EM, O'Connor GT, for the Northern New England Cardiovascular Disease Study Group. Effect of coronary artery diameter in patients undergoing coronary bypass surgery. Circulation 1996;93:652-5.

27. Mickleborough LL, Takagi Y, Maruyama H, Sun Z, Mohamed S. Is sex a factor in determining operative risk for aortocoronary bypass graft surgery? Circulation 1995;92(Suppl II):II-80-4.

28. Edwards FH, Carey JS, Grover FL, Bero JW, Hartz RS. Impact of gender on coronary bypass operative mortality. Ann Thorac Surg 1998;66:125-31.

29. Brandrup-Wognsen G, Berggren H, Hartford M, Hjalmarson A, Karlsson T, Herlitz J. Female sex is associated with increased mortality and morbidity early, but not late, after coronary artery bypass grafting. Eur Heart J 1996;17:1426-31.

30. Christenson JT, Simonet F, Schmuziger M. The impact of a short interval (less than or equal to 1 year) between primary and reoperative coronary artery bypass grafting procedures. Cardiovasc Surg 1996;4:801-7.

31. Christenson JT, Schmuziger M, Simonet F. Reoperative coronary artery bypass procedures: risk factors for early mortality and late survival. Eur J Cardiothorac Surg 1997;11:129-33.

32. Phillips SJ, Kongtahworn C, Skinner JR, Zeff RH. Emergency coronary artery reperfusion: a choice therapy for evolving myocardial infarction: results in 339 patients. J Thorac Cardiovasc Surg 1983;86:679-88.

33. Kaul TK, Fields BL, Riggins SL, Dacumos GC, Wyatt DA, Jones CR. Coronary artery bypass grafting within 30 days of an acute myocardial infarction. Ann Thorac Surg 1995;59:1169-76.

34. Lee JH, Murrell HK, Strony J, et al. Risk analysis of coronary bypass surgery after acute myocardial infarction. Surgery

Downloaded from circ.ahajournals.org by on August 4, 2008

1997;122:675-80; discussion 6.

35. Herlitz J, Brandrup G, Haglid M, et al T. Death, mode of death, morbidity, and rehospitalization after coronary artery bypass grafting in relation to occurrence of and time since a previous myocardial infarction. Thorac Cardiovasc Surg 1997;45:109-13.

35a. Hochman JS, Sleeper LA, White HD, et al, for the SHOCK Investigators. Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock. One-year survival following early revascularization for cardiogenic shock. JAMA 2001; 285:190-2.

36. Smith LR, Harrell FE, Rankin JS, et al. Determinants of early versus late cardiac death in patients undergoing coronary artery bypass graft surgery. Circulation 1991;84:III245-53.

37. Birkmeyer JD, Quinton HB, O'Connor NJ, et al, for the Northern New England Cardiovascular Disease Study Group. The effect of peripheral vascular disease on long-term mortality after coronary artery bypass surgery. Arch Surg 1996;131:316-21.

38. Chertow GM, Lazarus JM, Christiansen CL, Cook EF, Hammermeister KE, Grover F, Daley J. Preoperative renal risk stratification. Circulation 1997;95:878-84.

39. Acinapura AJ, Jacobowitz IJ, Kramer MD, Zisbrod Z, Cunningham JN. Internal mammary artery bypass: thirteen years of experience: influence of angina and survival in 5,125 patients. J Cardiovasc Surg (Torino) 1992;33:554-9.

40. Lytle BW. Long-term results of coronary bypass surgery: is the internal mammary artery graft superior? Postgrad Med 1988; 83:66-7, 71-5.

41. Azariades M, Fessler CL, Floten HS, Starr A. Five-year results of coronary bypass grafting for patients older than 70 years: role of internal mammary artery. Ann Thorac Surg 1990;50:940-5.

42. Edwards FH, Clark RE, Schwartz M. Impact of internal mammary artery conduits on operative mortality in coronary revascularization. Ann Thorac Surg 1994;57:27-32.

43. Mora CT. The central nervous system: response to cardiopulmonary bypass In: Mora CT, ed. Cardiopulmonary Bypass: Principles and Techniques of Extracorporeal Circulation. New York, NY: Springer-Verlag, 1995:114-46.

44. Breuer AC, Furlan AJ, Hanson MR, et al. Central nervous system complications of coronary artery bypass graft surgery: prospective analysis of 421 patients. Stroke. 1983;14:682-7.

45. Furlan AJ, Breuer AC. Central nervous system complications of open heart surgery. Stroke. 1984;15:912-5.

46. Harrison MJ. Neurologic complications of coronary artery bypass grafting: diffuse or focal ischemia? Ann Thorac Surg 1995;59:1356-8.

47. Hornick P, Smith PL, Taylor KM. Cerebral complications after coronary bypass grafting. Curr Opin Cardiol 1994;9:670-9.

48. Roach GW, Kanchuger M, Mangano CM, et al, for the Multicenter Study of Perioperative Ischemia Research Group and the Ischemia Research and Education Foundation Investigators. Adverse cerebral outcomes after coronary bypass surgery. N Engl J Med 1996;335:1857-63.

49. Gardner TJ, Horneffer PJ, Manolio TA, et al. Stroke following coronary artery bypass grafting: a ten-year study. Ann Thorac Surg 1985;40:574-81.

50. Frye RL, Kronmal R, Schaff HV, Myers WO, Gersh BJ, for the participants in the Coronary Artery Surgery Study. Stroke in coronary artery bypass graft surgery: an analysis of the CASS experience. Int J Cardiol 1992;36:213-21.

51. Duda AM, Letwin LB, Sutter FP, Goldman SM. Does routine use of aortic ultrasonography decrease the stroke rate in coronary artery bypass surgery? J Vasc Surg 1995;21:98-107.

52. Kouchoukos NT, Wareing TH, Daily BB, Murphy SF. Management of the severely atherosclerotic aorta during cardiac operations. J Card Surg 1994;9:490-4.

53. Wareing TH, Davila-Roman VG, Daily BB, et al. Strategy for the reduction of stroke incidence in cardiac surgical patients. Ann Thorac Surg 1993;55:1400-7.

54. Diegeler A, Hirsch R, Schneider F, et al. Neuromonitoring and neurocognitive outcome in off-pump versus conventional coronary bypass operation. Ann Thorac Surg 2000;69:1162-6.

55. Lloyd CT, Ascione R, Underwood MJ, Gardner F, Black A, Angelini GD. Serum S-100 protein release and neuropsychologic outcome during coronary revascularization on the beating heart: a prospective randomized study. J Thorac Cardiovasc Surg 2000;119:148-54.

56. Cognitive outcome after off-pump and on-pump coronary artery bypass graft surgery: a randomized trial. JAMA 2002;287:1405-12.

57. Iglesias I, Murkin JM. Beating heart surgery or conventional CABG: are neurologic outcomes different? Semin Thorac Cardiovasc Surg 2001;13:158-69.

58. Loop FD, Lytle BW, Cosgrove DM, et al. J. Maxwell Chamberlain memorial paper: sternal wound complications after isolated coronary artery bypass grafting: early and late mortality, morbidity, and cost of care. Ann Thorac Surg 1990;49:179-86.

58a. Zerr KJ, Furnary AP, Grunkemeier GL, Bookin S, Kanhere V, Starr A. Glucose control lowers the risk of wound infection in diabetics after open heart operations. Ann Thorac Surg 1997;63:356-61.

59. Sarr MG, Gott VL, Townsend TR. Mediastinal infection after cardiac surgery. Ann Thorac Surg 1984;38:415-23.

60. Nagachinta T, Stephens M, Reitz B, Polk BF. Risk factors for surgical-wound infection following cardiac surgery. J Infect Dis 1987;156:967-73.

61. Milano CA, Kesler K, Archibald N, Sexton DJ, Jones RH. Mediastinitis after coronary artery bypass graft surgery: risk factors and long-term survival. Circulation 1995;92:2245-51.

62. Risk factors for deep sternal wound infection after sternotomy: a prospective, multicenter study. J Thorac Cardiovasc Surg 1996;111:1200-7.

62a. Grossi EA, Esposito R, Harris LJ, et al. Sternal wound infections and use of internal mammary artery grafts. J Thorac Cardiovasc Surg 1991;102:342-7.

63. Ottino G, De Paulis R, Pansini S, et al. Major sternal wound infection after open-heart surgery: a multivariate analysis of risk factors in 2,579 consecutive operative procedures. Ann Thorac Surg 1987;44:173-9.

64. Mangano CM, Diamondstone LS, Ramsay JG, Aggarwal A, Herskowitz A, Mangano DT, for the The Multicenter Study of Perioperative Ischemia Research Group. Renal dysfunction after myocardial revascularization: risk factors, adverse outcomes, and hospital resource utilization. Ann Intern Med 1998;128:194-203.

65. Koning HM, Koning AJ, Defauw JJ. Optimal perfusion during extra-corporeal circulation. Scand J Thorac Cardiovasc Surg 1987;21:207-13.

66. Corwin HL, Sprague SM, DeLaria GA, Norusis MJ. Acute renal failure associated with cardiac operations: a case-control study. J Thorac Cardiovasc Surg 1989;98:1107-12.

67. Slogoff S, Reul GJ, Keats AS, et al. Role of perfusion pressure and flow in major organ dysfunction after cardiopulmonary bypass. Ann Thorac Surg 1990;50:911-8.

68. Reves JG, Karp RB, Buttner EE, et al. Neuronal and adrenomedullary catecholamine release in response to cardiopul-

Downloaded from circ.ahajournals.org by on August 4, 2008

monary bypass in man. Circulation 1982;66:49-55.
69. Mori A, Watanabe K, Onoe M, et al. Regional blood flow in the liver, pancreas and kidney during pulsatile and nonpulsatile perfusion under profound hypothermia. Jpn Circ J 1988;52:219-27.
70. Mazzarella V, Gallucci MT, Tozzo C, et al. Renal function in patients undergoing cardiopulmonary bypass operations. J Thorac Cardiovasc Surg 1992;104:1625-7.
71. Samuels LE, Sharma S, Morris RJ, et al. Coronary artery bypass grafting in patients with chronic renal failure: a reappraisal. J Card Surg 1996;11:128-33.
72. Chertow GM, Levy EM, Hammermeister KE, Grover F, Daley J. Independent association between acute renal failure and mortality following cardiac surgery. Am J Med 1998;104:343-8.
73. Thourani VH, Weintraub WS, Stein B, et al. Influence of diabetes mellitus on early and late outcome after coronary artery bypass grafting. Ann Thorac Surg 1999;67:1045-52.
74. Lytle BW, Loop FD, Cosgrove DM, Ratliff NB, Easley K, Taylor PC. Long-term (5 to 12 years) serial studies of internal mammary artery and saphenous vein coronary bypass grafts. J Thorac Cardiovasc Surg 1985;89:248-58.
75. Gurné O, Buche M, Chenu P, et al. Quantitative angiographic follow-up study of the free inferior epigastric coronary bypass graft. Circulation 1994;90(Suppl II):II-148-54.
76. Pick AW, Orszulak TA, Anderson BJ, Schaff HV. Single versus bilateral internal mammary artery grafts: 10-year outcome analysis. Ann Thorac Surg 1997;64:599-605.
77. Isomura T, Sato T, Hisatomi K, Hayashida N, Maruyama H. Intermediate clinical results of combined gastroepiploic and internal thoracic artery bypass. Ann Thorac Surg 1996;62:1743-7.
78. Kurlansky PA, Dorman MJ, Galbut DL, et al. Bilateral internal mammary artery grafting in women: a 21-year experience. Ann Thorac Surg 1996;62:63-9.
79. Eleven-year survival in the Veterans Administration randomized trial of coronary bypass surgery for stable angina. The Veterans Administration Coronary Artery Bypass Surgery Cooperative Study Group. N Engl J Med 1984;311:1333-9.
80. Coronary Artery Surgery Study (CASS): a randomized trial of coronary artery bypass surgery. Quality of life in patients randomly assigned to treatment groups. Circulation 1983;68:951-60.
81. Varnauskas E. Twelve-year follow-up of survival in the randomized European Coronary Surgery Study. N Engl J Med 1988; 319:332-7.
82. Kloster FE, Kremkau EL, Ritzmann LW, Rahimtoola SH, Rösch J, Kanarek PH. Coronary bypass for stable angina: a prospective randomized study. N Engl J Med 1979;300:149-57.
83. Mathur VS, Guinn GA. Prospective randomized study of the surgical therapy of stable angina. Cardiovasc Clin 1977;8:131-44.
84. Norris RM, Agnew TM, Brandt PW, et al. Coronary surgery after recurrent myocardial infarction: progress of a trial comparing surgical with nonsurgical management for asymptomatic patients with advanced coronary disease. Circulation 1981;63:785-92.
85. Yusuf S, Zucker D, Peduzzi P, et al. Effect of coronary artery bypass graft surgery on survival: overview of 10-year results from randomised trials by the Coronary Artery Bypass Graft Surgery Trialists Collaboration. Lancet 1994;344:563-70.
86. Hlatky MA, Califf RM, Harrell FE, Lee KL, Mark DB, Pryor DB. Comparison of predictions based on observational data with the results of randomized controlled clinical trials of coronary artery bypass surgery. J Am Coll Cardiol 1988;11:237-45.
87. Muhlbaier LH, Pryor DB, Rankin JS, et al. Observational comparison of event-free survival with medical and surgical therapy in patients with coronary artery disease: 20 years of follow-up. Circulation 1992;86(Suppl II):II-198-204.
88. National Heart, Lung, and Blood Institute Coronary Artery Surgery Study. A multicenter comparison of the effects of randomized medical and surgical treatment of mildly symptomatic patients with coronary artery disease, and a registry of consecutive patients undergoing coronary angiography. Circulation 1981;63(Suppl I):I-1-81.
89. Proudfit WL, Kramer JR, Goormastic M, Loop FD. Ten-year survival of patients with mild angina or myocardial infarction without angina: a comparison of medical and surgical treatment. Am Heart J 1990;119:942-8.
90. Proudfit WL. Does coronary bypass surgery improve long-term survival? Cleve Clin J Med 1989;56:561-8.
91. Rahimtoola SH, Grunkemeier GL, Starr A. Ten year survival after coronary artery bypass surgery for angina in patients aged 65 years and older. Circulation 1986;74:509-17.
92. Caracciolo EA, Davis KB, Sopko G, et al. Comparison of surgical and medical group survival in patients with left main equivalent coronary artery disease: long-term CASS experience. Circulation 1995;91:2335-44.
93. Chaitman BR, Fisher LD, Bourassa MG, et al. Effect of coronary bypass surgery on survival patterns in subsets of patients with left main coronary artery disease: report of the Collaborative Study in Coronary Artery Surgery (CASS). Am J Cardiol 1981;48:765-77.
94. Chaitman BR, Davis K, Fisher LD, et al. A life table and Cox regression analysis of patients with combined proximal left anterior descending and proximal left circumflex coronary artery disease: non-left main equivalent lesions (CASS). Circulation 1983;68:1163-70.
95. Takaro T, Peduzzi P, Detre KM, et al. Survival in subgroups of patients with left main coronary artery disease. Veterans Administration Cooperative Study of Surgery for Coronary Arterial Occlusive Disease. Circulation 1982;66:14-22.
96. Rogers WJ, Coggin CJ, Gersh BJ, et al. Ten-year follow-up of quality of life in patients randomized to receive medical therapy or coronary artery bypass graft surgery. The Coronary Artery Surgery Study (CASS). Circulation 1990;82:1647-58.
97. Califf RM, Harrell FE, Lee KL, et al. The evolution of medical and surgical therapy for coronary artery disease. A 15-year perspective. JAMA 1989;261:2077-86.
98. Myers WO, Gersh BJ, Fisher LD, et al. Medical versus early surgical therapy in patients with triple-vessel disease and mild angina pectoris: a CASS registry study of survival. Ann Thorac Surg 1987;44:471-86.
99. Myers WO, Schaff HV, Gersh BJ, et al. Improved survival of surgically treated patients with triple vessel coronary artery disease and severe angina pectoris: a report from the Coronary Artery Surgery Study (CASS) registry. J Thorac Cardiovasc Surg 1989;97:487-95.
100. Taylor HA, Deumite NJ, Chaitman BR, Davis KB, Killip T, Rogers WJ. Asymptomatic left main coronary artery disease in the Coronary Artery Surgery Study (CASS) registry. Circulation 1989;79:1171-9.
101. Williams DO, Baim DS, Bates E, et al. Coronary anatomic and procedural characteristics of patients randomized to coronary angioplasty in the Bypass Angioplasty Revascularization Investigation (BARI). Am J Cardiol 1995;75:27C-33C.
102. Protocol for the Bypass Angioplasty Revascularization Investigation. Circulation 1991;84(Suppl V):V-1-27.
103. Chaitman BR, Ryan TJ, Kronmal RA, Foster ED, Frommer PL, Killip T. Coronary Artery Surgery Study (CASS): comparability of 10 year survival in randomized and randomizable patients. J Am Coll Cardiol 1990;16:1071-8.

Downloaded from circ.ahajournals.org by on August 4, 2008

104. Alderman EL, Bourassa MG, Cohen LS, et al. Ten-year follow-up of survival and myocardial infarction in the randomized Coronary Artery Surgery Study. Circulation 1990;82:1629-46.
105. Scott SM, Deupree RH, Sharma GV, Luchi RJ. VA Study of Unstable Angina: 10-year results show duration of surgical advantage for patients with impaired ejection fraction. Circulation 1994;90(Suppl II):II-120-3.
106. Scott SM, Luchi RJ, Deupree RH. Veterans Administration Cooperative Study for treatment of patients with unstable angina: results in patients with abnormal left ventricular function. Circulation 1988;78(Suppl I):I-113-21.
107. Weiner DA, Ryan TJ, Parsons L, et al. Significance of silent myocardial ischemia during exercise testing in women: report from the Coronary Artery Surgery Study. Am Heart J 1995;129:465-70.
108. Vogt AR, Funk M, Remetz M. Comparison of symptoms, functional ability, and health perception of elderly patients with coronary artery disease managed with three different treatment modalities. Cardiovasc Nurs 1994;30:33-8.
109. Mark DB, Lam LC, Lee KL, et al. Effects of coronary angioplasty, coronary bypass surgery, and medical therapy on employment in patients with coronary artery disease: a prospective comparison study. Ann Intern Med 1994;120:111-7.
110. Booth DC, Deupree RH, Hultgren HN, DeMaria AN, Scott SM, Luchi RJ. Quality of life after bypass surgery for unstable angina: 5-year follow-up results of a Veterans Affairs Cooperative Study. Circulation 1991;83:87-95.
111. Anderson AJ, Barboriak JJ, Hoffmann RG, Mullen DC. Retention or resumption of employment after aortocoronary bypass operations. JAMA 1980;243:543-5.
112. Barnes GK, Ray MJ, Oberman A, Kouchoukos NT. Changes in working status of patients following coronary bypass surgery. JAMA 1977;238:1259-62.
113. Boulay FM, David PP, Bourassa MG. Strategies for improving the work status of patients after coronary artery bypass surgery. Circulation 1982;66(Suppl III):III-43-49.
114. Smith HC, Hammes LN, Gupta S, Vlietstra RE, Elveback L. Employment status after coronary artery bypass surgery. Circulation 1982;65:120-5.
115. Varnauskas E. Survival, myocardial infarction, and employment status in a prospective randomized study of coronary bypass surgery. Circulation 1985;72(Suppl V):V-90--101.
116. Bell MR, Gersh BJ, Schaff HV, et al. Effect of completeness of revascularization on long-term outcome of patients with three-vessel disease undergoing coronary artery bypass surgery: a report from the Coronary Artery Surgery Study (CASS) Registry. Circulation 1992;86:446-57.
117. The Bypass Angioplasty Revascularization Investigation (BARI) Investigators. Comparison of coronary bypass surgery with angioplasty in patients with multivessel disease. [published errata appears in N Engl J Med 1997;336:2] N Engl J Med 1996;335:217-25.
118. Sim I, Gupta M, McDonald K, Bourassa MG, Hlatky MA. A meta-analysis of randomized trials comparing coronary artery bypass grafting with percutaneous transluminal coronary angioplasty in multivessel coronary artery disease. Am J Cardiol 1995;76:1025-9.
119. King SB, Lembo NJ, Weintraub WS, et al. A randomized trial comparing coronary angioplasty with coronary bypass surgery: Emory Angioplasty versus Surgery Trial (EAST). N Engl J Med 1994;331:1044-50.
120. Bourassa MG, Roubin GS, Detre KM, et al. Bypass Angioplasty Revascularization Investigation: patient screening, selection, and recruitment. Am J Cardiol 1995;75:3C-8C.
121. King SB, Barnhart HX, Kosinski AS, et al, for the Emory Angioplasty versus Surgery Trial Investigators. Angioplasty or surgery for multivessel coronary artery disease: comparison of eligible registry and randomized patients in the EAST trial and influence of treatment selection on outcomes. Am J Cardiol 1997;79:1453-9.
122. Hueb WA, Bellotti G, de Oliveira SA, et al. The Medicine, Angioplasty or Surgery Study (MASS): a prospective, randomized trial of medical therapy, balloon angioplasty or bypass surgery for single proximal left anterior descending artery stenoses. J Am Coll Cardiol 1995;26:1600-5.
123. Pocock SJ, Henderson RA, Rickards AF, et al. Meta-analysis of randomised trials comparing coronary angioplasty with bypass surgery. Lancet 1995;346:1184-9.
124. Hlatky MA, Rogers WJ, Johnstone I, et al, for the Bypass Angioplasty Revascularization Investigation (BARI) Investigators. Medical care costs and quality of life after randomization to coronary angioplasty or coronary bypass surgery. N Engl J Med 1997;336:92-9.
125. Hlatky MA. Analysis of costs associated with CABG and PTCA. Ann Thorac Surg 1996;61:S30-2.
126. Coronary angioplasty versus coronary artery bypass surgery: the Randomized Intervention Treatment of Angina (RITA) trial. Lancet 1993;341:573-80.
127. Pocock SJ, Henderson RA, Seed P, Treasure T, Hampton JR. Quality of life, employment status, and anginal symptoms after coronary angioplasty or bypass surgery: 3-year follow-up in the Randomized Intervention Treatment of Angina (RITA) Trial. Circulation 1996;94:135-42.
128. Zhao XQ, Brown BG, Stewart DK, et al. Effectiveness of revascularization in the Emory Angioplasty versus Surgery Trial: a randomized comparison of coronary angioplasty with bypass surgery. Circulation 1996;93:1954-62.
128a. Reference deleted during update.
129. Chaitman BR, Rosen AD, Williams DO, et al. Myocardial infarction and cardiac mortality in the Bypass Angioplasty Revascularization Investigation (BARI) randomized trial. Circulation 1997;96:2162-70.
130. Seven-year outcome in the Bypass Angioplasty Revascularization Investigation (BARI) by treatment and diabetic status. J Am Coll Cardiol 2000;35:1122-9.
131. King SB, Kosinski AS, Guyton RA, Lembo NJ, Weintraub WS. Eight-year mortality in the Emory Angioplasty versus Surgery Trial (EAST) J Am Coll Cardiol 2000;35:1116-21.
132. Rodriguez A, Mele E, Peyregne E, et al. Three-year follow-up of the Argentine Randomized Trial of Percutaneous Transluminal Coronary Angioplasty Versus Coronary Artery Bypass Surgery in Multivessel Disease (ERACI). J Am Coll Cardiol 1996;27:1178-84.
133. Rodriguez A, Boullon F, Perez-Baliño N, Paviotti C, Liprandi MI, Palacios IF, for the ERACI Group. Argentine randomized trial of percutaneous transluminal coronary angioplasty versus coronary artery bypass surgery in multivessel disease (ERACI): in-hospital results and 1-year follow-up. J Am Coll Cardiol 1993;22:1060-7.
134. Goy JJ, Eeckhout E, Burnand B, et al. Coronary angioplasty versus left internal mammary artery grafting for isolated proximal left anterior descending artery stenosis. Lancet 1994;343:1449-53.
135. Weintraub WS, Mauldin PD, Becker E, Kosinski AS, King SB. A

Downloaded from circ.ahajournals.org by on August 4, 2008

comparison of the costs of and quality of life after coronary angioplasty or coronary surgery for multivessel coronary artery disease: results from the Emory Angioplasty Versus Surgery Trial (EAST). Circulation 1995;92:2831-40.
136. Sculpher MJ, Seed P, Henderson RA, et al. Health service costs of coronary angioplasty and coronary artery bypass surgery: the Randomised Intervention Treatment of Angina (RITA) trial. Lancet 1994;344:927-30.
137. Serruys PW, Unger F, Sousa JE, et al; Arterial Revascularization Therapies Study Group. Comparison of coronary-artery bypass surgery and stenting for the treatment of multivessel disease. N Engl J Med 2001;344:1117-24.
138. Abizaid A, Costa MA, Centemero M, et al, for the Atrial Revascularization Therapy Study Group. Clinical and economic impact of diabetes mellitus on percutaneous and surgical treatment of multivessel coronary disease patients: insights from the Arterial Revascularization Therapy Study (ARTS) trial. Circulation 2001;104:533-8.
139. Abizaid A, Costa MA, Centemero M, et al, for the Arterial Revascularization Therapy Study Group. Coronary artery bypass surgery versus percutaneous coronary intervention with stent implantation in patients with multivessel coronary artery disease (the Stent or Surgery trial): a randomised controlled trial. Lancet 2002;360:965-70.
140. Morrison DA, Sethi G, Sacks J, et al, for the Investigators of the Department of Veterans Affairs Cooperative Study #385, the Angina With Extremely Serious Operative Mortality Evaluation (AWESOME). Percutaneous coronary intervention versus coronary artery bypass graft surgery for patients with medically refractory myocardial ischemia and risk factors for adverse outcomes with bypass: a multicenter, randomized trial J Am Coll Cardiol 2001;38:143-9.
141. Goy JJ, Kaufmann U, Goy-Eggenberger D, et al. A prospective randomized trial comparing stenting to internal mammary artery grafting for proximal, isolated de novo left anterior coronary artery stenosis: the SIMA trial. Stenting vs Internal Mammary Artery. Mayo Clin Proc 2000;75:1116-23.
142. Influence of diabetes on 5-year mortality and morbidity in a randomized trial comparing CABG and PTCA in patients with multivessel disease: the Bypass Angioplasty Revascularization Investigation (BARI). Circulation 1997;96:1761-9.
143. First-year results of CABRI (Coronary Angioplasty versus Bypass Revascularisation Investigation). CABRI Trial Participants. Lancet 1995;346:1179-84.
144. Detre KM, Rosen A, Jones R, et al. Is five-year mortality different for treatment by choice vs. random assignment in the Bypass Angioplasty Revascularization Investigation (BARI)? [abstr] J Am Coll Cardiol 1996; 33:243A.
145. Gum PA, O'Keefe JH, Borkon AM, et al. Bypass surgery versus coronary angioplasty for revascularization of treated diabetic patients. Circulation 1997;96(Suppl II):II-7-10.
146. Weintraub WS, Stein B, Kosinski A, et al. Outcome of coronary bypass surgery versus coronary angioplasty in diabetic patients with multivessel coronary artery disease. J Am Coll Cardiol 1998;31:10-9.
147. Ellis SG, Narins CR. Problem of angioplasty in diabetics. Circulation 1997;96:1707-10.
148. Rogers WJ, Bourassa MG, Andrews TC, et al, for the ACIP Investigators. Asymptomatic Cardiac Ischemia Pilot (ACIP) study: outcome at 1 year for patients with asymptomatic cardiac ischemia randomized to medical therapy or revascularization. J Am Coll Cardiol 1995;26:594-605.
149. Bourassa MG, Knatterud GL, Pepine CJ, et al. Asymptomatic Cardiac Ischemia Pilot (ACIP) Study. Improvement of cardiac ischemia at 1 year after PTCA and CABG. Circulation 1995;92(Suppl II):II-1-7.
150. Hannan EL, Racz MJ, McCallister BD, et al. A comparison of three-year survival after coronary artery bypass graft surgery and percutaneous transluminal coronary angioplasty. J Am Coll Cardiol 1999;33:63-72.
151. Moussa I, Reimers B, Moses J, et al. Long-term angiographic and clinical outcome of patients undergoing multivessel coronary stenting. Circulation 1997;96:3873-9.
152. Mangano DT. Cardiovascular morbidity and CABG surgery---a perspective: epidemiology, costs, and potential therapeutic solutions. J Card Surg 1995;10:366-8.
153. Kaste M, Fogelholm R, Rissanen A. Economic burden of stroke and the evaluation of new therapies. Public Health 1998;112:103-12.
154. Taylor TN. The medical economics of stroke. Drugs 1997;54 (suppl 3):51-7.
155. Jørgensen HS, Nakayama H, Raaschou HO, Olsen TS. Acute stroke care and rehabilitation: an analysis of the direct cost and its clinical and social determinants. The Copenhagen Stroke Study. Stroke 1997;28:1138-41.
156. Tuman KJ, McCarthy RJ, Najafi H, Ivankovich AD. Differential effects of advanced age on neurologic and cardiac risks of coronary artery operations. J Thorac Cardiovasc Surg 1992;104:1510-7.
157. Gardner TJ, Horneffer PJ, Manolio TA, Hoff SJ, Pearson TA. Major stroke after coronary artery bypass surgery: changing magnitude of the problem. J Vasc Surg 1986;3:684-7.
158. D'Agostino RS, Svensson LG, Neumann DJ, Balkhy HH, Williamson WA, Shahian DM. Screening carotid ultrasonography and risk factors for stroke in coronary artery surgery patients. Ann Thorac Surg 1996;62:1714-23.
159. Faggioli GL, Curl GR, Ricotta JJ. The role of carotid screening before coronary artery bypass. J Vasc Surg 1990;12:724-9.
160. Sylivris S, Calafiore P, Matalanis G, et al. The intraoperative assessment of ascending aortic atheroma: epiaortic imaging is superior to both transesophageal echocardiography and direct palpation. J Cardiothorac Vasc Anesth 1997;11:704-7.
161. Amarenco P, Duyckaerts C, Tzourio C, Hénin D, Bousser MG, Hauw JJ. The prevalence of ulcerated plaques in the aortic arch in patients with stroke. N Engl J Med 1992;326:221-5.
162. Karalis DG, Chandrasekaran K, Victor MF, Ross JJ, Mintz GS. Recognition and embolic potential of intraaortic atherosclerotic debris. J Am Coll Cardiol 1991;17:73-8.
163. Toyoda K, Yasaka M, Nagata S, Yamaguchi T. Aortogenic embolic stroke: a transesophageal echocardiographic approach. Stroke 1992;23:1056-61.
164. Horowitz DR, Tuhrim S, Budd J, Goldman ME. Aortic plaque in patients with brain ischemia: diagnosis by transesophageal echocardiography. Neurology 1992;42:1602-4.
165. The French Study of Aortic Plaques in Stroke Group. Atherosclerotic disease of the aortic arch as a risk factor for recurrent ischemic stroke. N Engl J Med 1996;334:1216-21.
166. Brennan RW, Patterson RH, Kessler J. Cerebral blood flow and metabolism during cardiopulmonary bypass: evidence of microembolic encephalopathy. Neurology 1971;21:665-72.
167. Mills NL, Everson CT. Atherosclerosis of the ascending aorta and coronary artery bypass: pathology, clinical correlates, and operative management. J Thorac Cardiovasc Surg 1991;102:546-53.
168. Borger MA, Ivanov J, Weisel RD, Rao V, Peniston CM. Stroke

Downloaded from circ.ahajournals.org by on August 4, 2008

0255
09/15/08

during coronary bypass surgery: principal role of cerebral macroemboli. Eur J Cardiothorac Surg 2001;19:627-32.

169. Blauth CI, Cosgrove DM, Webb BW, et al. Atheroembolism from the ascending aorta: an emerging problem in cardiac surgery. J Thorac Cardiovasc Surg 1992;103:1104-11.
170. Tobler HG, Edwards JE. Frequency and location of atherosclerotic plaques in the ascending aorta. J Thorac Cardiovasc Surg 1988;96:304-6.
171. Ohteki H, Itoh T, Natsuaki M, Minato N, Suda H. Intraoperative ultrasonic imaging of the ascending aorta in ischemic heart disease. Ann Thorac Surg 1990;50:539-42.
172. Barbut D, Lo YW, Hartman GS, et al. Aortic atheroma is related to outcome but not numbers of emboli during coronary bypass. Ann Thorac Surg 1997;64:454-9.
173. Katz ES, Tunick PA, Rusinek H, Ribakove G, Spencer FC, Kronzon I. Protruding aortic atheromas predict stroke in elderly patients undergoing cardiopulmonary bypass: experience with intraoperative transesophageal echocardiography. J Am Coll Cardiol 1992;20:70-7.
174. Marshall WG, Barzilai B, Kouchoukos NT, Saffitz J. Intraoperative ultrasonic imaging of the ascending aorta. Ann Thorac Surg 1989;48:339-44.
175. Wareing TH, Davila-Roman VG, Barzilai B, Murphy SF, Kouchoukos NT. Management of the severely atherosclerotic ascending aorta during cardiac operations: a strategy for detection and treatment. J Thorac Cardiovasc Surg 1992;103:453-62.
176. Akins CW. Noncardioplegic myocardial preservation for coronary revascularization. J Thorac Cardiovasc Surg 1984;88:174-81.
177. Culliford AT, Colvin SB, Rohrer K, Baumann FG, Spencer FC. The atherosclerotic ascending aorta and transverse arch: a new technique to prevent cerebral injury during bypass: experience with 13 patients. Ann Thorac Surg 1986;41:27-35.
178. Fuller JA, Adams GG, Buxton B. Atrial fibrillation after coronary artery bypass grafting: is it a disorder of the elderly? J Thorac Cardiovasc Surg 1989;97:821-5.
179. Cox JL. A perspective of postoperative atrial fibrillation in cardiac operations. Ann Thorac Surg 1993;56:405-9.
180. Rubin DA, Nieminski KE, Reed GE, Herman MV. Predictors, prevention, and long-term prognosis of atrial fibrillation after coronary artery bypass graft operations. J Thorac Cardiovasc Surg 1987;94:331-5.
181. Frost L, Mølgaard H, Christiansen EH, Hjortholm K, Paulsen PK, Thomsen PE. Atrial fibrillation and flutter after coronary artery bypass surgery: epidemiology, risk factors and preventive trials. Int J Cardiol 1992;36:253-61.
182. Almassi GH, Schowalter T, Nicolosi AC, et al. Atrial fibrillation after cardiac surgery: a major morbid event? Ann Surg 1997;226:501-11.
183. Mathew JP, Parks R, Savino JS, et al, for the MultiCenter Study of Perioperative Ischemia Research Group. Atrial fibrillation following coronary artery bypass graft surgery: predictors, outcomes, and resource utilization. JAMA 1996; 276:300-6.
184. Chauhan VS, Woodend KA, Tang AS. Lower incidence of atrial fibrillation after minimally invasive direct coronary artery bypass surgery than bypass surgery. Circulation 1997;96(suppl I):I-263.
185. Ascione R, Caputo M, Calori G, Lloyd CT, Underwood MJ, Angelini GD. Predictors of atrial fibrillation after conventional and beating heart coronary surgery: a prospective, randomized study. Circulation 2000;102:1530-5.
186. Klein AL, Grimm RA, Murray RD, et al, for the Assessment of Cardioversion Using Transesophageal Echocardiography Investigators. Use of transesophageal echocardiography to guide cardioversion in patients with atrial fibrillation. N Engl J Med 2001;344:1411-20.

186a. Laupacis A, Albers G, Dalen J, Dunn MI, Jacobson AK, Singer DE. Antithrombotic therapy in atrial fibrillation. Chest 1998;114(5 Suppl):579S-89S.

186b. Fuster V, Ryden LE, Asinger RW, et al. ACC/AHA/ESC Guidelines for the Management of Patients With Atrial Fibrillation: Executive Summary A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the European Society of Cardiology Committee for Practice Guidelines and Policy Conferences (Committee to Develop Guidelines for the Management of Patients With Atrial Fibrillation) Developed in Collaboration With the North American Society of Pacing and Electrophysiology. Circulation 2001;104:2118-50.

186c. Goldstein LB, Adams R, Becker K, et al. Primary prevention of ischemic stroke: A statement for healthcare professionals from the Stroke Council of the American Heart Association. Circulation 2001;103:163-82.

187. Maisel WH, Rawn JD, Stevenson WG. Atrial fibrillation after cardiac surgery. Ann Intern Med 2001;135:1061-73.
188. Keren A, Goldberg S, Gottlieb S, et al. Natural history of left ventricular thrombi: their appearance and resolution in the posthospitalization period of acute myocardial infarction. J Am Coll Cardiol 1990;15:790-800.
189. Johannessen KA, Nordrehaug JE, von der Lippe G. Left ventricular thrombi after short-term high-dose anticoagulants in acute myocardial infarction. Eur Heart J 1987;8:975-80.
190. McKhann GM, Goldsborough MA, Borowicz LM, et al. Predictors of stroke risk in coronary artery bypass patients. Ann Thorac Surg 1997;63:516-21.
191. Berens ES, Kouchoukos NT, Murphy SF, Wareing TH. Preoperative carotid artery screening in elderly patients undergoing cardiac surgery. J Vasc Surg 1992;15:313-21.

191a. Lanska DJ, Kryscio RJ. In-hospital mortality following carotid endarterectomy. Neurology 1998;51:440-7.

191b. Ricotta JJ, Char DJ, Cuadra SA, et al. Modeling stroke risk after coronary artery bypass and combined coronary artery bypass and carotid endarterectomy. Stroke 2003;34:1212-7.

191c. McCrory DC, Goldstein LB, Samsa GP, et al. Predicting complications of carotid endarterectomy. Stroke 1993;24:1285-91.

192. Prati P, Vanuzzo D, Casaroli M, et al. Prevalence and determinants of carotid atherosclerosis in a general population. Stroke 1992;23:1705-11.
193. Fabris F, Zanocchi M, Bo M, et al. Carotid plaque, aging, and risk factors: a study of 457 subjects. Stroke 1994;25:1133-40.
194. Schwartz LB, Bridgman AH, Kieffer RW, et al. Asymptomatic carotid artery stenosis and stroke in patients undergoing cardiopulmonary bypass. J Vasc Surg 1995;21:146-53.
195. Salasidis GC, Latter DA, Steinmetz OK, Blair JF, Graham AM. Carotid artery duplex scanning in preoperative assessment for coronary artery revascularization: the association between peripheral vascular disease, carotid artery stenosis, and stroke. J Vasc Surg 1995;21:154-60.
196. Rizzo RJ, Whittemore AD, Couper GS, et al. Combined carotid and coronary revascularization: the preferred approach to the severe vasculopath. Ann Thorac Surg 1992;54:1099-108.
197. Brener BJ, Brief DK, Alpert J, et al. A four-year experience with preoperative noninvasive carotid evaluation of two thousand twenty-six patients undergoing cardiac surgery. J Vasc Surg 1984;1:326-38.

Downloaded from circ.ahajournals.org by on August 4, 2008

198. Akins CW. The case for concomitant carotid and coronary artery surgery. Br Heart J 1995;74:97-8.
199. Ennix CL, Lawrie GM, Morris GC, et al. Improved results of carotid endarterectomy in patients with symptomatic coronary disease: an analysis of 1,546 consecutive carotid operations. Stroke 1979;10:122-5.
200. Hertzer NR, Lees CD. Fatal myocardial infarction following carotid endarterectomy: three hundred thirty-five patients followed 6-11 years after operation. Ann Surg 1981;194:212-8.
201. Hertzer NR, Arison R. Cumulative stroke and survival ten years after carotid endarterectomy. J Vasc Surg 1985;2:661-8.
202. Endarterectomy for asymptomatic carotid artery stenosis. Executive Committee for the Asymptomatic Carotid Atherosclerosis Study. JAMA 1995;273:1421-8.
203. Endarterectomy for moderate symptomatic carotid stenosis: interim results from the MRC European Carotid Surgery Trial. Lancet 1996;347:1591-3.
204. North American Symptomatic Carotid Endarterectomy Trial. Methods, patient characteristics, and progress. Stroke 1991;22:711-20.
205. Akins CW, Moncure AC, Daggett WM, et al. Safety and efficacy of concomitant carotid and coronary artery operations. Ann Thorac Surg 1995;60:311-7.
206. Vermeulen FE, Hamerlijnck RP, Defauw JJ, Ernst SM. Synchronous operation for ischemic cardiac and cerebrovascular disease: early results and long-term follow-up. Ann Thorac Surg 1992;53:381-9.
207. Wennberg DE, Lucas FL, Birkmeyer JD, Bredenberg CE, Fisher ES. Variation in carotid endarterectomy mortality in the Medicare population: trial hospitals, volume, and patient characteristics. JAMA 1998;279:1278-81.
208. Cebul RD, Snow RJ, Pine R, Hertzer NR, Norris DG. Indications, outcomes, and provider volumes for carotid endarterectomy. JAMA 1998;279:1282-7.
209. Sauvé JS, Thorpe KE, Sackett DL, et al. Can bruits distinguish high-grade from moderate symptomatic carotid stenosis? The North American Symptomatic Carotid Endarterectomy Trial. Ann Intern Med 1994;120:633-7.
210. Coyle KA, Gray BC, Smith RB, et al. Morbidity and mortality associated with carotid endarterectomy: effect of adjunctive coronary revascularization. Ann Vasc Surg 1995;9:21-7.
211. Hertzer NR, Loop FD, Beven EG, O'Hara PJ, Krajewski LP. Surgical staging for simultaneous coronary and carotid disease: a study including prospective randomization. J Vasc Surg 1989;9:455-63.
212. North American Symptomatic Carotid Endarterectomy Trial Collaborators. Beneficial effect of carotid endarterectomy in symptomatic patients with high-grade carotid stenosis. N Engl J Med 1991;325:445-53.
213. European Carotid Surgery Trialists' Collaborative Group. MRC European Carotid Surgery Trial: interim results for symptomatic patients with severe (70-99%) or with mild (0-29%) carotid stenosis. Lancet 1991;337:1235-43.
214. Mayberg MR, Wilson SE, Yatsu F, et al, for the Veterans Affairs Cooperative Studies Program 309 Trialist Group. Carotid endarterectomy and prevention of cerebral ischemia in symptomatic carotid stenosis. JAMA 1991;266:3289-94.
215. Moore WS, Barnett HJ, Beebe HG, et al. Guidelines for carotid endarterectomy: a multidisciplinary consensus statement from the ad hoc Committee, American Heart Association. Stroke 1995;26:188-201.
216. Moore WS, Vescera CL, Robertson JT, Baker WH, Howard VJ, Toole JF. Selection process for surgeons in the Asymptomatic Carotid Atherosclerosis Study. Stroke 1991;22:1353-7.
217. Hertzer NR. A personal view: the Asymptomatic Carotid Atherosclerosis Study results---read the label carefully. J Vasc Surg 1996;23:167-71.
218. Newman MF, Kirchner JL, Phillips-Bute B, et al, for the Neurological Outcome Research Group and the Cardiothoracic Anesthesiology Research Endeavors Investigators. Longitudinal assessment of neurocognitive function after coronary-artery bypass surgery. N Engl J Med 2001;344:395-402.
219. Murkin JM, Martzke JS, Buchan AM. Cognitive and neurological function after coronary artery surgery: a prospective study [Abstr]. Anesth Analg 1992;74:S215.
220. Mora CT. The central nervous system: response to cardiopulmonary bypass In: Mora CT, ed. Cardiopulmonary Bypass: Principles and Techniques of Extracorporeal Circulation. New York, NY: Springer-Verlag, 1995:114-46 .
220a. Reference deleted during update.
220b. Reference deleted during update.
220c Reference deleted during update.
220d. Reference deleted during update.
221. Pugsley W, Klinger L, Paschalis C, Treasure T, Harrison M, Newman S. The impact of microemboli during cardiopulmonary bypass on neuropsychological functioning. Stroke 1994;25:1393-9.
222. Stump DA, Rogers AT, Hammon JW, Newman SP. Cerebral emboli and cognitive outcome after cardiac surgery. J Cardiothorac Vasc Anesth 1996;10:113-8.
223. Stump DA, Rogers AT, Kahn ND, et al. When emboli occur during coronary artery bypass graft surgery [Abstr]. Anesthesiology 1993;79(suppl 3A):A49.
224. Albin MS, Hantler C, Bunegin L. Intracranial air embolism is detected by transcranial Doppler (TCD) during cardiopulmonary bypass procedures [Abstr]. Anesthesiology 1990;73:A458.
225. Moody DM, Bell MA, Challa VR, Johnston WE, Prough DS. Brain microemboli during cardiac surgery or aortography. Ann Neurol 1990;28:477-86.
226. Hammon JW, Stump DA, Butterworth JB, Moody DM. Approaches to reduce neurologic complications during cardiac surgery. Semin Thorac Cardiovasc Surg 2001;13:184-91.
227. Padayachee TS, Parsons S, Theobold R, Linley J, Gosling RG, Deverall PB. The detection of microemboli in the middle cerebral artery during cardiopulmonary bypass: a transcranial Doppler ultrasound investigation using membrane and bubble oxygenators. Ann Thorac Surg 1987;44:298-302.
228. Blauth CI, Smith PL, Arnold JV, Jagoe JR, Wootton R, Taylor KM. Influence of oxygenator type on the prevalence and extent of microembolic retinal ischemia during cardiopulmonary bypass: assessment by digital image analysis. J Thorac Cardiovasc Surg 1990;99:61-9.
229. Murkin JM, Boyd WD, Ganapathy S, Adams SJ, Peterson RC. Beating heart surgery: why expect less central nervous system morbidity? Ann Thorac Surg 1999;68:1498-501.
230. Arom KV, Cohen DE, Strobl FT. Effect of intraoperative intervention on neurological outcome based on electroencephalographic monitoring during cardiopulmonary bypass. Ann Thorac Surg 1989;48:476-83.
231. Edmonds HL, Griffiths LK, van der Laken J, Slater AD, Shields CB. Quantitative electroencephalographic monitoring during myocardial revascularization predicts postoperative disorientation and improves outcome. J Thorac Cardiovasc Surg 1992; 103:555-63.

Downloaded from circ.ahajournals.org by on August 4, 2008

0257
09/15/08

232. Murkin JM, Martzke JS, Buchan AM, Bentley C, Wong CJ. A randomized study of the influence of perfusion technique and pH management strategy in 316 patients undergoing coronary artery bypass surgery, II. Neurologic and cognitive outcomes. J Thorac Cardiovasc Surg 1995;110:349-62.
233. Engelman RM, Pleet AB, Rousou JA, et al. Does cardiopulmonary bypass temperature correlate with postoperative central nervous system dysfunction? J Card Surg 1995;10:493-7.
234. Nathan HJ, Munson J, Wells G, Mundi C, Balaa F, Wynands JE. The management of temperature during cardiopulmonary bypass: effect on neuropsychological outcome. J Card Surg 1995;10:481-7.
235. Christakis GT, Abel JG, Lichtenstein SV. Neurological outcomes and cardiopulmonary temperature: a clinical review. J Card Surg 1995;10:475-80.
236. Guyton RA, Mellitt RJ, Weintraub WS. A critical assessment of neurological risk during warm heart surgery. J Card Surg 1995;10:488-92.
237. Harris DN, Bailey SM, Smith PL, Taylor KM, Oatridge A, Bydder GM. Brain swelling in first hour after coronary artery bypass surgery. Lancet 1993;342:586-7.
238. Badner NH, Murkin JM, Lok P. Differences in pH management and pulsatile/nonpulsatile perfusion during cardiopulmonary bypass do not influence renal function. Anesth Analg 1992;75:696-701.
239. Henze T, Stephan H, Sonntag H. Cerebral dysfunction following extracorporeal circulation for aortocoronary bypass surgery: no differences in neuropsychological outcome after pulsatile versus nonpulsatile flow. Thorac Cardiovasc Surg 1990;38:65-8.
240. Murkin JM, Martzke JS, Buchan AM. Pulsatile perfusion during hypothermic cardiopulmonary bypass significantly influences morbidity and mortality after coronary artery bypass surgery [Abstr]. Anesth Analg 1993;76:S280.
241. Martin TD, Craver JM, Gott JP, et al. Prospective, randomized trial of retrograde warm blood cardioplegia: myocardial benefit and neurologic threat. Ann Thorac Surg 1994;57:298-302.
242. Engleman RM, Levitsky S. A Textbook of Cardioplegia for Difficult Clinical Problems. Mt. Kisco, NY: Futura;1992.
243. Akins CW, Carroll DL. Event-free survival following nonemergency myocardial revascularization during hypothermic fibrillatory arrest. Ann Thorac Surg 1987;43:628-33.
244. Buckberg GD, Olinger GN, Mulder DG, Maloney JV. Depressed postoperative cardiac performance: prevention by adequate myocardial protection during cardiopulmonary bypass. J Thorac Cardiovasc Surg 1975;70:974-94.
245. Buckberg GD. Normothermic blood cardioplegia: alternative or adjunct? J Thorac Cardiovasc Surg 1994;107:860-7.
246. Buckberg GD. Myocardial temperature management during aortic clamping for cardiac surgery: protection, preoccupation, and perspective. J Thorac Cardiovasc Surg 1991;102:895-903.
247. Illes RW, Silverman NA, Krukenkamp IB, Yusen RD, Chausow DD, Levitsky S. The efficacy of blood cardioplegia is not due to oxygen delivery. J Thorac Cardiovasc Surg 1989;98:1051-6.
248. Allen BS, Rosenkranz E, Buckberg GD, et al. Studies on prolonged acute regional ischemia, VI: myocardial infarction with left ventricular power failure: a medical/surgical emergency requiring urgent revascularization with maximal protection of remote muscle. J Thorac Cardiovasc Surg 1989;98:691-702.
249. Rosenkranz ER, Buckberg GD, Laks H, Mulder DG. Warm induction of cardioplegia with glutamate-enriched blood in coronary patients with cardiogenic shock who are dependent on inotropic drugs and intra-aortic balloon support. J Thorac Cardiovasc Surg 1983;86:507-18.
250. Allen BS, Buckberg GD, Fontan FM, et al. Superiority of controlled surgical reperfusion versus percutaneous transluminal coronary angioplasty in acute coronary occlusion. J Thorac Cardiovasc Surg 1993;105:864-84.
251. Bottner RK, Wallace RB, Visner MS, et al. Reduction of myocardial infarction after emergency coronary artery bypass grafting for failed coronary angioplasty with use of a normothermic reperfusion cardioplegia protocol. J Thorac Cardiovasc Surg 1991;101:1069-75.
252. Christakis GT, Fremes SE, Weisel RD, et al. Reducing the risk of urgent revascularization for unstable angina: a randomized clinical trial. J Vasc Surg 1986;3:764-72.
253. Christakis GT, Lichtenstein SV, Buth KJ, Fremes SE, Weisel RD, Naylor CD. The influence of risk on the results of warm heart surgery: a substudy of a randomized trial. Eur J Cardiothorac Surg 1997;11:515-20.
254. Kennedy JW, Kaiser GC, Fisher LD, et al. Multivariate discriminant analysis of the clinical and angiographic predictors of operative mortality from the Collaborative Study in Coronary Artery Surgery (CASS). J Thorac Cardiovasc Surg 1980;80:876-87.
255. Dresdale AR, Silverman NA. Cardioplegia for the dysfunctional ventricle. In: Engleman RM, Levitsky S, eds. A Textbook of Cardioplegia for Difficult Clinical Problems. Mt. Kisco, NY: Futura; 1992:92-102.
256. Yau TM, Weisel RD, Mickle DAG, Ivanov J. Cardioplegia for the dysfunctional ventricle. In: Engleman RM, Levitsky S, eds. A Textbook of Cardioplegia for Difficult Clinical Problems. Mt. Kisco, NY :Futura; 1992:83-94.
257. Fiore AC, Barner HB. Myocardial protection for the impaired ventricle. In: Engleman RM, Levitsky S, eds. A Textbook of Cardioplegia for Difficult Clinical Problems. Mt. Kisco, NY: Futura; 1992:103-114.
258. Chaitman BR, Alderman EL, Sheffield LT, et al. Use of survival analysis to determine the clinical significance of new Q waves after coronary bypass surgery. Circulation 1983;67:302-9.
259. Schaff HV, Gersh BJ, Fisher LD, et al. Detrimental effect of perioperative myocardial infarction on late survival after coronary artery bypass: report from the Coronary Artery Surgery Study (CASS). J Thorac Cardiovasc Surg 1984;88:972-81.
260. Force T, Hibberd P, Weeks G, et al. Perioperative myocardial infarction after coronary artery bypass surgery: clinical significance and approach to risk stratification. Circulation 1990; 82:903-12.
261. Brener SJ, Lytle BW, Schneider JP, Ellis SG, Topol EJ. Association between CK-MB elevation after percutaneous or surgical revascularization and three-year mortality. J Am Coll Cardiol 2002;40:1961-7.
262. Costa MA, Carere RG, Lichtenstein SV, et al. Incidence, predictors, and significance of abnormal cardiac enzyme rise in patients treated with bypass surgery in the Arterial Revascularization Therapies Study (ARTS). Circulation 2001;104:2689-93.
263. Klatte K, Chaitman BR, Theroux P, et al, for the GUARDIAN Investigators (The GUARD during Ischemia Against Necrosis). Increased mortality after coronary artery bypass graft surgery is associated with increased levels of postoperative creatine kinase-myocardial band isoenzyme release: results from the GUARDIAN trial. J Am Coll Cardiol 2001;38:1070-7.
264. Steuer J, Hörte LG, Lindahl B, Ståhle E. Impact of perioperative myocardial injury on early and long-term outcome after coronary artery bypass grafting. Eur Heart J 2002;23:1219-27.
265. Januzzi JL, Lewandrowski K, MacGillivray TE, et al. A compar-

Downloaded from circ.ahajournals.org by on August 4, 2008

ison of cardiac troponin T and creatine kinase-MB for patient evaluation after cardiac surgery. J Am Coll Cardiol 2002; 39:1518-23.
266. Dietl CA, Berkheimer MD, Woods EL, Gilbert CL, Pharr WF, Benoit CH. Efficacy and cost-effectiveness of preoperative IABP in patients with ejection fraction of 0.25 or less. Ann Thorac Surg 1996;62:401-8.
267. Christenson JT, Simonet F, Badel P, Schmuziger M. Evaluation of preoperative intra-aortic balloon pump support in high risk coronary patients. Eur J Cardiothorac Surg 1997;11:1097-103.
268. Christenson JT, Badel P, Simonet F, Schmuziger M. Preoperative intraaortic balloon pump enhances cardiac performance and improves the outcome of redo CABG. Ann Thorac Surg 1997;64:1237-44.
269. Pearl JM, Drinkwater DC, Laks H, Capouya ER, Gates RN. Leukocyte-depleted reperfusion of transplanted human hearts: a randomized, double-blind clinical trial. J Heart Lung Transplant 1992;11:1082-92.
270. Byrne JG, Appleyard RF, Lee CC, et al. Controlled reperfusion of the regionally ischemic myocardium with leukocyte-depleted blood reduces stunning, the no-reflow phenomenon, and infarct size. J Thorac Cardiovasc Surg 1992;103:66-71.
271. Sawa Y, Matsuda H, Shimazaki Y, et al. Evaluation of leukocyte-depleted terminal blood cardioplegic solution in patients undergoing elective and emergency coronary artery bypass grafting. J Thorac Cardiovasc Surg 1994;108:1125-31.
272. Wilson IC, Gardner TJ, DiNatale JM, Gillinov AM, Curtis WE, Cameron DE. Temporary leukocyte depletion reduces ventricular dysfunction during prolonged postischemic reperfusion. J Thorac Cardiovasc Surg 1993;106:805-10.
273. Lazar HL, Zhang X, Hamasaki T, et al. Role of leukocyte depletion during cardiopulmonary bypass and cardioplegic arrest. Ann Thorac Surg 1995;60:1745-8.
274. Zeff RH, Kongtahworn C, Iannone LA, et al. Internal mammary artery versus saphenous vein graft to the left anterior descending coronary artery: prospective randomized study with 10-year follow-up. Ann Thorac Surg 1988;45:533-6.
275. He GW, Acuff TE, Ryan WH, Bowman RT, Douthit MB, Mack MJ. Determinants of operative mortality in elderly patients undergoing coronary artery bypass grafting: emphasis on the influence of internal mammary artery grafting on mortality and morbidity. J Thorac Cardiovasc Surg 1994;108:73-81.
276. Gardner TJ, Greene PS, Rykiel MF, et al. Routine use of the left internal mammary artery graft in the elderly. Ann Thorac Surg 1990;49:188-93.
277. Zapolanski A, Rosenblum J, Myler RK, et al. Emergency coronary artery bypass surgery following failed balloon angioplasty: role of the internal mammary artery graft. J Card Surg 1991;6:439-48.
278. Lytle BW, McElroy D, McCarthy P, et al. Influence of arterial coronary bypass grafts on the mortality in coronary reoperations. J Thorac Cardiovasc Surg 1994;107:675-82.
279. Gott JP, Han DC. Surgical treatment of acute myocardial infarct: clinical considerations. Semin Thorac Cardiovasc Surg 1995;7: 198-207.
280. Roberts N, Harrison DG, Reimer KA, Crain BS, Wagner GS. Right ventricular infarction with shock but without significant left ventricular infarction: a new clinical syndrome. Am Heart J 1985;110:1047-53.
281. Dell'Italia LJ, Starling MR, O'Rourke RA. Physical examination for exclusion of hemodynamically important right ventricular infarction. Ann Intern Med 1983;99:608-11.
281a. Zehender M, Kasper W, Kauder E, et al. Right ventricular infarction as an independent predictor of prognosis after acute inferior myocardial infarction. N Engl J Med 1993;328:981-8.
282. Serrano Júnior CV, Ramires JA, César LA, et al. Prognostic significance of right ventricular dysfunction in patients with acute inferior myocardial infarction and right ventricular involvement. Clin Cardiol 1995;18:199-205.
283. Berger PB, Ruocco NA, Ryan TJ, et al, for the TIMI Research Group. Frequency and significance of right ventricular dysfunction during inferior wall left ventricular myocardial infarction treated with thrombolytic therapy (results from the Thrombolysis In Myocardial Infarction [TIMI] II trial). Am J Cardiol 1993; 71:1148-52.
284. Andersen HR, Falk E, Nielsen D. Right ventricular infarction: frequency, size and topography in coronary heart disease: a prospective study comprising 107 consecutive autopsies from a coronary care unit. J Am Coll Cardiol 1987;10:1223-32.
285. Bowers TR, O'Neill WW, Grines C, Pica MC, Safian RD, Goldstein JA. Effect of reperfusion on biventricular function and survival after right ventricular infarction. N Engl J Med 1998; 338:933-40.
286. Goldstein JA, Barzilai B, Rosamond TL, Eisenberg PR, Jaffe AS. Determinants of hemodynamic compromise with severe right ventricular infarction. Circulation 1990;82:359-68.
286a. Goldstein JA, Tweddell JS, Barzilai B, Yagi Y, Jaffe AS, Cox JL. Importance of left ventricular function and systolic ventricular interaction to right ventricular performance during acute right heart ischemia. J Am Coll Cardiol 1992;19:704-11.
287. Calvin JE. Optimal right ventricular filling pressures and the role of pericardial constraint in right ventricular infarction in dogs. Circulation 1991;84:852-61.
288. Braat SH, Ramentol M, Halders S, Wellens HJ. Reperfusion with streptokinase of an occluded right coronary artery: effects on early and late right and left ventricular ejection fraction. Am Heart J 1987;113:257-60.
289. Tobinick E, Schelbert HR, Henning H, et al. Right ventricular ejection fraction in patients with acute anterior and inferior myocardial infarction assessed by radionuclide angiography. Circulation 1978;57:1078-84.
290. Boldt J, Kling D, Thiel A, Scheld HH, Hempelmann G. Revascularization of the right coronary artery: influence on thermodilution right ventricular ejection fraction. J Cardiothorac Vasc Anesth 1998;2:140-6.
291. Gott JP, Cooper WA, Schmidt FE, et al. Modifying risk for extracorporeal circulation: trial of four antiinflammatory strategies. Ann Thorac Surg 1998;66:747-53.
292. Kirklin JK. Prospects for understanding and eliminating the deleterious effects of cardiopulmonary bypass. Ann Thorac Surg 1991;51:529-31.
293. Hall RI, Smith MS, Rocker G. The systemic inflammatory response to cardiopulmonary bypass: pathophysiological, therapeutic, and pharmacological considerations. Anesth Analg 1997;85:766-82.
294. Andersen LW, Baek L, Thomsen BS, Rasmussen JP. Effect of methylprednisolone on endotoxemia and complement activation during cardiac surgery. J Cardiothorac Anesth 1989;3:544-9.
295. Engelman RM, Rousou JA, Flack JE, Deaton DW, Kalfin R, Das DK. Influence of steroids on complement and cytokine generation after cardiopulmonary bypass. Ann Thorac Surg 1995;60: 801-4.
296. Hill GE, Snider S, Galbraith TA, Forst S, Robbins RA. Glucocorticoid reduction of bronchial epithelial inflammation

Downloaded from circ.ahajournals.org by on August 4, 2008

0259
09/15/08

during cardiopulmonary bypass. Am J Respir Crit Care Med 1995;152:1791-5.
297. Hill GE, Alonso A, Spurzem JR, Stammers AH, Robbins RA. Aprotinin and methylprednisolone equally blunt cardiopulmonary bypass-induced inflammation in humans. J Thorac Cardiovasc Surg 1995;110:1658-62.
298. Niazi Z, Flodin P, Joyce L, Smith J, Mauer H, Lillehei RC. Effects of glucocorticosteroids in patients undergoing coronary artery bypass surgery. Chest 1979;76:262-8.
299. Jansen NJ, van Oeveren W, van den Broek L, et al. Inhibition by dexamethasone of the reperfusion phenomena in cardiopulmonary bypass. J Thorac Cardiovasc Surg 1991;102:515-25.
300. Rao G, King J, Ford W, King G. The effects of methylprednisolone on the complications of coronary artery surgery. Vasc Surg 1977;11:1-7.
301. Thorn GW. Clinical considerations in the use of corticosteroids. N Engl J Med 1996;274:775-81.
302. Kawamura T, Inada K, Okada H, Okada K, Wakusawa R. Methylprednisolone inhibits increase of interleukin 8 and 6 during open heart surgery. Can J Anaesth 1995;42:399-403.
303. Lasser EC, Berry CC, Talner LB, et al. Pretreatment with corticosteroids to alleviate reactions to intravenous contrast material. N Engl J Med 1987;317:845-9.
304. Murkin JM. Cardiopulmonary bypass and the inflammatory response: a role for serine protease inhibitors? J Cardiothorac Vasc Anesth 1997;11:19-23.
305. Puskas JD, Wright CE, Ronson RS, Brown WM 3rd, Gott JP, Guyton RA. Modifying risk for extracorporeal circulation: trial of four anti-inflammatory strategies. Ann Thorac Surg 1998; 66:1068-72.
306. Bando K, Pillai R, Cameron DE, et al. Leukocyte depletion ameliorates free radical-mediated lung injury after cardiopulmonary bypass. J Thorac Cardiovasc Surg 1990;99:873-7.
307. Gu YJ, de Vries AJ, Boonstra PW, van Oeveren W. Leukocyte depletion results in improved lung function and reduced inflammatory response after cardiac surgery. J Thorac Cardiovasc Surg 1996;112:494-500.
308. Johnson D, Thomson D, Mycyk T, Burbridge B, Mayers I. Depletion of neutrophils by filter during aortocoronary bypass surgery transiently improves postoperative cardiorespiratory status. Chest 1995;107:1253-9.
309. Jones DR, Hill RC, Hollingsed MJ, et al. Use of heparin-coated cardiopulmonary bypass. Ann Thorac Surg 1993;56:566-8.
310. Gu YJ, van Oeveren W, Akkerman C, Boonstra PW, Huyzen RJ, Wildevuur CR. Heparin-coated circuits reduce the inflammatory response to cardiopulmonary bypass. Ann Thorac Surg 1993; 55:917-22.
311. Redmond JM, Gillinov AM, Stuart RS, et al. Heparin-coated bypass circuits reduce pulmonary injury. Ann Thorac Surg 1993; 56:474-8.
312. Wagner WR, Johnson PC, Thompson KA, Marrone GC. Heparin-coated cardiopulmonary bypass circuits: hemostatic alterations and postoperative blood loss. Ann Thorac Surg 1994;58:734-40.
313. Edmunds LH. Surface-bound heparin—panacea or peril? Ann Thorac Surg 1994;58:285-6.
314. Furnary AP, Zerr KJ, Grunkemeier GL, Starr A. Continuous intravenous insulin infusion reduces the incidence of deep sternal wound infection in diabetic patients after cardiac surgical procedures. Ann Thorac Surg 1999;67:352-60.
315. Geelhoed GW, Sharpe K, Simon GL. A comparative study of surgical skin preparation methods. Surg Gynecol Obstet 1983;157: 265-8.
316. Kaiser AB, Kernodle DS, Barg NL, Petracek MR. Influence of preoperative showers on staphylococcal skin colonization: a comparative trial of antiseptic skin cleansers. Ann Thorac Surg 1988;45:35-8.
317. Reference deleted during update.
318. Alexander JW, Fischer JE, Boyajian M, Palmquist J, Morris MJ. The influence of hair-removal methods on wound infections. Arch Surg 1983;118:347-52.
319. Cruse PJ, Foord R. A five-year prospective study of 23,649 surgical wounds. Arch Surg 1973;107:206-10.
320. Nishida H, Grooters RK, Soltanzadeh H, Thieman KC, Schneider RF, Kim WP. Discriminate use of electrocautery on the median sternotomy incision: a 0.16% wound infection rate. J Thorac Cardiovasc Surg 1991;101:488-94.
321. Nelson DR, Buxton TB, Luu QN, Rissing JP. The promotional effect of bone wax on experimental Staphylococcus aureus osteomyelitis. J Thorac Cardiovasc Surg 1990;99:977-80.
322. Wong PS, Young VK, Youhana A, Wright JE. Surgical glove punctures during cardiac operations. Ann Thorac Surg 1993;56:108-10.
323. Gani JS, Anseline PF, Bissett RL. Efficacy of double versus single gloving in protecting the operating team. Aust N Z J Surg 1990;60:171-5.
324. Bennett B, Duff P. The effect of double gloving on frequency of glove perforations. Obstet Gynecol 1991;78:1019-22.
325. Webb JM, Pentlow BD. Double gloving and surgical technique. Ann R Coll Surg Engl 1993;75:291-2.
326. Berridge DC, Starky G, Jones NA, Chamberlain J. A randomized controlled trial of double-versus single-gloving in vascular surgery. J R Coll Surg Edinb 1998;43:9-10.
327. Nugent WC, Maislen EL, O'Connor GT, Marrin CA, Plume SK. Pericardial flap prevents sternal wound complications. Arch Surg 1988;123:636-9.
328. Slaughter MS, Olson MM, Lee JT, Ward HB. A fifteen-year wound surveillance study after coronary artery bypass. Ann Thorac Surg 1993;56:1063-8.
329. Murphy PJ, Connery C, Hicks GL, Blumberg N. Homologous blood transfusion as a risk factor for postoperative infection after coronary artery bypass graft operations. J Thorac Cardiovasc Surg 1992;104:1092-9.
330. van de Watering LM, Hermans J, Houbiers JG, et al. Beneficial effects of leukocyte depletion of transfused blood on postoperative complications in patients undergoing cardiac surgery: a randomized clinical trial. Circulation 1998;97:562-8.
331. Blumberg N, Triulzi DJ, Heal JM. Transfusion-induced immunomodulation and its clinical consequences. Transfus Med Rev 1990;4:24-35.
332. Kreter B, Woods M. Antibiotic prophylaxis for cardiothoracic operations: meta-analysis of thirty years of clinical trials. J Thorac Cardiovasc Surg 1992;104:590-9.
333. Menges T, Sablotzki A, Welters I, et al. Concentration of cefamandole in plasma and tissues of patients undergoing cardiac surgery: the influence of different cefamandole dosage. J Cardiothorac Vasc Anesth 1997;11:565-70.
334. Townsend TR, Reitz BA, Bilker WB, Bartlett JG. Clinical trial of cefamandole, cefazolin, and cefuroxime for antibiotic prophylaxis in cardiac operations. J Thorac Cardiovasc Surg 1993;106:664-70.
335. Ariano RE, Zhanel GG. Antimicrobial prophylaxis in coronary bypass surgery: a critical appraisal. DICP 1991;25:478-84.
336. Antimicrobial prophylaxis in surgery. Med Lett Drugs Ther 1997;39:97-101.

Downloaded from circ.ahajournals.org by on August 4, 2008

0260
09/15/08

337. Vuorisalo S, Pokela R, Syrjälä H. Comparison of vancomycin and cefuroxime for infection prophylaxis in coronary artery bypass surgery. Infect Control Hosp Epidemiol 1998;19:234-9.
338. Romanelli VA, Howie MB, Myerowitz PD, et al. Intraoperative and postoperative effects of vancomycin administration in cardiac surgery patients: a prospective, double-blind, randomized trial. Crit Care Med 1993;21:1124-31.
339. Vuorisalo S, Pokela R, Syrjälä H. Is single-dose antibiotic prophylaxis sufficient for coronary artery bypass surgery? An analysis of peri- and postoperative serum cefuroxime and vancomycin levels. J Hosp Infect 1997;37:237-47.
340. Kriaras I, Michalopoulos A, Michalis A. Antibiotic prophylaxis in cardiac surgery. J Cardiovasc Surg (Torino) 1997;38:605-10.
341. Kaiser AB, Petracek MR, Lea JW, et al. Efficacy of cefazolin, cefamandole, and gentamicin as prophylactic agents in cardiac surgery: results of a prospective, randomized, double-blind trial in 1030 patients. Ann Surg 1987;206:791-7.
342. Nichols RL. Surgical antibiotic prophylaxis. Med Clin North Am 1995;79:509-22.
343. Niederhäuser U, Vogt M, Vogt P, Genoni M, Künzli A, Turina MI. Cardiac surgery in a high-risk group of patients: is prolonged postoperative antibiotic prophylaxis effective? J Thorac Cardiovasc Surg 1997;114:162-8.
344. Wellens F, Pirlet M, Larbuisson R, De Meireleire F, De Somer P. Prophylaxis in cardiac surgery: a controlled randomized comparison between cefazolin and cefuroxime. Eur J Cardiothorac Surg 1995;9:325-9.
345. American Medical Association, Division of Drugs and Toxicology. Antimicrobial chemoprophylaxis for surgical patients. In: Drug Evaluations Annual 1994. Milwaukee, WI: American Medical Association;1994:1317.
346. University Health System Consortium Services Corporation. Clinical Process Improvement (CABG)/Clinical Benchmarking Data Base Report. March 1, 1996;15.
347. Classen DC, Evans RS, Pestotnik SL, Horn SD, Menlove RL, Burke JP. The timing of prophylactic administration of antibiotics and the risk of surgical-wound infection. N Engl J Med 1992;326:281-6.
348. Jurkiewicz MJ, Bostwick J, Hester TR, Bishop JB, Craver J. Infected median sternotomy wound. Successful treatment by muscle flaps. Ann Surg 1980;191:738-44.
349. Jones G, Jurkiewicz MJ, Bostwick J, et al. Management of the infected median sternotomy wound with muscle flaps: the Emory 20-year experience. Ann Surg 1997;225:766-76.
350. Rand RP, Cochran RP, Aziz S, et al. Prospective trial of catheter irrigation and muscle flaps for sternal wound infection. Ann Thorac Surg 1998;65:1046-9.
351. Aranki SF, Shaw DP, Adams DH, et al. Predictors of atrial fibrillation after coronary artery surgery: current trends and impact on hospital resources. Circulation 1996;94:390-7.
352. Hylek EM, Skates SJ, Sheehan MA, Singer DE. An analysis of the lowest effective intensity of prophylactic anticoagulation for patients with nonrheumatic atrial fibrillation. N Engl J Med 1996;335:540-6.
353. Lamb RK, Prabhakar G, Thorpe JA, Smith S, Norton R, Dyde JA. The use of atenolol in the prevention of supraventricular arrhythmias following coronary artery surgery. Eur Heart J 1988;9:32-6.
354. Merrick AF, Odom NJ, Keenan DJ, Grotte GJ. Comparison of propafenone to atenolol for the prophylaxis of postcardiotomy supraventricular tachyarrhythmias: a prospective trial. Eur J Cardiothorac Surg 1995;9:146-9.
354a. Reference deleted during update.
355. Andrews TC, Reimold SC, Berlin JA, Antman EM. Prevention of supraventricular arrhythmias after coronary artery bypass surgery: a meta-analysis of randomized control trials. Circulation 1991;84(suppl III):III-236-44.
356. Daoud EG, Strickberger SA, Man KC, et al. Preoperative amiodarone as prophylaxis against atrial fibrillation after heart surgery. N Engl J Med 1997;337:1785-91.
357. Giri S, White CM, Dunn AB, et al. Oral amiodarone for prevention of atrial fibrillation after open heart surgery, the Atrial Fibrillation Suppression Trial (AFIST): a randomised placebo-controlled trial. Lancet 2001;357:830-6.
358. Schreiber GB, Busch MP, Kleinman SH, Korelitz JJ. The risk of transfusion-transmitted viral infections. The Retrovirus Epidemiology Donor Study. N Engl J Med 1996;334:1685-90.
359. Graves EJ. National hospital discharge survey: annual summary, 1991. Vital Health Stat 13 1993:1-62.
360. Ferraris VA, Ferraris SP. Limiting excessive postoperative blood transfusion after cardiac procedures: a review. Tex Heart Inst J 1995;22:216-30.
361. Ferraris VA, Gildengorin V. Predictors of excessive blood use after coronary artery bypass grafting: a multivariate analysis. J Thorac Cardiovasc Surg 1989;98:492-7.
362. Scott WJ, Kessler R, Wernly JA. Blood conservation in cardiac surgery. Ann Thorac Surg 1990;50:843-51.
363. Bracey AW, Radovancevic R. The hematologic effects of cardiopulmonary bypass and the use of hemotherapy in coronary artery bypass grafting. Arch Pathol Lab Med 1994;118:411-6.
364. Goodnough LT, Johnston MF, Toy PT, for the Transfusion Medicine Academic Award Group. The variability of transfusion practice in coronary artery bypass surgery. JAMA 1991;265:86-90.
365. Cosgrove DM, Loop FD, Lytle BW, et al. Determinants of blood utilization during myocardial revascularization. Ann Thorac Surg 1985;40:380-4.
366. Hardy JF, Perrault J, Tremblay N, Robitaille D, Blain R, Carrier M. The stratification of cardiac surgical procedures according to use of blood products: a retrospective analysis of 1480 cases. Can J Anaesth 1991;38:511-7.
367. Goodnough LT, Soegiarso RW, Geha AS. Blood lost and blood transfused in coronary artery bypass graft operation as implications for blood transfusion and blood conservation strategies. Surg Gynecol Obstet 1993;177:345-51.
368. Paone G, Spencer T, Silverman NA. Blood conservation in coronary artery surgery. Surgery 1994;116:672-7.
369. Kallis P, Tooze JA, Talbot S, Cowans D, Bevan DH, Treasure T. Pre-operative aspirin decreases platelet aggregation and increases post-operative blood loss—a prospective, randomised, placebo controlled, double-blind clinical trial in 100 patients with chronic stable angina. Eur J Cardiothorac Surg 1994;8:404-9.
370. Sethi GK, Copeland JG, Goldman S, Moritz T, Zadina K, Henderson WG. Implications of preoperative administration of aspirin in patients undergoing coronary artery bypass grafting. Department of Veterans Affairs Cooperative Study on Antiplatelet Therapy. J Am Coll Cardiol 1990;15:15-20.
371. Harder MP, Eijsman L, Roozendaal KJ, van Oeveren W, Wildevuur CR. Aprotinin reduces intraoperative and postoperative blood loss in membrane oxygenator cardiopulmonary bypass. Ann Thorac Surg 1991;51:936-41.
372. Cosgrove DM, Heric B, Lytle BW, et al. Aprotinin therapy for reoperative myocardial revascularization: a placebo-controlled study. Ann Thorac Surg 1992;54:1031-6.
373. Havel M, Grabenwöger F, Schneider J, et al. Aprotinin does not

Downloaded from circ.ahajournals.org by on August 4, 2008

0261
09/15/08

decrease early graft patency after coronary artery bypass grafting despite reducing postoperative bleeding and use of donated blood. J Thorac Cardiovasc Surg 1994;107:807-10.

374. Levy JH, Pifarre R, Schaff HV, et al. A multicenter, double-blind, placebo-controlled trial of aprotinin for reducing blood loss and the requirement for donor-blood transfusion in patients undergoing repeat coronary artery bypass grafting. Circulation 1995; 92:2236-44.
375. DelRossi AJ, Cernaianu AC, Botros S, Lemole GM, Moore R. Prophylactic treatment of postperfusion bleeding using EACA. Chest 1989;96:27-30.
376. Vander Salm TJ, Kaur S, Lancey RA, et al. Reduction of bleeding after heart operations through the prophylactic use of epsilon-aminocaproic acid. J Thorac Cardiovasc Surg 1996;112:1098-107.
377. Horrow JC, Hlavacek J, Strong MD, et al. Prophylactic tranexamic acid decreases bleeding after cardiac operations. J Thorac Cardiovasc Surg 1990;99:70-4.
378. Horrow JC, Van Riper DF, Strong MD, Brodsky I, Parmet JL. Hemostatic effects of tranexamic acid and desmopressin during cardiac surgery. Circulation 1991;84:2063-70.
379. Fremes SE, Wong BI, Lee E, et al. Metaanalysis of prophylactic drug treatment in the prevention of postoperative bleeding. Ann Thorac Surg 1994;58:1580-8.
380. Ferraris VA, Berry WR, Klingman RR. Comparison of blood reinfusion techniques used during coronary artery bypass grafting. Ann Thorac Surg 1993;56:433-9.
381. Scott WJ, Rode R, Castlemain B, et al. Efficacy, complications, and cost of a comprehensive blood conservation program for cardiac operations. J Thorac Cardiovasc Surg 1992;103:1001-6.
382. Helm RE, Rosengart TK, Gomez M, et al. Comprehensive multimodality blood conservation: 100 consecutive CABG operations without transfusion. Ann Thorac Surg 1998;65:125-36.
383. Magovern JA, Sakert T, Magovern GJ, et al. A model that predicts morbidity and mortality after coronary artery bypass graft surgery. J Am Coll Cardiol 1996;128:1147-53.
384. Crosby L, Palarski VA, Cottington E, Cmolik B. Iron supplementation for acute blood loss anemia after coronary artery bypass surgery: a randomized, placebo-controlled study. Heart Lung 1994;23:493-9.
385. D'Ambra MN, Gray RJ, Hillman R, et al. Effect of recombinant human erythropoietin on transfusion risk in coronary bypass patients. Ann Thorac Surg 1997;64:1686-93.
386. Vertrees RA, Conti VR, Lick SD, Zwischenberger JB, McDaniel LB, Shulman G. Adverse effects of postoperative infusion of shed mediastinal blood. Ann Thorac Surg 1996;62:717-23.
387. Prasad US, Walker WS, Sang CT, Campanella C, Cameron EW. Influence of obesity on the early and long term results of surgery for coronary artery disease. Eur J Cardiothorac Surg 1991;5:67-72.
388. Chesebro JH, Fuster V, Elveback LR, et al. Effect of dipyridamole and aspirin on late vein-graft patency after coronary bypass operations. N Engl J Med 1984;310:209-14.
389. Lorenz RL, Schacky CV, Weber M, et al. Improved aortocoronary bypass patency by low-dose aspirin (100 mg daily): effects on platelet aggregation and thromboxane formation. Lancet 1984; 1:1261-4.
390. Koch M, Gradaus F, Schoebel FC, Leschke M, Grabensee B. Relevance of conventional cardiovascular risk factors for the prediction of coronary artery disease in diabetic patients on renal replacement therapy. Nephrol Dial Transplant 1997;12:1187-91.
391. Sharma GV, Khuri SF, Josa M, Folland ED, Parisi AF. The effect of antiplatelet therapy on saphenous vein coronary artery bypass graft patency. Circulation 1983;68(suppl II):II-218-21.
392. Goldman S, Copeland J, Moritz T, et al. Internal mammary artery and saphenous vein graft patency: effects of aspirin. Circulation 1990;82(suppl IV):IV-237--42.
393. Mangano DT, for the Multicenter Study of Perioperative Ischemia Research Group. Aspirin and mortality from coronary bypass surgery. N Engl J Med 2002;347:1309-17.
394. Limet R, David JL, Magotteaux P, Larock MP, Rigo P. Prevention of aorta-coronary bypass graft occlusion: beneficial effect of ticlopidine on early and late patency rates of venous coronary bypass grafts: a double-blind study. J Thorac Cardiovasc Surg 1987;94:773-83.
395. CAPRIE Steering Committee. A randomised, blinded, trial of clopidogrel versus aspirin in patients at risk of ischaemic events (CAPRIE). Lancet 1996;348:1329-39.
396. Rajah SM, Nair U, Rees M, et al. Effects of antiplatelet therapy with indobufen or aspirin-dipyridamole on graft patency one year after coronary artery bypass grafting. J Thorac Cardiovasc Surg 1994;107:1146-53.
397. The Post Coronary Artery Bypass Graft Trial Investigators. The effect of aggressive lowering of low-density lipoprotein cholesterol levels and low-dose anticoagulation on obstructive changes in saphenous-vein coronary-artery bypass grafts. N Engl J Med 1997;336:153-62.
398. Yli-Mäyry S, Huikuri HV, Korhonen UR, et al. Efficacy and safety of anticoagulant therapy started pre-operatively in preventing coronary vein graft occlusion. Eur Heart J 1992;13:1259-64.

398a. Reference deleted during update.

399. Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) Executive Summary. National Cholesterol Education Program, National Heart, Lung, and Blood Institute, National Institutes of Health; May 2001. NIH publication No. 01-3670.

399a. Grundy SM, Cleeman JI, Merz CN, et al, for the National Heart, Lung, and Blood Institute; American College of Cardiology Foundation; American Heart Association. Implications of recent clinical trials for the National Cholesterol Education Program Adult Treatment Panel III guidelines. Circulation 2004;110:227-39.

400. Medical Research Council/British Heart Foundation Heart Protection Study. Available at http://www.hpsinfo.org/. Accessed November 7, 2002.
401. Fonarow GC, Gawlinski A, Moughrabi S, Tillisch JH. Improved treatment of coronary heart disease by implementation of a Cardiac Hospitalization Atherosclerosis Management Program (CHAMP). Am J Cardiol 2001;87:819-22.
402. Ridker PM. Evaluating novel cardiovascular risk factors: can we better predict heart attacks? Ann Intern Med 1999;130:933-7.
403. Reference deleted during update.
404. Eritsland J, Arnesen H, Seljeflot I, et al. Influence of serum lipoprotein(a) and homocyst(e)ine levels on graft patency after coronary artery bypass grafting. Am J Cardiol 1994;74:1099-102.
405. Hulley S, Grady D, Bush T, et al, for the Heart and Estrogen/progestin Replacement Study (HERS) Research Group. Randomized trial of estrogen plus progestin for secondary prevention of coronary heart disease in postmenopausal women. JAMA 1998;280:605-13.

405a. Reference deleted during update.

405b. Reference deleted during update.

406. Wasley MA, McNagny SE, Phillips VL, Ahluwalia JS. The cost-

Downloaded from circ.ahajournals.org by on August 4, 2008

effectiveness of the nicotine transdermal patch for smoking cessation. Prev Med 1997;26:264-70.
407. Cavender JB, Rogers WJ, Fisher LD, Gersh BJ, Coggin CJ, Myers WO, for the CASS Investigators. Effects of smoking on survival and morbidity in patients randomized to medical or surgical therapy in the Coronary Artery Surgery Study (CASS): 10-year follow-up. J Am Coll Cardiol 1992;20:287-94.
408. Voors AA, van Brussel BL, Plokker HW, et al. Smoking and cardiac events after venous coronary bypass surgery: a 15-year follow-up study. Circulation 1996;93:42-7.
409. FitzGibbon GM, Leach AJ, Kafka HP. Atherosclerosis of coronary artery bypass grafts and smoking. CMAJ 1987;136:45-7.
410. Levenson JL. Cardiovascular disease. In: Stoudemire A, Fogel BS. Psychiatric Care of the Medical Patient. New York, NY:Oxford University Press 1993;23:539-64.
411. Anda RF, Williamson DF, Escobedo LG, Mast EE, Giovino GA, Remington PL. Depression and the dynamics of smoking: a national perspective. JAMA 1990;264:1541-5.
412. Hurt RD, Sachs DP, Glover ED, et al. A comparison of sustained-release bupropion and placebo for smoking cessation. N Engl J Med 1997;337:1195-202.
413. Lee DD, DeQuattro V, Allen J, et al. Behavioral vs beta-blocker therapy in patients with primary hypertension: effects on blood pressure, left ventricular function and mass, and the pressor surge of social stress anger. Am Heart J 1988;116:637-44.
414. Richmond RL, Kehoe L, de Almeida Neto AC. Effectiveness of a 24-hour transdermal nicotine patch in conjunction with a cognitive behavioural programme: one year outcome. Addiction 1997;92:27-31.
415. Kornitzer M, Boutsen M, Dramaix M, Thijs J, Gustavsson G. Combined use of nicotine patch and gum in smoking cessation: a placebo-controlled clinical trial. Prev Med 1995;24:41-7.
416. Fiore MC, Bailey WC, Cohen JJ, et al. Smoking cessation. Clinical Practice Guideline Number 18. AHCPR publication No. 96-0692. Rockville, MD: Agency for Health Care Policy and Research, Public Health Service, U.S. Department of Health and Human Services; 1996.
417. Wenger NK, Hellerstein HK. Rehabilitation of the coronary Patient. 2nd ed. New York, NY: John Wiley; 1998.
418. McLane M, Krop H, Mehta J. Psychosexual adjustment and counseling after myocardial infarction. Ann Intern Med 1980;92:514-9.
419. Oldridge NB, Guyatt GH, Fischer ME, Rimm AA. Cardiac rehabilitation after myocardial infarction. Combined experience of randomized clinical trials. JAMA 1988;260:945-50.
420. O'Connor GT, Buring JE, Yusuf S, et al. An overview of randomized trials of rehabilitation with exercise after myocardial infarction. Circulation 1989;80:234-44.
421. Milani RV, Lavie CJ. Prevalence and effects of cardiac rehabilitation on depression in the elderly with coronary heart disease. Am J Cardiol 1998;81:1233-6.
422. Milani RV, Lavie CJ. The effects of body composition changes to observed improvements in cardiopulmonary parameters after exercise training with cardiac rehabilitation. Chest 1998; 113:599-601.
423. Harlan WR, Sandler SA, Lee KL, Lam LC, Mark DB. Importance of baseline functional and socioeconomic factors for participation in cardiac rehabilitation. Am J Cardiol 1995;76:36-9.
424. Lavie CJ, Milani RV, Littman AB. Benefits of cardiac rehabilitation and exercise training in secondary coronary prevention in the elderly. J Am Coll Cardiol 1993;22:678-83.
425. Lavie CJ, Milani RV. Effects of cardiac rehabilitation and exercise training programs in patients greater than or equal to 75 years of age. Am J Cardiol 1996;78:675-7.
426. Lavie CJ, Milani RV. Effects of cardiac rehabilitation and exercise training on exercise capacity, coronary risk factors, behavioral characteristics, and quality of life in women. Am J Cardiol 1995;75:340-3.
427. Cannistra LB, Balady GJ, O'Malley CJ, Weiner DA, Ryan TJ. Comparison of the clinical profile and outcome of women and men in cardiac rehabilitation. Am J Cardiol 1992;69:1274-9.
428. Friedman DB, Williams AN, Levine BD. Compliance and efficacy of cardiac rehabilitation and risk factor modification in the medically indigent. Am J Cardiol 1997;79:281-5.
429. Engblom E, Korpilahti K, Hamalainen H, Ronnemaa T, Puukka P. Quality of life and return to work 5 years after coronary artery bypass surgery: long-term results of cardiac rehabilitation. J Cardpulm Rehabil 1997;17:29-36.
430. Shiran A, Kornfeld S, Zur S, et al. Determinants of improvement in exercise capacity in patients undergoing cardiac rehabilitation. Cardiology 1997;88:207-13.
431. Ades PA, Huang D, Weaver SO. Cardiac rehabilitation participation predicts lower rehospitalization costs. Am Heart J 1992;123:916-21.
432. Papadapoulos C. Education of the patient and family: sexual problems/interventions. In: Wenger NK, Hellerstein HK, eds. Rehabilitation of the Coronary Patient. 3rd ed. New York: Churchill Livingstone, 1992:493-81.
433. Oxman TE, Freeman DH, Manheimer ED. Lack of social participation or religious strength and comfort as risk factors for death after cardiac surgery in the elderly. Psychosom Med 1995;57:5-15.
434. Ruberman W, Weinblatt E, Goldberg JD, Chaudhary BS. Psychosocial influences on mortality after myocardial infarction. N Engl J Med 1984;311:552-9.
435. Frasure-Smith N, Prince R. The ischemic heart disease life stress monitoring program: impact on mortality. Psychosom Med 1985;47:431-45.
436. McKhann GM, Borowicz LM, Goldsborough MA, Enger C, Selnes OA. Depression and cognitive decline after coronary artery bypass grafting. Lancet 1997;349:1282-4.
437. Kennedy GJ, Hofer MA, Cohen D, Shindledecker R, Fisher JD. Significance of depression and cognitive impairment in patients undergoing programed stimulation of cardiac arrhythmias. Psychosom Med 1987;49:410-21.
438. Krohn BG, Kay JH, Mendez MA, Zubiate P, Kay GL. Rapid sustained recovery after cardiac operations. J Thorac Cardiovasc Surg 1990;100:194-7.
439. Quigley RL, Reitknecht FL. A coronary artery bypass "fast-track" protocol is practical and realistic in a rural environment. Ann Thorac Surg 1997;64:706-9.
440. Konstantakos AK, Lee JH. Fast tracking of the coronary artery bypass surgery patient. Contemp Surg 1998;52:327-32.
441. Acinapura AJ, Jacobowitz IJ, Kramer MD, Adkins MS, Zisbrod Z, Cunningham JN. Demographic changes in coronary artery bypass surgery and its effect on mortality and morbidity. Eur J Cardiothorac Surg 1990;4:175-81.
442. Ivanov J, Weisel RD, David TE, Naylor CD. Fifteen-year trends in risk severity and operative mortality in elderly patients undergoing coronary artery bypass graft surgery. Circulation 1998;97:673-80.
443. McGrath LB, Laub GW, Graf D, Gonzalez-Lavin L. Hospital death on a cardiac surgical service: negative influence of chang-

Downloaded from circ.ahajournals.org by on August 4, 2008

0263
09/15/08

ing practice patterns. Ann Thorac Surg 1990;49:410-2.
444. Moshkovitz Y, Paz Y, Shabtai E, et al. Predictors of early and overall outcome in coronary artery bypass without cardiopulmonary bypass. Eur J Cardiothorac Surg 1997;12:31-9.
445. Kurki TS, Kataja M. Preoperative prediction of postoperative morbidity in coronary artery bypass grafting. Ann Thorac Surg 1996;61:1740-5.
446. Christenson JT, Simonet F, Schmuziger M. The influence of age on the results of reoperative coronary artery bypass grafting. Coron Artery Dis 1997;8:91-6.
447. Gehlot AS, Santamaria JD, White AL, Ford GC, Ervine KL, Wilson AC. Current status of coronary artery bypass grafting in patients 70 years of age and older. Aust N Z J Surg 1995;65:177-81.
448. Ståhle E, Bergström R, Holmberg L, Nyström SO, Hansson HE. Risk factors for operative mortality and morbidity in patients undergoing coronary artery bypass surgery for stable angina pectoris. Eur Heart J 1991;12:162-8.
449. Canver CC, Nichols RD, Cooler SD, Heisey DM, Murray EL, Kroncke GM. Influence of increasing age on long-term survival after coronary artery bypass grafting. Ann Thorac Surg 1996;62:1123-7.
450. Wasvary H, Shannon F, Bassett J, O'Neill W. Timing of coronary artery bypass grafting after acute myocardial infarction. Am Surg 1997;63:710-5.
451. Fremes SE, Goldman BS, Weisel RD, et al. Recent preoperative myocardial infarction increases the risk of surgery for unstable angina. J Card Surg 1991;6:2-12.
452. Applebaum R, House R, Rademaker A, et al. Coronary artery bypass grafting within thirty days of acute myocardial infarction: early and late results in 406 patients. J Thorac Cardiovasc Surg 1991;102:745-52.
453. Horvath KA, DiSesa VJ, Peigh PS, Couper GS, Collins JJ, Cohn LH. Favorable results of coronary artery bypass grafting in patients older than 75 years. J Thorac Cardiovasc Surg 1990;99:92-5.
454. Ko W, Krieger KH, Lazenby WD, et al. Isolated coronary artery bypass grafting in one hundred consecutive octogenarian patients: a multivariate analysis. J Thorac Cardiovasc Surg 1991;102:532-8.
455. Rao V, Ivanov J, Weisel RD, Ikonomidis JS, Christakis GT, David TE. Predictors of low cardiac output syndrome after coronary artery bypass. J Thorac Cardiovasc Surg 1996;112:38-51.
456. Curtis JJ, Walls JT, Boley TM, et al. Coronary revascularization in the elderly: determinants of operative mortality. Ann Thorac Surg 1994;58:1069-72.
457. He GW, Ryan WH, Acuff TE, et al. Risk factors for operative mortality and sternal wound infection in bilateral internal mammary artery grafting. J Thorac Cardiovasc Surg 1994;107:196-202.
458. He GW, Acuff TE, Ryan WH, Mack MJ. Risk factors for operative mortality in elderly patients undergoing internal mammary artery grafting. Ann Thorac Surg 1994;57:1453-60.
459. Karl TK, Fields BL, Wyatt DA, Jones CR, Kahn DR. Reoperative coronary artery bypass surgery: early and late results and management in 1,300 patients. J Cardiovasc Surg (Torino) 1995;36:303-12.
460. Tashiro T, Todo K, Haruta Y, Yasunaga H, Tachikawa Y. Coronary artery bypass grafting without cardiopulmonary bypass for high-risk patients. Cardiovasc Surg 1996;4:207-11.
461. Moshkovitz Y, Lusky A, Mohr R. Coronary artery bypass without cardiopulmonary bypass: analysis of short-term and mid-term outcome in 220 patients. J Thorac Cardiovasc Surg 1995;110:979-87.
462. Jones EL, Weintraub WS, Craver JM, Guyton RA, Cohen CL. Coronary bypass surgery: is the operation different today? J Thorac Cardiovasc Surg 1991;101:108-15.
463. Kallis P, Unsworth-White J, Munsch C, et al. Disability and distress following cardiac surgery in patients over 70 years of age. Eur J Cardiothorac Surg 1993;7:306-11.
464. Tsai TP, Nessim S, Kass RM, et al. Morbidity and mortality after coronary artery bypass in octogenarians. Ann Thorac Surg 1991;51:983-6.
465. Cane ME, Chen C, Bailey BM, et al. CABG in octogenarians: early and late events and actuarial survival in comparison with a matched population. Ann Thorac Surg 1995;60:1033-7.
466. Boucher JM, Dupras A, Jutras N, Pagé V, LeLorier J, Gagnon RM. Long-term survival and functional status in the elderly after cardiac surgery. Can J Cardiol 1997;13:646-52.
467. Peterson ED, Cowper PA, Jollis JG, et al. Outcomes of coronary artery bypass graft surgery in 24,461 patients aged 80 years or older. Circulation 1995;92(suppl II):II-85--91.
468. Katz NM, Hannan RL, Hopkins RA, Wallace RB. Cardiac operations in patients aged 70 years and over: mortality, length of stay, and hospital charge. Ann Thorac Surg 1995;60:96-100.
469. Artinian NT, Duggan C, Miller P. Age differences in patient recovery patterns following coronary artery bypass surgery. Am J Crit Care 1993;2:453-61.
470. Rao V, Christakis GT, Weisel RD, et al. Risk factors for stroke following coronary bypass surgery. J Card Surg 1995;10:468-74.
471. He GW, Grunkemeier GL, Starr A. Aortic valve replacement in elderly patients: influence of concomitant coronary grafting on late survival. Ann Thorac Surg 1996;61:1746-51.
472. Jones EL, Weintraub WS, Craver JM, Guyton RA, Shen Y. Interaction of age and coronary disease after valve replacement: implications for valve selection. Ann Thorac Surg 1994;58:378-84.
473. Aranki SF, Rizzo RJ, Couper GS, et al. Aortic valve replacement in the elderly: effect of gender and coronary artery disease on operative mortality. Circulation 1993;88(suppl II):II-17-23.
474. Morris JJ, Schaff HV, Mullany CJ, et al. Determinants of survival and recovery of left ventricular function after aortic valve replacement. Ann Thorac Surg 1993;56:22-9.
475. Edwards FH, Taylor AJ, Thompson L, et al. Current status of coronary artery operation in septuagenarians. Ann Thorac Surg 1991;52:265-9.
476. Saw HS. Coronary artery bypass surgery in the elderly. Ann Acad Med Singapore 1990;19:45-50.
477. Pasic M, Turina J, Turina M. Improved life expectancy after coronary artery bypass grafting in elderly. Lijec Vjesn 1992;114:48-9.
478. Risum O, Abdelnoor M, Nitter-Hauge S, Levorstad K, Svennevig JL. Coronary artery bypass surgery in women and in men; early and long-term results: a study of the Norwegian population adjusted by age and sex. Eur J Cardiothorac Surg 1997;11:539-46.
479. Hochman JS, McCabe CH, Stone PH, et al, for the TIMI Investigators. Outcome and profile of women and men presenting with acute coronary syndromes: a report from Thrombolysis in Myocardial Infarction (TIMI) IIIB. J Am Coll Cardiol 1997;30:141-8.
480. Hammar N, Sandberg E, Larsen FF, Ivert T. Comparison of early and late mortality in men and women after isolated coronary artery bypass graft surgery in Stockholm, Sweden, 1980 to 1989.

Downloaded from circ.ahajournals.org by on August 4, 2008

J Am Coll Cardiol 1997;29:659-64.
481. Findlay IN. Coronary bypass surgery in women. Curr Opin Cardiol 1994;9:650-7.
482. King KB, Clark PC, Hicks GL. Patterns of referral and recovery in women and men undergoing coronary artery bypass grafting. Am J Cardiol 1992;69:179-82.
483. Czajkowski SM, Terrin M, Lindquist R, et al. Comparison of preoperative characteristics of men and women undergoing coronary artery bypass grafting (the Post Coronary Artery Bypass Graft [CABG] Biobehavioral Study). Am J Cardiol 1997;79:1017-24.
484. Ayanian JZ, Guadagnoli E, Cleary PD. Physical and psychosocial functioning of women and men after coronary artery bypass surgery. JAMA 1995;274:1767-70.
485. Utley JR, Wilde EF, Leyland SA, Morgan MS, Johnson HD. Intraoperative blood transfusion is a major risk factor for coronary artery bypass grafting in women. Ann Thorac Surg 1995;60:570-4; 574-5.
486. Ramström J, Lund O, Cadavid E, Thuren J, Oxelbark S, Henze A. Multiarterial coronary artery bypass grafting with special reference to small vessel disease and results in women. Eur Heart J 1993;14:634-9.
487. Rahimtoola SH, Bennett AJ, Grunkemeier GL, Block P, Starr A. Survival at 15 to 18 years after coronary bypass surgery for angina in women. Circulation 1993;88(suppl II):II-71--8.
488. Barbir M, Lazem F, Ilsley C, Mitchell A, Khaghani A, Yacoub M. Coronary artery surgery in women compared with men: analysis of coronary risk factors and in-hospital mortality in a single centre. Br Heart J 1994;71:408-12.
489. Burker EJ, Blumenthal JA, Feldman M, et al. Depression in male and female patients undergoing cardiac surgery. Br J Clin Psychol 1995;34(pt 1):119-28.
490. Simchen E, Israeli A, Merin G, Ferderber N. Israeli women were at a higher risk than men for mortality following coronary bypass surgery. Eur J Epidemiol 1997;13:503-9.
491. Christakis GT, Weisel RD, Buth KJ, et al. Is body size the cause for poor outcomes of coronary artery bypass operations in women? J Thorac Cardiovasc Surg 1995;110:1344-56.
492. Koch CG, Higgins TL, Capdeville M, Maryland P, Leventhal M, Starr NJ. The risk of coronary artery surgery in women: a matched comparison using preoperative severity of illness scoring. J Cardiothorac Vasc Anesth 1996;10:839-43.
493. Liao Y, Cooper RS, Ghali JK, Szocka A. Survival rates with coronary artery disease for black women compared with black men. JAMA 1992;268:1867-71.
494. Jaglal SB, Tu JV, Naylor CD, for the Provincial Adult Cardiac Care Network of Ontario. Higher in-hospital mortality in female patients following coronary artery bypass surgery: a population-based study. Clin Invest Med 1995;18:99-107.
495. Farrer M, Skinner JS, Albers CJ, Alberti KG, Adams PC. Outcome after coronary artery surgery in women and men in the north of England. QJM 1997;90:203-11.
496. Limacher MC. Coronary heart disease in women. Past gaps, present state and future promises. J Fla Med Assoc 1996;83:455-8.
497. Davis KB, Chaitman B, Ryan T, Bittner V, Kennedy JW. Comparison of 15-year survival for men and women after initial medical or surgical treatment for coronary artery disease: a Coronary Artery Surgery Study (CASS) registry study. J Am Coll Cardiol 1995;25:1000-9.
498. Weintraub WS, Wenger NK, Jones EL, Craver JM, Guyton RA. Changing clinical characteristics of coronary surgery patients. Differences between men and women. Circulation 1993;88(suppl II):II-79-86.
499. King KB, Clark PC, Norsen LH, Hicks GL. Coronary artery bypass graft surgery in older women and men. Am J Crit Care 1992;1:28-35.
500. Aronson D, Rayfield EJ. Diabetes and obesity. In: Fuster V, Ross R, Topol EJ, eds. Atherosclerosis and Coronary Artery Disease. Philadelphia: Lippincott-Raven; 1996:327-359.
501. Stone PH, Muller JE, Hartwell T, et al, for the MILIS Study Group. The effect of diabetes mellitus on prognosis and serial left ventricular function after acute myocardial infarction: contribution of both coronary disease and diastolic left ventricular dysfunction to the adverse prognosis. J Am Coll Cardiol 1989;14:49-57.
502. Herlitz J, Malmberg K, Karlson BW, Rydén L, Hjalmarson A. Mortality and morbidity during a five-year follow-up of diabetics with myocardial infarction. Acta Med Scand 1988;224:31-8.
503. Fava S, Azzopardi J, Agius-Muscat H. Outcome of unstable angina in patients with diabetes mellitus. Diabet Med 1997;14:209-13.
503a. Barzilay JL, Kronmal RA, Bittner V, et al. Coronary artery disease and coronary artery bypass grafting in diabetic patients aged 65 years or more: a report from the Coronary Artery Surgery Study (CASS) Registry. Am J Cardiol 1994;74:334-9.
504. Herlitz J, Wognsen GB, Emanuelsson H, et al. Mortality and morbidity in diabetic and nondiabetic patients during a 2-year period after coronary artery bypass grafting. Diabetes Care 1996;19:698-703.
505. Brooks MM, Jones RH, Bach RG, et al, for the BARI Investigators. Predictors of mortality and mortality from cardiac causes in the Bypass Angioplasty Revascularization Investigation (BARI) randomized trial and registry. Circulation 2000;101:2682-9.
506. Manske CL, Wang Y, Rector T, Wilson RF, White CW. Coronary revascularisation in insulin-dependent diabetic patients with chronic renal failure. Lancet 1992;340:998-1002.
507. Williams ME. Management of the diabetic transplant recipient. Kidney Int 1995;48:1660-74.
508. Mathay MA, Chatterjee K. Respiratory and hemodynamic management after cardiac surgery. Cardiology 1997;3:1-6.
509. Michel L, McMichan JC, Marsh HM, Rehder K. Measurement of ventilatory reserve as an indicator for early extubation after cardiac operation. J Thorac Cardiovasc Surg 1979;78:761-4.
510. Klineberg PL, Geer RT, Hirsh RA, Aukburg SJ. Early extubation after coronary artery bypass graft surgery. Crit Care Med 1977;5:272-4.
511. The Acute Respiratory Distress Syndrome Network. Ventilation with lower tidal volumes as compared with traditional tidal volumes for acute lung injury and the acute respiratory distress syndrome. N Engl J Med 2000;342:1301-8.
512. Kroenke K, Lawrence VA, Theroux JF, Tuley MR. Operative risk in patients with severe obstructive pulmonary disease. Arch Intern Med 1992;152:967-71.
513. Cohen A, Katz M, Katz R, Hauptman E, Schachner A. Chronic obstructive pulmonary disease in patients undergoing coronary artery bypass grafting. J Thorac Cardiovasc Surg 1995;109:574-81.
514. Grover FL, Hammermeister KE, Burchfiel C. Initial report of the Veterans Administration Preoperative Risk Assessment Study for Cardiac Surgery. Ann Thorac Surg 1990;50:12-26.
515. Wahl GW, Swinburne AJ, Fedullo AJ, Lee DK, Shayne D. Effect of age and preoperative airway obstruction on lung function after coronary artery bypass grafting. Ann Thorac Surg 1993;56:104-7.

Downloaded from circ.ahajournals.org by on August 4, 2008

0265
09/15/08

516. Goyal V, Pinto RJ, Mukherjee K, Trivedi A, Sharma S, Bhattacharya S. Alteration in pulmonary mechanics after coronary artery bypass surgery: comparison using internal mammary artery and saphenous vein grafts. Indian Heart J 1994;46:345-8.
517. Jenkins SC, Soutar SA, Forsyth A, Keates JR, Moxham J. Lung function after coronary artery surgery using the internal mammary artery and the saphenous vein. Thorax 1989;44:209-11.
518. Shapira N, Zabatino SM, Ahmed S, Murphy DM, Sullivan D, Lemole GM. Determinants of pulmonary function in patients undergoing coronary bypass operations. Ann Thorac Surg 1990;50:268-73.
519. Gaynes R, Bizek B, Mowry-Hanley J, Kirsh M. Risk factors for nosocomial pneumonia after coronary artery bypass graft operations. Ann Thorac Surg 1991;51:215-8.
520. Demmy TL, Park SB, Liebler GA, et al. Recent experience with major sternal wound complications. Ann Thorac Surg 1990; 49:458-62.
521. Newman LS, Szczukowski LC, Bain RP, Perlino CA. Suppurative mediastinitis after open heart surgery: a case control study of risk factors. Chest 1988;94:546-53.
522. Excerpts from United States Renal Data System: annual data report. Am J Kidney Dis 1997;30:S1-213.
522a. Reference deleted during update.
522b. Reference deleted during update.
523. Rutsky EA, Rostand DG. Coronary artery bypass graft surgery in end-stage renal disease: indications, contraindications, and uncertainties. Semin Dial 1994;7:91.
524. Batiuk TD, Kurtz SB, Oh JK, Orszulak TA. Coronary artery bypass operation in dialysis patients. Mayo Clin Proc 1991; 66:45-53.
525. Liu JY, Birkmeyer NJ, Sanders JH, et al, for the Northern New England Cardiovascular Disease Study Group. Risks of morbidity and mortality in dialysis patients undergoing coronary artery bypass surgery. Circulation 2000;102:2973-7.
525a. Reference deleted during update.
525b. Reference deleted during update.
525c. Reference deleted during update.
525d. Reference deleted during update.
525e. Reference deleted during update.
525f. Reference deleted during update.
526. Exadactylos N, Sugrue DD, Oakley CM. Prevalence of coronary artery disease in patients with isolated aortic valve stenosis. Br Heart J 1984;51:121-4.
527. Chobadi R, Wurzel M, Teplitsky I, Menkes H, Tamari I. Coronary artery disease in patients 35 years of age or older with valvular aortic stenosis. Am J Cardiol 1989;64:811-2.
528. Green SJ, Pizzarello RA, Padmanabhan VT, Ong LY, Hall MH, Tortolani AJ. Relation of angina pectoris to coronary artery disease in aortic valve stenosis. Am J Cardiol 1985;55:1063-5.
529. Crochet D, Petitier H, de Laguerenne J, Wanlin P, Chiffoleau S, Grossete R, Godin JF. [Aortic stenosis in adults: contribution of catheterization to the study of associated lesions. Apropos of 137 cases] Arch Mal Coeur Vaiss 1983;76:1057-64.
530. Harris CN, Kaplan MA, Parker DP, Dunne EF, Cowell HS, Ellestad MH. Aortic stenosis, angina, and coronary artery disease: interrelations. Br Heart J 1975;37:656-61.
531. Morrison GW, Thomas RD, Grimmer SF, Silverton PN, Smith DR. Incidence of coronary artery disease in patients with valvular heart disease. Br Heart J 1980;44:630-7.
532. Graboys TB, Cohn PF. The prevalence of angina pectoris and abnormal coronary arteriograms in severe aortic valvular disease. Am Heart J 1977;93:683-6.
533. Hancock EW. Aortic stenosis, angina pectoris, and coronary artery disease. Am Heart J 1977;93:382-93.
534. Aklog L, Filsoufi F, Flores KQ, et al. Does coronary artery bypass grafting alone correct moderate ischemic mitral regurgitation? Circulation 2001;104:I68-75.
535. Flameng WJ, Herijgers P, Szécsi J, Sergeant PT, Daenen WJ, Scheys I. Determinants of early and late results of combined valve operations and coronary artery bypass grafting. Ann Thorac Surg 1996;61:621-8.
536. Karp RB, Mills N, Edmunds LH. Coronary artery bypass grafting in the presence of valvular disease. Circulation 1989;79(Suppl I):I-182-4.
536a. Wolman RL, Nussmeier NA, Aggarwal A, et al. Cerebral injury after cardiac surgery: identification of a group at extraordinary risk. Multicenter Study of Perioperative Ischemia Research Group (McSPI) and the Ischemia Research Education Foundation (IREF) Investigators. Stroke 1999;30:514-22.
537. Mullany CJ, Elveback LR, Frye RL, et al. Coronary artery disease and its management: influence on survival in patients undergoing aortic valve replacement. J Am Coll Cardiol 1987;10:66-72.
538. Sundt TM, Murphy SF, Barzilai B, et al. Previous coronary artery bypass grafting is not a risk factor for aortic valve replacement. Ann Thorac Surg 1997;64:651-7.
539. Odell JA, Mullany CJ, Schaff HV, Orszulak TA, Daly RC, Morris JJ. Aortic valve replacement after previous coronary artery bypass grafting. Ann Thorac Surg 1996;62:1424-30.
540. Morris JJ, Schaff HV, Mullany CJ, Morris PB, Frye RL, Orszulak TA. Gender differences in left ventricular functional response to aortic valve replacement. Circulation 1994;90(Suppl II):II-183-9.
541. Lytle BW, Loop FD, Taylor PC, et al. The effect of coronary reoperation on the survival of patients with stenoses in saphenous vein bypass grafts to coronary arteries. J Thorac Cardiovasc Surg 1993;105:605-12.
541a. Reference deleted during update.
541b. Reference deleted during update.
541c. Reference deleted during update.
542. Gersh BJ, Rihal CS, Rooke TW, Ballard DJ. Evaluation and management of patients with both peripheral vascular and coronary artery disease. J Am Coll Cardiol 1991;18:203-14.
543. Hertzer NR, Beven EG, Young JR, et al. Coronary artery disease in peripheral vascular patients: a classification of 1000 coronary angiograms and results of surgical management. Ann Surg 1984;199:223-33.
544. Brown OW, Hollier LH, Pairolero PC, Kazmier FJ, McCready RA. Abdominal aortic aneurysm and coronary artery disease. Arch Surg 1981;116:1484-8.
545. Jamieson WR, Janusz MT, Miyagishima RT, Gerein AN. Influence of ischemic heart disease on early and late mortality after surgery for peripheral occlusive vascular disease. Circulation 1982;66(Suppl I):I-92--7.
546. DeBakey ME, Crawford ES, Cooley DA, Morris GC Jr, Garrett HE, Fields WS. Cerebral arterial insufficiency: one to 11-year results following arterial reconstructive operation. Ann Surg 1965;161:921-45.
547. Crawford ES, Bomberger RA, Glaeser DH, Saleh SA, Russell WL. Aortoiliac occlusive disease: factors influencing survival and function following reconstructive operation over a twenty-five-year period. Surgery 1981;90:1055-67.
548. Burnham SJ, Johnson G, Gurri JA. Mortality risks for survivors of vascular reconstructive procedures. Surgery 1982;92:1072-6.
549. Eagle KA, Rihal CS, Foster ED, Mickel MC, Gersh BJ, for the

Downloaded from circ.ahajournals.org by on August 4, 2008

0266
09/15/08

Coronary Artery Surgery Study (CASS) Investigators. Long-term survival in patients with coronary artery disease: importance of peripheral vascular disease. J Am Coll Cardiol 1994;23:1091-5.
550. Birkmeyer JD, O'Connor GT, Quinton HB, et al, for the Northern New England Cardiovascular Disease Study Group. The effect of peripheral vascular disease on in-hospital mortality rates with coronary artery bypass surgery. J Vasc Surg 1995;21:445-52.
551. Baker DW, Jones R, Hodges J, Massie BM, Konstam MA, Rose EA. Management of heart failure, III: the role of revascularization in the treatment of patients with moderate or severe left ventricular systolic dysfunction. JAMA 1994;272:1528-34.
552. Kennedy JW, Kaiser GC, Fisher LD, et al. Clinical and angiographic predictors of operative mortality from the collaborative study in coronary artery surgery (CASS). Circulation 1981;63:793-802.
553. Ståhle E, Bergström R, Edlund B, et al. Influence of left ventricular function on survival after coronary artery bypass grafting. Ann Thorac Surg 1997;64:437-44.
554. Alderman EL, Fisher LD, Litwin P, et al. Results of coronary artery surgery in patients with poor left ventricular function (CASS). Circulation 1983;68:785-95.
555. Passamani E, Davis KB, Gillespie MJ, Killip T. A randomized trial of coronary artery bypass surgery: survival of patients with a low ejection fraction. N Engl J Med 1985;312:1665-71.
556. Elefteriades JA, Tolis G, Levi E, Mills LK, Zaret BL. Coronary artery bypass grafting in severe left ventricular dysfunction: excellent survival with improved ejection fraction and functional state. J Am Coll Cardiol 1993;22:1411-7.
557. Hosenpud JD, Novick RJ, Breen TJ, Keck B, Daily P. The Registry of the International Society for Heart and Lung Transplantation: twelfth official report---1995. J Heart Lung Transplant 1995;14:805-15.
558. Sharples LD, Caine N, Mullins P, et al. Risk factor analysis for the major hazards following heart transplantation---rejection, infection, and coronary occlusive disease. Transplantation 1991;52:244-52.
559. Bieber CP, Hunt SA, Schwinn DA, et al. Complications in long-term survivors of cardiac transplantation. Transplant Proc 1981;13:207-11.
560. McGiffin DC, Kirklin JK, Naftel DC, Bourge RC. Competing outcomes after heart transplantation: a comparison of eras and outcomes. J Heart Lung Transplant 1997;16:190-8.
561. Uretsky BF, Murali S, Reddy PS, et al. Development of coronary artery disease in cardiac transplant patients receiving immunosuppressive therapy with cyclosporine and prednisone. Circulation 1987;76:827-34.
562. Gao SZ, Schroeder JS, Alderman EL, et al. Prevalence of accelerated coronary artery disease in heart transplant survivors: comparison of cyclosporine and azathioprine regimens. Circulation 1989;80(Suppl III):III-100-5.
563. Gao SZ, Alderman EL, Schroeder JS, Silverman JF, Hunt SA. Accelerated coronary vascular disease in the heart transplant patient: coronary arteriographic findings. J Am Coll Cardiol 1988;12:334-40.
564. Hosenpud JD, Shipley GD, Wagner CR. Cardiac allograft vasculopathy: current concepts, recent developments, and future directions. J Heart Lung Transplant 1992;11:9-23.
565. Schmid C, Kerber S, Baba HA, Deng M, Hammel D, Scheld HH. Graft vascular disease after heart transplantation. Eur Heart J 1997;18:554-9.
566. Kobashigawa JA, Katznelson S, Laks H, et al. Effect of pravastatin on outcomes after cardiac transplantation. N Engl J Med 1995;333:621-7.
567. Park JW, Merz M, Braun P. Regression of transplant coronary artery disease during chronic low-density lipoprotein-apheresis. J Heart Lung Transplant 1997;16:290-7.
568. Redonnet M, Tron C, Koning R, et al. Coronary angioplasty and stenting in cardiac allograft vasculopathy following heart transplantation. Transplant Proc 2000;32:463-5.
568a. Topaz O, Cowley MJ, Mohanty PK, Vetrovec GW. Percutaneous revascularization modalities in heart transplant recipients. Catheter Cardiovasc Interv 1999;46:227-37.
569. Wong PM, Piamsomboon C, Mathur A, et al. Efficacy of coronary stenting in the management of cardiac allograft vasculopathy. Am J Cardiol 1998;82:239-41.
569a. Jain SP, Ramee SR, White CJ, et al. Coronary stenting in cardiac allograft vasculopathy. J Am Coll Cardiol 1998;32:1636-40.
570. Copeland JG, Butman SM, Sethi G. Successful coronary artery bypass grafting for high-risk left main coronary artery atherosclerosis after cardiac transplantation. Ann Thorac Surg 1990;49:106-10.
571. Frazier OH, Vega JD, Duncan JM, et al. Coronary artery bypass two years after orthotopic heart transplantation: a case report. J Heart Lung Transplant 1991;10:1036-40.
572. Deutsch E, Bernstein RC, Addonizio P, Kussmaul WG. Coronary artery bypass surgery in patients on chronic hemodialysis: a case-control study. Ann Intern Med 1989;110:369-72.
573. Dresler C, Uthoff K, Wahlers T, et al. Open heart operations after renal transplantation. Ann Thorac Surg 1997;63:143-6.
574. Mitruka SN, Griffith BP, Kormos RL, et al. Cardiac operations in solid-organ transplant recipients. Ann Thorac Surg 1997; 64:1270-8.
575. Luchi RJ, Scott SM, Deupree RH. Comparison of medical and surgical treatment for unstable angina pectoris: results of a Veterans Administration Cooperative Study. N Engl J Med 1987;316:977-84.
576. Parisi AF, Khuri S, Deupree RH, Sharma GV, Scott SM, Luchi RJ. Medical compared with surgical management of unstable angina: 5-year mortality and morbidity in the Veterans Administration Study. Circulation 1989;80:1176-89.
577. Sharma GV, Deupree RH, Khuri SF, Parisi AF, Luchi RJ, Scott SM, for the Veterans Administration Unstable Angina Cooperative Study Group. Coronary bypass surgery improves survival in high-risk unstable angina: results of a Veterans Administration Cooperative study with an 8-year follow-up. Circulation 1991;84(Suppl III):III-260-7.
578. Ellis SG, Vandormael MG, Cowley MJ, et al, for the Multivessel Angioplasty Prognosis Study Group. Coronary morphologic and clinical determinants of procedural outcome with angioplasty for multivessel coronary disease: implications for patient selection. Circulation 1990;82:1193-202.
579. von Segesser LK, Popp J, Amann FW, Turina MI. Surgical revascularization in acute myocardial infarction. Eur J Cardiothorac Surg 1994;8:363-8.
580. Donatelli F, Benussi S, Triggiani M, Guarracino F, Marchetto G, Grossi A. Surgical treatment for life-threatening acute myocardial infarction: a prospective protocol. Eur J Cardiothorac Surg 1997;11:228-33.
581. Creswell LL, Moulton MJ, Cox JL, Rosenbloom M. Revascularization after acute myocardial infarction. Ann Thorac Surg 1995;60:19-26.
582. Louagie YA, Jamart J, Buche M, et al. Operation for unstable angina pectoris: factors influencing adverse in-hospital outcome. Ann Thorac Surg 1995;59:1141-9.

Downloaded from circ.ahajournals.org by on August 4, 2008

0267
09/15/08

583. Goodman SG, Langer A, Ross AM, et al, for the GUSTO-I Angiographic Investigators. Non-Q-wave versus Q-wave myocardial infarction after thrombolytic therapy: angiographic and prognostic insights from the global utilization of streptokinase and tissue plasminogen activator for occluded coronary arteries-I angiographic substudy. Circulation 1998;97:444-50.
584. Fremes SE, Goldman BS, Christakis GT, et al. Current risk of coronary bypass for unstable angina. Eur J Cardiothorac Surg 1991;5:235-42.
585. Braxton JH, Hammond GL, Letsou GV, et al. Optimal timing of coronary artery bypass graft surgery after acute myocardial infarction. Circulation 1995;92(Suppl II):II-66-8.
586. Clark SC, Vitale N, Zacharias J, Forty J. Effect of low molecular weight heparin (fragmin) on bleeding after cardiac surgery. Ann Thorac Surg 2000;69:762-4.
586a. Kincaid EH, Monroe ML, Saliba DL, Kon ND, Byerly WG, Reichert MG. Effects of preoperative enoxaparin versus unfractionated heparin on bleeding indices in patients undergoing coronary artery bypass graft surgery. Ann Thorac Surg 2003;76:124-8.
586b. Jones HU, Muhlstein JB, Jones KW, et al. Preoperative use of enoxaparin compared with unfractionated heparin increases the incidence of re-exploration for postoperative bleeding after open-heart surgery in patients who present with acute coronary syndrome: clinical investigation and reports. Circulation 2002; 106:119-22.
587. Lincoff AM, LeNarz LA, Despotis GJ, et al. Abciximab and bleeding during coronary surgery: results from the EPILOG and EPISTENT trials. Improve Long-term Outcome with abciximab GP IIb/IIIa blockade. Evaluation of Platelet IIb/IIIa Inhibition in STENTing. Ann Thorac Surg 2000;70:516-26.
588. Yusuf S, Zhao F, Mehta SR, Chrolavicius S, Tognoni G, Fox KK, for the Clopidogrel in Unstable Angina to Prevent Recurrent Events Trial Investigators. Effects of clopidogrel in addition to aspirin in patients with acute coronary syndromes without ST-segment elevation. N Engl J Med 2001;345:494-502.
589. Dyke CM, Bhatia D, Lorenz TJ, at al. Immediate coronary artery bypass surgery after platelet inhibition with eptifibatide: results from PURSUIT. Platelet Glycoprotein IIb/IIIa in Unstable Angina: Receptor Suppression Using Integrelin Therapy. Ann Thorac Surg 2000;70:866-71.
590. Singh M, Nuttall GA, Ballman KV, et al. Effect of abciximab on the outcome of emergency coronary artery bypass grafting after failed percutaneous coronary intervention. Mayo Clin Proc 2001;76:784-8.
591. Katz NM, Gersh BJ, Cox JL. Changing practice of coronary bypass surgery and its impact on early risk and long-term survival. Curr Opin Cardiol 1998;13:465-75.
592. Ferguson TB Jr, Hammill BG, Peterson ED, DeLong ER, Grover FL, for the STS National Database Committee. A decade of change—risk profiles and outcomes for isolated coronary artery bypass grafting procedures, 1990-1999: a report from the STS National Database Committee and the Duke Clinical Research Institute. Society of Thoracic Surgeons. Ann Thorac Surg 2002; 73:480-9.
593. Benetti FJ, Naselli G, Wood M, Geffner L. Direct myocardial revascularization without extracorporeal circulation: experience in 700 patients. Chest 1991;100:312-6.
593a. Reference deleted during update.
594. Buffolo E, de Andrade CS, Branco JN, Teles CA, Aguiar LF, Gomes WJ. Coronary artery bypass grafting without cardiopulmonary bypass. Ann Thorac Surg 1996;61:63-6.
594a. Reference deleted during update.
594b. Reference deleted during update.
594c. Reference deleted during update.
594d. Reference deleted during update.
594e. Reference deleted during update.
594f. Reference deleted during update.
594g. Reference deleted during update.
594h. Reference deleted during update.
595. Subramanian VA, Sani G, Benetti FJ, et al. Minimally invasive coronary bypass surgery: a multicenter report of preliminary clinical experience [abstr]. Circulation 1995;92(suppl I):I-645.
596. Calafiore AM, Giammarco GD, Teodori G, et al. Left anterior descending coronary artery grafting via left anterior small thoracotomy without cardiopulmonary bypass. Ann Thorac Surg 1996;61:1658-63.
597. Diegeler A, Falk V, Walther T, Mohr FW. Minimally invasive coronary-artery bypass surgery without extracorporeal circulation. N Engl J Med 1997;336:1454.
598. Calafiore AM, Vitolla G, Mazzei V, et al. The LAST operation: techniques and results before and after the stabilization era. Ann Thorac Surg 1998;66:998-1001.
599. Hart JC. Multivessel off-pump coronary bypass with the Octopus experience in 226 patients. J Card Surg 2000;15:266-70.
600. Hart JC, Spooner TH, Pym J, et al. A review of 1,582 consecutive Octopus off-pump coronary bypass patients. Ann Thorac Surg 2000;70:1017-20.
601. Cartier R, Brann S, Dagenais F, Martineau R, Couturier A. Systematic off-pump coronary artery revascularization in multivessel disease: experience of three hundred cases. J Thorac Cardiovasc Surg 2000;119:221-9.
602. Hart JC, Puskas JD, Sabik JF. Off-pump coronary revascularization: current state of the art. Semin Thorac Cardiovasc Surg 2002;14:70-81.
603. Puskas JD, Thourani VH, Marshall JJ, et al. Clinical outcomes, angiographic patency, and resource utilization in 200 consecutive off-pump coronary bypass patients. Ann Thorac Surg 2001;71:1477-83.
604. Calafiore AM, Di Mauro M, Contini M, et al. Myocardial revascularization with and without cardiopulmonary bypass in multivessel disease: impact of the strategy on early outcome. Ann Thorac Surg 2001;72:456-62.
605. Sabik JF, Gillinov AM, Blackstone EH, et al. Does off-pump coronary surgery reduce morbidity and mortality? J Thorac Cardiovasc Surg 2002;124:698-707.
606. Hernandez F, Cohn WE, Baribeau YR, et al for the Northern New England Cardiovascular Disease Study Group. In-hospital outcomes of off-pump versus on-pump coronary artery bypass procedures: a multicenter experience. Ann Thorac Surg 2001; 72:1528-33.
607. Magee MJ, Jablonski KA, Stamou SC, et al. Elimination of cardiopulmonary bypass improves early survival for multivessel coronary artery bypass patients. Ann Thorac Surg 2002;73:1196-202.
608. Plomondon ME, Cleveland JC, Ludwig ST, et al. Off-pump coronary artery bypass is associated with improved risk-adjusted outcomes. Ann Thorac Surg 2001;72:114-9.
609. Cleveland JC, Shroyer AL, Chen AY, Peterson E, Grover FL. Off-pump coronary artery bypass grafting decreases risk-adjusted mortality and morbidity. Ann Thorac Surg 2001;72:1282-8.
610. Angelini GD, Taylor FC, Reeves BC, Ascione R. Early and midterm outcome after off-pump and on-pump surgery in Beating Heart Against Cardioplegic Arrest Studies (BHACAS I

Downloaded from circ.ahajournals.org by on August 4, 2008

and 2): a pooled analysis of two randomised controlled trials. Lancet 2002;359:1194-9.
611. van Dijk D, Nierich AP, Jansen EW, et al, for the Octopus Study Group. Early outcome after off-pump versus on-pump coronary bypass surgery: results from a randomized study. Circulation 2001;104:1761-6.
612. Puskas JD, Williams WH, Duke PG, et al. Off-pump coronary artery bypass grafting provides complete revascularization with reduced myocardial injury, transfusion requirements, and length of stay: a prospective randomized comparison of two hundred unselected patients undergoing off-pump versus conventional coronary artery bypass grafting. J Thorac Cardiovasc Surg 2003;125:797-808.
613. Fann JI, Pompili MF, Stevens JH, et al. Port-access cardiac operations with cardioplegic arrest. Ann Thorac Surg 1997;63:S35-9.
613a. Reference deleted during update.
614. Boyd WD, Kodera K, Stahl KD, Rayman R. Current status and future directions in computer-enhanced video- and robotic-assisted coronary bypass surgery. Semin Thorac Cardiovasc Surg 2002;14:101-9.
615. Damiano RJ, Tabaie HA, Mack MJ, et al. Initial prospective multicenter clinical trial of robotically-assisted coronary artery bypass grafting. Ann Thorac Surg 2001;72:1263-8.
616. Wolf RK, Ohtsuka T, Flege JB. Early results of thoracoscopic internal mammary artery harvest using an ultrasonic scalpel. Eur J Cardiothorac Surg 1998;14:S54-7.
617. Mohr FW, Falk V, Diegler A, et al. Computer-enhanced "robotic" cardiac surgery: experience in 148 patients. J Thorac Cardiovasc Surg 2001;121:842-853.
618. Dogan S, Aybek T, Andressen E, Byhahn C, et al. Totally endoscopic coronary artery bypass grafting on cardiopulmonary bypass with robotically enhanced telemanipulation: report of forty-five cases. J Thorac Cardiovasc Surg 2002;123:1125-31.
618a. Reference deleted during update.
618b. Reference deleted during update.
618c. Reference deleted during update.
618d. Reference deleted during update.
618e. Reference deleted during update.
618f. Reference deleted during update.
618g. Reference deleted during update.
618h. Reference deleted during update.
618i. Reference deleted during update.
618j. Reference deleted during update.
618k. Reference deleted during update.
618l. Reference deleted during update.
619. Carpentier A, Guermonprez JL, Deloche A, Frechette C, DuBost C. The aorta-to-coronary radial artery bypass graft: a technique avoiding pathological changes in grafts. Ann Thorac Surg 1973; 16:111-21.
620. Fisk RL, Brooks CH, Callaghan JC, Dvorkin J. Experience with the radial artery graft for coronary artery bypass. Ann Thorac Surg 1976;21:513-8.
621. Geha AS, Krone RJ, McCormick JR, Baue AE. Selection of coronary bypass: anatomic, physiological, and angiographic considerations of vein and mammary artery grafts. J Thorac Cardiovasc Surg 1975;70:414-31.
622. Brodman RF, Frame R, Camacho M, Hu E, Chen A, Hollinger I. Routine use of unilateral and bilateral radial arteries for coronary artery bypass graft surgery. J Am Coll Cardiol 1996;28:959-63.
623. Acar C, Ramsheyi A, Pagny JY, et al. The radial artery for coronary artery bypass grafting: clinical and angiographic results at five years. J Thorac Cardiovasc Surg 1998;116:981-9.
624. Suma H, Fukumoto H, Takeuchi A. Coronary artery bypass grafting by utilizing in situ right gastroepiploic artery: basic study and clinical application. Ann Thorac Surg 1987;44:394-7.
625. Pym J, Brown PM, Charrette EJ, Parker JO, West RO. Gastroepiploic-coronary anastomosis: a viable alternative bypass graft. J Thorac Cardiovasc Surg 1987;94:256-9.
626. Jegaden O, Eker A, Montagna P, et al. Technical aspects and late functional results of gastroepiploic bypass grafting (400 cases). Eur J Cardiothorac Surg 1995;9:575-80.
627. Lytle BW, Cosgrove DM, Ratliff NB, Loop FD. Coronary artery bypass grafting with the right gastroepiploic artery. J Thorac Cardiovasc Surg 1989;97:826-31.
628. Suma H, Wanibuchi Y, Terada Y, Fukuda S, Takayama T, Furuta S. The right gastroepiploic artery graft: clinical and angiographic midterm results in 200 patients. J Thorac Cardiovasc Surg 1993; 105:615-22.
629. Puig LB, Ciongolli W, Cividanes GV, et al. Inferior epigastric artery as a free graft for myocardial revascularization. J Thorac Cardiovasc Surg 1990;99:251-5.
630. van Son JA, Smedts F, Vincent JG, van Lier HJ, Kubat K. Comparative anatomic studies of various arterial conduits for myocardial revascularization. J Thorac Cardiovasc Surg 1990;99:703-7.
631. Milgalter E, Pearl JM, Laks H, et al. The inferior epigastric arteries as coronary bypass conduits: size, preoperative duplex scan assessment of suitability, and early clinical experience. J Thorac Cardiovasc Surg 1992;103:463-5.
632. Buche M, Schoevaerdts JC, Louagie Y, et al. Use of the inferior epigastric artery for coronary bypass. J Thorac Cardiovasc Surg 1992;103:665-70.
633. Laub GW, Muralidharan S, Clancy R, et al. Cryopreserved allograft veins as alternative coronary artery bypass conduits: early phase results. Ann Thorac Surg 1992;54:826-31.
634. Silver GM, Katske GE, Stutzman FL, Wood NE. Umbilical vein for aortocoronary bypass. Angiology 1982;33:450-3.
635. Suma H, Wanibuchi Y, Takeuchi A. Bovine internal thoracic artery graft for myocardial revascularization: late results. Ann Thorac Surg 1994;57:704-7.
636. Mitchell IM, Essop AR, Scott PJ, et al. Bovine internal mammary artery as a conduit for coronary revascularization: long-term results. Ann Thorac Surg 1993;55:120-2.
637. Sauvage LR, Schloemer R, Wood SJ, Logan G. Successful interposition synthetic graft between aorta and right coronary artery: angiographic follow-up to sixteen months. J Thorac Cardiovasc Surg 1976;72:418-21.
638. Cooley DA, Hallman GL, Bloodwell RD. Definitive surgical treatment of anomalous origin of left coronary artery from pulmonary artery: indications and results. J Thorac Cardiovasc Surg 1966;52:798-808.
639. Hallman GL, Cooley DH, McNamara DG, Latson JR. Single left coronary artery with fistula to right ventricle: reconstruction of two-coronary system with Dacron graft. Circulation 1965;32:293-7.
640. Hehrlein FW, Schlepper M, Loskot F, Scheld HH, Walter P, Mulch J. The use of expanded polytetrafluoroethylene (PTFE) grafts for myocardial revascularization. J Cardiovasc Surg (Torino) 1984;25:549-53.
641. Chard RB, Johnson DC, Nunn GR, Cartmill TB. Aorta-coronary bypass grafting with polytetrafluoroethylene conduits: early and late outcome in eight patients. J Thorac Cardiovasc Surg 1987; 94:132-4.
642. The EPILOG Investigators. Platelet glycoprotein IIb/IIIa receptor

Downloaded from circ.ahajournals.org by on August 4, 2008

0269
09/15/08

blockade and low-dose heparin during percutaneous coronary revascularization. N Engl J Med 1997;336:1689-96.
643. Herrmann HC, Buchbinder M, Clemen MW, et al. Emergent use of balloon-expandable coronary artery stenting for failed percutaneous transluminal coronary angioplasty. Circulation 1992;86:812-9.
644. Serruys PW, de Jaegere P, Kiemeneij F, et al, for the Benestent Study Group. A comparison of balloon-expandable-stent implantation with balloon angioplasty in patients with coronary artery disease. N Engl J Med 1994;331:489-95.
645. Lindsay J, Hong MK, Pinnow EE, Pichard AD. Effects of endoluminal coronary stents on the frequency of coronary artery bypass grafting after unsuccessful percutaneous transluminal coronary vascularization. Am J Cardiol 1996;77:647-9.
646. Baim DS, Cutlip DE, Sharma SK, et al. Final results of the Balloon vs Optimal Atherectomy Trial (BOAT). Circulation 1998;97:322-31.
647. Bertrand ME, Lablanche JM, Leroy F, et al. Percutaneous transluminal coronary rotary ablation with Rotablator (European experience). Am J Cardiol 1992;69:470-4.
648. Tardif JC, Côté G, Lespérance J, et al, for the Multivitamins and Probucol Study Group. Probucol and multivitamins in the prevention of restenosis after coronary angioplasty. N Engl J Med 1997;337:365-72.
649. Schnyder G, Roffi M, Pin R, et al. Decreased rate of coronary restenosis after lowering of plasma homocysteine levels. N Engl J Med 2001;345:1593-600.
650. Schnyder G, Roffi M, Flammer Y, Pin R, Hess OM. Effect of homocysteine-lowering therapy with folic acid, vitamin B(12), and vitamin B(6) on clinical outcome after percutaneous coronary intervention: the Swiss Heart study: a randomized controlled trial. JAMA 2002;288:973-9.
651. Teirstein PS, Massullo V, Jani S, et al. Catheter-based radiotherapy to inhibit restenosis after coronary stenting. N Engl J Med 1997;336:1697-703.
652. Grise MA, Massullo V, Jani S, Popma JJ, et al. Five-year clinical follow-up after intracoronary radiation: results of a randomized clinical trial. Circulation 2002;105:2737-40.
653. Waksman R, Ajani AE, White RL, et al. Intravascular gamma radiation for in-stent restenosis in saphenous-vein bypass grafts. N Engl J Med 2002;346:1194-9.
654. Morice MC, Serruys PW, Sousa JE, et al, for the RAVEL Study Group. Randomized Study with the Sirolimus-Coated Bx Velocity Balloon-Expandable Stent in the Treatment of Patients with de Novo Native Coronary Artery Lesions: a randomized comparison of a sirolimus-eluting stent with a standard stent for coronary revascularization. N Engl J Med 2002;346:1773-80.
655. Bourassa MG, Fisher LD, Campeau L, Gillespie MJ, McConney M, Lespérance J. Long-term fate of bypass grafts: the Coronary Artery Surgery Study (CASS) and Montreal Heart Institute experiences. Circulation 1985;72(Suppl V):V-71-8.
656. Murphy ML, Hultgren HN, Detre K, Thomsen J, Takaro T. Treatment of chronic stable angina: a preliminary report of survival data of the randomized Veterans Administration cooperative study. N Engl J Med 1977;297:621-7.
657. Goldman S, Copeland J, Moritz T, et al. Saphenous vein graft patency 1 year after coronary artery bypass surgery and effects of antiplatelet therapy: results of a Veterans Administration Cooperative Study. Circulation 1989;80:1190-7.
658. Kuntz RE, Piana R, Schnitt SJ, Johnson RG, Safian RD, Baim DS. Early ostial vein graft stenosis: management by atherectomy. Cathet Cardiovasc Diagn 1991;24:41-4.
659. Bourassa MG, Enjalbert M, Campeau L, Lesperance J. Progression of atherosclerosis in coronary arteries and bypass grafts: ten years later. Am J Cardiol 1984;53:102C-107C.
660. FitzGibbon GM, Leach AJ, Kafka HP, Keon WJ. Coronary bypass graft fate: long-term angiographic study. J Am Coll Cardiol 1991;17:1075-80.
661. Campeau L, Lespérance J, Hermann J, Corbara F, Grondin CM, Bourassa MG. Loss of the improvement of angina between 1 and 7 years after aortocoronary bypass surgery: correlations with changes in vein grafts and in coronary arteries. Circulation 1979;60:1-5.
662. Cameron A, Kemp HG, Shimomura S, et al. Aortocoronary bypass surgery: a 7-year follow-up. Circulation 1979;60:9-13.
663. de Feyter PJ, Serruys PW, Brower RW, et al. Comparison of preoperative, operative and postoperative variables in asymptomatic or minimally symptomatic patients to severely symptomatic patients three years after coronary artery bypass grafting: analysis of 423 patients. Am J Cardiol 1985;55:362-6.
664. Foster ED, Fisher LD, Kaiser GC, Myers WO. Comparison of operative mortality and morbidity for initial and repeat coronary artery bypass grafting: the Coronary Artery Surgery Study (CASS) registry experience. Ann Thorac Surg 1984;38:563-70.
665. Lamas GA, Mudge GH, Collins JJ, et al. Clinical response to coronary artery reoperations. J Am Coll Cardiol 1986;8:274-9.
666. Cameron A, Kemp HG, Green GE. Reoperation for coronary artery disease: 10 years of clinical follow-up. Circulation 1988;78(Suppl I):I-158-62.
667. Platko WP, Hollman J, Whitlow PL, Franco I. Percutaneous transluminal angioplasty of saphenous vein graft stenosis: long-term follow-up. J Am Coll Cardiol 1989;14:1645-50.
668. de Feyter PJ, van Suylen RJ, de Jaegere PP, Topol EJ, Serruys PW. Balloon angioplasty for the treatment of lesions in saphenous vein bypass grafts. J Am Coll Cardiol 1993;21:1539-49.
669. Reeves F, Bonan R, Côté G, et al. Long-term angiographic follow-up after angioplasty of venous coronary bypass grafts. Am Heart J 1991;122:620-7.
670. Hirshfeld JW, Schwartz JS, Jugo R, et al, for the M-HEART Investigators. Restenosis after coronary angioplasty: a multivariate statistical model to relate lesion and procedure variables to restenosis. J Am Coll Cardiol 1991;18:647-56.
671. Holmes DR, Topol EJ, Califf RM, et al, for the CAVEAT-II Investigators. A multicenter, randomized trial of coronary angioplasty versus directional atherectomy for patients with saphenous vein bypass graft lesions. Circulation 1995;91:1966-74.
672. Lefkovits J, Holmes DR, Califf RM, et al. Predictors and sequelae of distal embolization during saphenous vein graft intervention from the CAVEAT-II trial. Coronary Angioplasty Versus Excisional Atherectomy Trial. Circulation 1995;92:734-40.
673. Savage MP, Douglas JS, Fischman DL, et al, for the Saphenous Vein De Novo Trial Investigators. Stent placement compared with balloon angioplasty for obstructed coronary bypass grafts. N Engl J Med 1997;337:740-7.
674. Baim DS, Wahr D, George B, et al, for the Saphenous vein graft Angioplasty Free of Emboli Randomized (SAFER) Trial Investigators. Randomized trial of a distal embolic protection device during percutaneous intervention of saphenous vein aortocoronary bypass grafts. Circulation 2002;105:1285-90.
675. Bonchek LI. More on "hybrid revascularization." N Engl J Med 1997;337:861-2.
676. Wearn JT, Mettier SE, Klump TG. The nature of the vascular communications between the coronary arteries and the chambers of the heart. Am Heart J 1933;9:143-64.

Downloaded from circ.ahajournals.org by on August 4, 2008

677. Vineberg AM. Development of an anastomosis between the coronary vessels and a transplated internal mammary artery. Can Med Assoc J 1946;55:117-9.
678. Sen PK, Daulatram J, Kinare SG, Udwadia TE, Parulkar GB. Further studies in multiple transmyocardial acupuncture as a method of myocardial revascularization. Surgery 1968;64:861-70.
679. Sen PK, Daulatram J, Kinare SG, Paulkar GB. Transmyocardial acupuncture. J Thorac Cardiovasc Surg 1965;50:181-9.
680. Mirhoseini M, Cayton MM. Revascularization of the heart by laser. J Microsurg 1981;2:253-60.
681. Mirhoseini M, Muckerheide M, Cayton MM. Transventricular revascularization by laser. Lasers Surg Med 1982;2:187-98.
682. Mirhoseini M, Cayton MM, Shelgikar S, Fisher JC. Laser myocardial revascularization. Lasers Surg Med 1986;6:459-61.
683. Whittaker P, Rakusan K, Kloner RA. Transmural channels can protect ischemic tissue: assessment of long-term myocardial response to laser- and needle-made channels. Circulation 1996;93:143-52.
684. Cooley DA, Frazier OH, Kadipasaoglu KA, Pehlivanoglu S, Shannon RL, Angelini P. Transmyocardial laser revascularization: anatomic evidence of long-term channel patency. Tex Heart Inst J 1994;21:220-4.
685. Malik FS, Mehra MR, Ventura HO, Smart FW, Stapleton DD, Ochsner JL. Management of cardiac allograft vasculopathy by transmyocardial laser revascularization. Am J Cardiol 1997;80:224-5.
686. Patel VS, Radovancevic B, Springer W, et al. Revascularization procedures in patients with transplant coronary artery disease. Eur J Cardiothorac Surg 1997;11:895-901.
687. Horvath KA, Cohn LH, Cooley DA, et al. Transmyocardial laser revascularization: results of a multicenter trial with transmyocardial laser revascularization used as sole therapy for end-stage coronary artery disease. J Thorac Cardiovasc Surg 1997;113:645-53.
688. Reference deleted during update.
689. Schofield PM, Sharples LD, Caine N, et al. Transmyocardial laser revascularisation in patients with refractory angina: a randomised controlled trial. Lancet 1999;353:519-24.
690. Allen KB, Dowling RD, Fudge TL, et al. Comparison of transmyocardial revascularization with medical therapy in patients with refractory angina. N Engl J Med 1999;341:1029-36.
691. Burkhoff D, Schmidt S, Schulman SP, et al, for the ATLANTIC Investigators. Angina Treatments-Lasers and Normal Therapies in Comparison. Transmyocardial laser revascularisation compared with continued medical therapy for treatment of refractory angina pectoris: a prospective randomised trial. Lancet 1999;354:885-90.
692. Frazier OH, March RJ, Horvath KA. Transmyocardial revascularization with a carbon dioxide laser in patients with end-stage coronary artery disease. N Engl J Med 1999;341:1021-8.
693. Aaberge L, Rootwelt K, Blomhoff S, Saatvedt K, Abdelnoor M, Forfang K. Continued symptomatic improvement three to five years after transmyocardial revascularization with CO(2) laser: a late clinical follow-up of the Norwegian Randomized trial with transmyocardial revascularization. J Am Coll Cardiol 2002; 39:1588-93.
694. Horvath KA, Aranki SF, Cohn LH, et al. Sustained angina relief 5 years after transmyocardial laser revascularization with a CO(2) laser. Circulation 2001;104(Suppl I):I-81-4.
695. Hayat N, Shafie M, Gumaa MK, Khan N. Transmyocardial laser revascularization: is the enthusiasm justified? Clin Cardiol 2001;24:321-4.
696. De Carlo M, Milano AD, Pratali S, Levantino M, Mariotti R, Bortolotti U. Symptomatic improvement after transmyocardial laser revascularization: how long does it last? Ann Thorac Surg 2000;70:1130-3.
697. Landolfo CK, Landolfo KP, Hughes GC, Coleman ER, Coleman RB, Lowe JE. Intermediate-term clinical outcome following transmyocardial laser revascularization in patients with refractory angina pectoris. Circulation 1999;100(Suppl II):II-128-33.
698. Agarwal R, Ajit M, Kurian VM, Rajan S, Arumugam SB, Cherian KM. Transmyocardial laser revascularization: early results and 1-year follow-up. Ann Thorac Surg 1999;67:432-6.
699. Nägele H, Stubbe HM, Nienaber C, Rödiger W. Results of transmyocardial laser revascularization in non-revascularizable coronary artery disease after 3 years follow-up. Eur Heart J 1998; 19:1525-30.
700. Diegeler A, Schneider J, Lauer B, Mohr FW, Kluge R. Transmyocardial laser revascularization using the Holium-YAG laser for treatment of end stage coronary artery disease. Eur J Cardiothorac Surg 1998;13:392-7.
701. Allen KB, Dowling RD, DelRossi AJ, et al. Transmyocardial laser revascularization combined with coronary artery bypass grafting: a multicenter, blinded, prospective, randomized, controlled trial. J Thorac Cardiovasc Surg 2000;119:540-9.
702. Spertus JA, Jones PG, Coen M, et al. Transmyocardial CO(2) laser revascularization improves symptoms, function, and quality of life: 12-month results from a randomized controlled trial. Am J Med 2001;111:341-8.
703. Hattler BG, Griffith BP, Zenati MA, et al. Transmyocardial laser revascularization in the patient with unmanageable unstable angina. Ann Thorac Surg 1999;68:1203-9.
703a. Reference deleted during update.
704. Luft HS, Hunt SS, Maerki SC. The volume-outcome relationship: practice-makes-perfect or selective-referral patterns? Health Serv Res 1987;22:157-82.
705. Maerki SC, Luft HS, Hunt SS. Selecting categories of patients for regionalization: implications of the relationship between volume and outcome. Med Care 1986;24:148-58.
706. Hartz AJ, Kuhn EM. Comparing hospitals that perform coronary artery bypass surgery: the effect of outcome measures and data sources. Am J Public Health 1994;84:1609-14.
707. Hannan EL, Kilburn H, Lindsey ML, Lewis R. Clinical versus administrative data bases for CABG surgery. Does it matter? Med Care 1992;30:892-907.
708. Malenka DJ, McLerran D, Roos N, Fisher ES, Wennberg JE. Using administrative data to describe casemix: a comparison with the medical record. J Clin Epidemiol 1994;47:1027-32.
709. Hannan EL, O'Donnell JF, Kilburn H, Bernard HR, Yazici A. Investigation of the relationship between volume and mortality for surgical procedures performed in New York State hospitals. JAMA 1989;262:503-10.
710. Hannan EL, Kilburn H, Bernard H, O'Donnell JF, Lukacik G, Shields EP. Coronary artery bypass surgery: the relationship between inhospital mortality rate and surgical volume after controlling for clinical risk factors. Med Care 1991;29:1094-107.
711. Shroyer AL, Marshall G, Warner BA, et al. No continuous relationship between Veterans Affairs hospital coronary artery bypass grafting surgical volume and operative mortality. Ann Thorac Surg 1996;61:17-20.
712. Clark RE. Outcome as a function of annual coronary artery bypass graft volume. The Ad Hoc Committee on Cardiac Surgery Credentialing of the Society of Thoracic Surgeons. Ann Thorac

Downloaded from circ.ahajournals.org by on August 4, 2008

0271
09/15/08

Surg 1996;61:21-6.
713. Dudley RA, Johansen KL, Brand R, Rennie DJ, Milstein A. Selective referral to high-volume hospitals: estimating potentially avoidable deaths. JAMA 2000;283:1159-66.
714. Birkmeyer JD, Siewers AE, Finlayson EV, et al. Hospital volume and surgical mortality in the United States. N Engl J Med 2002;346:1128-37.
715. Tu JV, Naylor CD, for the Steering Committee of the Provincial Adult Cardiac Care Network of Ontario. Coronary artery bypass mortality rates in Ontario: a Canadian approach to quality assurance in cardiac surgery. Circulation 1996;94:2429-33.
716. Sowden AJ, Deeks JJ, Sheldon TA. Volume and outcome in coronary artery bypass graft surgery: true association or artefact? BMJ 1995;311:151-5.
717. Hannan EL, Siu AL, Kumar D, Racz M, Pryor DB, Chassin MR. Assessment of coronary artery bypass graft surgery performance in New York: is there a bias against taking high-risk patients? Med Care 1997;35:49-56.
718. Grover FL, Johnson RR, Marshall G, Hammermeister KE. Factors predictive of operative mortality among coronary artery bypass subsets. Ann Thorac Surg 1993;56:1296-306.
719. Omoigui NA, Miller DP, Brown KJ, et al. Outmigration for coronary bypass surgery in an era of public dissemination of clinical outcomes. Circulation 1996;93:27-33.
720. Ghali WA, Ash AS, Hall RE, Moskowitz MA. Statewide quality improvement initiatives and mortality after cardiac surgery. JAMA 1997;277:379-82.
721. Peterson ED, DeLong ER, Jollis JG, Muhlbaier LH, Mark DB. The effects of New York's bypass surgery provider profiling on access to care and patient outcomes in the elderly. J Am Coll Cardiol 1998;32:993-9.
722. Chassin MR. Achieving and sustaining improved quality: lessons from New York State and cardiac surgery. Health Aff (Millwood) 2002;21:40-51.
723. Rudd J, Glanz K. A survey of newspaper coverage of HCFA hospital mortality data. Public Health Rep 1991;106:517-23.
724. Hannan EL, Stone CC, Biddle TL, DeBuono BA. Public release of cardiac surgery outcomes data in New York: what do New York state cardiologists think of it? Am Heart J 1997;134:1120-8.
725. Schneider EC, Epstein AM. Use of public performance reports: a survey of patients undergoing cardiac surgery. JAMA 1998;279:1638-42.
726. Schneider EC, Epstein AM. Influence of cardiac-surgery performance reports on referral practices and access to care: a survey of cardiovascular specialists. N Engl J Med 1996;335:251-6.
727. Shahian DM, Yip W, Westcott G, Jacobson J. Selection of a cardiac surgery provider in the managed care era. J Thorac Cardiovasc Surg 2000;120:978-87.
728. Finlayson SR, Birkmeyer JD, Tosteson AN, Nease RF. Patient preferences for location of care: implications for regionalization. Med Care 1999;37:204-9.
729. Shahian DM, Normand SL, Torchiana DF, et al. Cardiac surgery report cards: comprehensive review and statistical critique. Ann Thorac Surg 2001;72:2155-68.
730. Goldfarb S. The utility of decision support, clinical guidelines, and financial incentives as tools to achieve improved clinical performance. Jt Comm J Qual Improv 1999;25:137-44.
731. Proceedings of the 28th Bethesda Conference. Practice Guidelines and the Quality of Care. Bethesda, Maryland, October 21-22, 1996. J Am Coll Cardiol 1997;29:1125-79.
732. Wise CG, Billi JE. A model for practice guideline adaptation and implementation: empowerment of the physician. Jt Comm J Qual Improv 1995;21:465-76.
733. Grimm RH, Shimoni K, Harlan WR, Estes EH. Evaluation of patient-care protocol use by various providers. N Engl J Med 1975;292:507-11.
734. Kupersmith J, Holmes-Rovner M, Hogan A, et al. Cost effective analysis in heart disease, part III: ischemia, congestive heart failure, and arrhythmias; Cost effectiveness analysis in heart disease, part II: preventive therapies; Cost effective analysis in heart disease, part I: general principles. Prog Cardiovas Dis 1995, 1994;37:307-356, 243-271, 161-184.
735. Weinstein MC, Stason WB. Cost-effectiveness of coronary artery bypass surgery. Circulation 1982;66(Suppl III):III-56-66.
736. Wong JB, Sonnenberg FA, Salem DN, Pauker SG. Myocardial revascularization for chronic stable angina: analysis of the role of percutaneous transluminal coronary angioplasty based on data available in 1989. Ann Intern Med 1990;113:852-71.
737. Mark DB. Implications of cost in treatment selection for patients with coronary heart disease. Ann Thorac Surg 1996;61:S12-5.
738. McGregor M, Pelletier G. Planning of specialized health facilities: size vs. cost and effectiveness in heart surgery. N Engl J Med 1978;299:179-81.
739. Showstack JA, Rosenfeld KE, Garnick DW, Luft HS, Schaffarzick RW, Fowles J. Association of volume with outcome of coronary artery bypass graft surgery: scheduled vs nonscheduled operations. JAMA 1987;257:785-9.
740. Finkler SA. Cost effectiveness of regionalization-further results for heart surgery. Health Serv Res 1981;16:325-33.
741. Shahian DM, Heatley GJ, Westcott GA. Relationship of hospital size, case volume, and cost for coronary artery bypass surgery: analysis of 12,774 patients operated on in Massachusetts during fiscal years 1995 and 1996. J Thorac Cardiovasc Surg 2001;122:53-64.
742. King RC, Reece TB, Hurst JL, et al. Minimally invasive coronary artery bypass grafting decreases hospital stay and cost. Ann Surg 1997;225:805-9.
743. Arcidi JM, Powelson SW, King SB, et al. Trends in invasive treatment of single-vessel and double-vessel coronary disease. J Thorac Cardiovasc Surg 1988;95:773-81.
744. Henderson RA, Pocock SJ, Sharp SJ, et al. Long-term results of RITA-1 trial: clinical and cost comparisons of coronary angioplasty and coronary artery bypass grafting. Randomised Intervention Treatment of Angina. Lancet 1998;352:1419-25.
745. Christenson JT, Simonet F, Badel P, Schmuziger M. Optimal timing of preoperative intraaortic balloon pump support in high-risk coronary patients. Ann Thorac Surg 1999;68:934-9.
746. Every NR, Maynard C, Cochran RP, Martin J, Weaver WD, for the Myocardial Infarction Triage and Intervention Investigators. Characteristics, management, and outcome of patients with acute myocardial infarction treated with bypass surgery. Circulation 1996;94(Suppl II):II-81-6.
747. Norell MS, Gershlick AH, Pillai R, et al. Ventricular septal rupture complicating myocardial infarction: is earlier surgery justified? Eur Heart J 1987;8:1281-6.
748. Parry G, Goudevenos J, Adams PC, Reid DS. Septal rupture after myocardial infarction: is very early surgery really worthwhile? Eur Heart J 1992;13:373-82.
749. Purcaro A, Costantini C, Ciampani N, et al. Diagnostic criteria and management of subacute ventricular free wall rupture complicating acute myocardial infarction. Am J Cardiol 1997;80:397-405.
750. Lemery R, Smith HC, Giuliani ER, Gersh BJ. Prognosis in rup-

Downloaded from circ.ahajournals.org by on August 4, 2008

0272
09/15/08

ture of the ventricular septum after acute myocardial infarction and role of early surgical intervention. Am J Cardiol 1992;70:147-51.
751. Komeda M, Fremes SE, David TE. Surgical repair of postinfarction ventricular septal defect. Circulation 1990;82(Suppl IV):IV-243-7.
752. Oliva PB, Hammill SC, Edwards WD. Cardiac rupture, a clinically predictable complication of acute myocardial infarction: report of 70 cases with clinicopathologic correlations. J Am Coll Cardiol 1993;22:720-6.
753. Piwnica A. Update in surgical treatment of acute post infarction VSDs and MIs. Eur J Cardiothorac Surg 1995;9:117-9.
754. Muehrcke DD, Blank S, Daggett WM. Survival after repair of postinfarction ventricular septal defects in patients over the age of 70. J Card Surg 1992;7:290-300.
755. Afridi I, Grayburn PA, Panza JA, Oh JK, Zoghbi WA, Marwick TH. Myocardial viability during dobutamine echocardiography predicts survival in patients with coronary artery disease and severe left ventricular systolic dysfunction. J Am Coll Cardiol 1998;32:921-6.
756. Meluzín J, Cerný J, Frélich M, et al, for the Investigators of this Multicenter Study. Prognostic value of the amount of dysfunctional but viable myocardium in revascularized patients with coronary artery disease and left ventricular dysfunction. J Am Coll Cardiol 1998;32:912-20.
757. Pagley PR, Beller GA, Watson DD, Gimple LW, Ragosta M. Improved outcome after coronary bypass surgery in patients with ischemic cardiomyopathy and residual myocardial viability. Circulation 1997;96:793-800.
758. Kelly P, Ruskin JN, Vlahakes GJ, Buckley MJ, Freeman CS, Garan H. Surgical coronary revascularization in survivors of prehospital cardiac arrest: its effect on inducible ventricular arrhythmias and long-term survival. J Am Coll Cardiol 1990;15:267-73.
759. Every NR, Fahrenbruch CE, Hallstrom AP, Weaver WD, Cobb LA. Influence of coronary bypass surgery on subsequent outcome of patients resuscitated from out of hospital cardiac arrest. J Am Coll Cardiol 1992;19:1435-9.
760. Autschbach R, Falk V, Gonska BD, Dalichau H. The effect of coronary bypass graft surgery for the prevention of sudden cardiac death: recurrent episodes after ICD implantation and review of literature. Pacing Clin Electrophysiol 1994;17:552-8.
761. Berntsen RF, Gunnes P, Lie M, Rasmussen K. Surgical revascularization in the treatment of ventricular tachycardia and fibrillation exposed by exercise-induced ischaemia. Eur Heart J 1993;14:1297-303.
762. Daoud EG, Niebauer M, Kou WH, et al. Incidence of implantable defibrillator discharges after coronary revascularization in survivors of ischemic sudden cardiac death. Am Heart J 1995;130:277-80.
763. Topaz O, Salter D, Janin Y, Vetrovec G. Emergency bypass surgery for failed coronary interventions. Cathet Cardiovasc Diagn 1997;40:55-65.
764. Klepzig H, Kober G, Satter P, Kaltenbach M. Analysis of 100 emergency aortocoronary bypass operations after percutaneous transluminal coronary angioplasty: which patients are at risk for large infarctions? Eur Heart J 1991;12:946-51.
765. Greene MA, Gray LA, Slater AD, Ganzel BL, Mavroudis C. Emergency aortocoronary bypass after failed angioplasty. Ann Thorac Surg 1991;51:194-9.
766. Craver JM, Weintraub WS, Jones EL, Guyton RA, Hatcher CR. Emergency coronary artery bypass surgery for failed percutaneous coronary angioplasty: a 10-year experience. Ann Surg 1992;215:425-33.
767. Pragliola C, Kootstra GJ, Lanzillo G, Rose PA, Quafford M, Uitdenhaag G. Current results of coronary bypass surgery after failed angioplasty. J Cardiovasc Surg (Torino) 1994;35:365-9.
768. Talley JD, Weintraub WS, Roubin GS, et al. Failed elective percutaneous transluminal coronary angioplasty requiring coronary artery bypass surgery: in-hospital and late clinical outcome at 5 years. Circulation 1990;82:1203-13.
769. Borkon AM, Failing TL, Piehler JM, Killen DA, Hoskins ML, Reed WA. Risk analysis of operative intervention for failed coronary angioplasty. Ann Thorac Surg 1992;54:884-90.
770. Berger PB, Stensrud PE, Daly RC, et al. Time to reperfusion and other procedural characteristics of emergency coronary artery bypass surgery after unsuccessful coronary angioplasty. Am J Cardiol 1995;76:565-9.
771. Barner HB, Lea JW, Naunheim KS, Stoney WS. Emergency coronary bypass not associated with preoperative cardiogenic shock in failed angioplasty, after thrombolysis, and for acute myocardial infarction. Circulation 1989;79(Suppl I):I-152-9.
772. Ladowski JS, Dillon TA, Deschner WP, DeRiso AJ, Peterson AC, Schatzlein MH. Durability of emergency coronary artery bypass for complications of failed angioplasty. Cardiovasc Surg 1996;4:23-7.
773. Hannan EL, Kumar D, Racz M, Siu AL, Chassin MR. New York State's Cardiac Surgery Reporting System: four years later. Ann Thorac Surg 1994;58:1852-7.
774. O'Connor GT, Plume SK, Olmstead EM, et al, for the Northern New England Cardiovascular Disease Study Group. Multivariate prediction of in-hospital mortality associated with coronary artery bypass graft surgery. Circulation 1992;85:2110-8.
775. Higgins TL, Estafanous FG, Loop FD, Beck GJ, Blum JM, Paranandi L. Stratification of morbidity and mortality outcome by preoperative risk factors in coronary artery bypass patients: a clinical severity score [published erratum appears in JAMA 1992;268:1860]. JAMA 1992;267:2344-8.
776. Hamm CW, Reimers J, Ishinger T, Rupprecht HJ, Berger J, Bleifield W. A randomized study of coronary angioplasty compared with bypass surgery in patients with symptomatic multivessel coronary disease: German Angioplasty Bypass Surgery Investigation (GABI). N Engl J Med 1994;331:1037-1043.
777. Curtis JJ, Walls JT, Salam NH, et al. Impact of unstable angina on operative mortality with coronary revascularization at varying time intervals after myocardial infarction. J Thorac Cardiovasc Surg. 1991;102:867-73.
778. Carrie D, Elbaz M, Puel J, et al. Five-year outcome after coronary angioplasty versus bypass surgery in multivessel coronary artery disease: results from the French Monocentric Study. Circulation 1997;96 (Suppl II):II-1-6.
779. Naunheim KS, Fiore AC, Arango DC, et al. Coronary artery bypass grafting for unstable angina pectoris: risk analysis. Ann Thorac Surg. 1989;47:569-74.
780. Rodriguez A, Bernardi V, Navia J, et al, for the ERACI II Investigators. Argentine Randomized Study: Coronary Angioplasty with Stenting versus Coronary Bypass Surgery in patients with Multiple-Vessel Disease (ERACI II): 30-day and one-year follow-up results [published erratum appears in J Am Coll Cardiol 2001;37:973-4]. J Am Coll Cardiol 2001;37:51-8.
781. Deigler A, Thiele H, Falk V, et al. Comparison of stenting with minimally invasive bypass surgery for stenosis of the left anterior descending coronary artery. N Engl J Med 2002;347:561-6.
782. Ali IM, Sanalla AA, Clark V. Beta-blocker effects on postoperative atrial fibrillation. Eur J Cardiothorac Surg 1997;79:1114-7.

Downloaded from circ.ahajournals.org by on August 4, 2008

0273
09/15/08

783. Silverman NA, Wright R, Levitsky S. Efficacy of low-dose propanolol in preventing supraventricular tachyarrhythmias: a prospective, randomized study. Ann Surg 1982;196:194-7.
784. Matangyi MF, Neutze JM, Graham KJ, et al. Arrhythmia prophylaxis after aorta-coronary bypass: the effect of minidose propanolol. J Thorac Surg 1985;89:439-43.
785. Myhre ES, Sirlie D, Aarbakke J, et al. Effects of low-dose propanolol after coronary bypass surgery. J Cardiovas Surg (Torino) 1984;25:348-52
786. Lauer MS, Eagle KA, Buckley MJ, et al. Atrial fibrillation following coronary artery bypass surgery. Prog Cardiovas Dis 1989;31:367-78.
787. Nystrom U, Edvardsson N, Breggren H, et al. Oral sotalol reduces the incidence of atrial fibrillation after coronary artery bypass surgery. J Thorac Cardiovas Surg 1993;41:34-7.
788. Alford WC, Fanning WJ, Roach A, Stoney WS, Thomas CS, Tomichek R. Prophylaxis of atrial fibrillation with magnesium sulfate after coronary artery bypass grafting. Ann Thorac Surg 1991;52:529-33.
789. Hohnloser SH, Meinartz T, Dannbacher T, et al. Electrocardiographic and antiarrhythmic effects of intravenous amiodarone: results of a prospective, placebo controlled study. Am Heart J 1991;121:89-95.
790. Klemperer JD, Klein IL, Ojama K, et al. Triiodothyronine therpapy lowers the incidence of atrial fibrillation after cardiac operations. Ann Thorac Surg 1996;61:1323-7.
791. Johnson LW, Dickstein RA, Fruehan CT, et al. Prophylactic digitalization for coronary artery bypass surgery. Circulation 1976;53:819-22.
792. Tyras RH, Stothert JC, Jr, Kaiser GC, et al. Supraventricular tachyarrhthmias after myocardial revascularization: a randomized trial of prophylactic digitalization. J Thorac Cardiovas Surg 1979;77:310-4.
793. Davison R, Hartz R, Kaplan K, et al. Prophylaxis of supraventricular tachyarrhthmia after coronary bypass surgery with oral verapamil: a randomized, double-blind trial. Ann Thorac Surg 1985;39:336-39.
794. Williams DB, Misbach GA, Kruse AP, et al. Oral verapamil for of supraventricular tachycardia after myocardial revascularization: a randomized trial. J Thorac Cardiovas Surg 1985;90:592-6.
795. Smith EE, Shore DF, Monro JL, et al. Oral verapamil fails to prevent supraventricular tachycardia following acute coronary artery surgery. Int J Cardiol 1985;9:37-44.

Downloaded from circ.ahajournals.org by on August 4, 2008

Corrections

In the article by Antman et al, "ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction—Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 1999 Guidelines for the Management of Patients With Acute Myocardial Infarction)," which appeared in the August 3, 2004, issue of the journal (*Circulation.* 2004:110:588–636), the following errors occur:

- Table 3 (p 619): In the footnote entry "How to Use the Table," the example text states that Temporary transvenous pacing (TV) is Class IIb, whereas the table shows TV to be Class IIa. This should be Class IIa in both instances.
- Table 4 (p 626): The footnote entry listing the source of the data is incorrect. The correct citation should be "Smith et al. *Circulation.* 2001;104:1577–1579."
- Page 630: The recommendation for Cardiac Rehabilitation programs should be a Class I recommendation, not a Class IIa recommendation.

The corrected version of this article is available online at http://circ.ahajournals.org/cgi/content/full/110/5/588. (The previous version, if needed, can be accessed by selecting the "Previous Version of This Article" link.)

DOI: 10.1161/01.CIR.0000163465.65091.7A

In the article by Antman et al, "ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Revise the 1999 Guidelines for the Management of Patients With Acute Myocardial Infarction)," which appeared in the August 31, 2004, issue of the journal (*Circulation.* 2004;110:e82–e292), the following errors occur:

- Table 12 (p e127): The entry "Traumatic or prolonged (greater than 10 minutes) CPR or major surgery (within less than 3 weeks)" should read "Traumatic or prolonged (greater than 10 minutes) CPR or major surgery (less than 3 weeks)."
- Table 13 (p e129): In the Model column for CCP and for InTIME-2, the SBP values on admission of 170 mm Hg or greater=1 entries should be deleted.
- Table 23 (p e166): Row 2 is incorrect. It should read "2. IV or D5W to keep the vein open. Start a second IV if IV medication is being given. This may be a heparin lock."
- Table 23 (p e166): Row 3 is incorrect. It should read "3. Vital signs: every 30 min until stable, then every 4 h as needed. Notify physician if HR is less than 60 bpm or greater than 100 bpm, systolic BP is less than 100 mm Hg or greater than 150 mm Hg, respiratory rate is less than 8 breaths per minute or greater than 22 breaths per minute."
- Table 23 (p e166): Row 5 is incorrect. It should read "5. Diet: NPO except for sips of water until stable. Then start 2 gram sodium/day, low saturated fat (less than 7% total calories/day), low cholesterol (less than 200 mg/d) diet, such as Therapeutic Lifestyle Changes (TLC) diet."
- Table 23 (p e166): Row 6 is incorrect. It should read "6. Activity: Bedrest and bedside commode and light activity when stable."
- Table 29 (p e198): Column 1 is missing a heading. It should read "Normal."
- Table 29 (p e199): The "How to Use the Table" footnote line 4 states that Temporary transvenous pacing (TV) is Class IIb, whereas the table according to the instructions shows that TV should be Class IIa. The footnote should read Class IIa.
- Page e237: The entry for Class I number 9 is incorrect. It should read "Class I. Cardiac

(*Circulation.* **2005;111:2013–2014.**)
© 2005 American Heart Association, Inc.

***Corrections* is available at http://www.circulationaha.org**

Downloaded from circ.ahajournals.org by on August 4, 2008

0275
09/15/08

rehabilitation/secondary prevention programs, when available, are recommended for patients with STEMI, particularly those with multiple modifiable risk factors and/or those moderate- to high-risk patients for whom supervised exercise training is warranted. (Level of Evidence: C)"

- Page e239: Under the staff listing for the American Heart Association, the name of Fernando Costa, MD, FAHA, Staff Scientist, was omitted.
- Page e247: The entry for Peer Reviewer Dr Frans Van de Werf under the column Stock Ownership should read "None."

The corrected version of this article is available online at http://circ.ahajournals.org/cgi/reprint/110/9/e82. (The previous version, if needed, can be accessed by selecting the "Previous Version of This Article" link.)

DOI: 10.1161/01.CIR.0000163471.93598.4A

In the article by Eagle and Guyton et al, "ACC/AHA 2004 Guideline Update for Coronary Artery Bypass Graft Surgery: Summary Article," which appeared in the August 31, 2004, issue of the journal (*Circulation*. 2004;110:1168–1176), the following error occurred:

On page 1175, the Class IIa recommendation in Section 9.2.4, "ST-Elevation MI," should read as follows: "CABG may be performed as primary reperfusion in patients who have suitable anatomy and who are not candidates for or who have had failed fibrinolysis/PCI and who are in the early hours (6 to 12 hours) of evolving STEMI (Level of Evidence: B)."

The corrected version of this article is available online at http://circ.ahajournals.org/cgi/content/full/110/9/1168. (The previous version, if needed, can be accessed by selecting the "Previous Version of This Article" link.)

DOI: 10.1161/01.CIR.0000163473.82675.77

In the article by Eagle and Guyton et al, "ACC/AHA 2004 Guideline Update for Coronary Artery Bypass Graft Surgery—Full Text," which appeared in the October 5, 2004, issue of the journal (*Circulation*. 2004;110:e340–e437), the following errors occurred:

- Page e348: The footnote to Table 3 should read as follows: "**Calculation of Mortality Risk**: An 80-year old female, with an EF less than 40% who is having elective CABG surgery, has had no prior CABG surgery and has no other risk factors. Her total score=6.5 (age greater than or equal to 80) +2 (female sex) +2 (EF less than 40%)=10.5. Since her total score equals 10.5, round up to 11; her predicted risk of mortality=4.0%."
- Page e371: In Table 13, the value for the Class Indication for Preoperative Carotid screening should be IIa, not I as it currently shows.

The corrected version of this article is available online at http://circ.ahajournals.org/cgi/reprint/110/14/e340. (The previous version, if needed, can be accessed by selecting the "Previous Version of This Article" link.)

DOI: 10.1161/01.CIR.0000163478.50217.83

Downloaded from circ.ahajournals.org by on August 4, 2008

0276
09/15/08

Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION

American Heart Association®
Learn and Live℠

ACCF/AHA/SCAI 2007 Update of the Clinical Competence Statement on Cardiac Interventional Procedures: A Report of the American College of Cardiology Foundation/American Heart Association/American College of Physicians Task Force on Clinical Competence and Training (Writing Committee to Update the 1998 Clinical Competence Statement on Recommendations for the Assessment and Maintenance of Proficiency in Coronary Interventional Procedures)

Circulation 2007;116;98-124; originally published online Jun 25, 2007;
DOI: 10.1161/CIRCULATIONAHA.107.185159
Circulation is published by the American Heart Association. 7272 Greenville Avenue, Dallas, TX 72514
Copyright © 2007 American Heart Association. All rights reserved. Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circ.ahajournals.org

Subscriptions: Information about subscribing to Circulation is online at
http://circ.ahajournals.org/subscriptions/

Permissions: Permissions & Rights Desk, Lippincott Williams & Wilkins, a division of Wolters Kluwer Health, 351 West Camden Street, Baltimore, MD 21202-2436. Phone: 410-528-4050. Fax: 410-528-8550. E-mail:
journalpermissions@lww.com

Reprints: Information about reprints can be found online at
http://www.lww.com/reprints

Downloaded from circ.ahajournals.org by on August 4, 2008

0277
09/15/08

ACCF/AHA/SCAI 2007 Update of the Clinical Competence Statement on Cardiac Interventional Procedures

A Report of the American College of Cardiology Foundation/American Heart Association/American College of Physicians Task Force on Clinical Competence and Training (Writing Committee to Update the 1998 Clinical Competence Statement on Recommendations for the Assessment and Maintenance of Proficiency in Coronary Interventional Procedures)

WRITING COMMITTEE MEMBERS

Spencer B. King III, MD, MACC, FAHA, FSCAI, Chair;
Thomas Aversano, MD, FACC; William L. Ballard, MD, FACC, FSCAI;
Robert H. Beekman III, MD, FACC, FAHA;
Michael J. Cowley, MD, FACC, FSCAI*; Stephen G. Ellis, MD, FACC;
David P. Faxon, MD, FACC, FAHA, FSCAI*; Edward L. Hannan, PhD, FACC;
John W. Hirshfeld, Jr, MD, FACC, FAHA; Alice K. Jacobs, MD, FACC, FAHA, FSCAI;
Mirle A. Kellett, Jr, MD, FACC, FSCAI; Stephen E. Kimmel, MD, FACC, FAHA;
Joel S. Landzberg, MD, FACC; Louis S. McKeever, MD, FACC, FSCAI;
Mauro Moscucci, MD, FACC; Richard M. Pomerantz, MD, FACC, FSCAI;
Karen M. Smith, MD, FACC, FSCAI; George W. Vetrovec, MD, FACC, FSCAI*

TASK FORCE MEMBERS

Mark A. Creager, MD, FACC, FAHA, Chair; John W. Hirshfeld, Jr, MD, FACC, FAHA†; David R. Holmes, Jr, MD, FACC; L. Kristin Newby, MD, FACC, FAHA; Howard H. Weitz, MD, FACC, FACP; Geno Merli, MD, FACP; Ileana Piña, MD, FACC, FAHA;
George P. Rodgers, MD, FACC, FAHA; Cynthia M. Tracy, MD, FACC†

*Society for Cardiovascular Angiography and Interventions Representative.

†Former Task Force member during the writing effort.

This document was approved by the American College of Cardiology Board of Trustees in May 2007, the American Heart Association Science Advisory and Coordinating Committee in May 2007, and the Society for Cardiovascular Angiography and Interventions in May 2007.

When this document is cited, the American College of Cardiology, American Heart Association, and Society for Cardiovascular Angiography and Interventions would appreciate the following citation format: King SB III, Aversano T, Ballard WL, Beekman RH III, Cowley MJ, Ellis SG, Faxon DP, Hannan EL, Hirshfeld JW Jr., Jacobs AK, Kellett MA Jr., Kimmel SE, Landzberg JS, McKeever LS, Moscucci M, Pomerantz RM, Smith KM, Vetrovec GW. ACCF/AHA/SCAI 2007 update of the clinical competence statement on cardiac interventional procedures: a report of the American College of Cardiology Foundation/American Heart Association/American College of Physicians Task Force on Clinical Competence and Training (Writing Committee to Update the 1998 Clinical Competence Statement on Recommendations for the Assessment and Maintenance of Proficiency in Coronary Interventional Procedures). *Circulation.* 2007;116:98–124.

This article has been copublished in the July 3, 2007, issue of the *Journal of the American College of Cardiology.*

Copies: This document is available on the World Wide Web sites of the American College of Cardiology (www.acc.org), the American Heart Association (www.americanheart.org), and the Society for Cardiovascular Angiography and Interventions (www.scai.org). For copies of this document, please contact Elsevier Inc. Reprint Department, fax (212) 633-3820, e-mail reprints@elsevier.com. To purchase *Circulation* reprints, call 843-216-2533 or e-mail kelle.ramsay@wolterskluwer.com.

Permissions: Multiple copies, modification, alteration, enhancement, and/or distribution of this document are not permitted without the express permission of the American College of Cardiology or the American Heart Association. Instructions for obtaining permission are located at http://www.americanheart.org/presenter.jhtml?identifier=4431. A link to the "Permission Request Form" appears on the right side of the page.

(*Circulation.* 2007;116:98-124.)

© 2007 by the American College of Cardiology Foundation and the American Heart Association, Inc.

***Circulation* is available at http://www.circulationaha.org** **DOI: 10.1161/CIRCULATIONAHA.107.185159**

Downloaded from circ.ahajournals.org by on August 4, 2008

0278
09/15/08

TABLE OF CONTENTS

Preamble....99
Introduction....100
Purpose....101
Writing Group Composition....101
Literature Review....101
Percutaneous Coronary Intervention....101
Evolution of Competence and Training Standards....101
Evolution of Coronary Interventional Capabilities....102
Procedural Success and Complications of Coronary Interventional Procedures....102
Patient, Lesion, and Institutional Variables Influencing Success and Complication Rates....103
Measures/Definitions of Success....103
Patient and Lesion Characteristics Related to Procedural Success and Complication Rates....104
Strategies for Risk Stratification and Operator Evaluation....104
Impact of the Facility on Procedural Success....104
Components of Operator Competence....105
Cognitive Knowledge Base....105
Technical Skills....106
Nonballoon Devices....106
Relationships of Operator and Institutional Experience and Activity to Outcomes in Coronary Interventional Procedures....106
Evidence Reviewed....106
Relationship of Institutional Volume to Procedural Outcome....107
Volume and Outcomes Relationship for Primary PCI in Acute MI....108
Relationship of Individual Operator Volume to Procedural Outcome....109
Combination of Individual Operator Volume and Institutional Volume on Procedural Outcome....110
Ongoing Quality Improvement and Maintenance of Competence....111
Institutional Maintenance of Quality....111
Individual Maintenance of Quality....112
Quality Assurance....112
Definition of Quality in PCI....112
Institutional Quality Assurance Requirement....112
Role of Risk Adjustment in Assessing Quality....112
Challenges in Determining Quality....112
Requirement for Institutional Resources and Support....113
The Quality Assessment Process....113
Conclusions and Recommendations for PCIs....113
Success and Complication Rates....113
Risk Adjustment....114
Volume–Activity Relationships....114
Recommendations for Institutional Maintenance of Quality....114
Recommendations for Individual Maintenance of Quality....114
Percutaneous Noncoronary Interventions....114
Introduction....114
Disorders of the Atrial Septum....115
Criteria for Competency....115
Cardiologists in Training Programs....115
Cardiologists in Practice....115
Maintenance of Competency for Percutaneous ASD/PFO Closure....115
Quality Assurance....115
Hypertrophic Cardiomyopathy and Alcohol Septal Ablation....116
Criteria for Competency....116
Valvular Heart Disease....116
Cognitive Knowledge Base....116
Criteria for Competency....116
Percutaneous Ventricular Assist Devices....116
Laboratory and Staff Competence....116
Conclusions and Recommendations....117
Percutaneous Noncoronary Interventions....117
References....117
Appendix 1....121
Appendix 2....122

Preamble

The granting of clinical staff privileges to physicians is a primary mechanism used by institutions to uphold the quality of care. The Joint Commission on Accreditation of Health Care Organizations requires that the granting of continuing medical staff privileges be based on the criteria specified in the medical staff bylaws. Physicians themselves are thus charged with identifying the criteria that constitute professional competence and with evaluating their peers accordingly. Yet, the process of evaluating physicians' knowledge and competence is often constrained by the evaluator's own knowledge and ability to elicit the appropriate information, problems compounded by the growing number of highly specialized procedures for which privileges are requested.

The American College of Cardiology Foundation/American Heart Association/American College of Physicians (ACCF/AHA/ACP) Task Force on Clinical Compe-

Downloaded from circ.ahajournals.org by on August 4, 2008

0279
09/15/08

tence and Training was formed in 1998 to develop recommendations for attaining and maintaining the cognitive and technical skills necessary for the competent performance of a specific cardiovascular service, procedure, or technology. These documents are evidence based and, where evidence is not available, expert opinion is utilized to formulate recommendations. Indications and contraindications for specific services or procedures are not included in the scope of these documents. Recommendations are intended to assist those who must judge the competence of cardiovascular health care providers entering practice for the first time and/or those who are in practice and undergo periodic review of their practice expertise or who apply for privileges at a new institution. The assessment of competence is complex and multidimensional, therefore, isolated recommendations contained herein may not necessarily be sufficient or appropriate for judging overall competence. The current document addresses competence in cardiac interventional procedures and is authored by representatives of the ACCF, the AHA, and the Society for Cardiovascular Angiography and Interventions (SCAI). This document applies to specialists trained in internal medicine and/or adult cardiology and is not meant to be a clinical competence statement on procedures for congenital heart disease in the child or young adult.

The ACCF/AHA/ACP Task Force makes every effort to avoid any actual or potential conflicts of interest that might arise as a result of an outside relationship or personal interest of a member of the ACCF/AHA/ACP Writing Committee. Specifically, all members of the Writing Committee were asked to provide disclosure statements of all such relationships that might be perceived as real or potential conflicts of interest relevant to the document topic. These statements were reviewed by the Writing Committee and updated as changes occurred. The relationships with industry for authors and peer reviewers are published in the appendices of the document.

Mark A. Creager, MD, FACC, FAHA
Chair, ACCF/AHA/ACP Task Force on
Clinical Competence and Training

Introduction

Coronary intervention has evolved from an investigational procedure to a widely practiced, mature mainstream clinical therapy (1). Conventional balloon angioplasty, while still a core procedure in interventional cardiology, has been augmented by adjunctive stenting, which greatly improves procedure efficacy and modestly reduces the risk of restenosis (2). Bare-metal stents have been replaced by drug-eluting stents in the majority of cases, which further reduce the risk of restenosis (3). Because stents or other interventional devices are commonly used, the coronary angioplasty procedure is more aptly termed "percutaneous coronary intervention" (PCI).

The AHA estimated that more than 1,000,000 PCIs were performed in the United States in 2003 (4). Physicians performing these procedures represent approximately 25% of board-certified cardiologists in the United States (5).

As a result of the maturation of PCI as a discipline and the ongoing clarification of its role in the management of coronary heart disease, the public can and should appropriately expect consistent access to high-quality PCI capability. However, there is potential for substantial variation in the quality of PCI services. PCI is often a complex, demanding procedure. To perform PCI optimally, an operator must possess a substantial cognitive knowledge base as well as considerable technical skill. In addition, the technical difficulty of a particular procedure can vary greatly from one patient to another. Furthermore, serious complications of coronary interventional procedures may occur unpredictably in procedures that initially appear to be straightforward. Recognition and management of complications are critical components of PCI procedures that require skill, knowledge, experience, and judgment. Since there can be variation among operators in cognitive knowledge and skill and among procedures in technical difficulty, there is a potential for substantial variation in procedure safety and efficacy.

Credentialing physicians to perform procedures is the responsibility of the governance of the local health care facility. The Joint Commission on the Accreditation of Health Care Organizations requires that medical staff privileges be granted to applicants only after assessment based on professional criteria. Physicians are charged with the responsibility to establish the criteria that constitute professional competence and to evaluate their peers on the basis of such criteria. The U.S. health care system relies, in part, on this process of granting and renewing clinical privileges to maintain quality.

The issue of determining quality standards and credentialing criteria has presented a major challenge to the medical profession. Developing standards has been difficult because, until recently, there were few data available on which to base them and because PCI techniques, indications, and capability have evolved rapidly. During the past several years, documents have been published that have offered guidelines and standards for the training and maintenance of competence (6–15). Because of the paucity of clinical data, the earlier standards were developed principally through observation, experience, and intuition. These standards relied heavily on operator activity level as a surrogate for skill and quality.

The most recent document published by the ACC was based on the information available in 1998 (16). The recommendations of this and other similar documents require updating as technology and training evolve (17).

Percutaneous noncoronary cardiac interventions, such as aortic and mitral valvuloplasty, atrial septal defect (ASD) and patent foramen ovale (PFO) closure, and alcohol septal ablation therapy, were not addressed in the previous document (16). These procedures, although constituting a

Downloaded from circ.ahajournals.org by on August 4, 2008

0280
09/15/08

small minority of interventional activity, are performed by interventional cardiologists and are included in the Accreditation Council on Graduate Medical Education (ACGME) curriculum and the American Board of Internal Medicine (ABIM) certifying exam. There have been no statements addressing clinical competence in noncoronary interventions.

The ACC, the ACP, the SCAI, the Society for Vascular Medicine and Biology (SVMB), and the Society for Vascular Surgery (SVS) have jointly developed a document on acquisition and maintenance of competence in vascular medicine and catheter-based vascular interventions (18); however, PCI and other percutaneous cardiac procedures are not addressed by the current document. This document is divided into 2 sections: PCI and percutaneous noncoronary cardiac interventions.

Purpose

This document was developed to review the currently available scientific data with the following purposes:

1. To characterize the expected success and complication rates for coronary interventional procedures when performed by highly skilled operators.
2. To identify comorbidities and other risk factors that may be used for risk adjustment when assessing procedure-specific expected success and complication rates.
3. To assess the relationship between operator activity level and success rates in PCI procedures as assessed by risk-adjusted outcome statistics.
4. To assess the relationship between institutional activity level and success rates in PCI procedures as assessed by risk-adjusted outcome statistics.
5. To develop recommendations for standards to assess operator proficiency and institutional program quality. These include standards for data collection to permit monitoring of appropriateness and effectiveness of PCI procedures both at the level of the operator and the institution.
6. To expand the scope of this competency document, previously limited to coronary procedures, to also include noncoronary cardiac interventions.

Writing Group Composition

The Writing Group was selected to represent a broad range of experience and expertise to bear on this issue. The members of the Writing Group were identified on the basis of 1 or more of the following attributes: PCI operators with a broad range of experience (in practice and in academic settings); individuals who have performed clinical research studying the outcome of PCI procedures; individuals who direct catheterization laboratories with a broad cross section of interventional operators; and individuals with broad clinical experience who have had considerable previous involvement with PCI.

Literature Review

A literature search was conducted with 5 goals:

1. To identify published coronary and other cardiac interventional outcomes data that could be used as benchmarks for quality assessment. In addition, the process sought to identify those risk adjustment variables that affect the likelihood of success and complications. This review focused on outcomes of coronary interventions, including the latest interventional devices as of the date of this revision.
2. To identify data that examines the relationships between operator and institutional experience, and activity levels, and their impact on procedural success and complication rates.
3. To assess the issues and problems associated with judging operator and institutional proficiency based on outcome statistics—in particular, the challenge of accurately assessing the performance of low-volume operators and institutions.
4. To expand the recommendations beyond coronary interventions to other cardiac interventional procedures.
5. To identify methods for monitoring appropriateness of performance of PCI.

Percutaneous Coronary Intervention

Evolution of Competence and Training Standards

Initially, because experience was limited, the coronary angioplasty technique was disseminated informally among physicians who were highly experienced at diagnostic cardiac catheterization. During this period, physicians acquired angioplasty skills through "on-the-job" experience, and no standards existed for either training requirements or for demonstration of competence.

As the coronary angioplasty knowledge base grew and techniques evolved, standards were developed for training (19). Formal angioplasty training programs were first organized in the early 1980s. The most recent recommendations were published by the ACC in 1999 (20). The ABIM developed an Examination in Interventional Cardiology that was first administered in 1999. As of 2005, 5,020 physicians had successfully passed the examination and become board certified in interventional cardiology. Currently, eligibility to sit for the ABIM interventional cardiology examination requires completion of a fourth-year fellowship in interventional cardiology in an ACGME-accredited program. During academic year 2004 to 2005, there were 122 accredited interventional cardiology programs in the United States that had 240 filled training positions.

Professional organizations have addressed the issue of standards and criteria for proficiency in PCI procedures since 1986, with an increasing focus on the issue of

Downloaded from circ.ahajournals.org by on August 4, 2008

0281
09/15/08

maintenance of proficiency and skills (6–15). These documents have universally endorsed an annual caseload goal for maintenance of proficiency. The most commonly endorsed activity level has been 75 procedures per year per operator. This standard was initially based on general consensus of experts. In recent years, considerable research has examined the volume–outcome relationship and, in general, has affirmed it (21,22).

Since the previous guidelines were published, there has been debate over the relationship between volume and quality. While a relationship between volume and outcomes exists, volume alone does not determine quality. Also, the ABIM interventional cardiology board exam has been established to certify a level of knowledge and experience in the field. This competency document addresses these factors as they relate to determinations of overall operator and institutional quality.

Evolution of Coronary Interventional Capabilities

The cognitive and technical knowledge base required for proficiency in PCI has expanded. The fundamental concepts of coronary angioplasty technique, namely the coaxial guide catheter and the dilation catheter with a minimally compliant cylindrical balloon, were formulated by Andreas Gruntzig (23). Because of the initial comparatively primitive equipment design and capability, coronary angioplasty was only applicable to readily accessible discrete proximal coronary stenoses. Subsequent refinement in instrumentation has greatly enhanced procedural success and extended the indications for the performance of PCI. Complex anatomic situations now considered technically suitable for PCI procedures include multivessel disease (24–30), distal and bifurcation stenoses, total occlusions (31), saphenous vein graft stenoses (32), and complex stenoses. Challenging clinical situations now considered appropriate for coronary intervention include patients with unstable angina (33,34) and myocardial infarction (MI) (35,36) and those who are not considered candidates for coronary bypass surgery.

Nonballoon devices, including coronary stents, and directional, rotational, and laser atherectomy devices, have been introduced. These devices augment conventional balloon angioplasty and extend its capability; however, they all require specific training and mentoring by a previously experienced operator. To become competent in the use of any of these newer interventional devices, an operator must acquire the additional knowledge and technical skills specific to each device.

A number of adjunctive antithrombotic and antiplatelet medications have been introduced for the purpose of reducing acute thrombus-related treatment site complications. Understanding the appropriate indications for and complications associated with the use of these medications, which are powerful anticoagulants, requires knowledge of hemostatic mechanisms.

Procedural Success and Complications of Coronary Interventional Procedures

Recent clinical studies have demonstrated that despite a continuing increase in clinical and angiographic complexity, procedural and clinical success rates have remained high and complication rates have remained low (37–45) (Table 1). Angiographic success occurs in over 95% of patients. Among patients without ST-segment elevation myocardial infarction (STEMI), PCI is associated with an average mortality rate of less than 1%, a Q-wave MI rate of less than 1%, and an emergency coronary artery bypass surgery (CABG) rate of less than 1%. Table 1 contains data from 5 large contemporary registries of PCI procedures and the first 2 National Heart, Lung, and Blood Institute (NHLBI) registries for historical comparison. These data constitute a point of departure for developing benchmarking standards.

Adverse events related to PCI procedures are categorized either by the mechanism of the complication or by the adverse event caused by the procedure. A given adverse event, such as death, may be caused by a variety of complications.

Complications can be divided into 3 mechanistic categories:

1. **Coronary vascular injury.** Coronary arterial injury can occur when devices are introduced into coronary vessels or result from embolization of thrombotic or atherosclerotic material from devices or vessel walls. Examples include coronary dissection, thrombosis, perforation, and embolization.
2. **Other vascular events.** Other vascular events are caused either by injury to a peripheral vessel by catheter insertion, manipulation, or removal, or by embolization of thrombotic or atherosclerotic material. Examples include pseudoaneurysm, retroperitoneal hemorrhage, arteriovenous fistula, and stroke.
3. **Systemic nonvascular events.** Systemic nonvascular adverse events are caused by the procedure but are not due to vascular injury. They include all the systemic hazards of cardiovascular radiographic angiography procedures. Examples include contrast agent-induced nephropathy and acute pulmonary vascular congestion.

For the purpose of assessing clinical competence, complications may be divided into 8 basic outcome categories:

1. **Death**: related to the procedure, regardless of mechanism
2. **Stroke**
3. **MI**: related to the procedure, regardless of mechanism
4. **Ischemia requiring emergency CABG**: either as a result of procedure failure or a procedure complication
5. **Vascular access site complications**
6. **Contrast agent nephropathy**
7. **Excessive bleeding, requiring treatment**
8. **Other (such as coronary perforation and tamponade)**

The first 4 of these categories are generally considered major adverse cardiac and cerebral events (MACCE). Be-

Downloaded from circ.ahajournals.org by on August 4, 2008

0282
09/15/08

Table 1. Changes in Coronary Interventional Practice and Outcome From Registry Data

Variable	NHLBI-1 (40)	NHLBI-2 (38,39)	NHLBI Dynamic Registry (41)	ACC National Cardiovascular Data Registry (42)	Northern New England Consortium (43)	Michigan Blue Cross Consortium (44)	New York State Registry (45)	
							Nonemergent	Emergent
Clinical Characteristics								
Years of entry	1977–1981	1985–1986	1997–2002	1998–2005	2000–2004	2002	2001–2003	
No. of patients	1,155	1,802	6,183	1,082,690	36,831	5,901	124,096	14,946
Stent use (%)	0	0	78	91.6	86	84.0	87.5	92.7
Mean patient age (yrs)	54	58	63	61	62	63	65	60
Unstable angina (%)	37	49	44	35	43	32.0	27.8	83.6
ST-segment elevation MI (%)	0	0	25	13	12	18.9	0	53
Success and Complication Indicators								
Angiographic success (%)	68	91	93	2005: stented lesions: 99; nonstented lesions: 86	94	NA	97.5	97.5
Emergency CABG (%)	5.80	3.40	1.00	0.4	0.4	0.51	0.20	0.54
Mortality (%)	1.2	1.0	1.33	1.2 unadjusted rate	1.17	1.27	0.36	3.25

Reprinted with permission from Smith SC Jr., Feldman TE, Hirshfeld JW Jr., et al. ACC/AHA/SCAI 2005 guideline update for percutaneous coronary intervention—summary article: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (ACC/AHA/SCAI Writing Committee to Update the 2001 Guidelines for Percutaneous Coronary Intervention). J Am Coll Cardiol 2006;47:216–35 (15).

ACC = American College of Cardiology; CABG = coronary artery bypass graft surgery; MCD = multicenter database; MI = myocardial infarction; NA = not available; NHLBI = National Heart, Lung, and Blood Institute.

cause adverse events are definite end points, they are easily recognized and captured for statistical summary purposes. The ACC-National Cardiovascular Data Registry (NCDR)® has developed a comprehensive data dictionary with rigorous definitions of recognized adverse events (46). It may be impossible to determine conclusively whether death or a complication was caused by a procedure. Nonetheless, for the purposes of monitoring performance, rate of complications or deaths substantially above that expected, after adjustment for patient risk factors, is a cause for concern.

Patient, Lesion, and Institutional Variables Influencing Success and Complication Rates

A number of factors have improved the overall success and complication rates of PCI procedures. These include increased operator experience, modifications in conventional instrumentation (balloon catheters, guide catheters, guide wires), newer interventional devices (stents and embolization protection devices), and advances in adjunctive pharmacologic therapy. Concurrently, these improvements have led to the extension of interventional treatment to higher-risk patients with more complex coronary anatomy and comorbid disease. These factors have influenced overall acute and long-term outcome associated with PCI procedures.

Measures/Definitions of Success

Anatomic success. The definition of anatomic success focuses exclusively on the enlargement of the lumen at the target site and blood flow through the epicardial coronary artery. Although there has been disagreement, the current definition of success of PCI with stenting is the achievement of a minimal diameter stenosis of less than 20% as visually assessed by angiography and maintenance of Thrombolysis In Myocardial Infarction (TIMI) flow grade 3 (15). Anatomic success of PCI without stenting is defined as stenosis diameter reduction greater than 20% with residual stenosis less than 50%. Notably, there is frequently a disparity between the visual estimate of lumen diameter and quantitative measurements (47,48).

Procedural success. Procedural success has been defined as the achievement of anatomic success of all treated lesions without the major complications of death, MI, or emergency CABG (14,40). Although emergency CABG during hospitalization and death are easily identified end points, the definition of periprocedural MI has been more problematic. Some definitions require the development of Q waves in addition to a threshold value for creatine kinase (CK) elevation. However, more recent reports have included non-STEMIs with CK elevations greater than 3 or 5 times the upper limit of normal as clinically significant, since they have been shown to correlate with long-term mortality (49). Although major adverse cardiac events (MACE) have been

Downloaded from circ.ahajournals.org by on August 4, 2008

0283
09/15/08

used to judge success, some recent studies also include MACCE.

Short-term clinical success. Short-term clinical success requires, in addition to procedural success, the relief of signs and symptoms of myocardial ischemia.

Longer-term clinical success. Longer-term clinical success requires that the initial clinical success remains durable and that the patient has persistent relief of signs and symptoms of myocardial ischemia for 6 to 9 months after the procedure. Restenosis remains the principal cause of a lack of clinical success over the first year following a successful procedure. This directly leads to target lesion revascularization (TLR), target vessel revascularization, and target vessel failure. Thereafter, clinical events are usually caused by progression of disease at other sites. Clinically important restenosis may be judged by the frequency with which subsequent TLR procedures are performed after the index procedure. Incomplete revascularization, new lesion formation, and stent thrombosis may also limit long-term clinical success, especially in subsequent years (50).

Patient and Lesion Characteristics Related to Procedural Success and Complication Rates

Angioplasty procedural success and complication rates are influenced by a variety of patient and target lesion characteristics. These characteristics must be taken into consideration through risk adjustment when assessing adverse event rates. In addition, they must also be weighed in determining procedure appropriateness.

Patient clinical characteristics. The clinical factors associated with an increased risk of an adverse outcome after intervention include advanced age, female gender, acute coronary syndrome (especially STEMI), chronic renal insufficiency, heart failure, and multivessel coronary disease (7,12,14,15). Patients with impaired renal function, particularly patients with diabetes, are at increased risk for contrast-induced nephropathy (51).

Target lesion anatomic factors. Particular lesion morphologic characteristics are predictive of immediate outcome with coronary intervention (7,12,14,52). Lesion length, presence of thrombus, and degenerated saphenous vein grafts are independently associated with abrupt vessel closure and major ischemic complications. Chronic total occlusions (greater than or equal to 3 months) are associated with a lower procedural success rate. On the basis of these observations, a previous ACC/AHA Clinical Task Force on Clinical Privileges in Cardiology (13) proposed a classification scheme based on lesion morphology to estimate the likelihood of procedural success and complications. This scheme was subsequently modified by others (52) and has served as a useful guide for assessing the risk of an adverse outcome associated with a particular lesion. More recent experience indicates that improved devices and techniques have higher success rates in more complex lesions (53–56). As a result, lesion morphology may be less predictive of complications currently than it has been in the past (57).

Strategies for Risk Stratification and Operator Evaluation

Several large retrospective studies of patients undergoing PCI have identified clinical and angiographic characteristics that correlate with procedural success, in-hospital morbidity, and mortality (21,22,44) (Table 2). These observations have been used to develop multivariate logistic regression models that can stratify patients before the procedure. Model reliability is best assessed by relative predictive accuracy (C-statistic: moderate is greater than 0.80, excellent is greater than 0.90) and scaling accuracy (the Hosmer-Lemeshow statistic). Several models predict periprocedural mortality with C-statistic greater than 0.80 (Table 2). Prediction of other events is typically less accurate (58–60). Model utility also must consider the frequency and clinical importance of the event measured. Very infrequently occurring events, even if severe, may not allow adequate evaluation of operators with low volume. Results of several years of experience should be considered in order to have sufficient numbers of events to be adequately assessed from a statistical standpoint. Operators and catheterization laboratories should be encouraged to submit information to large databases that allow for evaluation of risk-adjusted outcomes.

Impact of the Facility on Procedural Success

Physical facility requirements. The physical facility in which interventional procedures are performed has an important impact on procedural success. The facility must provide radiologic equipment, monitoring, and patient support equipment to enable operators to perform at the best of their ability. The video and "cine" image quality of radiologic imaging equipment must be optimal to facilitate accurate catheter and device placement and enable proper assessment of procedure results. Physiologic monitoring equipment must provide continuous, accurate information about the patient's condition. Requisite support equipment must be available and in good operating order to respond to emergency situations.

Overall institutional system requirements. The interventional laboratory must have an extensive support system of specifically trained laboratory personnel. Cardiothoracic surgical, respiratory, and anesthesia services should be available to respond to emergency situations in order to minimize detrimental outcomes. The institution should have systems for credentialing, governance, data gathering, and quality assessment. Prospective, unbiased collection of key data elements on consecutive patients and consistent feedback of results to providers brings important quality control to the entire interventional program. The ACC/AHA/SCAI 2005 Guideline Update for PCI (15) recommends that each interventional program performing elective PCI

Downloaded from circ.ahajournals.org by on August 4, 2008

0284
09/15/08

Table 2. Odds Ratios* for Significant Independent Risk Factors† for Short-Term Mortality Related to PCI

Source	New York State	Northern New England	Michigan BMC2	ACC-NCDR	ACC-NCDR Update		COAP
No. of patients	50,046	15,331	10,796	100,253	No acute MI (142,817)	Acute MI (30,926)	19,358
Incidence (%)	0.58	1.1	1.6	1.4	N/A	N/A	1.6
Years	2003	1994–1996	1997–1999	1998–2000	1998–2001	1998–2001	1999–2000
Clinical							
Acute MI less than 12–24 h	8.6	5.5	2.8	1.3			+
Age	+	+	+	+	+	+	+
Cardiac arrest			3.7				
CHF	3.2	8.6					1.6
COPD				1.3	1.7	1.5	1.8
Diabetes				1.4	1.25		
Female	1.5		1.8				1.4
IABP pre		26.2		1.7		1.9	
Peripheral vascular disease	2.6	3.3	1.6				1.6
Prior CABG	1.4						
Priority (salvage, emergent urgent, elective)		+		+	+	+	+
Renal insufficiency	3.1	6.4	5.5	3.0	3.5	2.0	3.5
Shock	22.1	32.2	11.5	8.5	9.8	8.8	9.8
Anatomic							
ACC lesion score, C		2.9					
Ejection fraction	+	+		+	+	+	+
LMT lesion				2.0	1.5	2.1	
Number of diseased vessels	+		+				
Prox LAD lesion				2.0	1.3	1.3	+
SCAI lesion score				+	+	+	
Thrombus			+				
Procedural							
Lytic use				1.4		1.25	
Nonstent use				1.6	1.6	1.4	
C-statistic	0.905	0.88	0.90	0.89	0.85	0.87	0.87

*Values are odds ratios for binary variables unless otherwise noted; †specific definitions of risk factors may vary from series to series; +relationship exists for continuous or ordinal variables (61–66).
ACC-NCDR = American College of Cardiology National Cardiovascular Data Registry; BMC2 = Blue Cross Blue Shield of Michigan Cardiovascular Consortium; CABG = coronary artery bypass graft; CHF = congestive heart failure; COAP = clinical outcome assessment program; COPD = chronic obstructive pulmonary disease; IABP = intra-aortic balloon pump; LAD = left anterior descending; LMT = left main trunk; MI = myocardial infarction; PCI = percutaneous coronary intervention; SCAI = Society for Cardiovascular Angiography and Interventions.

should have in-house surgical support. Institutions that do not have in-house surgical support and are performing primary PCI only for STEMI, should have an established, well-organized system for emergency transfer to surgery at another institution.

Components of Operator Competence

Cognitive Knowledge Base

The knowledge needed to perform PCI, including that expected to be acquired in ACGME-approved interventional training programs, has been addressed by expert panels (7,8,20,67,68). The core knowledge is now tested by the ABIM Interventional Cardiology certifying examination which has been administered since 1999. Through 2003, physicians trained by a nontraditional pathway were eligible to take the examination based on either practice-based procedure activity and experience or by completion of an interventional training program. Since 2003, only individuals who have completed an ABIM-qualified training program are eligible to take the certifying examination. Individuals who train in interventional cardiology should become ABIM certified in interventional cardiology.

Training programs and the qualifying examination (20,69) require that interventional cardiologists be knowledgeable in anatomy, physiology, and pathophysiology of the cardiovascular system. In particular, one should understand the biology of coronary artery disease, be knowledgeable about the pathophysiology of myocardial ischemia and MI, and understand the dynamics of cardiac dysfunction. Interventionalists should possess a fundamental knowledge of stents and be familiar with the polymers and drugs that are incorporated into stents, coagulation cascade, thrombosis, and the pharmacology, therapeutic application, and risks of antiplatelet, antithrombin, and fibrinolytic drugs that are used in association with PCI. Competent operators must have knowledge of the indications for PCI and adjunctive and alternative use of medical therapy and surgery for patients with coronary artery disease based on an in-depth

Downloaded from circ.ahajournals.org by on August 4, 2008

0285
09/15/08

understanding of published clinical trials. Coronary interventionalists must understand the role of primary angioplasty compared with fibrinolytic therapy for STEMI and the alternative therapeutic approaches for treating STEMI that depend upon the time of presentation, anticipated door-to-balloon time, and the presence or absence of ongoing symptoms and/or electrocardiographic abnormalities.

Cognitive knowledge must be bolstered by clinical skills and experience that support the rational selection of optimal treatment strategies for each patient. Such decisions are based on symptoms, anatomy, and associated risk factors. Thus, equally important to knowing the indications for PCI is an understanding of its limitations and contraindications, particularly as these relate to comorbid systemic diseases and special anatomical subsets. Physicians performing these procedures should be conversant with the applicable guidelines (e.g., PCI, CABG, STEMI, unstable angina/NSTEMI [15,70–72]).

Coronary interventionalists must also have a thorough knowledge of specialized equipment, techniques, and devices used to perform PCI competently, including:

1. The theoretical and practical aspects of X-ray imaging, radiation physics and safety, and other equipment to generate digital images; quality control of images; image archiving; consequences of exposure of patients and personnel to ionizing radiation; and methods of reducing patient and staff radiation exposure (73).
2. Specialized catheterization recording and safety equipment (physiological data recorders, pressure transducers, blood gas analyzers, defibrillators) (74).
3. Catheters, guide wires, balloon catheters, stents, atherectomy devices, ultrasound catheters, intra-aortic balloon pumps, puncture site sealing devices, contrast agents, distal protection devices, and thrombus extraction devices.

Operators must be knowledgeable about the prevention, prompt recognition, and treatment of procedural complications. It is extremely important to have the knowledge and skills to diagnose and manage vessel perforation, no reflow, coronary dissection, expanding hematoma, pseudoaneurysm, arterial venous fistulas, and retroperitoneal hemorrhage. Interventionalists must also be cognizant of systemic complications, including cerebrovascular events and contrast-related nephropathy.

Technical Skills

Many of the skills required to perform coronary interventional procedures are closely related to those needed to perform diagnostic cardiac catheterization and coronary angiography. These include manual dexterity and the ability to obtain percutaneous arterial and venous access and maintain sterile surgical technique.

Most of the other required technical skills are unique to coronary interventional procedures and can only be acquired during training and by performing actual procedures under the direction of an experienced interventionalist. These include the manipulation and operation of guide catheters, coronary angioplasty guide wires, coronary angioplasty balloon catheters, specialized atherectomy devices, stents, and intracoronary ultrasound catheters. Such training appropriately occurs in standardized training programs that are ACGME-approved and lead to eligibility for board certification.

Nonballoon Devices

A special area of competence involves use of lesion assessment tools. Intracoronary devices commonly used by interventional cardiologists for assessment of intraluminal coronary anatomy and/or physiology include intravascular ultrasound (IVUS) or intracoronary ultrasound (ICUS), Doppler flow wires, and pressure wires. Competency in the use of angioscopy, optical coherence tomography, spectroscopy, intravascular thermography, and intravascular magnetic resonance imaging is beyond the scope of this document. Expertise in device manipulation and image interpretation is required to use these intravascular assessment devices safely and effectively. The risks of these devices is the same as those with PCI and include vessel spasm; myocardial ischemia; coronary artery dissection; plaque disruption; thrombosis; air, plaque, or thrombotic embolization; acute occlusion; coronary artery perforation; and contrast nephropathy, stroke, and access site complications. Therefore, only an interventional cardiologist skilled in transluminal coronary techniques such as balloon angioplasty and stenting who is able to diagnose and treat complications of interventional procedures should employ these devices. Recommendations regarding the use of IVUS, Doppler flow wires, and pressure wires are published in Appendix C of the ACC/AHA Guidelines for Coronary Angiography (75).

It is also important to ensure quality image acquisition, measurement, and reporting for each of the intravascular assessment devices. For ICUS, the reader is referred to the ACC Clinical Expert Consensus Document on Standards for Acquisition, Measurement and Reporting of Intravascular Ultrasound Studies (76). No such documents are available for Doppler analysis of coronary flow reserve and pressure wire analysis of fractional flow reserve, but many of the general principles in the IVUS document may be of some benefit in guiding appropriate use of these other modalities.

Relationships of Operator and Institutional Experience and Activity to Outcomes in Coronary Interventional Procedures

Evidence Reviewed

Computerized literature searches of English language publications, review of recent abstract publications, and solicitation of manuscripts under review for publication from

Downloaded from circ.ahajournals.org by on August 4, 2008

0286
09/15/08

Table 3. Published Data Relating Hospital Coronary Angioplasty Volume to Complication Rates

Study	Data Source	No. of Patients/ Hospitals Studied	Conclusions	Comments
Hartz et al. (78)	1989–1991 Wisconsin Medicare	2,091/16	No relation between volume and outcome	Very low number of cases and hospitals examined
Ritchie et al. (86)	1989 California State (Adm)	24,883/110	Increased CABG (not death) less than 20 cases per yr; finding is valid for both acute MI and nonacute MI patients	
Jollis et al. (85)	1987–1990 MEDPAR (Adm)	217,836/1,194	Death and CABG increased with low volume (risk increases with Medicare patient volume* (less than 100–200 total per yr for death, 200–300 per yr for CABG)	
Kimmel et al. (84)	1992–1993 SCAI	19,594/48	Fewer major complications for labs with greater than 400 cases per yr	Able to risk adjust more completely than most other analyses
GUSTO (IIb) Angioplasty Substudy Group (36)	GUSTO IIb trial	565/59	No difference, 200–625 vs. greater than 625 cases per yr for acute MI patients	All operators greater than or equal to 50 cases per yr
Kato et al. (79)	1991 HCFA (RAND Corp.)	113,576/862	Except for Medicare volume* less than 50, higher volume hospitals had higher mortality rates	
Stone et al. (80)	PAMI II trial	1,100/34	No difference, less than 500, 501–1,000, greater than 1,000 cases per yr for acute MI patients	
Jollis et al. (77)	1992 Medicare (Adm)	97,498/984	Incremental decrease in death and bypass surgery as hospital Medicare volume* less than 100, 100–200, greater than 200 per yr	
Tiefenbrunn et al. (83)	Second National Registry of MI (U.S.)	4,939/?	Increased acute MI mortality for hospital less than 25 acute MI cases per yr	
Hannan et al. (82)	1991–1994 NY State	62,670/31	Death alone and same-stay CABG increased with annual caseloads less than 600	Risk-adjusted
Zahn et al. (81)	1992–1995 German Hospital Consortium	4,625/?	For patients with acute MI; increased mortality in hospitals with less than or equal to 40 acute MI PTCA per yr	No risk-adjusted
Moscucci et al. (22)	1998–1999 NY State and MI	11,374/8	In-hospital death increased for hospital volume less than 400	Risk-adjusted
Hannan et al. (21)	1998–2000 NY State	107,713/34	Death, same-day CABG, same-stay CABG increased for hospital volume less than 400	Risk-adjusted

*Medicare patients usually constitute 35% to 50% of total interventional caseload.

Adm = administrative data set; CABG = coronary artery bypass graft; GUSTO = Global Use of Strategies to Open Occluded Coronary Arteries in Acute Coronary Syndromes; HCFA = Health Care Financing Administration; MEDPAR = Medicare provider analysis and review; MI = myocardial infarction; PAMI = Primary Angioplasty in Myocardial Infarction; PTCA = percutaneous transluminal coronary angioplasty; SCAI = Society for Cardiovascular Angiography and Interventions.

many physicians and epidemiologists expert in the field were used to compile the relevant available scientific evidence relating institutional and operator activity level to outcomes (Table 3). In general, greater weight was given to recent, fully peer-reviewed publications of high quality. No single work was considered definitive. It was recognized that many analyses were limited to some extent by lack of capacity to fully adjust expected outcomes for differences in patient characteristics, changes and advances in the field of interventional cardiology, and inability to generalize the results to a broader population.

Relationship of Institutional Volume to Procedural Outcome

The preponderance of data suggest that, on average, hospitals in which fewer coronary interventions are performed have a greater incidence of procedure-related complications, notably death and need for bypass surgery for failed intervention, than hospitals performing more procedures. Multiple data sources support the existence of a curvilinear, perhaps logarithmic, statistical relation between caseload and outcome (Fig. 1). However, for CABG, the continued importance of the relationship between volume and outcomes has been recently confirmed using contemporary clinical data (87). For PCI, the majority of the studies available either predate the widespread introduction in interventional practice of coronary stenting and adjunctive use of glycoprotein receptor blockers, or were obtained through analysis of Medicare claims data or other administrative data. Recognized limitations of Medicare data include the need to extrapolate the total number of proce-

Downloaded from circ.ahajournals.org by on August 4, 2008

0287
09/15/08

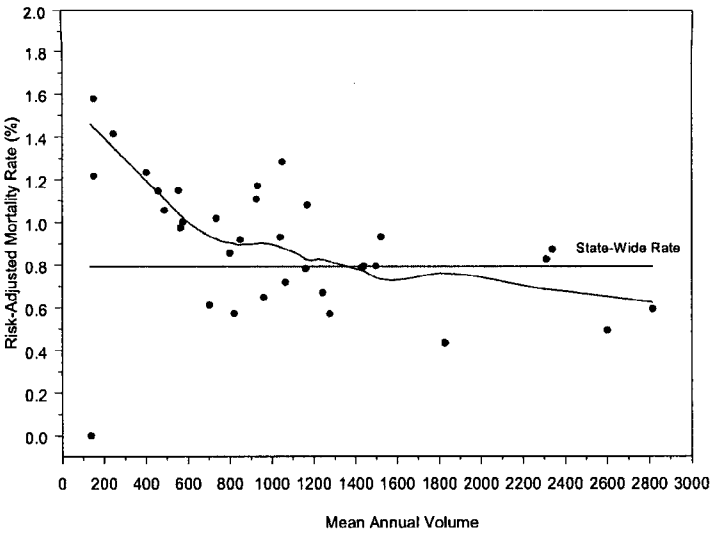


Figure 1. Mean Annual Hospital PCI Volume and Risk-Adjusted In-Hospital Mortality Rate in New York State, 1998–2000

Reprinted with permission from Hannan EL, Wu C, Walford G, et al. Volume-outcome relationships for percutaneous coronary interventions in the stent era. Circulation 2005; 112:1171–9 (21). PCI = percutaneous coronary intervention.

dures from the number of Medicare procedures, the incomplete reporting in Medicare claims of comorbidities that might be important predictors of adverse outcomes (16,17), and the possibility of miscoding complications as comorbidities (18).

The direct relationship between institutional volume and outcomes has been recently confirmed by 2 more contemporary analyses of large clinical registries. The first study compared data collected between 1998 and 1999 in a multicenter PCI registry in Michigan with data from the New York State data registry (22). An institutional annual volume less than 400 cases per year was found to be independently associated with an increased risk of in-hospital death compared with hospitals with annual volumes of at least 400 (adjusted odds ratio [OR] 1.77, 95% confidence interval [CI] 1.16 to 2.70). The second study (21), based on the New York State data registry, evaluated 107,713 procedures performed in 34 hospitals in New York State during 1998 to 2000. The same hospital volume threshold of less than 400 procedures per year was found to be associated with an increased risk of in-hospital mortality (adjusted OR 1.98, 95% CI 1.17 to 3.35), "same day" CABG surgery (adjusted OR 2.07, 95% CI 1.36 to 3.15) or "same stay" CABG surgery (adjusted OR 1.51, 95% CI 1.03 to 2.21). Figure 1 from the New York study presents the continuous relationship between hospital volume and risk-adjusted in-hospital mortality.

It is important to underscore that advancements in technology have resulted in a progressive improvement in outcomes of PCI, and that this improvement has at least in part offset the adverse institution volume–outcome relationship. In a recent study evaluating temporal trends in the volume–outcome relationship in the state of California, it was found that over time, the disparity in outcomes between low- and high-volume hospitals had narrowed, and that outcomes had improved significantly for all hospitals (88). The author of this study concluded that given these improvements, lower minimum volume standards might be justifiable in less populated areas, where the alternative is no access to angioplasty at all. Importantly, procedural volume is only one of many factors contributing to the variability of measured outcomes (58,82,89). Furthermore, there is no clear "cut-off" above or below which hospitals, or groups of hospitals in aggregate, perform well or poorly. There are institutions with low volumes that appear to achieve very acceptable results. For an individual institution, however, such an impression must be tempered by the statistical imprecision of the estimate of risk.

Volume and Outcomes Relationship for Primary PCI in Acute MI

The relationship between operator and institutional volume and outcome of primary PCI for acute MI has been examined nearly exclusively at hospitals with onsite cardiac surgery. In an analysis including 62,299 patients with acute MI and enrolled in the National Registry of Myocardial Infarction, Magid et al. (90) analyzed data from 446 acute-care hospitals providing primary angioplasty services. Hospitals were classified as low volume (less than 16 procedures per year), intermediate volume (17 to 48 procedures per year), and high volume (more than 49 procedures per year). In high-volume hospitals, mortality for acute MI patients was significantly lower with primary angioplasty when compared with fibrinolysis, while in low-volume hospitals, there were no differences in mortality rates between primary angioplasty and fibrinolysis. Two other

Downloaded from circ.ahajournals.org by on August 4, 2008

0288
09/15/08

analyses from the same registry and 2 studies using the New York State data registry have shown a direct relationship between hospital volume of primary angioplasty and mortality. In the analysis by Canto et al. (91), hospital volume was divided in quartiles. In-hospital mortality was 28% lower in patients treated in the highest volume quartile (greater than 33 primary PCIs per year) when compared with patients treated in the lowest volume quartile (less than 12 primary PCIs per year). Similar results were obtained by Cannon et al. (92). In this analysis, a procedure volume greater than 3 PCIs per month was found to be associated with a lower in-hospital mortality rate when compared with a procedure volume of less than 1 PCI per month, or with a procedure volume between 1 and 3 PCIs per month.

Recently, Hannan et al. (21) reported data from the New York State Coronary Angioplasty Reporting System Registry collected in the years 1998 to 2000, a period when stenting was used in a large majority of the STEMI patients. A trend toward an increased odds ratio of in-hospital mortality was observed for low-volume operators when compared with high-volume operators both for a volume cut of 8 procedures per year (OR 1.40, 95% CI 0.89 to 2.20) and with a volume cut of 10 procedures per year (OR 1.27, 95% CI 0.87 to 1.87). Importantly, a significant increase in the odds of in-hospital mortality was observed with lower institutional volume of primary PCI, regardless of whether the institutional volume cut point was set at 36 procedures per year (OR 2.01, 95% CI 1.27 to 3.17), 40 procedures per year (OR 1.73, 95% CI 1.1 to 2.71), or 60 procedures per year (OR 1.45, 95% CI 1.01 to 2.09).

Volume and outcomes relationship for PCI in hospitals without onsite cardiac surgery. There is only 1 report indicating a relationship between institutional PCI volume and outcome in hospitals without onsite cardiac surgery. Wennberg et al. (93) reported that among Medicare recipients, there was no difference in mortality after primary/rescue PCI (emergency procedure on the same day for STEMI) performed at hospitals with or without cardiac surgery onsite. However, they did report a higher mortality for PCI patients, excluding primary/rescue PCI, at hospitals without cardiac surgery onsite (adjusted OR 1.38, 95% CI 1.14 to 1.67; $p = 0.001$). The relationship between institutional volume and PCI affecting this outcome was confined mainly to hospitals without cardiac surgery onsite performing 50 or fewer nonprimary/rescue PCIs in Medicare recipients per year. Among hospitals performing more than 100 PCIs in Medicare recipients, mortality was not higher in hospitals without surgery onsite (adjusted OR 0.76, 95% CI 0.52 to 1.11; $p = 0.16$). These hospitals likely perform more than 200 PCIs per year based on the assumption that 100 Medicare PCIs represent approximately 200 total PCIs per year.

Taken together, these data suggest that the *relationship* between institutional volume of PCI patients (excluding primary/rescue PCI) and mortality in hospitals without surgery onsite may be similar to the relationship in hospitals with surgery onsite. For facilities without onsite surgery, it is mandatory that there be an established, well-organized plan for transfer for surgery if needed.

Relationship of Individual Operator Volume to Procedural Outcome

Several large studies have assessed the potential relation between individual operator caseload and procedural complications (93). Recently, McGrath et al. (94) analyzed relatively contemporary data (calendar year 1997) from the Medicare database. Based on a slightly different assumption than Wennberg et al. (93) that Medicare patients represent 35% to 45% of total PCI procedure volume, they estimated that 30 PCIs per operator per year on Medicare patients could be extrapolated to a total procedure volume of 70 PCIs per operator per year (94). A significant relationship between operator volume and outcomes was also reported in their study, with better outcomes observed in patients treated by high-volume operators when compared with patients treated by low-volume operators. Similar results were obtained in the study by Hannan et al. (21) in the analysis of data collected from the 107,713 procedures performed in the 34 hospitals performing PCI in New York State during 1998 to 2000. Operator volume thresholds were set at 75 procedures per year based on ACC/AHA recommendations, and at slightly higher levels of 100 and 125 procedures per year. There were no differences in risk-adjusted mortality between patients undergoing PCI performed by lower volume operators and patients undergoing PCI performed by higher volume operators for any of the 3 volume thresholds that were examined. However, for all 3 volume thresholds, significant differences for "same day" CABG surgery and for "same stay" CABG surgery were observed. For example, patients undergoing PCI with operators performing less than 75 procedures per year had a 65% increased odds of undergoing same-day CABG surgery, and a 55% increased odds of undergoing "same-stay" CABG surgery.

Further confirmation of the adverse operator volume–outcome relationship with contemporary PCI comes from an analysis by Moscucci et al. (95) of another regional, audited, clinical PCI registry. In that analysis including 18,504 procedures performed in 14 Michigan hospitals in calendar year 2002, operator volume was subdivided in quintiles (1 to 33 PCIs per year, 34 to 89 PCIs per year, 90 to 139 PCIs per year, 140 to 206 PCIs per year, and 207 to 582 PCIs per year). The primary end point was a composite of MACE, including death, CABG, stroke, transient ischemic attack, MI, and repeat PCI at the same lesion site. Stent utilization was greater than 80%, and greater than 70% of patients received a glycoprotein ($GP_{IIb/IIIa}$) receptor inhibitor. After adjustment for comorbidities, patients treated by operators in the 2 lower volume quintiles (Quintiles 1 and 2) had a 63% increase in the odds of MACE

Downloaded from circ.ahajournals.org by on August 4, 2008

0289
09/15/08

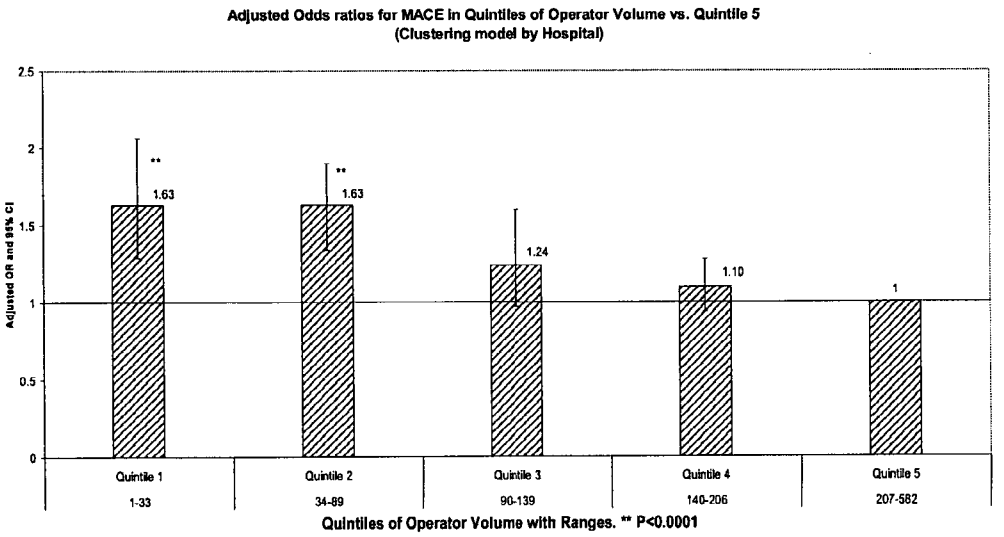


Figure 2. Adjusted Odds Ratios for MACE by Quintile of Operator Volume

Reprinted with permission from Moscucci M, Share D, Smith D, et al. Relationship between operator volume and adverse outcome in contemporary percutaneous coronary intervention practice: an analysis of a quality-controlled multicenter percutaneous coronary intervention clinical database. J Am Coll Cardiol 2005; 46:625–32 (95). MACE = major adverse cardiac events.

(Fig. 2). No significant relationship was observed between operator volume and risk of in-hospital death. The adverse relationship between operator volume and outcomes appeared to be relatively independent of patient risk. A detailed analysis of individual operator risk-adjusted outcomes revealed the presence of several low-volume operators with better than expected outcomes, and of a few high-volume operators with worse than expected outcomes, thus suggesting that there are exceptions to the rule, and that low-volume operators should be tracked over a longer period of time to ascertain their true performance (Fig. 3).

Combination of Individual Operator Volume and Institutional Volume on Procedural Outcome

The combined impact of hospital volume and operator volume on adverse outcomes was assessed by Hannan et al. (21). Patients undergoing PCI performed by operators with volumes below 75 per year in hospitals with volumes below 400 per year were found to have significantly higher odds of dying in the hospital than patients undergoing PCI performed by operators with volumes of 75 or more in hospitals with volumes of 400 or more (OR 5.92, 95% CI 3.25 to

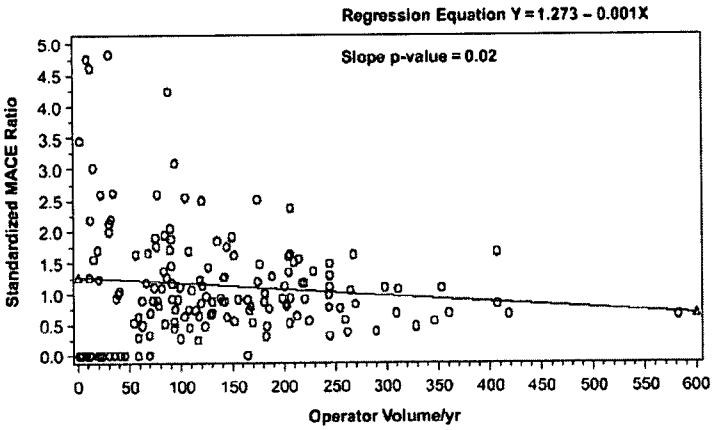


Figure 3. Linear Plot of Standardized MACE Ratios (Observed/Predicted Rates) Versus Annual Operator Volume

Reprinted with permission from Moscucci M, Share D, Smith D, et al. Relationship between operator volume and adverse outcome in contemporary percutaneous coronary intervention practice: an analysis of a quality-controlled multicenter percutaneous coronary intervention clinical database. J Am Coll Cardiol 2005; 46:625–32 (95). MACE = major adverse cardiac events.

Downloaded from circ.ahajournals.org by on August 4, 2008

0290
09/15/08

10.97). Also, patients undergoing PCI performed by operators with annual volumes of below 75 in hospitals with annual volumes below 400 experienced significantly higher same-day CABG rates than patients with high-volume operators (greater than 75 annually) in high-volume hospitals (greater than 400 annually), with an OR of 4.02. For same-stay CABG surgery the respective OR was 3.19. It should be noted that the magnitude of these ORs demonstrates that the increase in adverse outcomes compound when patients undergo PCIs performed by low-volume operators (less than 75 annually) in low-volume hospitals (less than 400 annually).

In summary, analysis of more contemporary data supports the hypothesis that technological advancements have not completely offset the influence of "practice" in determining proficiency of contemporary PCIs. However, procedure volume is only a poor substitute for quality and outcomes; therefore, it should not be used as a replacement for appropriately risk-adjusted outcomes. Nevertheless, it is easy to measure, and its potential implications are easily understood by patients undergoing PCI. As such, it seems appropriate to continue to include procedure volume among the several indirect quality indicators of contemporary PCI practice.

However, it is also important to underscore that there are significant limitations to the simplistic interpretation of procedure volume statistics as a measure of competence and quality. First, it is uncertain whether this relationship is a result of the "practice makes perfect" principle, or the fact that patients are more frequently referred to high-quality operators. Second, it remains unclear where the "cut-off" number should be set. Third, studies have shown significant variability in the volume–outcome relationship within the same registry, with some low-volume operators having better than expected outcomes, and a few high-volume operators having worse-than-expected outcomes. Furthermore, at present, few or no data exist linking operator volume to case selection, appropriateness of procedures, periprocedural MI, long-term clinical outcome, or cost-effectiveness, each of which measures a component of quality of care, or linking clinical outcomes to operator experience as measured by the number of years in practice, total procedure volume over a lifetime career, or board certification.

The development of national, regional, and state registries for outcome assessment is also promoting a shift of the paradigm surrounding quality of PCI from a mere collection of procedure volume to objective assessment of clinical outcomes. In addition, the past decade has been characterized by substantial advancement in methodology, scientific rigor, and acceptance of risk adjustment. Factors related to in-hospital mortality following PCI are now well defined, and progress is being made toward the development of statistical models for other outcomes. Clearly, the calculation of risk-adjusted outcomes using data from clinical registries is a more accurate way to assess outcomes than using volume as a surrogate, and as more registry data become available, procedure volume will likely no longer be used as a replacement or a surrogate for quality assessment.

Yet, limitations related to the effect of random variation and to the evaluation of rare events continue to exist. These limitations make it difficult to assess the true performance of very-low-volume operators. In such situations, close scrutiny of case selection and close monitoring of outcomes on a case-by-case basis might serve as a substitute/complement to risk adjustment.

In summary, while there are inherent limitations in using procedure volume as a surrogate of quality and outcomes, recent data suggest that there is still a relationship between experience and outcomes. In the analysis of the New York State data, the relationship appeared to be at a level of 75 procedures per year, with further improvement in outcomes observed at a volume threshold of greater than 100 procedures per year. In the analysis of the Michigan data, the relationship was at a level of 100 procedures per year. On the basis of these data, it is recommended that the operator volume threshold continue to be 75 procedures per year. Independent of procedure volume, all operators should participate in a regional or national program for outcome assessment and quality improvement. In addition, it is recognized that there are limitations in the application of the risk-adjustment methodology in the evaluation of rare events and of low-volume operators, and that there might be substantial variations in the volume–outcome relationship. For operators that do not meet a threshold of 75 cases per year measured in 2-year intervals, it is recommended that a case-by-case review, case selection, and prior experience including the total number of cases in a lifetime career be included in their evaluation. They could also partner with higher volume operators to perform cases together to gain further experience.

Ongoing Quality Improvement and Maintenance of Competence

Maintenance of competence in interventional procedures should be accomplished for both the individual physician operator and for the institutions in which cardiac interventional procedures are performed. The goals in setting criteria for maintaining competence include:

1. Ensuring quality of patient care and outcomes;
2. Enabling quality interventionalists and institutions to continue to perform PCI;
3. Providing standards that all institutions and operators should strive to achieve.

Institutional Maintenance of Quality

It is recommended that all institutions have a regular (at least monthly) catheterization laboratory conference. The opportunity for ongoing dialogue and collaboration among angiographers, interventional operators, and cardiothoracic surgical colleagues is highly desirable. New developments in

Downloaded from circ.ahajournals.org by on August 4, 2008

0291
09/15/08

the angioplasty literature should be reviewed, and procedural complications should be discussed.

Maintenance of competence also requires that patient outcomes be determined longitudinally for each procedure by the institution's quality assessment program. Participation in a state, regional, or national database is highly encouraged. This allows institutions to measure risk-adjusted outcomes and compare them to regional and national benchmarks for improving quality of care.

It is recommended that lower volume institutions (less than 400 interventions per year) consider holding conferences with a partnering, more highly experienced institution. It is also recommended that any institution that falls outside the risk-adjusted national benchmarks in mortality or emergency same-stay CABG during 2 of 3 contiguous 6-month periods have an external audit looking for opportunities to improve quality of care.

Individual Maintenance of Quality

To maintain a cognitive knowledge base, it is recommended that individual operators attend at least 30 h of interventional cardiology continuing medical education (CME) every 2 years. This could include catheterization conferences and PCI meetings in addition to expanding the use of simulation cases for procedure use and competence.

To ensure appropriate patient selection and quality of technical skills, it is recommended that all operators have 5 randomly selected cases and all major complications reviewed each year by the catheterization laboratory director or a Quality Assessment Committee at the institution. Any operator performing less than 75 cases per year should have 10 cases reviewed per year. These performance evaluations should include feedback to the operator. If it is determined that the quality of PCI care being provided does not meet national benchmarks, the catheterization laboratory director should have the discretion of making recommendations for improving quality and reassessing over the next 6 months. If disagreements concerning corrective action occur, external review is often helpful.

Quality Assurance

Definition of Quality in PCI

Satisfactory quality in PCI may be defined as selecting patients appropriately for the procedure and achieving risk-adjusted outcomes that are comparable to national benchmark standards in terms of procedure success and adverse event rates. To achieve optimal quality and outcomes in PCI it is necessary that both the physician operator and the supporting institution be appropriately skilled and experienced.

Institutional Quality Assurance Requirement

In the United States, responsibility for quality assurance is vested in the health care institution that is responsible to the public to ensure that patient care conducted under its jurisdiction is of acceptable quality. Quality assessment review should be conducted both at the level of the entire program and at the level of the individual practitioner.

Each institution that performs PCI must establish an ongoing mechanism for valid peer review of its quality and outcomes. The program should provide an opportunity for interventionalists as well as physicians who do not perform angioplasty, but are knowledgeable about it, to review its overall results on a regular basis. The review process should tabulate the results achieved both by individual physician operators and by the overall program and compare them to national benchmark standards with appropriate risk adjustment. Valid quality assessment requires that the institution maintain meticulous and confidential records that include the patient demographic and clinical characteristics necessary to assess appropriateness and to conduct risk adjustment.

Role of Risk Adjustment in Assessing Quality

A raw adverse event rate that is not appropriately risk adjusted has little meaning. Data compiled from large registries of procedures performed in recent years have generated multivariate risk adjustment models for adverse event rates for PCI in the current era. Six multivariate models of the risk of mortality following PCI have been published (62,64,96–99).

Although these models differ somewhat, they are consistent in identifying acute MI, shock, and age as important risk stratification variables for mortality. The ACC-NCDR® reported an univariate in-hospital mortality of 0.5% for patients undergoing elective PCI, mortality of 5.1% for patients undergoing primary PCI within 6 h of the onset of STEMI and mortality of 28% for patients undergoing PCI for cardiogenic shock (64). Thus, it is clear that, in order to assess PCI mortality rates, patients should be stratified by whether they are undergoing elective PCI, primary PCI for acute STEMI without shock, or primary PCI for STEMI with shock.

Challenges in Determining Quality

Given the complexity of case selection and procedure conduct, quality is difficult to measure in PCI and is not determined solely by adverse event rates even when properly risk adjusted. Accurate assessment of quality becomes more problematic for low-volume operators and institutions because absolute event rates are expected to be small. Thus, particularly in low-volume circumstances, quality may be better assessed by an intensive case-review process conducted by recognized experts who can properly judge all of the facets of the conduct of a case. Case review also has merit in high-volume situations as it can identify subtleties of case selection and procedure conduct that may not be reflected in pooled statistical data.

Downloaded from circ.ahajournals.org by on August 4, 2008

0292
09/15/08

Table 4. Key Components of a Quality Assurance Program

Clinical proficiency
• General indications/contraindications
• Institutional and individual operator complication rates, mortality, and emergency coronary artery bypass grafting
• Institutional and operator procedure volumes
• Training and qualifications of support staff
Equipment maintenance and management
• Quality of laboratory facility (see ACC/SCAI Expert Consensus Document on Catheterization Laboratory Standards [100])
Quality improvement process
• Establishment of an active concurrent database to track clinical and procedural information and patient outcomes for individual operators and the institution. Participation in multicenter database is highly encouraged.
Radiation safety
• Educational program in the diagnostic use of X-ray
• Patient and operator exposure

Requirement for Institutional Resources and Support

A high-quality PCI program requires appropriately trained, experienced, and skilled physician operators. However, the operator does not work in a vacuum. An operator needs a well-maintained high-quality cardiac catheterization facility to practice effectively. In addition, the operator depends on a multidisciplinary institutional infrastructure for support and response to emergencies. Thus, to provide quality PCI services, the institution must ensure that its catheterization facility is properly equipped and managed, and that all of its necessary support services, including data collection, are of high quality and are readily available.

The Quality Assessment Process

Quality assessment is a complex process that includes more than a mere tabulation of success and complication rates. Components of quality in coronary interventional procedures include appropriateness of case selection; quality of procedure execution; proper response to intraprocedural problems; accurate assessment of procedure outcome both short- and long-term; and appropriateness of postprocedure management. It is important to consider each of these parameters when conducting a quality assessment review. A quality program performs appropriately selected procedures while achieving risk-adjusted outcomes, in terms of procedure success and complication rates, that are comparable to national benchmark standards. It is accepted that quality assurance monitoring is best conducted through the peer-review process despite the political challenges associated with colleagues evaluating each other. There has been considerable controversy surrounding efforts to define standards, criteria, and methodologies for conducting quality assessment. There are many challenges to conducting this process in a fair and valid manner.

The cornerstone of quality assurance monitoring is the assessment of procedure outcomes in terms of success and adverse event rates. Other components of quality assurance monitoring include establishing criteria for assessing procedure appropriateness and applying proper risk adjustment to interpret adverse event rates. As adverse events should be rare, a valid estimate of a properly risk-adjusted adverse event rate generally requires tabulating the results of a large number of procedures. This adds an additional challenge to the valid assessment of low-volume operators and institutions. The responsible supervising authority should monitor the issues outlined in Table 4.

In addition, mere tabulation of adverse event rates, even with appropriate risk adjustment, is inadequate to judge operator or program quality. Such tabulations do not address numerous other quality issues—in particular, appropriateness. Thus, the quality assessment process should also conduct detailed reviews of both cases that have adverse outcomes, to determine the cause(s) of the adverse event, and of uncomplicated cases, in order to judge case selection appropriateness and procedure execution quality. These reviews should be conducted by recognized experienced interventionalists, drawn either from within the institution or externally, if a requisite number of appropriately qualified unconflicted individuals are not available.

Conclusions and Recommendations for PCIs

In formulating conclusions and recommendations it is important to emphasize that the ultimate goal of setting standards is to facilitate the attainment of optimal patient outcomes. Optimal outcome is most likely when operators select clinically appropriate patients for interventional procedures and perform these procedures at a requisite level of proficiency. Institutional and programmatic quality is ultimately determined by its success in achieving that goal.

Success and Complication Rates

Coronary interventional procedures may be complex and technically demanding to perform. Complications of these procedures may be life-threatening and can occur unpredictably. Nonetheless, recent clinical studies have demonstrated that despite increased clinical and angiographic complexity, procedural and clinical success has remained high and complications have remained low. Angiographic success (at least 1 lesion successfully dilated by greater than 20%, with a residual stenosis of less than 50%), excluding

Downloaded from circ.ahajournals.org by on August 4, 2008

0293
09/15/08

STEMI patients, occurs in over 95% with an average mortality rate of less than 1%, a Q-wave MI rate of less than 1%, and an emergency CABG rate of less than 1%.

Risk Adjustment

Several large retrospective studies have identified both clinical and angiographic characteristics of PCI that correlate with procedural success, hospital morbidity, and mortality. These studies have been used to develop multivariate logistic regression models that can stratify patients into risk groups before the procedure which have moderate predictive value for mortality (C-statistic 0.85 to 0.90), and slightly less predictive value for morbidity (C-statistic 0.67 to 0.78).

Volume–Activity Relationships

Analysis of more contemporary data supports the hypothesis that technological advancements have not offset the influence of "practice" in determining proficiency of contemporary PCIs. There are statistical associations between activity levels and short-term complication rates (emergency CABG and mortality) (17,58,85,89,97,101) for both institutions and for individual operators. In particular, low-volume operators operating at low-volume hospitals had an increased mortality rate. However, procedural volume is only one of many factors contributing to the variability of measured outcomes. Furthermore, there is no clear "cut-off" above or below which hospitals or individual operators perform well or poorly. Procedural volume continues to be correlated with outcomes, but should not serve as a substitute for a well-controlled analysis of results and does not ensure quality. The development of national, regional and state registries for outcome assessment is promoting objective assessment of clinical outcomes.

The expected low complication rate for coronary interventional procedures presents a major statistical power problem when attempting to estimate the true complication rate of the low-volume operator with meaningful precision. In such situations, close scrutiny of case selection and close monitoring of outcomes on a case-by-case basis would serve as a complement to risk adjustment.

Highly complex procedures require much more skill and experience, and should be undertaken by operators possessing these attributes. Complex cases appropriate for interventions should be referred, not denied.

Recommendations for Institutional Maintenance of Quality

It is recommended that all institutions have a regular (at least monthly) catheterization laboratory conference. Patient outcomes should be determined longitudinally for each procedure by the institution's quality assessment program. Participation in a state, regional, or national registry is highly encouraged to allow institutions to measure risk-adjusted outcomes and compare them to national benchmarks for improving quality of care.

For both institutional and individual volume assessments, ongoing 2-year volumes should be measured, then averaged to arrive at annual statistics. It is recommended that lower volume institutions (less than 400 per year) consider holding conferences with a more experienced partnering institution, with all staff expected to attend on a regular basis.

It is also recommended that any institution that falls more than 2 standard deviations outside the risk-adjusted national benchmarks in mortality or emergency same-stay CABG during 2 of 3 contiguous 6-month periods have an external audit looking for opportunities to improve quality of care.

An institution offering coronary interventional procedures should have a physician-director who is responsible for the program's overall quality. The director should be certified in interventional cardiology by the ABIM, with a career experience of more than 500 procedures. The director should perform procedures at the facility that he or she directs.

Recommendations for Individual Maintenance of Quality

To maintain an appropriate cognitive knowledge base for PCIs, it is recommended that individual operators attend at least 30 h of PCI CME every 2 years. The overall performance of physicians whose complication rates exceed national benchmark standards for 2 of 3 contiguous 6-month periods should be reviewed by the program director, with careful attention to statistical power and risk-adjustment issues. It is recommended that the operator volume threshold continue to be 75 procedures per year. Monitoring of physicians with an annual procedural volume of less than 75 should be particularly detailed because of the difficulty of estimating their true complication rate. These performance evaluations should include feedback to the operator.

If it is determined that the quality of PCI care being provided does not meet national benchmarks, the catheterization laboratory director should have the discretion of making recommendations for improving quality and reassessing over the next 6 months. These recommendations could include establishing a defined mentoring relationship with an experienced operator. If the operator in question disputes this assessment, then external review may be helpful in determining the most appropriate methods of assuring quality performance.

Percutaneous Noncoronary Interventions

Introduction

Noncoronary interventions are a growing and important contribution to the field of interventional cardiology. The majority of procedures have had their origin in the pediatric population, and several have expanded to the adult patient. The purpose of this section is to discuss the training and experience necessary for the safe and successful performance

Downloaded from circ.ahajournals.org by on August 4, 2008

0294
09/15/08

of valvuloplasty, alcohol septal ablation, and percutaneous repair of ASD/PFO.

The knowledge, skills, and training necessary for competency in noncoronary interventional procedures are different from that required for coronary interventions. Therefore, special study of the anatomy, physiology, and pathology of these conditions is a prerequisite for safe and effective treatment. Furthermore, an in-depth understanding of the clinical indications for treatment and the unique complications of these treatments are essential.

Although the scope of this document is focused on competency, this section will expand the discussion somewhat to describe some anatomical and procedural details. Such details are well known for PCI, and their performance is widespread, whereas these noncoronary procedures, in the estimation of this Writing Committee, warrant some discussion of background information and procedural alternatives.

Disorders of the Atrial Septum

Criteria for Competency

The knowledge base required for performing PCI is different than that required for percutaneous closure of ASD and PFO. Extensive knowledge of structural cardiac anatomy, especially that of the atrial septum and the adjacent structures, is required, as is the understanding of the impact of abnormal anatomy and function, and the relative value of therapeutic options (85,101–105). Therefore, specific training and experience is necessary to safely and successfully treat this subgroup of patients. The Food and Drug Administration guidelines on the use of device closure of PFOs in these patients state that only patients who have failed anticoagulation or have a compelling medical reason to not be anticoagulated are appropriate for device closure. These guidelines should be fully discussed with patients during the informed consent process. In addition, complications such as cardiac perforation, device embolization, thrombus formation on the device, infective endocarditis, arrhythmias, and early as well as late erosion of the device through the atrial wall or aorta should be disclosed. Currently, 2 studies are underway comparing percutaneous closure of PFO to standard oral anticoagulation, which should clarify the indications for interventional treatment.

Since these procedures are relatively new to interventionalists trained in adult cardiology, no pre-existing guidelines are available on which to base current opinion. In the absence of such guidelines, we arrived at these recommendations from discussions with colleagues actively performing these percutaneous closures.

Cardiologists in Training Programs

Acquisition of the knowledge and skills necessary to perform percutaneous procedures to treat ASD and PFO should be incorporated into the formal training of interventional cardiologists. There are no data regarding the minimum number of cases required for maintenance of competency and proficiency. A survey of Pediatric Cardiology Interventional Catheterization training programs concluded that a minimum of 10 percutaneous ASD closures is necessary for a trainee to gain clinical competence with the procedure (102).

With this in mind, it is recommended that interventional cardiologists who intend to perform these procedures independently, should be involved in these procedures during training with at least 10 of these cases being secundum ASD closures. Furthermore, as part of the procedure, the fellow should be fully conversant in the use of transesophageal echocardiography and/or intracardiac echocardiography. He or she should understand how to obtain the appropriate views to image necessary structures in order to perform the procedure safely and to exclude other anatomical problems such as a primum or sinus venosus ASD, anomalous pulmonary venous drainage, fenestrated or multiple ASD, or lipomatous hypertrophy of the septum. Obviously, not all fellows in training will be able to gain this experience and, therefore, concentrating the experience in training should be limited to a few trainees.

Cardiologists in Practice

Interventional cardiologists in practice who were not specifically trained in ASD/PFO closure but would like to perform these procedures should be fully credentialed in interventional techniques in their institution. The first several cases should be done with a proctor. To ensure safety and success, it seems prudent that the first 10 cases be proctored by someone fully credentialed in these techniques such as a pediatric cardiologist or adult cardiologist trained in congenital heart disease. Proctors should also be present for the first 3 to 5 cases if a different device is to be used after the initial credentialing proctorship.

Maintenance of Competency for Percutaneous ASD/PFO Closure

To maintain physician proficiency and competency in percutaneous ASD/PFO closure, a minimum of 10 cases per year is recommended. Similarly, to maintain catheterization laboratory proficiency, a minimum of 10 cases per year should be performed in each institution each year. To achieve this experience, it may be necessary to concentrate the procedures in the hands of only a few operators. A multidisciplinary program, including neurology consultation for PFO closure, prospective evaluation of case selection, and evaluation of clinical outcomes is critical to ensure appropriateness and maintain safety and efficacy. Laboratories and individual operators that are not active enough to maintain quality outcomes should reconsider treating these patients.

Quality Assurance

The quality improvement process used for oversight of ASD/PFO closure should include concurrent case review, and will also benefit from regular case conferences to discuss indications, procedural techniques, and case outcomes. It is particu-

Downloaded from circ.ahajournals.org by on August 4, 2008

0295
09/15/08

larly useful in any developing procedural area to share results with other institutions through informal and formal conferences. Because there are, as of yet, no large databases of outcomes for these procedures, participation in local, regional, and national registries is encouraged. Focusing the performance of these procedures in the hands of a few experienced operators is also recommended.

Hypertrophic Cardiomyopathy and Alcohol Septal Ablation

Hypertrophic cardiomyopathy is the most common genetic cardiovascular disease, with a prevalence in the general population estimated to be 0.2% (103). Physicians performing these procedures should have extensive knowledge of the outcomes, limitations and complications of medical therapy (104), dual chamber pacing and surgical myectomy (105–107), and alcohol septal ablation (105–114). No comparative trial against surgical myectomy has been performed.

Criteria for Competency

Acquisition of competence. It is strongly recommended that alcohol septal ablation be offered within a multidisciplinary program that includes the contribution of experienced cardiac surgeons, echocardiographers, general cardiologists, and electrophysiologists. Although there are currently no data regarding the minimum number of procedures required for training and for credentialing, a minimum number of 10 procedures seems to be appropriate.

Maintenance of competence. It is recommended that individual operators perform a minimum of 6 cases per year to maintain competence in performance of septal ablation for hypertrophic cardiomyopathy. Each institution should employ a multidisciplinary program with prospective evaluation of case selection and clinical outcomes. Such an approach is critical for any institution offering alcohol septal ablation as a treatment option for symptomatic patients with hypertrophic obstructive cardiomyopathy.

Quality assurance. Quality assurance in such low-volume procedures requires an approach similar to that outlined for ASD and PFO closures, as previously described.

Valvular Heart Disease

Cognitive Knowledge Base

Physicians performing invasive procedures on stenotic cardiac valves must have extensive knowledge of the pathoanatomy, the hemodynamic alterations, the clinical course, and the outcomes of various therapeutic options. Complications of aortic (115,116) and mitral (117–119) valvuloplasty should be well understood.

Criteria for Competency

Acquisition of competence. Mitral valvuloplasty is one of the most challenging cardiac procedures. The presence of a "learning curve" has been well described (120,121). Thus, training in the performance of mitral valvuloplasty requires the acquisition of clinical skills for the evaluation of indications for the procedure and the assessment of suitable valve morphology. It requires the development of proficiency in the performance of transseptal cardiac catheterization, device manipulation, and online evaluation of hemodynamic parameters. The interventionalist must be able to recognize and manage complications specific to mitral valvuloplasty, including acute mitral regurgitation, cardiac perforation, pericardial tamponade, and stroke. Although a learning curve has been well described, there are currently no specific data regarding the minimum numbers needed for competency. Nonetheless, 5 to 10 cases should be done with an experienced colleague before attempting to perform balloon valvuloplasty independently. Any program offering mitral valvuloplasty as an alternative to mitral valve replacement or surgical commissurotomy for the treatment of mitral stenosis should include a thorough quality assurance program and close monitoring of case selection and clinical outcomes. As with other infrequently performed procedures, concentration of experience among a small subset of interventional cardiologists within an institution is appropriate.

Maintenance of competence. With the low prevalence of mitral stenosis in the United States, maintaining experience is difficult. Given this limitation, concentration of this experience among institutional and perhaps regional centers may be appropriate.

Quality assurance. Quality assurance in such low-volume procedures requires an approach similar to that outlined for ASD and PFO closures, as previously described.

Percutaneous Ventricular Assist Devices

Percutaneous ventricular assist devices are becoming available. They require training and proctored supervision to attain competence, as well as periodic use or refresher drills to maintain competence. As with other seldom-used techniques, experience should be concentrated among a limited number of operators and laboratory staff who have received appropriate training.

Laboratory and Staff Competence

In order for laboratories to become competent in the performance of noncoronary cardiac procedures, the supervising or performing operator should be fully credentialed in the procedure. Initially, this may require off-site training, simulation training, a visiting proctor, or a combination of these approaches. The operator responsible for the performance of the procedure in the catheterization laboratory should supervise the staff in acquiring the necessary skills and equipment for the procedure. As is the case for the operators of lower volume procedures, there should be a small number of dedicated staff members trained to perform specific noncoronary interventions, concentrating the experience. If and when a specific procedure becomes more common, then the training may be expanded to the remainder of the staff and operators.

Downloaded from circ.ahajournals.org by on August 4, 2008

0296
09/15/08

Conclusions and Recommendations

Percutaneous Noncoronary Interventions

Noncoronary cardiac interventions require special training that is not possible for all operators to obtain because of the small number of these procedures. Therefore, it is necessary to concentrate the activity both in training and practice so that adequate experience can be obtained to allow for quality performance. Hospitals should develop clear credentialing criteria, despite the small number of cases and empiric data from which to judge appropriateness, as well as success and complication rates of these procedures.

The quality improvement process used for oversight of percutaneous noncoronary interventions should include concurrent case review, and will also benefit from regular case conferences to discuss indications, procedural techniques, and case outcomes. It is particularly useful in any developing procedural area to share results with other institutions through informal and formal conferences. Since there are, as of yet, no large databases of outcomes for these procedures, participation in local, regional, and national registries is encouraged. Focusing the performance of these procedures in the hands of a few experienced operators is also recommended.

Staff

American College of Cardiology Foundation
John C. Lewin, MD, Chief Executive Officer
Thomas E. Arend, Jr, Esq., Chief Operating Officer
Lisa Bradfield, Associate Director, Practice Guidelines
Erin A. Barrett, Senior Specialist, Clinical Policy and Documents

American Heart Association
M. Cass Wheeler, Chief Executive Officer
Rose Marie Robertson, MD, FACC, FAHA, Chief Science Officer
Kathryn A. Taubert, PhD, FAHA, Senior Scientist

REFERENCES

1. Gruntzig A. Transluminal dilatation of coronary-artery stenosis. Lancet 1978;1:263.
2. Fischman DL, Leon MB, Baim DS, et al. A randomized comparison of coronary-stent placement and balloon angioplasty in the treatment of coronary artery disease. Stent Restenosis Study Investigators. N Engl J Med 1994;331:496–501.
3. Moses JW, Leon MB, Popma JJ, et al. Sirolimus-eluting stents versus standard stents in patients with stenosis in a native coronary artery. N Engl J Med 2003;349:1315–23.
4. Thom T, Haase N, Rosamond W, et al. Heart disease and stroke statistics—2006 update: a report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Circulation 2006;113:e85–151.
5. American Board of Internal Medicine Certification Examination. Available at: http://www.abim.org/resources/statcert.shtm. Last update 2005.
6. Conti CR, Faxon DP, Gruentzig A, Gunnar RM, Lesch M, Reeves TJ. Training in cardiac catheterization. Bethesda Conference 17: Adult Cardiology Training Task Force III. J Am Coll Cardiol 1986;7:1205–6.
7. Cowley M, Faxon DP, Holmes DR Jr. Guidelines for training, credentialing, and maintenance of competence for the performance of coronary angioplasty: a report from the Interventional Cardiology Committee and the Training Program Standards Committee of the Society for Cardiac Angiography and Interventions. Cathet Cardiovasc Diagn 1993;30:1–4.
8. Cowley MJ, King SB. ACC/AHA guidelines for credentialing and facilities for performance of coronary angioplasty. Circulation 1988; 15:136–8.
9. Douglas JSJ, Levin DC, Pepine CJ, et al. Recommendations for development and maintenance of competence in coronary interventional procedures. American College of Cardiology Cardiac Catheterization Committee. J Am Coll Cardiol 1993;22:629–31.
10. Parker DJ, Birkhead JS, Balcon R, et al. Planning for coronary angioplasty: Guidelines for training and continuing competence. British Cardiac Society (BCS) and British Cardiovascular Intervention Society (BCIS) Working Group on Interventional Cardiology. Heart 1996;75:419–25.
11. Pepine CJ, Babb JD, Brinker JA, et al. Guidelines for training in adult cardiovascular medicine. Core Cardiology Training Symposium (COCATS). Task Force 3: training in cardiac catheterization and interventional cardiology. J Am Coll Cardiol 1995;25:14–6.
12. Ryan TJ, Faxon DP, Gunnar RM, et al. Guidelines for percutaneous transluminal coronary angioplasty: a report of the American College of Cardiology/American Heart Association Task Force on Assessment of Diagnostic and Therapeutic Cardiovascular Procedures (Subcommittee on Percutaneous Transluminal Coronary Angioplasty). J Am Coll Cardiol 1988;12:529–45.
13. Ryan TJ, Klocke FJ, Reynolds WA. Clinical competence in percutaneous transluminal coronary angioplasty: a statement for physicians from the ACP/ACC/AHA Task Force on Clinical Privileges in Cardiology. Circulation 1990;81:2041–6.
14. Ryan TJ, Bauman WB, Kennedy JW, et al. Guidelines for percutaneous transluminal coronary angioplasty: a report of the American College of Cardiology/American Heart Association Task Force on Assessment of Diagnostic and Therapeutic Cardiovascular Procedures (Committee on Percutaneous Transluminal Coronary Angioplasty). J Am Coll Cardiol 1993;22:2033–54.
15. Smith SC Jr., Feldman TE, Hirshfeld JW Jr., et al. ACC/AHA/SCAI 2005 guideline update for percutaneous coronary intervention—summary article: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (ACC/AHA/SCAI Writing Committee to Update the 2001 Guidelines for Percutaneous Coronary Intervention). J Am Coll Cardiol 2006;47:216–35.
16. Hirshfeld JW Jr., Ellis SG, Faxon DP. Recommendations for the assessment and maintenance of proficiency in coronary interventional procedures: atatement of the American College of Cardiology. J Am Coll Cardiol 1998;31:722–43.
17. Jollis JG, Peterson ED, Nelson CL, et al. Relationship between physician and hospital coronary angioplasty volume and outcome in elderly patients. Circulation 1997;95:2485–91.
18. Creager MA, Goldstone J, Hirshfeld JW Jr., et al. ACC/ACP/SCAI/SVMB/SVS clinical competence statement on vascular medicine and catheter-based peripheral vascular interventions: a report of the American College of Cardiology/American Heart Association/American College of Physician Task Force on Clinical Competence (ACC/ACP/SCAI/SVMB/SVS Writing Committee to Develop a Clinical Competence Statement on Peripheral Vascular Disease). J Am Coll Cardiol 2004;44:941–57.
19. Hodgson JM, Tommaso CL, Watson RM, Weiner BH. Core curriculum for the training of adult invasive cardiologists: report of the Society for Cardiac Angiography and Interventions Committee on Training Standards. Cathet Cardiovasc Diagn 1996;37:392–408.
20. Hirshfeld JW Jr., Banas JS Jr., Brundage BH, et al. American College of Cardiology training statement on recommendations for the structure of an optimal adult interventional cardiology training program: a report of the American College of Cardiology task force on clinical expert consensus documents. J Am Coll Cardiol 1999;34:2141–7.
21. Hannan EL, Wu C, Walford G, et al. Volume-outcome relationships for percutaneous coronary interventions in the stent era. Circulation 2005;112:1171–9.
22. Moscucci M, Eagle KA, Share D, et al. Public reporting and case selection for percutaneous coronary interventions: an analysis from

Downloaded from circ.ahajournals.org by on August 4, 2008

0297
09/15/08

two large multicenter percutaneous coronary intervention databases. J Am Coll Cardiol 2005;45:1759–65.
23. Gruntzig A. Percutaneous dilatation of experimental coronary artery stenosis—description of a new catheter system. Klin Wochenschr 1976;54:543–45.
24. CABRI Trial Participants. First-year results of CABRI (Coronary Angioplasty versus Bypass Revascularisation Investigation). Lancet 1995;346:1179–84.
25. The Bypass Angioplasty Revascularization Investigation (BARI) Investigators. Comparison of coronary bypass surgery with angioplasty in patients with multivessel disease. N Engl J Med 1996;335: 217–25.
26. Writing Group for the Bypass Angioplasty Revascularization Investigation (BARI) Investigators. Five-year clinical and functional outcome comparing bypass surgery and angioplasty in patients with multivessel coronary disease: a multicenter randomized trial. JAMA 1997;277:715–21.
27. King SB III, Lembo NJ, Weintraub WS, et al. A randomized trial comparing coronary angioplasty with coronary bypass surgery. Emory Angioplasty versus Surgery Trial (EAST). N Engl J Med 1994;331: 1044–50.
28. Serruys PW, Unger F, Sousa JE, et al. Comparison of coronary-artery bypass surgery and stenting for the treatment of multivessel disease. N Engl J Med 2001;344:1117–24.
29. Sharma S, Forrester J, Makkar RM. The SoS trial. Lancet 2003;361: 614–5.
30. Hamm CW, Reimers J, Ischinger T, Rupprecht HJ, Berger J, Bleifeld W. A randomized study of coronary angioplasty compared with bypass surgery in patients with symptomatic multivessel coronary disease. German Angioplasty Bypass Surgery Investigation (GABI). N Engl J Med 1994;331:1037–43.
31. Myler RK, Shaw RE, Stertzer SH, et al. Lesion morphology and coronary angioplasty: current experience and analysis. J Am Coll Cardiol 1992;19:1641–52.
32. de Feyter PJ, van Suylen RJ, de Jaegere PP, Topol EJ, Serruys PW. Balloon angioplasty for the treatment of lesions in saphenous vein bypass grafts. J Am Coll Cardiol 1993;21:1539–49.
33. Ambrose JA, Torre SR, Sharma SK, et al. Adjunctive thrombolytic therapy for angioplasty in ischemic rest angina: results of a double-blind randomized pilot study. J Am Coll Cardiol 1992;20:1197–204.
34. Perry RA, Seth A, Hunt A, Shiu MF. Coronary angioplasty in unstable angina and stable angina: a comparison of success and complications. Br Heart J 1988;60:367–72.
35. Grines CL, Browne KF, Marco J, et al. A comparison of immediate angioplasty with thrombolytic therapy for acute myocardial infarction. The Primary Angioplasty in Myocardial Infarction Study Group. N Engl J Med 1993;328:673–9.
36. GUSTO (IIb) Angioplasty Substudy Group. The Global Use of Strategies to Open Occluded Coronary Arteries in Acute Coronary Syndromes: a clinical trial comparing primary coronary angioplasty with tissue plasminogen activator for acute myocardial infarction. N Engl J Med 1997;336:1621–8.
37. Bittl JA. Advances in coronary angioplasty. N Engl J Med 1996;24; 335:1290–302.
38. Detre KM, Holubkov R, Kelsey S, et al. Percutaneous transluminal coronary angioplasty in 1985–1986 and 1977–1981: the National Heart, Lung, and Blood Institute Registry. N Engl J Med 1988;318: 265–70.
39. Holmes DRJ, Holubkov R, Vlietstra RE, et al. Comparison of complications during percutaneous transluminal coronary angioplasty from 1977 to 1981 and from 1985 to 1986: the National Heart, Lung, and Blood Institute Percutaneous Transluminal Coronary Angioplasty Registry. J Am Coll Cardiol 1988;12:1149–55.
40. Kent KM, Bentivoglio LG, Block PC, et al. Percutaneous transluminal coronary angioplasty: report from the Registry of the National Heart, Lung, and Blood Institute. Am J Cardiol 1982;49:2011–20.
41. Abbott JD, Choi EJ, Selzer F, Srinivas VS, Williams DO. Impact of coronary collaterals on outcome following percutaneous coronary intervention (from the National Heart, Lung, and Blood Institute Dynamic Registry). Am J Cardiol 2005;96:676–80.
42. Hirshfeld JW Jr. ACC-National Cardiovascular Data Registry®, CathPCI data repository, 1998–2005. November 28, 2005.
43. Malenka DJ, Leavitt BJ, Mearne MS, et al. Northern New England Cardiovascular Disease Study Group. Comparing long-term survival of patients with multivessel coronary disease after CAGB or PCI: analysis of BARI-like patients in northern New England. Circulation 2005;112:1371–6.
44. Moscucci M, Rogers EK, Montoye C, et al. Association of a continuous quality improvement initiative with practice and outcome variations of contemporary percutaneous coronary interventions. Circulation 2006;113:814–22.
45. Percutaneous Coronary Interventions (PCI) in New York State, 2001–2003. New York State Department of Health. Available at: http://www.health.state.ny.us/nysdoh/heart/pdf/pci_2001–2003.pdf. Last update 2005.
46. Weintraub WS, McKay CR, Riner RN, et al. The American College of Cardiology National Database: progress and challenges. American College of Cardiology Database Committee. J Am Coll Cardiol 1997;29:459–65.
47. Brown BG, Bolson EL, Dodge HT. Quantitative computer techniques for analyzing coronary arteriograms. Prog Cardiovasc Dis 1986;28:403–18.
48. Detre KM, Wright E, Murphy ML, Takaro T. Observer agreement in evaluating coronary angiograms. Circulation 1975;52:979–86.
49. Califf RM, Abdelmeguid AE, Kuntz RE, et al. Myonecrosis after revascularization procedures. J Am Coll Cardiol 1998;31:241–51.
50. Cutlip DE, Chhabra AG, Baim DS, et al. Beyond restenosis: five-year clinical outcomes from second-generation coronary stent trials. Circulation 2004;110:1226–30.
51. Mehran R, Aymong ED, Nikolsky E, et al. A simple risk score for prediction of contrast-induced nephropathy after percutaneous coronary intervention: development and initial validation. J Am Coll Cardiol 2004;44:1393–9.
52. Ellis SG, Vandormael MG, Cowley MJ, et al. Coronary morphologic and clinical determinants of procedural outcome with angioplasty for multivessel coronary disease. Implications for patient selection. Multivessel Angioplasty Prognosis Study Group. Circulation 1990;82: 1193–2.
53. Altmann DB, Racz M, Battleman DS, et al. Reduction in angioplasty complications after the introduction of coronary stents: results from a consecutive series of 2242 patients. Am Heart J 1996;132:503–7.
54. Williams DO, Holubkov R, Yeh W, et al. Percutaneous coronary intervention in the current era compared with 1985–1986: the National Heart, Lung, and Blood Institute Registries. Circulation 2000;102:2945–51.
55. Malenka DJ, Wennberg DE, Quinton HA, et al. Gender-related changes in the practice and outcomes of percutaneous coronary interventions in Northern New England from 1994 to 1999. J Am Coll Cardiol 2002;40:2092–101.
56. Krone RJ, Kimmel SE, Laskey WK, et al. Evaluation of the Society for Coronary Angiography and Interventions lesion classification system in 14,133 patients with percutaneous coronary interventions in the current stent era. Catheter Cardiovasc Interv 2002;55:1–7.
57. Krone RJ, Shaw RE, Klein LW, et al. Evaluation of the American College of Cardiology/American Heart Association and the Society for Coronary Angiography and Interventions lesion classification system in the current "stent era" of coronary interventions (from the ACC-National Cardiovascular Data Registry). Am J Cardiol 2003; 92:389–94.
58. Ellis SG, Omoigui N, Bittl JA, et al. Analysis and comparison of operator-specific outcomes in interventional cardiology: from a multicenter database of 4860 quality-controlled procedures. Circulation 1996;93:431–9.
59. Krone RJ, Laskey WK, Johnson C, et al. A simplified lesion classification for predicting success and complications of coronary angioplasty. Registry Committee of the Society for Cardiac Angiography and Intervention. Am J Cardiol 2000;85:1179–84.
60. Singh M, Lennon RJ, Holmes DR Jr., Bell MR, Rihal CS. Correlates of procedural complications and a simple integer risk score for percutaneous coronary intervention. J Am Coll Cardiol 2002;40: 387–93.
61. Maynard C, Goss JR, Malenka DJ, Reisman M. Adjusting for patient differences in predicting hospital mortality for percutaneous coronary interventions in the Clinical Outcomes Assessment Program. Am Heart J 2003;145:658–64.
62. Moscucci M, Kline-Rogers E, Share D, et al. Simple bedside additive tool for prediction of in-hospital mortality after percutaneous coronary interventions. Circulation 2001;104:263–8.

Downloaded from circ.ahajournals.org by on August 4, 2008

0298
09/15/08

63. O'Connor GT, Malenka DJ, Quinton H, et al. Multivariate prediction of in-hospital mortality after percutaneous coronary interventions in 1994–1996. Northern New England Cardiovascular Disease Study Group. J Am Coll Cardiol 1999;34:681–91.
64. Shaw RE, Anderson HV, Brindis RG, et al. Development of a risk adjustment mortality model using the American College of Cardiology-National Cardiovascular Data Registry (ACC-NCDR) experience: 1998–2000. J Am Coll Cardiol 2002;39:1104–12.
65. Shaw RE, Anderson HV, Brindis RG, et al. Updated risk adjustment mortality model using the complete 1.1 dataset from the American College of Cardiology National Cardiovascular Data Registry (ACC-NCDR). J Invasive Cardiol 2003;15:578–80.
66. Wu C, Hannan EL, Walford G, et al. A risk score to predict in-hospital mortality for percutaneous coronary interventions. J Am Coll Cardiol 2006;47:654–60.
67. Pepine CJ, Babb JD, Brinker JA, et al. Guidelines for training in adult cardiovascular medicine. Core Cardiology Training Symposium (COCATS). Task Force 3: training in cardiac catheterization and interventional cardiology. J Am Coll Cardiol 1995;25:14–6.
68. Beller GA, Bonow RO, Fuster V. ACC revised recommendations for training in adult cardiovascular medicine. Core Cardiology Training II (COCATS 2). (Revision of the 1995 COCATS training statement). J Am Coll Cardiol 2002;39:1242–6.
69. Smith SC Jr., Dove JT, Jacobs AK, et al. ACC/AHA guidelines of percutaneous coronary interventions (revision of the 1993 PTCA guidelines)—executive summary. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Revise the 1993 Guidelines for Percutaneous Transluminal Coronary Angioplasty). J Am Coll Cardiol 2001;37:2215–39.
70. Antman EM, Anbe DT, Armstrong PW, et al. ACC/AHA guidelines for the management of patients with ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Revise the 1999 Guidelines for the Management of Patients With Acute Myocardial Infarction). J Am Coll Cardiol 2004;44:E1–211.
71. Braunwald E, Antman EM, Beasley JW, et al. ACC/AHA 2002 guideline update for the management of patients with unstable angina and non-ST-segment elevation myocardial infarction—summary article: a report of the American College of Cardiology/American Heart Association task force on practice guidelines (Committee on the Management of Patients With Unstable Angina). J Am Coll Cardiol 2002;40:1366–74.
72. Eagle KA, Guyton RA, Davidoff R, et al. ACC/AHA 2004 guideline update for coronary artery bypass graft surgery: summary article. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Update the 1999 Guidelines for Coronary Artery Bypass Graft Surgery). J Am Coll Cardiol 2004;44:e213–e310.
73. Hirshfeld JW Jr., Balter S, Brinker JA, et al. ACCF/AHA/HRS/SCAI clinical competence statement on physician knowledge to optimize patient safety and image quality in fluoroscopically guided invasive cardiovascular procedures: a report of the American College of Cardiology Foundation/American Heart Association/American College of Physicians Task Force on Clinical Competence and Training. J Am Coll Cardiol 2004;44:2259–82.
74. Kern MJ, Lim M. Evaluation of myocardial blood flow and metabolism. In: Baim DS, editor. Grossman's Cardiac Catheterization, Angiography, and Intervention. Philadelphia, PA: Lippincott Williams & Wilkins, 2006:335–70.
75. Scanlon PJ, Faxon DP, Audet AM, et al. ACC/AHA guidelines for coronary angiography. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Coronary Angiography). Developed in collaboration with the Society for Cardiac Angiography and Interventions. J Am Coll Cardiol 1999;33:1756–824.
76. Mintz GS, Nissen SE, Anderson WD, et al. American College of Cardiology clinical expert consensus document on standards for acquisition, measurement and reporting of intravascular ultrasound studies (IVUS). A report of the American College of Cardiology Task Force on Clinical Expert Consensus Documents. J Am Coll Cardiol 2001;37:1478–92.
77. Jollis JG, Peterson ED, Nelson CL, et al. Relationship between physician and hospital coronary angioplasty volume and outcome in elderly patients. Circulation 1997;95:2485–91.
78. Hartz AJ, Kuhn EM, Kayser KL, et al. Assessing providers of coronary revascularization: a method for peer review organizations. Am J Public Health 1992;82:1631–40.
79. Kato NS, Ergun ME, Carter GM. Health policy implications of volume recommendations on percutaneous transluminal coronary angioplasty in the United States (abstr). Circulation 1996;94:I532.
80. Stone GW, Marsalese D, Brodie BR, et al., on behalf of the Second Primary Angioplasty In Myocardial Infarction (PAMI-II) Trial Investigators. A prospective, randomized evaluation of prophylactic intraaortic balloon counterpulsation in high risk patients with acute myocardial infarction treated with primary angioplasty. J Am Coll Cardiol 1997;29:1459–67.
81. Zahn R, Vogt A, Seidl K, et al, Balloon dilatation in acute myocardial infarct in routine clinical practice: results of the register of the Working Society of Leading Cardiologic Hospital Physicians in 4,625 patients. Z Kardiol 1997;86:712–21.
82. Hannan E, Racz M, Ryan TJ, et al. Coronary angioplasty volume-outcome relationships for hospitals and operators in New York State: 1991–1994. JAMA 1997;277:892–8.
83. Tiefenbrunn AJ, Chandra NC, French WJ, Gore JM, Rogers WJ. Clinical experience with primary PTCA compared with alteplase (rt-PA) in patients with acute myocardial infarction: a report from the Second National Registry of Myocardial Infarction (NRMI 2). J Am Coll Cardiol 1998;31:1240–5.
84. Kimmel SE, Berlin JA, Strom BL, Laskey WK. Development and validation of simplified predictive index for major complications in contemporary percutaneous transluminal coronary angioplasty practice. The Registry Committee of the Society for Cardiac Angiography and Interventions. J Am Coll Cardiol 1995;26:931–8.
85. Jollis JG, Peterson ED, DeLong ER, et al. The relation between the volume of coronary angioplasty procedures at hospitals treating Medicare beneficiaries and short-term mortality. N Engl J Med 1994;331:1625–29.
86. Ritchie JL, Phillips KA, Luft HS. Coronary angioplasty: statewide experience in California. Circulation 1993;88:2735–43.
87. Peterson ED, Coombs LP, DeLong ER, Haan CK, Ferguson TB. Procedural volume as a marker of quality for CABG surgery. JAMA 2004;291:195–201.
88. Ho V. Evolution of the volume-outcome relation for hospitals performing coronary angioplasty. Circulation 2000;101:1806–11.
89. Kimmel SE, Berlin JA, Laskey WK. The relationship between coronary angioplasty procedure volume and major complications. JAMA 1995;274:1137–42.
90. Magid DJ, Calonge BN, Rumsfeld JS, et al. Relation between hospital primary angioplasty volume and mortality for patients with acute MI treated with primary angioplasty vs thrombolytic therapy. JAMA 2000;284:3131–8.
91. Canto JG, Every NR, Magid DJ, et al. The volume of primary angioplasty procedures and survival after acute myocardial infarction. National Registry of Myocardial Infarction 2 Investigators. N Engl J Med 2000;342:1573–80.
92. Cannon CP, Gibson CM, Lambrew CT, et al. Relationship of symptom-onset-to-balloon time and door-to-balloon time with mortality in patients undergoing angioplasty for acute myocardial infarction. JAMA 2000;283:2941–7.
93. Wennberg DE, Lucas FL, Siewers AE, Kellett MA, Malenka DJ. Outcomes of percutaneous coronary interventions performed at centers without and with onsite coronary artery bypass graft surgery. JAMA 2004;292:1961–8.
94. McGrath PD, Wennberg DE, Dickens JD Jr., et al. Relation between operator and hospital volume and outcomes following percutaneous coronary interventions in the era of the coronary stent. JAMA 2000;284:3139–44.
95. Moscucci M, Share D, Smith D, et al. Relationship between operator volume and adverse outcome in contemporary percutaneous coronary intervention practice: an analysis of a quality-controlled multicenter percutaneous coronary intervention clinical database. J Am Coll Cardiol 2005;46:625–32.
96. Ellis SG, Weintraub W, Holmes D, Shaw R, Block PC, King SB III. Relation of operator volume and experience to procedural outcome of

Downloaded from circ.ahajournals.org by on August 4, 2008

0299
09/15/08

percutaneous coronary revascularization at hospitals with high interventional volumes. Circulation 1997;95:2479–84.
97. Hannan EL, Racz M, Ryan TJ, et al. Coronary angioplasty volume-outcome relationships for hospitals and cardiologists. JAMA 1997; 277:892–8.
98. Holmes DR, Selzer F, Johnston JM, et al. Modeling and risk prediction in the current era of interventional cardiology: a report from the National Heart, Lung, and Blood Institute Dynamic Registry. Circulation 2003;107:1871–6.
99. McGrath PD, Malenka DJ, Wennberg DE, et al. Changing outcomes in percutaneous coronary interventions: a study of 34,752 procedures in northern New England, 1990 to 1997. Northern New England Cardiovascular Disease Study Group. J Am Coll Cardiol 1999;34:674–80.
100. Bashore TM, Bates ER, Berger PB, et al. American College of Cardiology/Society for Cardiac Angiography and Interventions clinical expert consensus document on cardiac catheterization laboratory standards: a report of the American College of Cardiology Task Force on Clinical Expert Consensus Documents. J Am Coll Cardiol 2001;37:2170–214.
101. Ellis SG, Weintraub W, Holmes DR Jr., et al. Relation of operator volume and experience to procedural outcome of percutaneous coronary revascularization at hospitals with high interventional volumes. Circulation 1997;95:2479–84.
102. Beekman RH III, Hellenbrand WE, Lloyd TR, et al. ACCF/AHA/AAP recommendations for training in pediatric cardiology. Task force 3: training guidelines for pediatric cardiac catheterization and interventional cardiology endorsed by the Society for Cardiovascular Angiography and Interventions. J Am Coll Cardiol 2005;46:1388–90.
103. Maron BJ, Gardin JM, Flack JM, Gidding SS, Kurosaki TT, Bild DE. Prevalence of hypertrophic cardiomyopathy in a general population of young adults. Echocardiographic analysis of 4111 subjects in the CARDIA study. Coronary Artery Risk Development in (Young) Adults. Circulation 1995;92:785–9.
104. Maron BJ, McKenna WJ, Danielson GK, et al. American College of Cardiology/European Society of Cardiology clinical expert consensus document on hypertrophic cardiomyopathy: a report of the American College of Cardiology Foundation Task Force on Clinical Expert Consensus Documents and the European Society of Cardiology Committee for Practice Guidelines. J Am Coll Cardiol 2003;42: 1687–713.
105. Maron BJ. Surgery for hypertrophic obstructive cardiomyopathy: alive and quite well. Circulation 2005;111:2016–8.
106. Williams WG, Wigle ED, Rakowski H, Smallhorn J, LeBlanc J, Trusler GA. Results of surgery for hypertrophic obstructive cardiomyopathy. Circulation 1987;76:V104–8.
107. Woo A, Williams WG, Choi R, et al. Clinical and echocardiographic determinants of long-term survival after surgical myectomy in obstructive hypertrophic cardiomyopathy. Circulation 2005;111:2033–41.
108. Bhargava B, Narang R, Aggarwal R, Bahl VK, Manchanda SC. Conduction blocks following transcatheter septal ablation for hypertrophic cardiomyopathy. Eur Heart J 1997;18:2011–2.
109. Boltwood CM Jr., Chien W, Ports T. Ventricular tachycardia complicating alcohol septal ablation. N Engl J Med 2004;351: 1914–5.
110. Faber L, Meissner A, Ziemssen P, Seggewiss H. Percutaneous transluminal septal myocardial ablation for hypertrophic obstructive cardiomyopathy: long term follow up of the first series of 25 patients. Heart 2000;83:326–31.
111. Fernandes VL, Nagueh SF, Wang W, Roberts R, Spencer WH III. A prospective follow-up of alcohol septal ablation for symptomatic hypertrophic obstructive cardiomyopathy—the Baylor experience (1996–2002). Clin Cardiol 2005;28:124–30.
112. Kern MJ, Holmes DG, Simpson C, Bitar SR, Rajjoub H. Delayed occurrence of complete heart block without warning after alcohol septal ablation for hypertrophic obstructive cardiomyopathy. Catheter Cardiovasc Interv 2002;56:503–7.
113. Lakkis NM, Nagueh SF, Kleiman NS, et al. Echocardiography-guided ethanol septal reduction for hypertrophic obstructive cardiomyopathy. Circulation 1998;98:1750–5.
114. Nagueh SF, Ommen SR, Lakkis NM, et al. Comparison of ethanol septal reduction therapy with surgical myectomy for the treatment of hypertrophic obstructive cardiomyopathy. J Am Coll Cardiol 2001; 38:1701–6.
115. Kuntz RE, Tosteson AN, Berman AD, et al. Predictors of event-free survival after balloon aortic valvuloplasty. N Engl J Med 1991;325: 17–23.
116. Safian RD, Berman AD, Diver DJ, et al. Balloon aortic valvuloplasty in 170 consecutive patients. N Engl J Med 1988;319:125–30.
117. The National Heart, Lung, and Blood Institute Balloon Valvuloplasty Registry Participants. Multicenter experience with balloon mitral commissurotomy. NHLBI Balloon Valvuloplasty Registry Report on immediate and 30-day follow-up results. Circulation 1992;85:448–61.
118. Complications and mortality of percutaneous balloon mitral commissurotomy. A report from the National Heart, Lung, and Blood Institute Balloon Valvuloplasty Registry. Circulation 1992;85: 2014–24.
119. Feldman T. Hemodynamic results, clinical outcome, and complications of Inoue balloon mitral valvotomy. Cathet Cardiovasc Diagn 1994;Suppl 2:2–7.
120. Rihal CS, Nishimura RA, Holmes DR Jr. Percutaneous balloon mitral valvuloplasty: the learning curve. Am Heart J 1991;122: 1750–6.
121. Sanchez PL, Harrell LC, Salas RE, Palacios IF. Learning curve of the Inoue technique of percutaneous mitral balloon valvuloplasty. Am J Cardiol 2001;88:662–7.

Downloaded from circ.ahajournals.org by on August 4, 2008

0300
09/15/08

APPENDIX 1. AUTHOR RELATIONSHIPS WITH INDUSTRY—ACCF/AHA/SCAI WRITING COMMITTEE TO UPDATE THE CLINICAL COMPETENCE STATEMENT ON CARDIAC INTERVENTIONAL PROCEDURES

Name	Consultant	Research Grant	Scientific Advisory Board	Speakers' Bureau	Steering Committee	Stock Holder	Other
Dr. Thomas Aversano	None	None	None	None	None	None	None
Dr. William L. Ballard	None	None	None	None	None	None	None
Dr. Robert H. Beekman, III	• AGA Medical	None	None	None	None	None	None
Dr. Michael J. Cowley	None	None	None	None	None	None	None
Dr. Stephen G. Ellis	• Boston Scientific • Celera • Cordis • Guidant • Viacon	• Celera • Centacor/Lilly • Cordis	• Boston Scientific • Cordis • Viacon	None	None	None	None
Dr. David P. Faxon	• Bristol-Myers Squibb/Sanofi	None	• Boston Scientific	None	None	• Medical Technology Informational	None
Dr. Edward L. Hannon	None	None	None	None	None	None	None
Dr. John W. Hirshfeld, Jr.	None	None	• Bracco Inc. • Bristol-Myers Squibb/Sanofi	None	None	None	None
Dr. Alice K. Jacobs	None	None	None	None	None	None	• Wyeth-Spouse's Employer
Dr. Mirle A. Kellett, Jr.	None	None	None	None	None	None	None
Dr. Stephen E. Kimmel	None	None	None	None	None	None	None
Dr. Spencer B. King, III	• Bristol-Myers Squibb • CV Therapeutics • Sanofi/Aventis	None	• Medtronic	• Bristol-Myers Squibb • Sanofi	None	None	• Novoste-Royalties
Dr. Joel S. Landzberg	None	None	None	None	None	None	None
Dr. Louis S. McKeever	None	None	None	None	None	None	None
Dr. Mauro Moscucci	None	• BlueCross/BlueShield	None	• Aventis • Pfizer	None	None	• Cordis-Fellowship Training Grant
Dr. Richard M. Pomerantz	• Medacorp. • Sanofi/Aventis	None	None	• Sanofi/Aventis	None	• Pfizer	None
Dr. Karen M. Smith	None	None	None	None	None	None	None
Dr. George W. Vetrovec	Merck	• Cordis/Johnson & Johnson • NHLBI	None	• Lilly • Pfizer	None	• Johnson & Johnson	None

This table represents the relationships of committee members with industry that were reported orally at the initial writing committee meeting and updated in conjunction with all meetings and conference calls of the writing committee during the document development process. It does not necessarily reflect relationships with industry at the time of publication.

Downloaded from circ.ahajournals.org by on August 4, 2008

0301
09/15/08

APPENDIX 2. PEER REVIEWER RELATIONSHIPS WITH INDUSTRY—ACCF/AHA/SCAI 2007 UPDATE OF THE CLINICAL COMPETENCE STATEMENT ON CARDIAC INTERVENTIONAL PROCEDURES

Name	Representation	Consultant	Research Grant	Scientific Advisory Board	Speakers' Bureau	Steering Committee	Stock Holder	Other
Dr. John C. Giacomini	• Official–AHA	None	None	None	None	None	None	None
Dr. Lawrence Laslett	• Official–ACC Board of Governors	None	None	None	None	None	• General Electric	None
Dr. Carl J. Pepine	• Official–ACC Board of Trustees	• Abbott • CV Therapeutics	• Abbott • AstraZeneca • Berlex Laboratories • Pfizer	None	None	None	None	• Educational grant–AstraZeneca, CV Therapeutics, GlaxoSmithKline, King Pharmaceuticals, Monarch Pharmaceuticals, Pfizer, Sanofi-Aventis, Schering-Plough, Wyeth-Ayerst Laboratories
Dr. Albert P. Rocchini	• Official–AHA	None	None	None	None	None	None	None
Dr. Samuel J. Shubrooks	• Official–ACC Board of Governors	None	None	None	None	None	None	None
Dr. Alan Yeung	• Official–AHA	• Medtronic	• Abbott • Boston Scientific	• Abbott • Boston Scientific • Cordis	None	None	• Boston Scientific	None
Dr. Gregory Dehmer	• Organizational–Society for Cardiovascular Angiography and Interventions	None	None	None	None	None	None	None
Dr. John Hodgson	• Organizational–Society for Cardiovascular Angiography and Interventions	• Volcano Corp	• Boston Scientific • GE Medical • Lilly • RADI Medical • Volcano Corp	• Volcano Corp	• GE Medical • Pfizer	None	• Technology Solutions Group • BioInfo Accelerator Fund • Volcano Corp	• Management–Mytogen Technology Solutions Group • BioInfo Accelerator Fund
Dr. Morton J. Kern	• Organizational–Society for Cardiovascular Angiography and Interventions	• Bracco Inc. • Merritt Medical • Therox Inc.	None	None	• RADI Medical	None	None	None
Dr. Ronald Krone	• Organizational–Society for Cardiovascular Angiography and Interventions	None	None	None	None	None	None	None
Dr. Douglass A. Morrison	• Organizational–Society for Cardiovascular Angiography and Interventions	None	None	None	None	None	None	None
Dr. Mark Reisman	• Organizational–Society for Cardiovascular Angiography and Interventions	None	None	• Abbott • Boston Scientific • Cordis • Medtronic	• Boston Scientific • Cordis	None	None	None
Dr. Barry Uretsky	• Organizational–Society for Cardiovascular Angiography and Interventions	None	None	None	None	None	None	None
Dr. Mazen Abu-Fadel	• Content–ACCF Cardiac Catheterization and Intervention Committee	None	None	None	None	None	None	None
Dr. Peter Berger	• Content–Individual Reviewer	• Boston Scientific • Cordis/Johnson & Johnson • Genentech • Guilford	• Cardiokinetix • Conor • Cordis/Johnson & Johnson • Datascope • Guilford • Lilly • The Medicine Company • Medtronic • Sankyo • Sanofi-Aventis	• Arginox • Bristol-Myers Squibb • Sanofi-Aventis • Schering-Plough	None	None	• Lumen, Inc	None

Continued on next page

Downloaded from circ.ahajournals.org by on August 4, 2008

0302
09/15/08

APPENDIX 2. Continued

Name	Representation	Consultant	Research Grant	Scientific Advisory Board	Speakers' Bureau	Steering Committee	Stock Holder	Other
Dr. Robert O. Bonow	• Content–PCI Guideline Writing Committee	None	None	None	None	None	None	None
Dr. Jose G. Diez	• Content–ACCF Cardiac Catheterization and Intervention Committee	None	None	None	None	None	None	None
Dr. Ted E. Feldman	• Content–ACCF Cardiac Catheterization and Intervention Committee	• Boston Scientific • Cardiac Dimensions • Cordis • Myocor	• Abbott • Atritech • Boston Scientific • Cardiac Dimensions • Cordis • Evalve	None	None	None	None	None
Dr. James Ferguson	• Content–Individual Reviewer	None	None	None	None	None	None	None
Dr. Tommaso Gori	• Content–AHA Diagnostic & Interventional Cardiac Catherization Committee	None	None	None	None	None	None	None
Dr. Hani Jneid	• Content–AHA Diagnostic & Interventional Cardiac Catheterization Committee	None	Pfizer	None	None	None	None	None
Dr. Fred M. Kusnin	• Content–ACCF Cardiac Catheterization and Intervention Committee	None	None	None	None	None	• Boston Scientific • Johnson & Johnson • Medtronic	None
Dr. Glenn Levine	• Content–AHA Diagnostic & Interventional Cardiac Catheterization Committee	None	None	None	None	None	None	None
Dr. Charanjit S. Rihal	• Content–ACCF Cardiac Catheterization and Intervention Committee	None	None	None	None	None	None	None
Dr. Dan M. Roden	• Content–Individual Reviewer	• Abbott • Alza • Arpida • AstraZeneca • Bristol-Myers Squibb • CV Therapeutics • EBR Systems • First Genetic Trust • GlaxoSmithKline • Genzyme • Johnson & Johnson • Lexicon • Lundbeck • Medtronic • Merck • NPS Pharmaceuticals • Novartis • Pfizer • Sanofi-Synthelabo Groupe • Solvay • Thornton Medical • Wyeth • Yamanouchi	None	None	None	None	None	None
Dr. Carlos Ruiz	• Content–ACCF Cardiac Catheterization and Intervention Committee	None	None	None	None	None	None	None
Dr. Michael J. Silka	• Content–Individual Reviewer	None	None	None	None	None	None	• General Electric

Continued on next page

Downloaded from circ.ahajournals.org by on August 4, 2008

0303
09/15/08

APPENDIX 2. Continued

Name	Representation	Consultant	Research Grant	Scientific Advisory Board	Speakers' Bureau	Steering Committee	Stock Holder	Other
Dr. Thoralf M. Sundt	• Content–ACCF Cardiac Catheterization and Intervention Committee	None	None	None	None	None	• Medtronic (son has stock)	None
Dr. Cynthia M. Tracy	• Content–Individual Reviewer	None	• Guidant Corp • Medtronic	None	None	None	None	None
Dr. E. Murat Tuzcu	• Content–AHA Diagnostic & Interventional Cardiac Catheterization Committee	None	None	None	None	None	None	None
Dr. Matthew Wolff	• Content–ACCF Cardiac Catheterization and Intervention Committee	None	None	None	None	None	None	None
Dr. Yerem Yeghazarans	• Content–Individual Reviewer	None	None	None	• Pfizer • Sanofi-Aventis	None	None	None

This table represents the relationships of peer reviewers with industry that they reported as relevant to this topic. It does not necessarily reflect relationships with industry at the time of publication. Participation in the peer review process does not imply endorsement of the document. Names are listed in alphabetical order within each category of review.

Downloaded from circ.ahajournals.org by on August 4, 2008

Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION

American Heart Association®
Learn and Live℠

ACC/AHA/SCAI 2005 Guideline Update for Percutaneous Coronary Intervention—Summary Article: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (ACC/AHA/SCAI Writing Committee to Update the 2001 Guidelines for Percutaneous Coronary Intervention)

Sidney C. Smith, Jr, Ted E. Feldman, John W. Hirshfeld, Jr, Alice K. Jacobs, Morton J. Kern, Spencer B. King, III, Douglass A. Morrison, William W. O'Neill, Hartzell V. Schaff, Patrick L. Whitlow, David O. Williams, Elliott M. Antman, Sidney C. Smith, Jr, Cynthia D. Adams, Jeffrey L. Anderson, David P. Faxon, Valentin Fuster, Jonathan L. Halperin, Loren F. Hiratzka, Sharon Ann Hunt, Alice K. Jacobs, Rick Nishimura, Joseph P. Ornato, Richard L. Page and Barbara Riegel

Circulation 2006;113;156-175
DOI: 10.1161/CIRCULATIONAHA.105.170815
Circulation is published by the American Heart Association. 7272 Greenville Avenue, Dallas, TX 72514
Copyright © 2006 American Heart Association. All rights reserved. Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circ.ahajournals.org/cgi/content/full/113/1/156

Subscriptions: Information about subscribing to Circulation is online at
http://circ.ahajournals.org/subscriptions/

Permissions: Permissions & Rights Desk, Lippincott Williams & Wilkins, a division of Wolters Kluwer Health, 351 West Camden Street, Baltimore, MD 21202-2436. Phone: 410-528-4050. Fax: 410-528-8550. E-mail:
journalpermissions@lww.com

Reprints: Information about reprints can be found online at
http://www.lww.com/reprints

Downloaded from circ.ahajournals.org by on August 27, 2008

0305
09/15/08

ACC/AHA/SCAI 2005 Guideline Update for Percutaneous Coronary Intervention—Summary Article

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (ACC/AHA/SCAI Writing Committee to Update the 2001 Guidelines for Percutaneous Coronary Intervention)

WRITING COMMITTEE MEMBERS

Sidney C. Smith, Jr, MD, FACC, FAHA, Chair; Ted E. Feldman, MD, FACC, FSCAI*; John W. Hirshfeld, Jr, MD, FACC, FSCAI*; Alice K. Jacobs, MD, FACC, FAHA, FSCAI; Morton J. Kern, MD, FACC, FAHA, FSCAI*; Spencer B. King, III, MD, MACC, FSCAI; Douglass A. Morrison, MD, PhD, FACC, FSCAI*; William W. O'Neill, MD, FACC, FSCAI; Hartzell V. Schaff, MD, FACC, FAHA; Patrick L. Whitlow, MD, FACC, FAHA; David O. Williams, MD, FACC, FAHA, FSCAI

TASK FORCE MEMBERS

Elliott M. Antman, MD, FACC, FAHA, Chair; Sidney C. Smith, Jr, MD, FACC, FAHA, Vice-Chair; Cynthia D. Adams, MSN, APRN-BC, FAHA; Jeffrey L. Anderson, MD, FACC, FAHA; David P. Faxon, MD, FACC, FAHA†; Valentin Fuster, MD, PhD, FACC, FAHA, FESC†; Jonathan L. Halperin, MD, FACC, FAHA; Loren F. Hiratzka, MD, FACC, FAHA†; Sharon Ann Hunt, MD, FACC, FAHA; Alice K. Jacobs, MD, FACC, FAHA; Rick Nishimura, MD, FACC, FAHA; Joseph P. Ornato, MD, FACC, FAHA; Richard L. Page, MD, FACC, FAHA; Barbara Riegel, DNSc, RN, FAHA

The American College of Cardiology/American Heart Association/Society for Cardiovascular Angiography and Interventions (ACC/AHA/SCAI) 2005 Guideline Update for Percutaneous Coronary Intervention (PCI) contains changes in the recommendations, along with supporting text. For the purpose of comparison, this summary contains a list of the updated recommendations (middle column) alongside a list of the 2001 recommendations (left column), with each set accompanied by a comment (right column) that provides the rationale for the changes, additions, or deletions (see Table 1). References

*Official SCAI representative.

†Former Task Force Member during this writing effort.

Acknowledgment: The ACC and AHA recognize Dr J. Ward Kennedy for his dedicated service on developing ACC/AHA guidelines for PTCA and PCI since their inception in 1986 and for his counsel and advice in the preparation of this guideline.

This document was approved by the American College of Cardiology Foundation Board of Trustees in September 2005, by the American Heart Association Science Advisory and Coordinating Committee in September 2005, and by the Society for Cardiovascular Angiography and Interventions in September 2005.

The ACC/AHA Task Force on Practice Guidelines makes every effort to avoid any actual or potential conflicts of interest that might arise as a result of an outside relationship or personal interest of a member of the writing panel. Specifically, all members of the writing panel are asked to provide disclosure statements of all such relationships that might be perceived as real or potential conflicts of interest. These statements are reviewed by the parent task force, reported orally to all members of the writing panel at the first meeting, and updated as changes occur. The relationship with industry information for writing committee members, as well as peer reviewers of the document, is located in an appendix of the full-text guideline, which is available on the ACC, AHA, and SCAI Web sites.

When citing this document, the American Heart Association requests that the following citation format be used: Smith SC Jr, Feldman TE, Hirshfeld JW Jr, Jacobs AK, Kern MJ, King SB III, Morrison DA, O'Neill WW, Schaff HV, Whitlow PL, Williams DO. ACC/AHA/SCAI 2005 guideline update for percutaneous coronary intervention—summary article: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (ACC/AHA/SCAI Writing Committee to Update the 2001 Guidelines for Percutaneous Coronary Intervention). *Circulation.* 2006;113:156–175.

Copies: This document is available on the World Wide Web sites of the American College of Cardiology (www.acc.org), the American Heart Association (www.americanheart.org), and the Society for Cardiovascular Angiography and Interventions (www.scai.org). Single copies of this document are available by calling 1-800-253-4636 or writing the American College of Cardiology Foundation, Resource Center, at 9111 Old Georgetown Road, Bethesda, MD 20814-1699. Ask for reprint number 71-0346. To obtain a copy of the full text published in the January 3, 2006, issue of the *Journal of the American College of Cardiology*, the January 3, 2006, issue of *Circulation*, and the January 2006, issue of *Catheterization and Cardiovascular Interventions*, ask for reprint number 71-0347. To purchase bulk reprints (specify version and reprint number): Up to 999 copies, call 1-800-611-6083 US only) or fax 413-665-2671; 1000 or more copies, call 214-706-1789, fax 214-691-6342, or e-mail pubauth@heart.org.

Permissions: Multiple copies, modification, alteration, enhancement, and/or distribution of this document are not permitted without the express permission of the American College of Cardiology Foundation. Please direct requests to copyright_permissions@acc.org.

(*Circulation.* 2005;113:156-175.)

© 2006 by the American College of Cardiology Foundation and the American Heart Association, Inc.

***Circulation* is available at http://www.circulationaha.org** **DOI: 10.1161/CIRCULATIONAHA.105.170815**

Downloaded from circ.ahajournals.org by on August 27, 2008

0306
09/15/08

that support either the 2001 recommendations that have changed or the new or revised recommendations are cited in parentheses at the end of each recommendation or comment. A list of abbreviations is included in the Appendix. The reader is referred to the full-text guideline posted on the World Wide Web sites of the ACC, the AHA, and the SCAI for a more detailed explanation of the changes discussed here. Please note that we have changed the table of contents headings in the 2001 ACC/AHA Guidelines for Percutaneous Coronary Intervention from roman numerals to unique identifying numbers.

In preparing this update, the committee was guided by the following principles:

1. Changes in recommendations and levels of evidence were made because of the availability of data from new randomized trials, the accumulation of new clinical evidence, and/or the development of clinical consensus.
2. The committee is cognizant of the healthcare, logistic, and financial implications of recent trials and factored in these considerations in arriving at the class level of certain recommendations.
3. All recommendations in the PCI guideline update have been written in full sentences that express a complete thought, such that a recommendation, even if separated and presented apart from the rest of the document, will still convey the full intent of the recommendation.
4. The committee wishes to re-emphasize that the recommendations in the guideline apply to most patients but may require modification by existing situations that only the primary treating healthcare provider can evaluate properly.
5. The committee endeavored to maintain the consistency of recommendations in this and other previously published guidelines, primarily the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction and the ACC/AHA 2002 Guideline Update for the Management of Patients With Non–ST-Elevation Myocardial Infarction.

The classification of recommendations and levels of evidence are expressed in the ACC/AHA format as follows:

Classification of Recommendations

Class I: Conditions for which there is evidence for and/or general agreement that a given procedure or treatment is beneficial, useful, and effective.

Class II: Conditions for which there is conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of a procedure or treatment.

IIa: Weight of evidence/opinion is in favor of usefulness/efficacy.

IIb: Usefulness/efficacy is less well established by evidence/opinion.

Class III: Conditions for which there is evidence and/or general agreement that the procedure/treatment is not useful/effective and in some cases may be harmful.

Level of Evidence

Level of Evidence A: Data derived from multiple randomized clinical trials or meta-analyses.

Level of Evidence B: Data derived from a single randomized trial or nonrandomized studies.

Level of Evidence C: Only consensus opinion of experts, case studies, or standard-of-care.

Downloaded from circ.ahajournals.org by on August 27, 2008

0307
09/15/08

2001 Recommendation	2005 New or Revised Recommendation	Comments
3. Outcomes		
3.2 Acute Outcome: Procedural Complications		
Class I	**Class I**	
None	All patients who have signs or symptoms suggestive of MI during or after PCI and those with complicated procedures should have CK-MB and troponin I or T measured after the procedure. (*Level of Evidence: B*)	This recommendation appeared in the text of the 2001 revision for CK-MB only. Troponin I or T measurement has been added, and it is now listed as a class I, level of evidence B recommendation (1–10).
Class IIa	**Class IIa**	
None	Routine measurement of cardiac biomarkers (CK-MB and/or troponin I or T) in all patients undergoing PCI is reasonable 8 to 12 hours after the procedure. *(Level of Evidence: C)*	Routine measurement of CK-MB or troponin I or T is added as a new class IIa, level of evidence C recommendation. The committee did not think that evidence regarding the clinical utility of routine measurement of biomarkers in all patients was strong enough to warrant a class I recommendation.
4. Institutional and Operator Competency		
4.1 Quality Assurance		
Class I	**Class I**	
None	1. An institution that performs PCI should establish an ongoing mechanism for valid peer review of its quality and outcomes. Review should be conducted both at the level of the entire program and at the level of the individual practitioner. Quality-assessment reviews should take risk adjustment, statistical power, and national benchmark statistics into consideration. Quality-assessment reviews should include both tabulation of adverse event rates for comparison with benchmark values and case review of complicated procedures and some uncomplicated procedures. *(Level of Evidence: C)*	Quality assurance is an important responsibility for all institutions in which PCI is performed. Institutions must monitor the PCI program with respect to process, appropriateness, and outcomes and correct any circumstances in which quality falls below accepted norms. The quality assessment should be conducted at the level of both the entire program and the individual practitioner.
	2. An institution that performs PCI should participate in a recognized PCI data registry for the purpose of benchmarking its outcomes against current national norms. *(Level of Evidence: C)*	Participation in a recognized PCI registry for benchmarking outcomes against current national norms is an important part of the quality-improvement process. The ACC–National Cardiovascular Data Registry® or other databases may serve as a valuable resource in this regard.
4.2 Operator and Institutional Volume		
Class I	**Class I**	
PCI done by operators with acceptable volume (greater than or equal to 75) at high-volume centers (greater than 400). *(Level of Evidence: B)*	1. Elective PCI should be performed by operators with acceptable annual volume (at least 75 procedures) at high-volume centers (more than 400 procedures) with on-site cardiac surgery. *(Level of Evidence: B)*	Wording has been added to clarify this statement and emphasize that it relates to elective PCI performed at centers with on-site cardiac surgery.
	2. Elective PCI should be performed by operators and institutions whose historical and current risk-adjusted outcomes statistics are comparable to those reported in contemporary national data registries. *(Level of Evidence: C)*	This recommendation was added to emphasize that historical and current risk-adjusted outcomes for operators and institutions are an essential part of the quality-improvement process.
	3. Primary PCI for STEMI should be performed by experienced operators who perform more than 75 elective PCI procedures per year and, ideally, at least 11 PCI procedures for STEMI per year. Ideally, these procedures should be performed in institutions that perform more than 400 elective PCIs per year and more than 36 primary PCI procedures for STEMI per year. *(Level of Evidence: B)*	This recommendation is expanded based on data from the New York State registry indicating that physicians performing more than 10 primary PCI procedures per year have lower mortality rates (11–13).
Class IIa	**Class IIa**	
1. PCI done by operators with acceptable volume (75 or more) at low-volume centers (200–400). *(Level of Evidence: C)*	1. It is reasonable that operators with acceptable volume (at least 75 PCI procedures per year) perform PCI at low-volume centers (200 to 400 PCI procedures per year) with on-site cardiac surgery. *(Level of Evidence: B)*	Wording has been changed to comply with current recommended phrasing for class IIa recommendation. The fact that this recommendation applies to centers with on-site cardiac surgery is emphasized. Level of evidence has been changed to B based on accumulated published evidence (14).

Downloaded from circ.ahajournals.org by on August 27, 2008

0308
09/15/08

2001 Recommendation	2005 New or Revised Recommendation	Comments
2. PCI done by low-volume operators (fewer than 75) at high-volume centers (more than 400). Note: Ideally operators with an annual procedure volume less than 75 should only work at institutions with an activity level of more than 600 procedures/year.* *(Level of Evidence: C)* *Operators who perform fewer than 75 procedures per year should develop a defined mentoring relationship with a highly experienced operator who has an annual procedural volume of at least 150 procedures per year.	2. It is reasonable that low-volume operators (fewer than 75 PCI procedures per year) perform PCI at high-volume centers (more than 400 PCI procedures per year) with on-site cardiac surgery. Ideally, operators with an annual procedure volume less than 75 should only work at institutions with an activity level of more than 600 procedures per year. Operators who perform fewer than 75 procedures per year should develop a defined mentoring relationship with a highly experienced operator who has an annual procedural volume of at least 150 procedures per year. *(Level of Evidence: B)*	Wording has been changed to comply with current recommended phasing. Level of evidence has been changed to B based on accumulated published evidence (15).
Class IIb	**Class IIb**	
None	The benefit of primary PCI for STEMI patients eligible for fibrinolysis when performed by an operator who performs fewer than 75 procedures per year (or fewer than 11 PCIs for STEMI per year) is not well established. (Level of Evidence: C)	This recommendation has been added to address the issue of low-volume operators performing primary PCI. It reflects the relative lack of evidence supporting a benefit of primary PCI for low-volume operators.
Class III	**Class III**	
PCI done by low-volume operators (fewer than 75) at low-volume centers (200–400). Note: An institution with a volume of fewer than 200 procedures/year, unless in a region that is underserved because of geography, should carefully consider whether it should continue to offer service.* *(Level of Evidence: C)* *Operators who perform fewer than 75 procedures per year should develop a defined mentoring relationship with a highly experienced operator who has an annual procedural volume of at least 150 procedures per year.	It is not recommended that elective PCI be performed by low-volume operators (fewer than 75 procedures per year) at low-volume centers (200 to 400) with or without on-site cardiac surgery. An institution with a volume of fewer than 200 procedures per year, unless in a region that is underserved because of geography, should carefully consider whether it should continue to offer this service. *(Level of Evidence: B)*	Wording has been changed to reflect current preferred phrasing. Level of evidence changed to B on the basis of published data indicating poorer outcomes at low-volume centers (15).
4.3. Role of On-Site Cardiac Surgical Back-up		
Class I	**Class I**	
1. Patients undergoing elective PCI in facilities with on-site cardiac surgery. *(Level of Evidence: B)*	1. Elective PCI should be performed by operators with acceptable annual volume (at least 75 procedures per year) at high-volume centers (more than 400 procedures annually) that provide immediately available on-site emergency cardiac surgical services. *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology and volume criteria; otherwise, no significant changes.
2. Patients undergoing primary PCI in facilities with on-site cardiac surgery. *(Level of Evidence: B)*	2. Primary PCI for patients with STEMI should be performed in facilities with on-site cardiac surgery. *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology and to be consistent with the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction.
Class III	**Class III**	
Patients undergoing elective PCI in facilities without on-site cardiac surgery. *(Level of Evidence: C)*	Elective PCI should not be performed at institutions that do not provide on-site cardiac surgery.* *(Level of Evidence: C)* *Several centers have reported satisfactory results based on careful case selection with well-defined arrangements for immediate transfer to a surgical program (18–28). A small, but real fraction of patients undergoing elective PCI will experience a life-threatening complication that could be managed with the immediate on-site availability of cardiac surgical support but cannot be managed effectively by urgent transfer. Wennberg et al. found higher mortality in the Medicare database for patients undergoing elective PCI in institutions without onsite cardiac surgery (29). These recommendations may be subject to revision as clinical data and experience increase.	Phrasing has been changed to reflect current terminology. As with many dynamic areas in interventional cardiology, these recommendations may be subject to revision as clinical data and experience increase.

Downloaded from circ.ahajournals.org by on August 27, 2008

0309
09/15/08

2001 Recommendation	2005 New or Revised Recommendation	Comments
Section 4.4 Primary PCI for STEMI Without On-Site Cardiac Surgery		
Class IIb	**Class IIb**	
Patients undergoing primary PCI in facilities without on-site cardiac surgery, but with a proven plan for rapid access (within 1 h) to a cardiac surgery operating room in a nearby facility with appropriate hemodynamic support capability for transfer. The procedure should be limited to patients with ST-segment elevation MI or new LBBB on ECG, and done in a timely fashion (balloon inflation within 90 plus or minus 30 min of admission) by persons skilled in the procedure (at least 75 PCIs/year) and only at facilities performing a minimum of 36 primary PCI procedures per year. *(Level of Evidence: B)*	Primary PCI for patients with STEMI might be considered in hospitals without on-site cardiac surgery, provided that appropriate planning for program development has been accomplished, including appropriately experienced physician operators (more than 75 total PCIs and, ideally, at least 11 primary PCIs per year for STEMI), an experienced catheterization team on a 24 hours per day, 7 days per week call schedule, and a well-equipped catheterization laboratory with digital imaging equipment, a full array of interventional equipment, and intra-aortic balloon pump capability, and provided that there is a proven plan for rapid transport to a cardiac surgery operating room in a nearby hospital with appropriate hemodynamic support capability for transfer. The procedure should be limited to patients with STEMI or MI with new or presumably new LBBB on ECG and should be performed in a timely fashion (goal of balloon inflation within 90 minutes of presentation) by persons skilled in the procedure (at least 75 PCIs per year) and at hospitals that perform a minimum of 36 primary PCI procedures per year. *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology. Recommendations have been added that 1) physicians perform at least 11 primary PCIs per year for STEMI, 2) a 24 hours per day, 7 days per week call schedule be maintained, and 3) the catheterization laboratory be well equipped with digital imaging equipment, a full array of interventional equipment, and intra-aortic balloon pump capability. The intent is to ensure optimal experience availability and capability to perform primary PCI in patients with STEMI (16,17).
Class III	**Class III**	
Patients undergoing primary PCI in facilities without on-site cardiac surgery and without a proven plan for rapid access (within 1 h) to a cardiac surgery operating room in a nearby facility with appropriate hemodynamic support capability for transfer or when performed by lower-skilled operators (fewer than 75 PCIs per year) in a facility performing fewer than 36 primary PCI procedures per year. *(Level of Evidence: C)*	Primary PCI should not be performed in hospitals without on-site cardiac surgery and without a proven plan for rapid transport to a cardiac surgery operating room in a nearby hospital or without appropriate hemodynamic support capability for transfer. *(Level of Evidence: C)*	Phrasing has been changed to reflect current terminology and to place emphasis on need for inter-institutional planning and support.
4.5 Elective PCI Without On-Site Surgery		
Class III	**Class III**	
Patients undergoing elective PCI in facilities without on-site cardiac surgery. *(Level of Evidence: C)*	Elective PCI should not be performed at institutions that do not provide on-site cardiac surgery. *(Level of Evidence: C)* *Several centers have reported satisfactory results based on careful case selection with well-defined arrangements for immediate transfer to a surgical program (18–28). A small, but real fraction of patients undergoing elective PCI will experience a life-threatening complication that could be managed with the immediate on-site availability of cardiac surgical support but cannot be managed effectively by urgent transfer. Wennberg et al. found higher mortality in the Medicare database for patients undergoing elective PCI in institutions without onsite cardiac surgery (29). These recommendations may be subject to revision as clinical data and experience increase.	Repeated from previous section for consistency. Phrasing has been changed to reflect current terminology.
5.1. Patients With Asymptomatic Ischemia or Canadian Cardiovascular Society (CCS) Class I or II Angina		
Class I	**Class IIa**	
Patients who do not have treated diabetes with asymptomatic ischemia or mild angina with 1 or more significant lesions in 1 or 2 coronary arteries suitable for PCI with a high likelihood of success and a low risk of morbidity and mortality. The vessels to be dilated must subtend a large area of viable myocardium. *(Level of Evidence: B)*	1. PCI is reasonable in patients with asymptomatic ischemia or CCS class I or II angina and with 1 or more significant lesions in 1 or 2 coronary arteries suitable for PCI with a high likelihood of success and a low risk of morbidity and mortality. The vessels to be dilated must subtend a moderate to large area of viable myocardium or be associated with a moderate to severe degree of ischemia on noninvasive testing. *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology. This recommendation and all of those that follow in Section 5 have been reworded to be consistent with the CCS classification system of angina. This recommendation has been changed to class IIa to reflect the published data and Writing Committee consensus that not all patients in this clinical category must have PCI performed (30,31).
Class IIa		
1. The same clinical and anatomic requirements for Class I, except the myocardial area at risk is of moderate size or the patient has treated diabetes. *(Level of Evidence: B)*		This recommendation has been merged with other class IIa recommendations of this section, and the phrasing has been changed to reflect current terminology.

Downloaded from circ.ahajournals.org by on August 27, 2008

0310
09/15/08

2001 Recommendation	2005 New or Revised Recommendation	Comments
	2. PCI is reasonable for patients with asymptomatic ischemia or CCS class I or II angina, and recurrent stenosis after PCI with a large area of viable myocardium or high-risk criteria on noninvasive testing. *(Level of Evidence: C)*	This is a new recommendation dealing with the management of recurrent stenosis after PCI among patients with asymptomatic ischemia or class I or II angina.
	3. Use of PCI is reasonable in patients with asymptomatic ischemia or CCS class I or II angina with significant left main CAD (greater than 50% diameter stenosis) who are candidates for revascularization but are not eligible for CABG. *(Level of Evidence: B)*	This recommendation for PCI among patients who are eligible for CABG who have significant left main disease has been added to reflect the favorable results noted by several trials with PCI (32–35).
Class IIb		
Patients with asymptomatic ischemia or mild angina with greater than or equal to 3 coronary arteries suitable for PCI with a high likelihood of success and a low risk of morbidity and mortality. The vessels to be dilated must subtend at least a moderate area of viable myocardium. In the physician's judgment, there should be evidence of myocardial ischemia by ECG exercise testing, stress nuclear imaging, stress echocardiography or ambulatory ECG monitoring or intracoronary physiologic measurements. *(Level of Evidence: B)*		This recommendation has been eliminated and replaced by the following 2 recommendations. For each, the phrasing has been constructed to reflect current terminology.
	Class IIb	
	1. The effectiveness of PCI for patients with asymptomatic ischemia or CCS class I or II angina who have 2- or 3-vessel disease with significant proximal LAD CAD who are otherwise eligible for CABG with 1 arterial conduit and who have treated diabetes or abnormal LV function is not well established. *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology. Among patients who are eligible, CABG with 1 arterial conduit is generally preferred for treatment of multivessel disease with significant proximal LAD obstruction in patients with treated diabetes and/or abnormal LV function (36).
	2. PCI might be considered for patients with asymptomatic ischemia or CCS class I or II angina with nonproximal LAD CAD that subtends a moderate area of viable myocardium and demonstrates ischemia on noninvasive testing. *(Level of Evidence: C)*	Phrasing has been changed to reflect current terminology. PCI might be considered in this clinical setting.
Class III	**Class III**	
Patients with asymptomatic ischemia or mild angina who do not meet the criteria as listed under Class I or Class II and who have: a. Only a small area of viable myocardium at risk b. No objective evidence of ischemia c. Lesions that have a low likelihood of successful dilatation d. Mild symptoms that are unlikely to be due to myocardial ischemia e. Factors associated with increased risk of morbidity or mortality f. Left main disease g. Insignificant disease less than 50% *(Level of Evidence: C)*	PCI is not recommended in patients with asymptomatic ischemia or CCS class I or II angina who do not meet the criteria as listed under the class II recommendations or who have 1 or more of the following: a. Only a small area of viable myocardium at risk *(Level of Evidence: C)* b. No objective evidence of ischemia *(Level of Evidence: C)* c. Lesions that have a low likelihood of successful dilatation *(Level of Evidence: C)* d. Mild symptoms that are unlikely to be due to myocardial ischemia *(Level of Evidence: C)* e. Factors associated with increased risk of morbidity or mortality *(Level of Evidence: C)* f. Left main disease and eligibility for CABG *(Level of Evidence: C)* g. Insignificant disease (less than 50% coronary stenosis) *(Level of Evidence: C)*	Phrasing has been changed to reflect current terminology. Recommendation has been reworded to be consistent with CCS classification system for angina. Level of evidence has been added for each subgroup.
5.2 Patients With CCS Class III Angina		
Class I	**Class IIa**	
Patients with 1 or more significant lesions in 1 or more coronary arteries suitable for PCI with a high likelihood of success and low risk of morbidity or mortality. The vessel(s) to be dilated must subtend a moderate or large area of viable myocardium and have high risk. *(Level of Evidence: B)*	1. It is reasonable that PCI be performed in patients with CCS class III angina and single-vessel or multivessel CAD who are undergoing medical therapy and who have 1 or more significant lesions in 1 or more coronary arteries suitable for PCI with a high likelihood of success and low risk of morbidity or mortality. *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology. Recommendation has been reworded to be consistent with CCS classification system for angina. The recommendation class has been changed to IIa to reflect published data and Writing Committee consensus. Criteria regarding viable and high-risk myocardium have been deleted from this recommendation (30, 31).

Downloaded from circ.ahajournals.org by on August 27, 2008

0311
09/15/08

2001 Recommendation	2005 New or Revised Recommendation	Comments
Class IIa		
Patients with focal saphenous vein graft lesions or multiple stenoses who are poor candidates for reoperative surgery. *(Level of Evidence: C)*	2. It is reasonable that PCI be performed in patients with CCS class III angina with single-vessel or multivessel CAD who are undergoing medical therapy with focal saphenous vein graft lesions or multiple stenoses who are poor candidates for reoperative surgery. *(Level of Evidence: C)*	Phrasing has been changed to reflect current terminology.
	3. Use of PCI is reasonable in patients with CCS class III angina with significant left main CAD (greater than 50% diameter stenosis) who are candidates for revascularization but are not eligible for CABG. *(Level of Evidence: B)*	This recommendation for PCI among patients with significant left main disease who are not eligible for CABG has been added to reflect the favorable results noted by several trials with PCI (32–35).
Class IIb	**Class IIb**	
Patient has 1 or more lesions to be dilated with reduced likelihood of success or the vessel(s) subtend a less than moderate area of viable myocardium. Patients with 2- or 3-vessel disease, with significant proximal LAD CAD and treated diabetes or abnormal LV function. *(Level of Evidence: B)*	1. PCI may be considered in patients with CCS class III angina with single-vessel or multivessel CAD who are undergoing medical therapy and who have 1 or more lesions to be dilated with a reduced likelihood of success. *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology. The 2001 recommendation has been split into 2 separate recommendations.
	2. PCI may be considered in patients with CCS class III angina and no evidence of ischemia on noninvasive testing or who are undergoing medical therapy and have 2- or 3-vessel CAD with significant proximal LAD CAD and treated diabetes or abnormal LV function. *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology. The use of noninvasive testing to evaluate for evidence of ischemia has been added.
Class III	**Class III**	
Patient has no evidence of myocardial injury or ischemia on objective testing and has not had a trial of medical therapy, or has a. Only a small area of myocardium at risk b. All lesions or the culprit lesion to be dilated with morphology with a low likelihood of success c. A high risk of procedure-related morbidity or mortality. *(Level of Evidence: C)*	PCI is not recommended for patients with CCS class III angina with single-vessel or multivessel CAD, no evidence of myocardial injury or ischemia on objective testing, and no trial of medical therapy, or who have 1 of the following: a. Only a small area of myocardium at risk *(Level of Evidence: C)* b. All lesions or the culprit lesion to be dilated with morphology that conveys a low likelihood of success *(Level of Evidence: C)* c. A high risk of procedure-related morbidity or mortality *(Level of Evidence: C)* d. Insignificant disease (less than 50% coronary stenosis) *(Level of Evidence: C)* e. Significant left main CAD and candidacy for CABG *(Level of Evidence: C)*	Phrasing has been changed to reflect current terminology. Class III recommendations #2 and #3 from the 2001 guidelines have been merged into this recommendation.
2. Patients with insignificant coronary stenosis (e.g., less than 50% diameter). *(Level of Evidence: C)*		See above.
3. Patients with significant left main CAD who are candidates for CABG. *(Level of Evidence: B)*		See above.
5.3 Unstable Angina/Non–ST-Elevation Myocardial Infarction (UA/NSTEMI) *(Note: Some of these recommendations have been repeated from above because the sections for the 2005 guideline were revised slightly.)*		
	Class I	
	An early invasive PCI strategy is indicated for patients with UA/NSTEMI who have no serious comorbidity and who have coronary lesions amenable to PCI. Patients must have any of the following high-risk features: a. Recurrent ischemia despite intensive anti-ischemic therapy *(Level of Evidence: A)* b. Elevated troponin level *(Level of Evidence: A)* c. New ST-segment depression *(Level of Evidence: A)* d. CHF symptoms or new or worsening MR *(Level of Evidence: A)* e. Depressed LV systolic function *(Level of Evidence: A)* f. Hemodynamic instability *(Level of Evidence: A)* g. Sustained ventricular tachycardia *(Level of Evidence: A)* h. PCI within 6 months *(Level of Evidence: A)* i. Prior CABG *(Level of Evidence: A)*	Added to maintain consistency with the ACC/AHA 2002 Guideline Update for the Management of Patients With Unstable Angina and Non–ST-Segment Myocardial Infarction (37).

Downloaded from circ.ahajournals.org by on August 27, 2008

0312
09/15/08

2001 Recommendation	2005 New or Revised Recommendation	Comments
Class IIa	**Class IIa**	
1. Patients with focal saphenous vein graft lesions or multiple stenoses who are poor candidates for reoperative surgery. *(Level of Evidence: C)*	1. It is reasonable that PCI be performed in patients with UA/NSTEMI and single-vessel or multivessel CAD who are undergoing medical therapy with focal saphenous vein graft lesions or multiple stenoses who are poor candidates for reoperative surgery. *(Level of Evidence: C)*	Phrasing has been changed to reflect current terminology.
	2. In the absence of high-risk features associated with UA/NSTEMI, it is reasonable to perform PCI in patients with amenable lesions and no contraindication for PCI with either an early invasive or early conservative strategy. See full-text guidelines. *(Level of Evidence: B)*	Added in accordance with growing evidence regarding PCI for patients with UA/NSTEMI (30, 37–39).
	3. Use of PCI is reasonable in patients with UA/NSTEMI with significant left main CAD (greater than 50% diameter stenosis) who are candidates for revascularization but are not eligible for CABG. *(Level of Evidence: B)*	Added in accordance with growing evidence regarding PCI for patients with UA/NSTEMI (32–35, 40–43).
	Class IIb	
	1. In the absence of high-risk features associated with UA/NSTEMI, PCI may be considered in patients with single-vessel or multivessel CAD who are undergoing medical therapy and who have 1 or more lesions to be dilated with reduced likelihood of success. *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology. Original recommendation replaced by 2 separate recommendations as noted here and in the following recommendations.
	2. PCI may be considered in patients with UA/NSTEMI who are undergoing medical therapy who have 2- or 3-vessel disease, significant proximal LAD CAD, and treated diabetes or abnormal LV function. *(Level of Evidence: B)*	See above.
2. All patients after a non–Q-wave MI. *(Level of Evidence: C)*		This recommendation was removed because it is now covered by the revised recommendations from the ACC/AHA 2002 Guideline Update for the Management of Patients With Unstable Angina and Non–ST-Segment Myocardial Infarction.
Class III	**Class III**	
1. Patient has no evidence of myocardial injury or ischemia on objective testing and has not had a trial of medical therapy, or has a. Only a small area of myocardium at risk b. All lesions or the culprit lesion to be dilated with morphology with a low likelihood of success c. A high risk of procedure-related morbidity or mortality. *(Level of Evidence: C)*	1. In the absence of high-risk features associated with UA/NSTEMI, PCI is not recommended for patients with UA/NSTEMI with single-vessel or multivessel CAD and no trial of medical therapy, or who have 1 or more of the following a. Only a small area of myocardium at risk *(Level of Evidence: C)* b. All lesions or the culprit lesion to be dilated with morphology that conveys a low likelihood of success *(Level of Evidence: C)* c. A high risk of procedure-related morbidity or mortality *(Level of Evidence: C)* d. Insignificant disease (less than 50% coronary stenosis) *(Level of Evidence: C)* e. Significant left main CAD and candidacy for CABG *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology and level of evidence for each subgroup. Class III recommendations #2 and #3 from the 2001 guidelines have been merged into this recommendation.
2. Patients with insignificant coronary stenosis (e.g., less than 50% diameter). *(Level of Evidence: C)*		See above.
3. Patients with significant left main CAD who are candidates for CABG. *(Level of Evidence: B)*		See above.

5.4. Patients With STEMI

The phrasing has been changed to reflect current terminology as needed for all recommendations in this section and to be consistent with the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction.

Downloaded from circ.ahajournals.org by on August 27, 2008

0313
09/15/08

2001 Recommendation	2005 New or Revised Recommendation	Comments
5.4.1. General and Specific Considerations		
Class I	**Class I**	
1. As an alternative to thrombolytic therapy in patients with AMI and ST-segment elevation or new or presumed new left bundle-branch block who can undergo angioplasty of the infarct artery less than or equal to 12 h from the onset of ischemic symptoms or more than 12 h if symptoms persist, if performed in a timely fashion* by individuals skilled in the procedure† and supported by experienced personnel in an appropriate laboratory environment.‡ *(Level of Evidence: A)* *Performance standard: balloon inflation within 90 plus or minus 30 min of hospital admission. †Individuals who perform 75 or more PCI procedures per year. ‡Centers that perform more than 200 PCI procedures per year and have cardiac surgical capability.	General considerations: 1. If immediately available, primary PCI should be performed in patients with STEMI (including true posterior MI) or MI with new or presumably new LBBB who can undergo PCI of the infarct artery within 12 hours of symptom onset, if performed in a timely fashion (balloon inflation goal within 90 minutes of presentation) by persons skilled in the procedure (individuals who perform more than 75 PCI procedures per year, ideally at least 11 PCIs per year for STEMI). The procedure should be supported by experienced personnel in an appropriate laboratory environment (one that performs more than 200 PCI procedures per year, of which at least 36 are primary PCI for STEMI, and that has cardiac surgery capability). *(Level of Evidence: A)* Primary PCI should be performed as quickly as possible, with a goal of a medical contact–to-balloon or door-to-balloon time within 90 minutes. *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology to be consistent with the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction. This revised recommendation reflects the evidence from several trials and a meta-analysis of 23 trials comparing PCI with fibrinolysis that confirm the advantage of PCI. The conditions under which PCI must be performed to optimize this advantage are included in the recommendation (11–13,44–47).
2. In patients who are within 36 h of an acute ST elevation/Q-wave or new left bundle-branch block MI who develop cardiogenic shock, are less than 75 years of age, and revascularization can be performed within 18 h of the onset of shock by individuals skilled in the procedure† and supported by experienced personnel in an appropriate laboratory environment.‡ *(Level of Evidence: A)* †Individuals who perform 75 or more PCI procedures per year. ‡Centers that perform more than 200 PCI procedures per year and have cardiac surgical capability (193, 194).	Specific considerations: 2. Primary PCI should be performed for patients less than 75 years old with ST elevation or presumably new LBBB who develop shock within 36 hours of MI and are suitable for revascularization that can be performed within 18 hours of shock, unless further support is futile because of the patient's wishes or contraindications/unsuitability for further invasive care. *(Level of Evidence: A)*	Phrasing has been changed to reflect current terminology. The changes from the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction have been included in this recommendation (48–53).
	3. Primary PCI should be performed in patients with severe HF and/or pulmonary edema (Killip class 3) and onset of symptoms within 12 hours. The medical contact–to-balloon or door-to-balloon time should be as short as possible (i.e., goal within 90 minutes). *(Level of Evidence: B)*	The changes from the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction are included in this new recommendation, which emphasizes the benefits of PCI for patients with severe CHF and onset of symptoms within 12 hours (54–56).
	Class IIa	
	1. Primary PCI is reasonable for selected patients 75 years or older with ST elevation or LBBB or who develop shock within 36 hours of MI and are suitable for revascularization that can be performed within 18 hours of shock. Patients with good prior functional status who are suitable for revascularization and agree to invasive care may be selected for such an invasive strategy. *(Level of Evidence: B)*	This recommendation, which addresses the benefit of PCI in patients at least 75 years of age with shock, is included from the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction with phrasing to reflect current terminology (48–53).
	2. It is reasonable to perform primary PCI for patients with onset of symptoms within the prior 12 to 24 hours and 1 or more of the following: a. Severe HF *(Level of Evidence: C)* b. Hemodynamic or electrical instability *(Level of Evidence: C)* c. Evidence of persistent ischemia *(Level of Evidence: C)*	This new recommendation provides guidance for use of primary PCI within 12 to 24 hours of symptom onset in certain patient subsets. Phrasing has been changed to reflect current terminology and to be consistent with the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction.

Downloaded from circ.ahajournals.org by on August 27, 2008

0314
09/15/08

2001 Recommendation	2005 New or Revised Recommendation	Comments
Class III	**Class III**	
1. Elective PCI of a non–infarct-related artery at the time of acute MI. *(Level of Evidence: C)*	1. Elective PCI should not be performed in a non–infarct-related artery at the time of primary PCI of the infarct-related artery in patients without hemodynamic compromise. *(Level of Evidence: C)*	Phrasing has been changed to reflect current terminology. Important phrasing has been added to address the issue of PCI of the non–infarct-related coronary artery at the time of primary PCI.
2. In patients with acute MI who: a. have received fibrinolytic therapy within 12 h and have no symptoms of myocardial ischemia b. are eligible for thrombolytic therapy and are undergoing primary angioplasty by an inexperienced operator (individual who performs fewer than 75 PCI procedures per year) c. are beyond 12 h after onset of symptoms and have no evidence of myocardial ischemia. *(Level of Evidence: C)*	2. Primary PCI should not be performed in asymptomatic patients more than 12 hours after onset of STEMI who are hemodynamically and electrically stable. *(Level of Evidence: C)* **Class IIb** 1. The benefit of primary PCI for STEMI patients eligible for fibrinolysis when performed by an operator who performs fewer than 75 PCI procedures per year (or fewer than 11 PCIs for STEMI per year) is not well established. *(Level of Evidence: C)*	Phrasing has been changed to reflect current terminology. Recommendation has been divided to emphasize specific points. The class IIb recommendation was upgraded in the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction and approved by the PCI Writing Committee.
5.4.2. PCI in Fibrinolytic-Ineligible Patients		
Class IIa	**Class I**	
As a reperfusion strategy in candidates who have a contraindication to thrombolytic therapy. *(Level of Evidence: C)*	Primary PCI should be performed in fibrinolytic-ineligible patients who present with STEMI within 12 hours of symptom onset. *(Level of Evidence: C)*	Revised recommendation reflects the committee's opinion that primary PCI should be a class I recommendation for fibrinolytic-ineligible patients within 12 hours of symptom onset. Phrasing has been changed to reflect current terminology and to be consistent with the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction.
	Class IIa	
	It is reasonable to perform primary PCI for fibrinolytic-ineligible patients with onset of symptoms within the prior 12 to 24 hours and 1 or more of the following: a. Severe HF *(Level of Evidence: C)* b. Hemodynamic or electrical instability *(Level of Evidence: C)* c. Evidence of persistent ischemia *(Level of Evidence: C)*	New recommendation from the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction that addresses conditions under which primary PCI is reasonable for fibrinolytic-ineligible patients with onset of symptoms within the prior 12 to 24 hours.
5.4.3. Facilitated PCI		
Class IIb	**Class IIb**	
None	Facilitated PCI might be performed as a reperfusion strategy in higher-risk patients when PCI is not immediately available and bleeding risk is low. *(Level of Evidence: B)*	New recommendation from the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction addressing conditions for which facilitated PCI might be considered. Important randomized trials are under way, and more data are needed regarding outcomes resulting from this treatment strategy (57–63).
5.4.4. PCI After Failed Fibrinolysis (Rescue PCI)		
Class I	**Class I**	
None	1. Rescue PCI should be performed in patients less than 75 years old with ST elevation or LBBB who develop shock within 36 hours of MI and are suitable for revascularization that can be performed within 18 hours of shock, unless further support is futile because of the patient's wishes or contraindications/unsuitability for further invasive care. *(Level of Evidence: B)*	See above (49,51).
	2. Rescue PCI should be performed in patients with severe HF and/or pulmonary edema (Killip class 3) and onset of symptoms within 12 hours. *(Level of Evidence: B)*	See above (54–56).

Downloaded from circ.ahajournals.org by on August 27, 2008

0315
09/15/08

2001 Recommendation	2005 New or Revised Recommendation	Comments
Class IIa	**Class IIa**	
None	1. Rescue PCI is reasonable for selected patients 75 years or older with ST elevation or LBBB or who develop shock within 36 hours of MI and are suitable for revascularization that can be performed within 18 hours of shock. Patients with good prior functional status who are suitable for revascularization and agree to invasive care may be selected for such an invasive strategy. *(Level of Evidence: B)*	See above (49).
	2. It is reasonable to perform rescue PCI for patients with 1 or more of the following: a. Hemodynamic or electrical instability *(Level of Evidence: C)* b. Evidence of persistent ischemia. *(Level of Evidence: C)*	Phrasing has been changed to reflect current terminology.
Class IIb		
Recurrent angina without objective evidence of ischemia/infarction. *(Level of Evidence: C)*		Deleted. Recurrent angina is not applicable to rescue angioplasty. Recurrent symptoms are discussed elsewhere.
Class III	**Class III**	
Routine PTCA within 48 h following failed thrombolysis. *(Level of Evidence: B)*	Rescue PCI in the absence of 1 or more of the above class I or IIa indications is not recommended. *(Level of Evidence: C)*	Evidence obtained from studies of PTCA during the fibrinolytic era before the use of stents failed to show a benefit for reperfusion under these conditions. Current trials are under way to investigate the outcome of PCI with stent placement among patients with occluded arteries days after presentation with STEMI.
5.4.5. PCI After Successful Fibrinolysis or for Patients Not Undergoing Primary Reperfusion		
Class I	**Class I**	
1. Objective evidence for recurrent infarction or ischemia (rescue PCI). *(Level of Evidence: B)*	1. In patients whose anatomy is suitable, PCI should be performed when there is objective evidence of recurrent MI. *(Level of Evidence: C)*	Phrasing has been changed to reflect current terminology. Revised to a level of evidence C.
2. Spontaneous or provocable myocardial ischemia during recovery from infarction. *(Level of Evidence: C)*	2. In patients whose anatomy is suitable, PCI should be performed for moderate or severe spontaneous or provocable myocardial ischemia during recovery from STEMI. *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology. Level of evidence revised on the basis of review by the Writing Committee (64).
3. Persistent hemodynamic instability. *(Level of Evidence: C)*	3. In patients whose anatomy is suitable, PCI should be performed for cardiogenic shock or hemodynamic instability. See also Section 5.4.6 of the full-text guidelines. *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology. Level of evidence was revised on the basis of review by the Writing Committee, and cardiogenic shock has been added (cardiogenic shock is discussed in Section 5.4.6 and is a class I, level of evidence A recommendation for patients younger than 75 years old and a class IIa, level of evidence B recommendation for those aged 75 years and older) (49).
Class IIa	**Class IIa**	
Patients with LV ejection fraction less than or equal to 0.4, CHF, or serious ventricular arrhythmias. *(Level of Evidence: C)*	1. It is reasonable to perform routine PCI in patients with LV ejection fraction less than or equal to 0.40, CHF, or serious ventricular arrhythmias. *(Level of Evidence: C)*	Phrasing has been changed to reflect current terminology.
Class IIb		
1. Coronary angiography and angioplasty for an occluded infarct-related artery in an otherwise stable patient to revascularize that artery (open artery hypothesis). *(Level of Evidence: C)*		Recommendation deleted. Important trials are under way to provide evidence regarding outcomes associated with or resulting from this therapy.
2. Angioplasty of the infarct-related artery stenosis within hours to days (48 h) following successful thrombolytic therapy in asymptomatic patients without clinical and/or inducible evidence of ischemia. *(Level of Evidence: B)*		This recommendation has been merged into the upgraded class IIb recommendation for PCI after fibrinolytic therapy below.

Downloaded from circ.ahajournals.org by on August 27, 2008

0316
09/15/08

2001 Recommendation	2005 New or Revised Recommendation	Comments
	Class IIa	
3. Clinical HF during the acute episode, but subsequent demonstration of preserved LV function (LV ejection fraction greater than 0.4). *(Level of Evidence: C)*	2. It is reasonable to perform PCI when there is documented clinical heart failure during the acute episode, even though subsequent evaluation shows preserved LV function (LV ejection fraction greater than 0.40). *(Level of Evidence: C)*	Phrasing has been changed to reflect current terminology. Recommendation was upgraded to class IIa by the Writing Committee.
Class III	**Class III**	
1. PCI of the infarct-related artery within 48 to 72 h after thrombolytic therapy without evidence of spontaneous or provocable ischemia. *(Level of Evidence: C)*		This recommendation has been upgraded and merged into the IIb recommendation for PCI after fibrinolytic therapy below.
	Class IIb	
2. Routine PCI of the infarct-artery stenosis immediately after thrombolytic therapy. *(Level of Evidence: A)*	1. PCI might be considered as part of an invasive strategy after fibrinolytic therapy. *(Level of Evidence: C)*	This recommendation has been upgraded to class IIb to reflect a possible benefit from improved technology. The Committee recognizes the potential benefit of this therapy but believes more data are needed to define outcomes of PCI after fibrinolytic therapy in the current era of improved antiplatelet, anticoagulant, and drug-eluting stent therapies.
5.4.6. PCI for Cardiogenic Shock		
Class I	**Class I**	
None	Primary PCI is recommended for patients less than 75 years old with ST elevation or LBBB who develop shock within 36 hours of MI and are suitable for revascularization that can be performed within 18 hours of shock, unless further support is futile because of the patient's wishes or contraindications/unsuitability for further invasive care. *(Level of Evidence: A)*	Phrasing has been changed to reflect current terminology and the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction (48–53).
Class IIa	**Class IIa**	
Cardiogenic shock or hemodynamic instability. *(Level of Evidence: B)*	Primary PCI is reasonable for selected patients 75 years or older with ST elevation or LBBB who develop shock within 36 hours of MI and are suitable for revascularization that can be performed within 18 hours of shock. Patients with good prior functional status who are suitable for revascularization and agree to invasive care may be selected for such an invasive strategy. *(Level of Evidence: B)*	Phrasing has been changed to reflect current technology and modified to be consistent with the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction (48–53).
5.5. Percutaneous Intervention in Patients With Prior Coronary Bypass Surgery		
Class I	**Class I**	
Patients with early ischemia (usually within 30 days) after CABG (194). *(Level of Evidence: B)*	1. When technically feasible, PCI should be performed in patients with early ischemia (usually within 30 days) after CABG. *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology.
	2. It is recommended that distal embolic protection devices be used when technically feasible in patients undergoing PCI to saphenous vein grafts. *(Level of Evidence: B)*	New recommendation is based on several studies demonstrating efficacy of distal embolic protection devices in PCI to saphenous vein grafts (65,66).
Class IIa	**Class IIa**	
1. Patients with ischemia occurring 1 to 3 years postoperatively and preserved LV function with discrete lesions in graft conduits. *(Level of Evidence: B)*	1. PCI is reasonable in patients with ischemia that occurs 1 to 3 years after CABG and who have preserved LV function with discrete lesions in graft conduits. *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology.
2. Disabling angina secondary to new disease in a native coronary circulation. (If angina is not typical, the objective evidence of ischemia should be obtained.) *(Level of Evidence: B)*	2. PCI is reasonable in patients with disabling angina secondary to new disease in a native coronary circulation after CABG. (If angina is not typical, objective evidence of ischemia should be obtained.) *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology.
3. Patients with diseased vein grafts more than 3 years following CABG. *(Level of Evidence: B)*	3. PCI is reasonable in patients with diseased vein grafts more than 3 years after CABG. *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology.
	4. PCI is reasonable when technically feasible in patients with a patent left internal mammary artery graft who have clinically significant obstructions in other vessels. *(Level of Evidence: C)*	This new recommendation addresses the feasibility of PCI to native circulation in the presence of a patent left internal mammary artery graft.

Downloaded from circ.ahajournals.org by on August 27, 2008

0317
09/15/08

2001 Recommendation	2005 New or Revised Recommendation	Comments
Class III	**Class III**	
1. PCI to chronic total vein graft occlusions. *(Level of Evidence: B)*	1. PCI is not recommended in patients with prior CABG for chronic total vein graft occlusions. *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology.
2. Patients with multivessel disease, failure or multiple SVGs, and impaired LV function. *(Level of Evidence: B)*	2. PCI is not recommended in patients who have multiple target lesions with prior CABG and who have multivessel disease, failure of multiple SVGs, and impaired LV function unless repeat CABG poses excessive risk due to severe comorbid conditions. *(Level of Evidence: B)*	Phrasing has been changed to reflect current technology, and considerations regarding risk of repeat CABG have been added (36).
5.6.1. Intravascular Ultrasound Imaging (IVUS)		
Class IIa	**Class IIa**	
1. Assessment of the adequacy of deployment of coronary stents, including the extent of stent apposition and determination of the minimum luminal diameter within the stent. *(Level of Evidence: B)* 2. Determination of the mechanism of stent restenosis (inadequate expansion vs. neointimal proliferation) and to enable selection of appropriate therapy (plaque ablation vs. repeat balloon expansion). *(Level of Evidence: B)* 3. Evaluation of coronary obstruction at a location difficult to image by angiography in a patient with a suspected flow-limiting stenosis. *(Level of Evidence: C)*	1. IVUS is reasonable for the following: a. Assessment of the adequacy of deployment of coronary stents, including the extent of stent apposition and determination of the minimum luminal diameter within the stent. *(Level of Evidence: B)* b. Determination of the mechanism of stent restenosis (inadequate expansion versus neointimal proliferation) and to enable selection of appropriate therapy (vascular brachytherapy versus repeat balloon expansion). *(Level of Evidence: B)* c. Evaluation of coronary obstruction at a location difficult to image by angiography in a patient with a suspected flow-limiting stenosis. *(Level of Evidence: C)* d. Assessment of a suboptimal angiographic result after PCI. *(Level of Evidence: C)* e. Establishment of the presence and distribution of coronary calcium in patients for whom adjunctive rotational atherectomy is contemplated. *(Level of Evidence: C)* f. Determination of plaque location and circumferential distribution for guidance of directional coronary atherectomy. *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology. The previous class IIa recommendations for IVUS have been listed together in the recommendation rather than separately, with the exception that the Writing Committee has changed the recommendation to evaluate coronary disease after transplantation to class IIb.
4. Assessment of a suboptimal angiographic result following PCI. *(Level of Evidence: C)* 5. Diagnosis and management of coronary disease following cardiac transplantation. *(Level of Evidence: C)* 6. Establish presence and distribution of coronary calcium in patients for whom adjunctive rotational atherectomy is contemplated. *(Level of Evidence: C)* 7. Determination of plaque location and circumferential distribution for guidance of directional coronary atherectomy. *(Level of Evidence: B)*		
Class IIb	**Class IIb**	
1. Determine extent of atherosclerosis in patients with characteristic anginal symptoms and a positive functional study with no focal stenoses or mild CAD on angiography. *(Level of Evidence: C)* 2. Preinterventional assessment of lesional characteristics and vessel dimensions as a means to select an optimal revascularization device. *(Level of Evidence: C)*	IVUS may be considered for the following: a. Determination of the extent of atherosclerosis in patients with characteristic anginal symptoms and a positive functional study with no focal stenoses or mild CAD on angiography. *(Level of Evidence: C)* b. Preinterventional assessment of lesional characteristics and vessel dimensions as a means to select an optimal revascularization device. *(Level of Evidence: C)* c. Diagnosis of coronary disease after cardiac transplantation. *(Level of Evidence: C)*	Phrasing has been changed to reflect current terminology. The previous class IIb recommendations for IVUS have been listed together in this recommendation rather than separately. The use of IVUS to evaluate coronary disease in transplant patients is now a class IIb recommendation.
Class III	**Class III**	
When angiographic diagnosis is clear and no interventional treatment is planned. *(Level of Evidence: C)*	IVUS is not recommended when the angiographic diagnosis is clear and no interventional treatment is planned. *(Level of Evidence: C)*	Phrasing has been changed to reflect current terminology.

Downloaded from circ.ahajournals.org by on August 27, 2008

0318
09/15/08

2001 Recommendation	2005 New or Revised Recommendation	Comments
5.6.2. Coronary Artery Pressure and Flow: Use of Fractional Flow Reserve and Coronary Vasodilatory Reserve		
Class IIa	**Class IIa**	
Assessment of the physiological effects of intermediate coronary stenoses (30 to 70% luminal narrowing) in patients with anginal symptoms. Coronary pressure or Doppler velocimetry may also be useful as an alternative to performing noninvasive functional testing (e.g., when the functional study is absent or ambiguous) to determine whether an intervention is warranted. *(Level of Evidence: B)*	It is reasonable to use intracoronary physiologic measurements (Doppler ultrasound, fractional flow reserve) in the assessment of the effects of intermediate coronary stenoses (30% to 70% luminal narrowing) in patients with anginal symptoms. Coronary pressure or Doppler velocimetry may also be useful as an alternative to performing noninvasive functional testing (e.g., when the functional study is absent or ambiguous) to determine whether an intervention is warranted. *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology.
Class IIb	**Class IIb**	
1. Evaluation of the success of percutaneous coronary revascularization in restoring flow reserve and to predict the risk of restenosis. *(Level of Evidence: C)*	1. Intracoronary physiologic measurements may be considered for the evaluation of the success of PCI in restoring flow reserve and to predict the risk of restenosis. *(Level of Evidence: C)*	Phrasing has been changed to reflect current terminology.
2. Evaluation of patients with anginal symptoms without an apparent angiographic culprit lesion. *(Level of Evidence: C)*	2. Intracoronary physiologic measurements may be considered for the evaluation of patients with anginal symptoms without an apparent angiographic culprit lesion. *(Level of Evidence: C)*	Phrasing has been changed to reflect current terminology.
Class III	**Class III**	
Routine assessment of the severity of angiographic disease in patients with a positive, unequivocal noninvasive functional study. *(Level of Evidence: C)*	Routine assessment with intracoronary physiologic measurements such as Doppler ultrasound or fractional flow reserve to assess the severity of angiographic disease in patients with a positive, unequivocal noninvasive functional study is not recommended. *(Level of Evidence: C)*	Phrasing has been changed to reflect current terminology.
6. Management of Patients Undergoing PCI **6.1. Evolution of Technologies** **6.1.1. Acute Results**		
	Class I	
	It is recommended that distal embolic protection devices be used when technically feasible in patients undergoing PCI to saphenous vein grafts. *(Level of Evidence: B)*	Published clinical trials using distal embolic protection devices confirm their benefit in improving cardiovascular outcomes among patients undergoing PCI to saphenous vein grafts (65,66).
6.2. Antiplatelet and Antithrombotic Adjunctive Therapies for PCI **6.2.1. Oral Antiplatelet Therapy**		
	Class I	
The recommendations in this section appeared in table format in the 2001 guideline (see 2001 Table). The phrasing has been changed to reflect current terminology and to be consistent with new evidence and/or recommendations in the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction and the ACC/AHA 2002 Guideline Update for Patients With Unstable Angina/Non–ST-Elevation Myocardial Infarction.	1. Patients already taking daily chronic aspirin therapy should take 75 to 325 mg of aspirin before the PCI procedure is performed. *(Level of Evidence: A)*	A daily dose of 75 mg of aspirin has been shown to result in improved cardiovascular outcomes similar to daily doses of 325 mg but with fewer bleeding complications (67–69).
	2. Patients not already taking daily chronic aspirin therapy should be given 300 to 325 mg of aspirin at least 2 hours and preferably 24 hours before the PCI procedure is performed. *(Level of Evidence: C)*	Higher doses of aspirin are recommended for patients not already taking aspirin therapy immediately before PCI procedures.
	3. After the PCI procedure, in patients with neither aspirin resistance, allergy, nor increased risk of bleeding, aspirin 325 mg daily should be given for at least 1 month after bare-metal stent implantation, 3 months after sirolimus-eluting stent implantation, and 6 months after paclitaxel-eluting stent implantation, after which daily chronic aspirin use should be continued indefinitely at a dose of 75 to 162 mg. *(Level of Evidence: B)*	The doses and duration of aspirin therapy recommended herein are derived from those used for US Food and Drug Administration approval of the specific stent types noted in the recommendation. Daily chronic aspirin therapy is based on recommendations in the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction and evidence indicating that aspirin therapy in dosages as low as 75 mg per day yields outcomes similar to those achieved with 325 mg per day but with fewer side effects (67,69–71).

Downloaded from circ.ahajournals.org by on August 27, 2008

0319
09/15/08

2001 Recommendation	2005 New or Revised Recommendation	Comments
	4. A loading dose of clopidogrel should be administered before PCI is performed. *(Level of Evidence: A)* An oral loading dose of 300 mg, administered at least 6 hours before the procedure, has the best established evidence of efficacy. *(Level of Evidence: B)*	Clopidogrel is an important adjunctive therapy for patients undergoing PCI with stent placement. The best evidence of efficacy exists for 300 mg given at least 6 hours before PCI is performed (68,69,72).
	5. In patients who have undergone PCI, clopidogrel 75 mg daily should be given for at least 1 month after bare-metal stent implantation (unless the patient is at increased risk for bleeding; then it should be given for a minimum of 2 weeks), 3 months after sirolimus stent implantation, and 6 months after paclitaxel stent implantation, and ideally up to 12 months in patients who are not at high risk of bleeding. *(Level of Evidence: B)*	Clopidogrel therapy in the dosage of 75 mg daily should be given after stent placement to all patients. The duration of therapy varies for each stent and is based on data from clinical trials used for US Food and Drug Administration approval of that stent (67,69–71).
	Class IIa	
	1. If clopidogrel is given at the time of procedure, supplementation with GP IIb/IIIa receptor antagonists can be beneficial to facilitate earlier platelet inhibition than with clopidogrel alone. *(Level of Evidence: B)*	When clopidogrel is given at the time of a PCI procedure, supplementation with glycoprotein IIb/IIIa receptor antagonists can be beneficial, especially among high-risk patients (73,74).
	2. For patients with an absolute contraindication to aspirin, it is reasonable to give a 300-mg loading dose of clopidogrel, administered at least 6 hours before PCI, and/or GP IIb/IIIa antagonists, administered at the time of PCI. *(Level of Evidence: C)*	A significant number of patients will have resistance to aspirin. The strongest evidence for clopidogrel benefit exists for doses of 300 mg given at least 6 hours before the procedure.
	3. When a loading dose of clopidogrel is administered, a regimen of greater than 300 mg is reasonable to achieve higher levels of antiplatelet activity more rapidly, but the efficacy and safety compared with a 300-mg loading dose are less established. *(Level of Evidence: C)*	Many patients receive clopidogrel therapy at the time of PCI in dosages greater than 600 mg. Although more pronounced inhibition of platelet function has been demonstrated for doses of clopidogrel greater than 300 mg, the safety of these higher doses and their benefits on clinical outcome are not fully established.
	4. It is reasonable that patients undergoing brachytherapy be given daily clopidogrel 75 mg indefinitely and daily aspirin 75 to 325 mg indefinitely unless there is significant risk for bleeding. *(Level of Evidence: C)*	Subacute or later thrombosis has been observed in patients undergoing brachytherapy, and for this reason long-term antiplatelet therapy is recommended.
	Class IIb	
	In patients in whom subacute thrombosis may be catastrophic or lethal (unprotected left main, bifurcating left main, or last patent coronary vessel), platelet aggregation studies may be considered and the dose of clopidogrel increased to 150 mg per day if less than 50% inhibition of platelet aggregation is demonstrated. *(Level of Evidence: C)*	Clopidogrel resistance is a significant problem, and owing to its contribution to catastrophic clinical outcomes, the Writing Committee recommends studies be performed with increases in clopidogrel dose being recommended for use in those with higher-risk lesions.
6.2.2 Glycoprotein IIb/IIIa Inhibitors		
	Class I	
The recommendations in this section appeared in table format in the 2001 guideline (see 2001 Table). The phrasing has been changed to reflect current terminology and to be consistent with new evidence and/or recommendations in the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction and the ACC/AHA 2002 Guideline Update for the Management of Patients With Unstable Angina/ Non–ST-Elevation Myocardial Infarction.	In patients with UA/NSTEMI undergoing PCI without clopidogrel administration, a GP IIb/IIIa inhibitor (abciximab, eptifibatide, or tirofiban) should be administered. *(Level of Evidence: A)*§ §It is acceptable to administer the GP IIb/IIIa inhibitor before performance of the diagnostic angiogram ("upstream treatment") or just before PCI ("in-lab treatment").	This recommendation and phrasing are compatible with the ACC/AHA 2002 Guideline Update for the Management of Patients With Unstable Angina and Non–ST-Segment Myocardial Infarction and current evidence from randomized clinical trials. The benefits of GP IIb/IIIa inhibition are especially efficacious when clopidogrel is not given (37).
	Class IIa	
	1. In patients with UA/NSTEMI undergoing PCI with clopidogrel administration, it is reasonable to administer a GP IIb/IIIa inhibitor (abciximab, eptifibatide, or tirofiban). *(Level of Evidence: B)*§ §It is acceptable to administer the GP IIb/IIIa inhibitor before performance of the diagnostic angiogram ("upstream treatment") or just before PCI ("in-lab treatment").	See above (37).
	2. In patients with STEMI undergoing PCI, it is reasonable to administer abciximab as early as possible. *(Level of Evidence: B)*	Recommendation has been added for consistency with the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction (57,75–78).

Downloaded from circ.ahajournals.org by on August 27, 2008

0320
09/15/08

2001 Recommendation	2005 New or Revised Recommendation	Comments
	3. In patients undergoing elective PCI with stent placement, it is reasonable to administer a GP IIb/IIIa inhibitor (abciximab, eptifibatide, or tirofiban). *(Level of Evidence: B)*	Phrasing has been changed to reflect current terminology, especially in a high-risk patient (79,80).
	Class IIb	
	In patients with STEMI undergoing PCI, treatment with eptifibatide or tirofiban may be considered. *(Level of Evidence: C)*	Recommendation has been added for consistency with the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction.
6.2.3. Antithrombotic Therapy		
6.2.3.1 Unfractionated Heparin, Low-Molecular-Weight Heparin, and Bivalirudin		
	Class I	
The recommendations in this section appeared in table format in the 2001 guideline (see 2001 Table). The phrasing has been changed to reflect current terminology and to be consistent with new evidence and/or recommendations in the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction and the ACC/AHA 2002 Guideline Update for the Management of Patients With Unstable Angina/Non–ST-Elevation Myocardial Infarction.	1. Unfractionated heparin should be administered to patients undergoing PCI. *(Level of Evidence: C)*	Phrasing has been changed to reflect current terminology.
	2. For patients with heparin-induced thrombocytopenia, it is recommended that bivalirudin or argatroban be used to replace heparin. *(Level of Evidence: B)*	Bivalirudin and argatroban are established therapies in place of heparin among patients with heparin-induced thrombocytopenia (81, 82).
Class IIa	**Class IIa**	
None	1. It is reasonable to use bivalirudin as an alternative to unfractionated heparin and glycoprotein IIb/IIIa antagonists in low-risk patients undergoing elective PCI. *(Level of Evidence: B)*	New recommendation is based on data from a clinical trial (REPLACE-2) indicating bivalirudin is an acceptable alternative to heparin and GP IIb/IIIa antagonists in low-risk patients undergoing PCI (83).
	2. Low-molecular-weight heparin is a reasonable alternative to unfractionated heparin in patients with UA/NSTEMI undergoing PCI. *(Level of Evidence: B)*	Recommendation from the ACC/AHA 2002 Guideline Update for the Management of Patients With Unstable Angina and Non–ST-Segment Myocardial Infarction has been approved by this Writing Committee and included in these guidelines for consistency.
Class IIb	**Class IIb**	
None	Low-molecular-weight heparin may be considered as an alternative to unfractionated heparin in patients with STEMI undergoing PCI. *(Level of Evidence: B)*	Recommendation from the ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction has been approved by this Writing Committee and included in these guidelines for consistency.
6.3.4. Left Main CAD		
Class IIa	**Class IIa**	
None	It is reasonable that patients undergoing PCI to unprotected left main coronary obstructions be followed up with coronary angiography between 2 and 6 months after PCI. *(Level of Evidence: C)*	Patients undergoing PCI to an unprotected left main coronary artery are at higher risk for adverse events and should be monitored carefully. On the basis of experience and opinion in the available reports, the Writing Committee recommends angiography be performed between 2 and 6 months after PCI.
7.3.3. Management Strategies for Restenosis After PTCA		
Class IIa	**Class IIa**	
None	It is reasonable to consider that patients who develop restenosis after PTCA or PTCA with atheroablative devices are candidates for repeat coronary intervention with intracoronary stents if anatomic factors are appropriate. *(Level of Evidence: B)*	This new recommendation reflects data indicating a significant reduction in target-lesion revascularization and restenosis for patients undergoing bare-metal stent placement compared with PTCA for restenosis after PTCA (84).
7.3.5. Drug-Eluting Stents		
Class I	**Class I**	
None	A drug-eluting stent should be considered as an alternative to the bare-metal stent in subsets of patients in whom trial data suggest efficacy. *(Level of Evidence: A)*	New recommendation since the 2001 ACC/AHA Guidelines for Percutaneous Coronary Intervention. Evidence continues to accumulate that supports the use of drug-eluting stents (DES) versus bare-metal stents in certain subsets in which DES results and outcomes are better (70, 71, 85–97).
Class IIb	**Class IIb**	
None	A drug-eluting stent may be considered for use in anatomic settings in which the usefulness, effectiveness, and safety have not been fully documented in published trials. *(Level of Evidence: C)*	The data that a DES can improve clinical outcomes for PCI are generally strong. However, DESs have not undergone evaluation for use in all clinical situations and anatomic settings.

Downloaded from circ.ahajournals.org by on August 27, 2008

0321
09/15/08

2001 Recommendation	2005 New or Revised Recommendation	Comments
7.3.6.2 Drug-Eluting Stents for the Management of In-Stent Restenosis		
Class IIa None	**Class IIa** It is reasonable to perform repeat PCI for in-stent restenosis with a DES or a new DES for patients who develop in-stent restenosis if anatomic factors are appropriate. *(Level of Evidence: B)*	This is a new recommendation. Clinical trials comparing sirolimus and paclitaxel DESs with PTCA for in-stent restenosis demonstrate improved outcomes for the DESs (97–101).
7.3.6.3. Radiation for Restenosis		
Class IIa None	**Class IIa** Brachytherapy can be useful as a safe and effective treatment for in-stent restenosis. *(Level of Evidence: A)*	This is a new recommendation since the 2001 ACC/AHA Guidelines for Percutaneous Coronary Intervention based on evidence supporting the efficacy of brachytherapy in the treatment of in-stent restenosis (102–109).

2001 TABLE. Recommendations for Pharmacological Management of Patients Undergoing PCI—For Comparison Purposes Only (Deleted From 2005 Guideline)

	Clinical Status				
		Transmural Myocardial Infarction			
Drugs	Class I Angina	Class II–IV Angina, Unstable Angina, NSTEMI	Acute Phase MI	After Thrombolysis	Hospital Management Phase
Aspirin	I*	I	I	I	I
Ticlopidine, Clopidogrel†	I‡	I	I	I	I§
Warfarin‖	III‖	III	III	II	I¶
GP blockers#	II	I	II	I	III
Abciximab					
Tirofiban					
Eptifibatide					
Unfractionated heparin**	I	I	I	II	III††

Note: This table has been deleted from the 2005 PCI Guideline Update. The recommendations in this table were updated or deleted, as determined by the writing committee, and included in the 2005 PCI Guideline Update in the recommendation list.

*Roman numerals indicate ACC/AHA class indication I, II, or III.
†In conjunction with stenting.
‡To be given 24–48 h before planned stenting, if possible.
§For 2 to 4 weeks after stent placement.
¶For patients without atrial fibrillation or other pre-existing clinical indications.
‖For patients with anterior myocardial wall motion abnormalities or LV thrombus.
#Every indication may not apply to all individual agents.
**Low-molecular-weight heparin is under investigation to replace unfractionated heparin.
††Other noncoronary thrombotic complications (eg, thrombophlebitis).

Appendix. Abbreviations

CABG	coronary artery bypass graft surgery
CAD	coronary artery disease
CK	creatine kinase
DES	drug-eluting stent
ECG	electrocardiogram
GP	glycoprotein
HF	heart failure
IVUS	intravascular ultrasound
LAD	left anterior descending artery
LBBB	left bundle-branch block
LV	left ventricular
MB	cardiac muscle isoenzyme of creatine kinase
MI	myocardial infarction
MR	mitral regurgitation
NSTEMI	non–ST-elevation myocardial infarction
PCI	percutaneous coronary intervention
STEMI	ST-elevation myocardial infarction
UA	unstable angina

Downloaded from circ.ahajournals.org by on August 27, 2008

0322
09/15/08

References

1. Alpert JS, Thygesen K, Antman E, Bassand JP. Myocardial infarction redefined—a consensus document of The Joint European Society of Cardiology/American College of Cardiology Committee for the redefinition of myocardial infarction. J Am Coll Cardiol 2000; 36:959–69.
2. Selvanayagam JB, Porto I, Channon K, et al. Troponin elevation after percutaneous coronary intervention directly represents the extent of irreversible myocardial injury: insights from cardiovascular magnetic resonance imaging. Circulation 2005; 111:1027–32.
3. Bertinchant JP, Polge A, Ledermann B, et al. Relation of minor cardiac troponin I elevation to late cardiac events after uncomplicated elective successful percutaneous transluminal coronary angioplasty for angina pectoris. Am J Cardiol 1999; 84:51–7.
4. Garbarz E, Iung B, Lefevre G, et al. Frequency and prognostic value of cardiac troponin I elevation after coronary stenting. Am J Cardiol 1999; 84:515–8.
5. Fuchs S, Kornowski R, Mehran R, et al. Prognostic value of cardiac troponin-I levels following catheter-based coronary interventions. Am J Cardiol 2000; 85:1077–82.
6. Cantor WJ, Newby LK, Christenson RH, et al. Prognostic significance of elevated troponin I after percutaneous coronary intervention. J Am Coll Cardiol 2002; 39:1738–44.
7. Wu AH, Boden WE, McKay RG. Long-term follow-up of patients with increased cardiac troponin concentrations following percutaneous coronary intervention. Am J Cardiol 2002; 89:1300–2.
8. Kizer JR, Muttrej MR, Matthai WH, et al. Role of cardiac troponin T in the long-term risk stratification of patients undergoing percutaneous coronary intervention. Eur Heart J 2003; 24:1314–22.
9. Ricciardi MJ, Davidson CJ, Gubernikoff G, et al. Troponin I elevation and cardiac events after percutaneous coronary intervention. Am Heart J 2003; 145:522–8.
10. Kini AS, Lee P, Marmur JD, et al. Correlation of postpercutaneous coronary intervention creatine kinase-MB and troponin I elevation in predicting mid-term mortality. Am J Cardiol 2004; 93:18–23.
11. Vakili BA, Kaplan R, Brown DL. Volume-outcome relation for physicians and hospitals performing angioplasty for acute myocardial infarction in New York state. Circulation 2001; 104:2171–6.
12. Vakili BA, Brown DL. Relation of total annual coronary angioplasty volume of physicians and hospitals on outcomes of primary angioplasty for acute myocardial infarction (data from the 1995 Coronary Angioplasty Reporting System of the New York State Department of Health). Am J Cardiol 2003; 91:726–8.
13. Cannon CP, Gibson CM, Lambrew CT, et al. Relationship of symptom-onset-to-balloon time and door-to-balloon time with mortality in patients undergoing angioplasty for acute myocardial infarction. JAMA 2000; 283:2941–7.
14. Jollis JG, Peterson ED, Nelson CL, et al. Relationship between physician and hospital coronary angioplasty volume and outcome in elderly patients. Circulation 1997; 95:2485–91.
15. Klein LW, Schaer GL, Calvin JE, et al. Does low individual operator coronary interventional procedural volume correlate with worse institutional procedural outcome? J Am Coll Cardiol 1997; 30:870–7.
16. Magid DJ, Calonge BN, Rumsfeld JS, et al. Relation between hospital primary angioplasty volume and mortality for patients with acute MI treated with primary angioplasty vs thrombolytic therapy. JAMA 2000; 284:3131–8.
17. Canto JG, Every NR, Magid DJ, et al. The volume of primary angioplasty procedures and survival after acute myocardial infarction: National Registry of Myocardial Infarction 2 Investigators. N Engl J Med 2000; 342:1573–80.
18. Klinke WP, Hui W. Percutaneous transluminal coronary angioplasty without on-site surgical facilities. Am J Cardiol 1992; 70:1520–5.
19. Meier B, Urban P, Dorsaz PA, Favre J. Surgical standby for coronary balloon angioplasty. JAMA 1992; 268:741–5.
20. Iniguez A, Macaya C, Hernandez R, et al. Comparison of results of percutaneous transluminal coronary angioplasty with and without selective requirement of surgical standby. Am J Cardiol 1992; 69:1161–5.
21. Hubner PJ, Balcon R, Dyet J, Dymond DS, et al. Surgical cover for percutaneous transluminal coronary angioplasty. Br Heart J 1992; 68:339–41.
22. Sowton E, de Bono D, Gribbin B, O'Keeffe B, et al. Coronary angioplasty in the United Kingdom. Br Heart J 1991; 66:325–31.
23. Loubeyre C, Morice MC, Berzin B, et al. Emergency coronary artery bypass surgery following coronary angioplasty and stenting: results of a French multicenter registry. Catheter Cardiovasc Interv 1999; 47:441–8.
24. Vogt A, Bonzel T, Harmjanz D, et al. PTCA registry of German community hospitals. Arbeitsgemeinschaft Leitender Kardiologischer Krankenhausarzte (ALKK) Study Group. Eur Heart J 1997; 18:1110–4.
25. Dellavalle A, Steffenino G, Ribichini F, Russo P, Uslenghi E. Elective coronary angioplasty with and without surgical standby: clinical and angiographic criteria for the selection of patients. Coron Artery Dis 1995; 6:513–20.
26. Richardson SG, Morton P, Murtagh JG, O'Keeffe DB, Murphy P, Scott ME. Management of acute coronary occlusion during percutaneous transluminal coronary angioplasty: experience of complications in a hospital without on site facilities for cardiac surgery [see comments]. BMJ 1990; 300:355–8.
27. Reifart N, Preusler W, Schwarz F, et al. A large center experience of coronary angioplasty without on-site surgical standby. In: Topol EJ, Serruys PW, editors. Current Review of Interventional Cardiology. Philadelphia: Current Medicine, 1995:296–303.
28. Yusuf S, Wittes J, Probstfield J, Tyroler HA. Analysis and interpretation of treatment effects in subgroups of patients in randomized clinical trials. JAMA 1991; 266:93–8.
29. Wennberg DE, Lucas FL, Siewers AE, Kellett MA, Malenka DJ. Outcomes of percutaneous coronary interventions performed at centers without and with onsite coronary artery bypass graft surgery. JAMA 2004; 292:1961–8.
30. Fox KA, Poole-Wilson PA, Henderson RA, et al. Interventional versus conservative treatment for patients with unstable angina or non-ST-elevation myocardial infarction: the British Heart Foundation RITA 3 randomised trial. Randomized Intervention Trial of unstable Angina. Lancet 2002; 360:743–51.
31. Hueb W, Soares PR, Gersh BJ, et al. The medicine, angioplasty, or surgery study (MASS-II): a randomized, controlled clinical trial of three therapeutic strategies for multivessel coronary artery disease: one-year results. J Am Coll Cardiol 2004; 43:1743–51.
32. Chieffo A, Stankovic G, Bonizzoni E, et al. Early and mid-term results of drug-eluting stent implantation in unprotected left main. Circulation 2005; 111:791–5.
33. Park SJ, Kim YH, Lee BK, et al. Sirolimus-eluting stent implantation for unprotected left main coronary artery stenosis: comparison with bare metal stent implantation. J Am Coll Cardiol 2005; 45:351–6.
34. Silvestri M, Barragan P, Sainsous J, et al. Unprotected left main coronary artery stenting: immediate and medium-term outcomes of 140 elective procedures. J Am Coll Cardiol 2000; 35:1543–50.
35. Tan WA, Tamai H, Park SJ, et al. Long-term clinical outcomes after unprotected left main trunk percutaneous revascularization in 279 patients. Circulation 2001; 104:1609–14.
36. Eagle KA, Guyton RA, Davidoff R, et al. ACC/AHA 2004 guideline update for coronary artery bypass graft surgery—summary article: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Update the 1999 Guidelines for Coronary Artery Bypass Graft Surgery). J Am Coll Cardiol 2004; 44:1146–310.
37. Braunwald E, Antman EM, Beasley JW, et al. ACC/AHA 2002 guideline update for the management of patients with unstable angina and non–ST-segment elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on the Management of Patients With Unstable Angina) 2002. Available at: http://www.acc.org/clinical/guidelines/unstable/incorporated/index.htm. Accessed January 10, 2005.
38. Invasive compared with non-invasive treatment in unstable coronary-artery disease: FRISC II prospective randomised multicentre study. FRagmin and Fast Revascularisation during InStability in Coronary artery disease Investigators. Lancet 1999; 354:708–15.
39. Cannon CP, Weintraub WS, Demopoulos LA, et al. Comparison of early invasive and conservative strategies in patients with unstable coronary syndromes treated with the glycoprotein IIb/IIIa inhibitor tirofiban. N Engl J Med 2001; 344:1879–87.
40. de Lezo JS, Medina A, Pan M, et al. Rapamycin-eluting stents for the treatment of unprotected left main coronary disease. Am Heart J 2004; 148:481–5.
41. Black A, Cortina R, Bossi I, Choussat R, Fajadet J, Marco J. Unprotected left main coronary artery stenting: correlates of midterm survival and impact of patient selection. J Am Coll Cardiol 2001; 37:832–8.
42. Takagi T, Stankovic G, Finci L, et al. Results and long-term predictors of adverse clinical events after elective percutaneous interventions on unprotected left main coronary artery. Circulation 2002; 106:698–702.
43. Park SJ, Park SW, Hong MK, et al. Long-term (three-year) outcomes after stenting of unprotected left main coronary artery stenosis in patients with normal left ventricular function. Am J Cardiol 2003; 91:12–6.

Downloaded from circ.ahajournals.org by on August 27, 2008

0323
09/15/08

44. Keeley EC, Boura JA, Grines CL. Primary angioplasty versus intravenous thrombolytic therapy for acute myocardial infarction: a quantitative review of 23 randomised trials. Lancet 2003; 361:13–20.
45. Nallamothu BK, Bates ER. Percutaneous coronary intervention versus fibrinolytic therapy in acute myocardial infarction: is timing (almost) everything? Am J Cardiol 2003; 92:824–6.
46. De LG, Suryapranata H, Ottervanger JP, Antman EM. Time delay to treatment and mortality in primary angioplasty for acute myocardial infarction: every minute of delay counts. Circulation 2004; 109:1223–5.
47. Berger PB, Ellis SG, Holmes DR, Jr., et al. Relationship between delay in performing direct coronary angioplasty and early clinical outcome in patients with acute myocardial infarction: results from the global use of strategies to open occluded arteries in Acute Coronary Syndromes (GUSTO-IIb) trial. Circulation 1999; 100:14–20.
48. Hochman JS, Sleeper LA, Webb JG, et al. Early revascularization in acute myocardial infarction complicated by cardiogenic shock. SHOCK Investigators. Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock [see comments]. N Engl J Med 1999; 341:625–34.
49. Hochman JS, Sleeper LA, White HD, et al. One-year survival following early revascularization for cardiogenic shock. JAMA 2001; 285:190–2.
50. Urban P, Stauffer JC, Bleed D, et al. A randomized evaluation of early revascularization to treat shock complicating acute myocardial infarction. The (Swiss) Multicenter Trial of Angioplasty for Shock-(S)MASH. Eur Heart J 1999; 20:1030–8.
51. Dzavik V, Sleeper LA, Picard MH, et al. Outcome of patients aged >or=75 years in the SHould we emergently revascularize Occluded Coronaries in cardiogenic shocK (SHOCK) trial: do elderly patients with acute myocardial infarction complicated by cardiogenic shock respond differently to emergent revascularization? Am Heart J 2005; 149:1128–34.
52. Dauerman HL, Goldberg RJ, Malinski M, Yarzebski J, Lessard D, Gore JM. Outcomes and early revascularization for patients >or= 65 years of age with cardiogenic shock. Am J Cardiol 2001; 87:844–8.
53. Dauerman HL, Ryan TJ, Jr., Piper WD, et al. Outcomes of percutaneous coronary intervention among elderly patients in cardiogenic shock: a multicenter, decade-long experience. J Invasive Cardiol 2003; 15:380–4.
54. Wu AH, Parsons L, Every NR, Bates ER. Hospital outcomes in patients presenting with congestive heart failure complicating acute myocardial infarction: a report from the Second National Registry of Myocardial Infarction (NRMI-2). J Am Coll Cardiol 2002; 40:1389–94.
55. Bengtson JR, Kaplan AJ, Pieper KS, et al. Prognosis in cardiogenic shock after acute myocardial infarction in the interventional era. J Am Coll Cardiol 1992; 20:1482–9.
56. Lee L, Erbel R, Brown TM, Laufer N, Meyer J, O'Neill WW. Multicenter registry of angioplasty therapy of cardiogenic shock: initial and long-term survival. J Am Coll Cardiol 1991; 17:599–603.
57. Montalescot G, Barragan P, Wittenberg O, et al. Platelet glycoprotein IIb/IIIa inhibition with coronary stenting for acute myocardial infarction. N Engl J Med 2001; 344:1895–903.
58. Brodie BR, Stuckey TD, Hansen C, Muncy D. Benefit of coronary reperfusion before intervention on outcomes after primary angioplasty for acute myocardial infarction. Am J Cardiol 2000; 85:13–8.
59. Stone GW, Mehran R, Dangas G, Lansky AJ, Kornowski R, Leon MB. Differential impact on survival of electrocardiographic Q-wave versus enzymatic myocardial infarction after percutaneous intervention: a device-specific analysis of 7147 patients. Circulation 2001; 104:642–7.
60. Gibson CM. A union in reperfusion: the concept of facilitated percutaneous coronary intervention. J Am Coll Cardiol 2000; 36:1497–9.
61. Herrmann HC, Moliterno DJ, Ohman EM, et al. Facilitation of early percutaneous coronary intervention after reteplase with or without abciximab in acute myocardial infarction: results from the SPEED (GUSTO-4 Pilot) Trial. J Am Coll Cardiol 2000; 36:1489–96.
62. Kastrati A, Mehilli J, Schlotterbeck K, et al. Early administration of reteplase plus abciximab vs abciximab alone in patients with acute myocardial infarction referred for percutaneous coronary intervention: a randomized controlled trial. JAMA 2004; 291:947–54.
63. Le May MR, Wells GA, Labinaz M, et al. Combined angioplasty and pharmacological intervention versus thrombolysis alone in acute myocardial infarction (CAPITAL AMI study). J Am Coll Cardiol 2005; 46:417–24.
64. Madsen JK, Grande P, Saunamaki K, et al. Danish multicenter randomized study of invasive versus conservative treatment in patients with inducible ischemia after thrombolysis in acute myocardial infarction (DANAMI). DANish trial in Acute Myocardial Infarction. Circulation 1997; 96:748–55.
65. Baim DS, Wahr D, George B, et al. Randomized trial of a distal embolic protection device during percutaneous intervention of saphenous vein aorto-coronary bypass grafts. Circulation 2002; 105:1285–90.
66. Stone GW, Rogers C, Hermiller J, et al. Randomized comparison of distal protection with a filter-based catheter and a balloon occlusion and aspiration system during percutaneous intervention of diseased saphenous vein aorto-coronary bypass grafts. Circulation 2003; 108:548–53.
67. Yusuf S, Zhao F, Mehta SR, Chrolavicius S, Tognoni G, Fox KK. Effects of clopidogrel in addition to aspirin in patients with acute coronary syndromes without ST-segment elevation. N Engl J Med 2001; 345:494–502.
68. Mehta SR, Yusuf S, Peters RJ, et al. Effects of pretreatment with clopidogrel and aspirin followed by long-term therapy in patients undergoing percutaneous coronary intervention: the PCI-CURE study. Lancet 2001; 358:527–33.
69. Steinhubl SR, Berger PB, Mann JT, III, et al. Early and sustained dual oral antiplatelet therapy following percutaneous coronary intervention: a randomized controlled trial. JAMA 2002; 288:2411–20.
70. Stone GW, Ellis SG, Cox DA, et al. One-year clinical results with the slow-release, polymer-based, paclitaxel-eluting TAXUS stent: the TAXUS-IV trial. Circulation 2004; 109:1942–7.
71. Holmes DR, Jr., Leon MB, Moses JW, et al. Analysis of 1-year clinical outcomes in the SIRIUS trial: a randomized trial of a sirolimus-eluting stent versus a standard stent in patients at high risk for coronary restenosis. Circulation 2004; 109:634–40.
72. Patti G, Colonna G, Pasceri V, Pepe LL, Montinaro A, Di SG. Randomized trial of high loading dose of clopidogrel for reduction of periprocedural myocardial infarction in patients undergoing coronary intervention: results from the ARMYDA-2 (Antiplatelet therapy for Reduction of MYocardial Damage during Angioplasty) study. Circulation 2005; 111:2099–106.
73. Kastrati A, Mehilli J, Schuhlen H, et al. A clinical trial of abciximab in elective percutaneous coronary intervention after pretreatment with clopidogrel. N Engl J Med 2004; 350:232–8.
74. Gurbel PA, Bliden KP, Zaman KA, Yoho JA, Hayes KM, Tantry US. Clopidogrel loading with eptifibatide to arrest the reactivity of platelets: results of the Clopidogrel Loading With Eptifibatide to Arrest the Reactivity of Platelets (CLEAR PLATELETS) study. Circulation 2005; 111:1153–9.
75. Brener SJ, Barr LA, Burchenal JE, et al. Randomized, placebo-controlled trial of platelet glycoprotein IIb/IIIa blockade with primary angioplasty for acute myocardial infarction. ReoPro and Primary PTCA Organization and Randomized Trial (RAPPORT) Investigators. Circulation 1998; 98:734–41.
76. Neumann FJ, Kastrati A, Schmitt C, et al. Effect of glycoprotein IIb/IIIa receptor blockade with abciximab on clinical and angiographic restenosis rate after the placement of coronary stents following acute myocardial infarction. J Am Coll Cardiol 2000; 35:915–21.
77. Stone GW, Grines CL, Cox DA, et al. Comparison of angioplasty with stenting, with or without abciximab, in acute myocardial infarction. N Engl J Med 2002; 346:957–66.
78. Antoniucci D, Santoro GM, Bolognese L, Valenti R, Trapani M, Fazzini PF. A clinical trial comparing primary stenting of the infarct-related artery with optimal primary angioplasty for acute myocardial infarction: results from the Florence Randomized Elective Stenting in Acute Coronary Occlusions (FRESCO) trial. J Am Coll Cardiol 1998; 31:1234–9.
79. Kong DF, Hasselblad V, Harrington RA, et al. Meta-analysis of survival with platelet glycoprotein IIb/IIIa antagonists for percutaneous coronary interventions. Am J Cardiol 2003; 92:651–5.
80. Karvouni E, Katritsis DG, Ioannidis JP. Intravenous glycoprotein IIb/IIIa receptor antagonists reduce mortality after percutaneous coronary interventions. J Am Coll Cardiol 2003; 41:26–32.
81. Angiomax (bivalirudin) for injection. Package Insert. The Medicine Company, Parsippany, NJ. Available at: http://www.themedicinescompany.com/~products_content/PN16019gt2.pdf. Accessed May 27, 2005.
82. Argatroban Injection. Prescribing Information. GlaxoSmithKline, Research Triangle, NC. Available at: http://us.gsk.com/products/assets/us_argatroban.pdf. Accessed May 27, 2005.
83. Lincoff AM, Bittl JA, Harrington RA, et al. Bivalirudin and provisional glycoprotein IIb/IIIa blockade compared with heparin and planned glycoprotein IIb/IIIa blockade during percutaneous coronary intervention: REPLACE-2 randomized trial. JAMA 2003; 289:853–63.
84. Erbel R, Haude M, Hopp HW, et al. Coronary-artery stenting compared with balloon angioplasty for restenosis after initial balloon angioplasty. Restenosis Stent Study Group [see comments]. N Engl J Med 1998; 339:1672–8.
85. Sousa JE, Costa MA, Abizaid AC, et al. Sustained suppression of neointimal proliferation by sirolimus-eluting stents: one-year angiographic and intravascular ultrasound follow-up. Circulation 2001; 104:2007–11.
86. Morice MC, Serruys PW, Sousa JE, et al. A randomized comparison of a sirolimus-eluting stent with a standard stent for coronary revascularization. N Engl J Med 2002; 346:1773–80.

Downloaded from circ.ahajournals.org by on August 27, 2008

0324
09/15/08

87. Schampaert E, Cohen EA, Schluter M, et al. The Canadian study of the sirolimus-eluting stent in the treatment of patients with long de novo lesions in small native coronary arteries (C-SIRIUS). J Am Coll Cardiol 2004; 43:1110–5.
88. Schofer J, Schluter M, Gershlick AH, et al. Sirolimus-eluting stents for treatment of patients with long atherosclerotic lesions in small coronary arteries: double-blind, randomised controlled trial (E-SIRIUS). Lancet 2003; 362:1093–9.
89. Lemos PA, Lee CH, Degertekin M, et al. Early outcome after sirolimus-eluting stent implantation in patients with acute coronary syndromes: insights from the Rapamycin-Eluting Stent Evaluated At Rotterdam Cardiology Hospital (RESEARCH) registry. J Am Coll Cardiol 2003; 41:2093–9.
90. Lemos PA, Saia F, Hofma SH, et al. Short- and long-term clinical benefit of sirolimus-eluting stents compared to conventional bare stents for patients with acute myocardial infarction. J Am Coll Cardiol 2004; 43:704–8.
91. Lemos PA, Serruys PW, van Domburg RT, et al. Unrestricted utilization of sirolimus-eluting stents compared with conventional bare stent implantation in the 'real world': the Rapamycin-Eluting Stent Evaluated At Rotterdam Cardiology Hospital (RESEARCH) registry. Circulation 2004; 109:190–5.
92. Hoye A, Tanabe K, Lemos PA, et al. Significant reduction in restenosis after the use of sirolimus-eluting stents in the treatment of chronic total occlusions. J Am Coll Cardiol 2004; 43:1954–8.
93. Liistro F, Stankovic G, Di MC, et al. First clinical experience with a paclitaxel derivate-eluting polymer stent system implantation for in-stent restenosis: immediate and long-term clinical and angiographic outcome. Circulation 2002; 105:1883–6.
94. Park SJ, Shim WH, Ho DS, et al. A paclitaxel-eluting stent for the prevention of coronary restenosis. N Engl J Med 2003; 348:1537–45.
95. Grube E, Silber S, Hauptmann KE, et al. TAXUS I: six- and twelve-month results from a randomized, double-blind trial on a slow-release paclitaxel-eluting stent for de novo coronary lesions. Circulation 2003; 107:38–42.
96. Colombo A, Orlic D, Stankovic G, et al. Preliminary observations regarding angiographic pattern of restenosis after rapamycin-eluting stent implantation. Circulation 2003; 107:2178–80.
97. Tanabe K, Serruys PW, Grube E, et al. TAXUS III Trial: in-stent restenosis treated with stent-based delivery of paclitaxel incorporated in a slow-release polymer formulation. Circulation 2003; 107:559–64.
98. Kastrati A, Mehilli J, von BN, et al. Sirolimus-eluting stent or paclitaxel-eluting stent vs balloon angioplasty for prevention of recurrences in patients with coronary in-stent restenosis: a randomized controlled trial. JAMA 2005; 293:165–71.
99. Sousa JE, Costa MA, Abizaid A, et al. Sirolimus-eluting stent for the treatment of in-stent restenosis: a quantitative coronary angiography and three-dimensional intravascular ultrasound study. Circulation 2003; 107:24–7.
100. Degertekin M, Regar E, Tanabe K, et al. Sirolimus-eluting stent for treatment of complex in-stent restenosis: the first clinical experience. J Am Coll Cardiol 2003; 41:184–9.
101. Neumann FJ, Desmet W, Grube E, et al. Effectiveness and safety of sirolimus-eluting stents in the treatment of restenosis after coronary stent placement. Circulation 2005; 111:2107–11.
102. Teirstein PS, Massullo V, Jani S, et al. Catheter-based radiotherapy to inhibit restenosis after coronary stenting. N Engl J Med 1997; 336:1697–703.
103. Raizner AE, Oesterle SN, Waksman R, et al. Inhibition of restenosis with beta-emitting radiotherapy: Report of the Proliferation Reduction with Vascular Energy Trial (PREVENT). Circulation 2000; 102:951–8.
104. Waksman R, White RL, Chan RC, et al. Intracoronary gamma-radiation therapy after angioplasty inhibits recurrence in patients with in-stent restenosis. Circulation 2000;101:2165–71.
105. Leon MB, Teirstein PS, Moses JW, et al. Localized intracoronary gamma-radiation therapy to inhibit the recurrence of restenosis after stenting. N Engl J Med 2001; 344:250–6.
106. Waksman R, Raizner AE, Yeung AC, Lansky AJ, Vandertie L. Use of localised intracoronary beta radiation in treatment of in-stent restenosis: the INHIBIT randomised controlled trial. Lancet 2002; 359:551–7.
107. Popma JJ, Suntharalingam M, Lansky AJ, et al. Randomized trial of 90Sr/90Y beta-radiation versus placebo control for treatment of in-stent restenosis. Circulation 2002; 106:1090–6.
108. Waksman R, Ajani AE, White RL, et al. Intravascular gamma radiation for in-stent restenosis in saphenous-vein bypass grafts. N Engl J Med 2002; 346:1194–9.
109. Waksman R, Cheneau E, Ajani AE, et al. Intracoronary radiation therapy improves the clinical and angiographic outcomes of diffuse in-stent restenotic lesions: results of the Washington Radiation for In-Stent Restenosis Trial for Long Lesions (Long WRIST) Studies. Circulation 2003; 107:1744–9.

Downloaded from circ.ahajournals.org by on August 27, 2008

0325
09/15/08

THE ANNALS OF THORACIC SURGERY

Quality Measurement in Adult Cardiac Surgery: Part 1—Conceptual Framework and Measure Selection

David M. Shahian, Fred H. Edwards, Victor A. Ferraris, Constance K. Haan, Jeffrey B. Rich, Sharon-Lise T. Normand, Elizabeth R. DeLong, Sean M. O'Brien, Cynthia M. Shewan, Rachel S. Dokholyan and Eric D. Peterson

Ann Thorac Surg 2007;83:3-12
DOI: 10.1016/j.athoracsur.2007.01.053

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://ats.ctsnetjournals.org/cgi/content/full/83/4_Supplement/S3

The Annals of Thoracic Surgery is the official journal of The Society of Thoracic Surgeons and the Southern Thoracic Surgical Association. Copyright © 2007 by The Society of Thoracic Surgeons.
Print ISSN: 0003-4975; eISSN: 1552-6259.

Downloaded from ats.ctsnetjournals.org by on August 4, 2008

0326
09/15/08

Quality Measurement in Adult Cardiac Surgery: Part 1—Conceptual Framework and Measure Selection

David M. Shahian, MD,[a†] Fred H. Edwards, MD,[b] Victor A. Ferraris, MD,[c] Constance K. Haan, MD,[b] Jeffrey B. Rich, MD,[d] Sharon-Lise T. Normand, PhD,[e] Elizabeth R. DeLong, PhD,[f] Sean M. O'Brien, PhD,[f] Cynthia M. Shewan, PhD,[g] Rachel S. Dokholyan, MPH,[f] and Eric D. Peterson, MD, MPH[f]

[a]Tufts University School of Medicine, Boston, Massachusetts; [b]Division of Cardiothoracic Surgery, University of Florida, Jacksonville, Florida; [c]Division of Cardiovascular & Thoracic Surgery, University of Kentucky Chandler Medical Center, Lexington, Kentucky; [d]Sentara Cardiovascular Research Institute, Norfolk, Virginia; [e]Department of Health Care Policy, Harvard Medical School and [e]Department of Biostatistics, Harvard School of Public Health, Boston, Massachusetts; [f]Duke Clinical Research Institute, Durham, North Carolina, and [g]The Society of Thoracic Surgeons, Chicago, Illinois

Executive Summary

The Society of Thoracic Surgeons established a Quality Measurement Task Force to develop a methodology for the comprehensive assessment of adult cardiac surgery quality of care, including both individual measures and an overall *composite quality score*. In Part 1 of a two-part series, the Task Force describes the conceptual framework, principles, and guidelines used to select and categorize the individual measures that comprise the composite score.

Quality indicators were selected using the following principles:

1. Quality assessment should be at the level of the program or hospital rather than the individual surgeon.
2. Initial quality reports should focus on coronary artery bypass grafting surgery.
3. Quality measures should be chosen from among those endorsed by the National Quality Forum.
4. Quality measure selection should be consistent with the principles and criteria recommended in the 2006 Institute of Medicine report *Performance Measurement: Accelerating Improvement.*
5. Quality measures should be available as data elements within The Society of Thoracic Surgeons National Adult Cardiac Surgery Database.
6. Quality scores should consider structure, process, and outcomes.
7. Quality scores should assess three temporal domains—preoperative, operative, and postoperative.
8. Quality scores should satisfy multiple criteria for validity.
9. Quality scores should be interpretable and actionable by providers.

Eleven individual measures of coronary artery bypass grafting quality within four domains were selected:

1. *Perioperative Medical Care,* a process bundle of four medications including preoperative β-blockade and discharge aspirin, β-blockade, and lipid-lowering agents.
2. *Operative Care,* a single process measure—use of at least one internal mammary artery.
3. *Risk-Adjusted Operative Mortality.*
4. *Postoperative Risk-Adjusted Major Morbidity,* defined as the risk-adjusted occurrence of any of the following: renal failure, deep sternal wound infection, reexploration, stroke, or prolonged ventilation/intubation.

In summary, The Society of Thoracic Surgeons Quality Measurement Task Force has selected a group of measures to serve as the basis for comprehensive assessment of adult cardiac surgery quality. Part 2 of this report describes the statistical considerations relevant to combining these measures into composite scores, then using such scores as the basis for a provider rating system.

Address correspondence to Dr Shahian, The Society of Thoracic Surgeons, 633 N Saint Clair St, Suite 2320, Chicago, IL 60611; e-mail: shahian@comcast.net.

†Dr Shahian is the Quality Measurement Task Force Chair and Writing Group Leader.

© 2007 by The Society of Thoracic Surgeons
Published by Elsevier Inc

Ann Thorac Surg 2007;83:S3–12 • 0003-4975/07/$32.00
doi:10.1016/j.athoracsur.2007.01.053

Downloaded from ats.ctsnetjournals.org by on August 4, 2008

Introduction

Performance measurement is an essential element of quality improvement initiatives and health care reform [1]. For two decades, cardiac surgeons have systematically collected and analyzed outcomes data in order to continually enhance the quality of care they deliver. Central to this effort was the development of The Society of Thoracic Surgeons National Adult Cardiac Surgery Database (STS NCD), which is the largest and most comprehensive single-specialty clinical database in health care. Through this resource, information is available on all aspects of adult cardiac procedures including preoperative patient characteristics, operative management, perioperative care, postoperative outcomes, and discharge medications and venue.

These data are used in numerous ways to improve selection, operative techniques, and perioperative care of cardiac surgical patients. Over the past decade, analysis of such risk-adjusted data has also been used by providers, health policy researchers, payers, and government agencies to assess the quality of cardiac surgical care. Until recently, these efforts were focused on the short-term outcomes (eg, operative mortality and morbidity) of cardiac surgery, particularly coronary artery bypass grafting (CABG) [2–4]. However, it is now recognized that such clinical outcomes are only one measure of overall health care quality. More comprehensive quality indicators are desirable, including intraoperative processes of care as well as perioperative measures that impact hospital outcomes, secondary prevention, and long-term health.

Continuing its tradition of leadership in efforts to assess and improve quality, The Society of Thoracic Surgeons recently established a Quality Measurement Task Force (QMTF) consisting of clinical, health policy, and statistical experts. Its charge is to develop methodologies to assess the overall quality of care delivered by cardiac surgery providers (used generically in these reports to refer to hospitals or cardiac surgical groups that participate in the STS NCD). Such information could serve several important functions: (1) to provide public accountability, a fundamental responsibility of any professional organization; (2) to facilitate quality improvement activities; and (3) to satisfy the reporting requirements of various pay for performance programs.

Commercial organizations, accrediting, and governmental agencies have previously developed cardiac surgery rating systems; however, most of these were designed without the involvement or endorsement of cardiac surgeons. Furthermore, all are based on administrative data with the exception of several state report cards (eg, New York, Massachusetts), and the latter have been limited primarily to operative outcomes. The goal of the QMTF is to develop a more *comprehensive* set of measures based on clinical data elements that have already received the endorsement of the National Quality Forum. With the widespread support of the provider community as well as broad external endorsement, it is expected that these measures could become the standard, benchmark methodology for assessing adult cardiac surgery quality.

The design of such comprehensive quality measures involved clinical, health policy, and statistical considerations. Part 1 of this report outlines the conceptual framework within which the QMTF conducted its deliberations and the guidelines used to select and categorize a comprehensive set of quality measures. Part 2 will describe the statistical considerations relevant to combining these measures into composite scores and subsequently using these scores as the basis for a provider rating system. It also presents the results of a pilot study of the proposed QMTF methodology using actual 2004 data from the STS NCD.

The Concept of Quality

Quality is an abstract construct that cannot be directly measured. In the nomenclature of modern measurement theory, it is characterized by one or more latent (unobserved) variables or traits. The overt, observable manifestations of such underlying traits may be intuitively apparent at the extremes, but difficult to quantify over the broad range between extremes. Different observers may agree that a luxury automobile is high quality, and that an entry-level automobile is of lower quality. However, what are the characteristics that permit this classification to be made, and how is it possible to scale these defining characteristics, weight their relative importance, and combine them into meaningful overall scores?

To quantify abstract constructs like quality, intelligence, or musical ability, we typically rely upon some combination or composite of measurable surrogates that are thought to be associated with or contribute to that underlying trait. For example, to assess intelligence it might be useful to objectively measure visual spatial ability, critical reasoning, and problem-solving approaches, and then assign a score to each area as well as a composite overall score. Ideally, it should also be possible to validate this score against some end point that is believed to be the product of intelligence, such as academic achievement.

Quality is a major focus of American medicine, but how best to define this elusive concept for health care is particularly challenging. At a minimum, any proposed measures of provider quality should be associated with the results we would expect from excellent health care; for example, fewer hospital admissions for chronic diseases, and improved long-term survival. In current practice, quality is often characterized by some combination of *structure, process,* and *outcome* measures, a triad first proposed by Professor Avedis Donabedian at the University of Michigan. Birkmeyer and associates [5] suggest that the suitability of structure, process, or outcome measures to assess quality for a particular procedure is a function of both the potential for adverse consequences and the frequency with which the procedure is performed. For many surgical procedures and medical conditions, small sample sizes [6] or lack of serious adverse sequelae diminish the utility of statistical outcomes com-

Downloaded from ats.ctsnetjournals.org by on August 4, 2008

0328
09/15/08

parisons, and in such instances process or structural measures may be more appropriate. In contrast, the evaluation of CABG quality is less subject to such limitations. This procedure has important, quantifiable end points and is performed with sufficient frequency to justify the evaluation of outcomes, as well as the more widely applicable process and structural measures.

Structure

Structural measures refer to inherent characteristics of the provider that are believed to be associated with higher quality. These may include, for example, the volume of a particular type of procedure performed annually, advanced information technology such as electronic health records or computerized order entry, participation in an outcomes database registry, sophisticated radiographic imaging capabilities, number of approved residencies, and nurse staffing ratios. For many such measures, the strength of their relationship with desired health care outcomes is not well defined.

Without question, volume is the most extensively studied structural measure of quality in all of medicine and surgery. Whether this reflects "practice makes perfect" or "selective referral" to institutions perceived to be of higher quality is uncertain. The strength of the volume-outcome relationship varies widely. For complex procedures such as esophagectomy or pancreatectomy that are performed relatively infrequently even at high-volume institutions, the volume-outcome association is strong [7]. For some frequently performed, relatively standardized and mature complex procedures such as CABG, where annual hospital volumes may range from 100 to more than 1000 cases, the volume-outcome relationship is weak [3, 7–10].

Structural measures may be useful proxies for outcomes when the latter data are unavailable. Conversely, their relative utility diminishes when reliable outcomes data are accessible. Furthermore, structural measures are often not readily actionable by providers, and this diminishes their usefulness as quality improvement tools.

Process

Process measures reflect the extent to which a provider complies with evidence-based care guidelines. Ideally, use of process measures should be shown to correlate directly with outcomes of care, although only a limited number of such measures meet this criterion (Table 1). In the acute care setting, appropriate process measures might include the administration of aspirin and β-blockade to reduce mortality in acute coronary syndromes, as well as "door to balloon" time for acute myocardial infarction. For chronic disease management, process measures include the degree of compliance with desirable practices such as frequent determination of hemoglobin A1c levels to optimize glycemic control. Evidence-based practice guidelines have been developed by professional organizations with the goal of decreasing practice variation and defining best-practice standards of care [11].

Process measures are particularly useful for procedures and medical conditions in which outcome measures are unavailable or impractical [3, 5, 6]. They have the advantage of being actionable by providers, and they are the dominant quality metric utilized in many pay-for-performance initiatives. Concern exists, however, that when payment depends on compliance with particular process measures, providers may focus on maximizing their performance in these specific areas. In some cases, this may be a perverse incentive, leading to tests or interventions that are unnecessary, costly, or inconsistent with the patient's wishes [12]. It may also focus attention on a few measured processes that comprise only a small fraction of overall care for a particular patient or condition, perhaps to the neglect of other important care measures.

Table 1. Classes of Recommendation and Levels of Evidence

Classes of Recommendation	
Class 1	Intervention is useful and effective
Class 2a	Weight of evidence/opinion favors utility/effectiveness
Class 2b	Usefulness/efficacy less well established by evidence/opinion
Class 3	Intervention is not useful/effective and is potentially harmful
Levels of Evidence	
A	Multiple randomized trials with large numbers of patients
B	Limited number of randomized trials with smaller number of patients, careful analysis of non-randomized studies, or observational registries
C	Expert consensus

In addition to such theoretical concerns, measurement of compliance with process measures also presents practical difficulties. Many patients have legitimate contraindications to a particular measure, such as the use of β-blockade in patients with significant heart block. Ideally, process measure compliance should reflect the number of *eligible* patients who received the treatment or therapy. In practice, agreement about what constitutes a legitimate exclusion has often been difficult even for expert panels, and mechanisms to document such exclusions are both problematic and susceptible to gaming. Many patients are ineligible for some or all of the process measures relevant to their condition, and the number of patients available for assessing provider practice is correspondingly reduced. Even for eligible patients, the proportion of outcome variability explained by adherence to process guidelines may be small [13].

Outcomes

Outcomes are the most obvious, intuitive, and historically used measures of quality. They also represent the quality metric that is generally most important to patients. Although known primarily as the founder of modern nursing practice, Florence Nightingale was in fact a highly regarded epidemiologist and statistician in the latter half of the 19th century [14–16]. Her careful

Downloaded from ats.ctsnetjournals.org by on August 4, 2008

0329
09/15/08

recording of British military deaths in Crimea, and her subsequent report to the government, had a profound impact on the care of wounded soldiers and is one of the earliest practical examples of epidemiologic outcomes analysis. Nightingale also introduced the concept of risk adjustment, which is central to modern profiling efforts.

Unquestionably the most important, seminal contribution to the study of surgical outcomes was that of Ernest Amory Codman, a Boston surgeon who advocated the methodical reporting of both short-term and long-term results. Although on the staff of the Massachusetts General Hospital, Dr Codman began his own hospital that was dedicated to the practical application of these principles. His obsession with quality was neither shared nor appreciated by many of his contemporaries, perhaps partly because of the often brusque fashion with which he presented his views. Nonetheless, his efforts contributed substantially to the development of what ultimately became the American College of Surgeons and the Joint Commission on the Accreditation of Healthcare Organizations [16–19].

It was near the end of the 20th century before the next attempt to quantify health care outcomes on a large scale occurred. The Health Care Financing Administration (HCFA), now known as The Centers for Medicare & Medicaid Services (CMS), publicly released hospital mortality data for all institutions that received payment from HCFA. Because of serious deficiencies with this program, including lack of risk adjustment and the use of an administrative database not designed for outcomes analysis, the program was abandoned shortly after its inception. However, a number of specialty organizations concluded that properly executed data collection and analysis could be a powerful tool to assess and improve quality. In the late 1980s, the STS began development of what subsequently became the NCD [20]. This is currently the largest single specialty clinical database in the world, with entries on more than 3 million surgical procedures from more than 780 cardiac surgery practices. Statistical models have been developed for risk-adjusted mortality and morbidity, and the database also includes substantial information on process measures such as the use of the internal mammary artery (IMA) and of recommended medications such as β-blockers, aspirin, and antilipid agents [4].

Cardiac Surgery Quality

Cardiac surgeons were early adopters of data collection, measurement, and analysis. Their dominant procedure, CABG, is the most commonly performed of all complex operations. It is costly and has broad implications for population health. CABG surgery is the paradigm for outcome measurement given both its frequency and its potential for serious morbidity and mortality.

In recognition of its important public health implications, the National Quality Forum (NQF) recently convened a Cardiac Surgery Performance Measures Steering Committee and associated Technical Advisory Panel, both of which included representatives of the STS, payers, regulators, health policy experts, and consumers. Their charge was to identify and endorse a set of evidence-based measures that would accurately reflect the performance of cardiac surgery programs. Ultimately, a set of 21 structure, process, and outcomes measures were selected (Table 2). It is expected that various subsets or combinations of these measures will become the basis for regional and national quality monitoring and improvement efforts in cardiac surgery. With the exception of those measures pertaining to preoperative antibiotic administration, timing, and duration, the remaining measures are directly related to data elements included in the STS NCD, which further emphasizes the central importance of this instrument.

Table 2. National Quality Forum Voluntary Consensus Standards for Cardiac Surgery

1. Participation in a systematic database for cardiac surgery
2. Surgical volume for isolated coronary artery bypass graft (CABG) surgery, valve surgery, and CABG + valve surgery
3. Timing of antibiotic administration for cardiac surgery patients
4. Selection of antibiotic administration for cardiac surgery patients
5. Preoperative β-blockade
6. Use of internal mammary artery
7. Duration of prophylaxis for cardiac surgery patients
8. Prolonged intubation
9. Deep sternal wound infection rate
10. Stroke/cerebrovascular accident rate
11. Postoperative renal insufficiency rate
12. Surgical reexploration rate
13. Antiplatelet medications at discharge
14. β-Blockade at discharge
15. Antilipid treatment at discharge
16. Risk-adjusted inpatient operative mortality for CABG
17. Risk-adjusted operative mortality for CABG
18. Risk-adjusted operative mortality for aortic valve replacement (AVR)
19. Risk-adjusted operative mortality for mitral valve replacement (MVR)
20. Risk-adjusted operative mortality for MVR + CABG
21. Risk-adjusted operative mortality for AVR + CABG

Principles for Measure Selection

After extensive investigation and discussion, the QMTF established the following principles for the development of a comprehensive quality rating system for cardiac surgery:

1. *Initial public quality reports should focus on programs, not individual surgeons.* Although a number of states, notably New York and Pennsylvania, publish surgeon-specific results, this continues to be a highly controversial topic. Performance reports on individual practitioners are fraught with even more vexing conceptual and technical concerns than reports on hospitals. The potential for unintended negative consequences is greater, leading many experts to recommend caution regarding their use [2, 21, 22].

Downloaded from ats.ctsnetjournals.org by on August 4, 2008

0330
09/15/08

Cardiac surgery is fundamentally a team endeavor, and publicly releasing information on just one element of that team detracts from the more important goals of improving overall team coordination, standardization of care, and clinical effectiveness. Surgeon report cards also focus attention on the one member of the team who ultimately decides which patients to accept for surgery, and this increases the potential for risk aversion. Hospitals do not decide which patients are acceptable risks for surgery—surgeons ultimately bear this responsibility alone. The inevitably higher mortality associated with surgery on high-risk populations will be diluted within the overall results of a hospital or practice group. In contrast, a few such patients may have a substantial negative impact on the results of an individual surgeon. Research indicates that when individual surgeon results are made public, surgeons become more risk averse because they fear the impact of a bad result on their public report card [2, 23, 24]. This may result in denial of care to the very group of high-risk patients who would potentially benefit most from surgery [2, 25, 26].

From a practical standpoint, sample size is also an issue and generally requires accumulating data during a period of 2 to 3 years. The resulting reports include some data that may be as much as 4 years old after the appropriate audit, validation, and analysis have been performed, and some believe this limits their relevance. Some have advocated aggregating data across several measures of individual practitioner performance as a way to mitigate this problem.

Because of the many serious and unresolved concerns regarding this issue, as well as specific prohibitions included in existing STS NCD Participation Agreements, the STS currently does not publicly release information on individual practitioners. It should be noted that alternative approaches to practitioner-level public reporting do exist. For example, it is possible to collect and analyze individual practitioner data confidentially and to have such data reviewed by a committee of experts including clinicians, statisticians, and health policy experts.

2. *Initial quality reports should focus on CABG.* Coronary artery bypass grafting is the most commonly performed and studied of all cardiac surgical procedures. It is relatively standardized, and it has a broad range of well-defined major and minor adverse outcomes, including death. Results for this procedure have become the benchmark by which overall adult cardiac surgery performance is assessed by consumers, regulators, and payers. It should be noted, however, that excellent risk models and data exist for valve surgery as well [27–29]. Early evidence suggests that the results for such procedures may have greater variability among programs than those for CABG, making them a likely focus for subsequent quality profiling.

3. *All measures should be derived from the set of 21 NQF-endorsed adult cardiac surgery measures.* The NQF is a private, not-for-profit organization established in 1999. Its mission is to develop and endorse standardized health care performance measures to provide public accountability, support quality improvement efforts, promote patient safety, and to serve as the basis for pay-for-performance programs and value-based purchasing. The NQF has quickly achieved national respect and credibility because of the extensive process undertaken before any candidate quality measure is endorsed, as well as the diverse constituencies included on its panels. These include providers, payers, consumers, accrediting agencies, and health policy experts. NQF-endorsed measures are widely accepted by both payers and government agencies, and they have legal status as national voluntary consensus standards.

   The NQF has published a set of National Voluntary Consensus Standards for Cardiac Surgery that includes 21 structure, process, and outcome measures (Table 2), all of which are consistent with the Institute of Medicine goals for health care: safe, effective, patient-centered, timely, efficient, and equitable. These measures have thus become *the* set of nationally recognized parameters for assessing quality in cardiac surgery. Use of some combination of these NQF-endorsed measures largely mitigates concerns about their selection or appropriateness and also maximizes the acceptability of the measure to all constituencies.

4. *Measure selection should be consistent with the principles and criteria recommended by the Institute of Medicine.* In its two previous landmark studies, *To Err is Human* [30] and *Crossing the Quality Chasm* [31], the Institute of Medicine established the improvement of health care quality as a major national priority. In its 2006 publication *Performance Measurement: Accelerating Improvement* [1], the Institute of Medicine proposes principles and criteria for the selection of measures by which quality may be assessed. These recommendations include comprehensive; evidence-based; longitudinal; supportive of multiple uses and stakeholders; intrinsic to the care process; providing opportunity for patient input; patient-level, population-based, and systems-level measurement; acknowledgement of shared accountability; a learning system, continually evaluating performance and advancing knowledge; independent and sustainable; scientifically sound (reliable, valid, and explicit); feasible; having important health implications; and aligned with existing leading measure sets [1].

   These guidelines will undoubtedly become the national benchmark by which to evaluate quality

Downloaded from ats.ctsnetjournals.org by on August 4, 2008

0331
09/15/08

and performance measures. Accordingly, the QMTF assessed all its proposed measures to assure compliance with pertinent Institute of Medicine recommendations.

5. *Measures should be readily accessible from the STS NCD instrument.* With the exception of those related to perioperative antibiotics, the NQF-endorsed cardiac surgery measures are based upon or may be derived from data in the STS NCD. The STS NCD is the largest, single-specialty clinical database in the world and is administered by the highly respected Duke Clinical Research Institute. It has unquestioned credibility among providers, payers, and regulators. As a clinical database, it is clearly superior in accuracy to the administrative databases used as the basis for many government and commercial report cards [32, 33].

   Nationally, more than 780 hospitals or adult cardiac surgery practices devote extensive time and resources to the accurate collection of STS NCD data elements. It is both desirable and more efficient to develop quality measures from these existing elements without necessitating any separate work process or substantial additional resources. Consistent with its longstanding practice, the STS will modify the NCD as necessary to meet the evolving needs for additional information.

   As the STS NCD becomes the basis for quality reports to governmental agencies, payers, referring physicians, and the public, it will be crucial to assure the accuracy and validity of these data. Although preliminary reports [34] are encouraging, the STS has nevertheless embarked upon a major auditing initiative to confirm these findings. Undoubtedly such efforts will continue to evolve, hopefully with additional external funding.

6. *Quality assessment should consider, either separately or as a composite, each of Donabedian's three domains of quality—structure, process, and outcomes.* This quality triad is widely accepted in health care, and measures from all three domains are available from the STS NCD. The actual method of presenting scores from individual domains—separately, as a roll-up composite score, or both—has statistical implications that are discussed in Part 2 of this report. Furthermore, the specific report format can be tailored to particular constituencies.

7. *Quality scores should assess all three relevant temporal domains of the cardiac surgical experience—preoperative, operative, and postoperative (including long-term) care.* Preparation for surgery, conduct of the surgical procedure, postoperative morbidity and mortality, and discharge protocols are all important aspects of the surgical experience. Often, they involve different personnel because cardiac surgery is the quintessential team endeavor. An appropriate comprehensive quality measure should have representation from each of these periods of care. The only time frame that currently is difficult to study is long term, but with better information systems and electronic health records, this too will become an important component of quality scores. Our quality measures begin to address this long-term perspective by including discharge medications that primarily impact secondary prevention (aspirin, β-blockade, lipid-lowering agents). The time of hospital discharge after CABG may be one of the most effective opportunities to institute such therapy [35].

8. *Quality scores should satisfy multiple criteria for validity.* Quality scores must be acceptable to both providers, who are being evaluated, and to payers, accrediting agencies, and regulators. The measures should have *face validity* (the measures appear reasonable for their intended purpose), *content validity* (the selected measures encompass all relevant aspects of the concept that is being measured), *construct validity* (the measures accurately reflect the construct they are designed to measure), and *attributional validity* (risk-adjusted outcome measures adequately compensate for patient factors, so that they reflect quality of care and not case mix) [15, 36].

9. *Quality scores should be interpretable and actionable by providers.* The goal is a transparent, clearly defined methodology whose results provide some understanding of a provider's (hospital or program) performance relative to that of other providers. Reporting options would include actual numerical scores, a three-star or five-star rating system, performance tiers with upper and lower bands as currently employed in the CMS Premier Demonstration Project, or statistical techniques that determine with high probability that a given provider's results differ from the performance of its peers.

   Quality scores should enable providers to enact changes that will improve both their scores and, more importantly, the actual quality of care delivered to their patients. In addition to their overall composite score and rating, providers should also receive scores for the four domains and the eleven individual measures, thus enabling them to better focus their quality improvement efforts.

   As will be discussed in Part 2 of this report, the QMTF investigated a number of sophisticated statistical methodologies, including approaches derived from modern psychometric or measurement theory (eg, latent variable analysis, item response theory). Unless such methodologies had unequivocally superior scientific justification for our application, or proved to have superior performance when applied to STS data in pilot studies, we chose to use simpler and more intuitive approaches.

Downloaded from ats.ctsnetjournals.org by on August 4, 2008

0332
09/15/08

Table 3. The Society of Thoracic Surgeons Quality Measures

1. Perioperative Medical Care (All or None Process Bundle)
   a. Preoperative β-blockade
   b. Discharge aspirin
   c. Discharge β-blockade
   d. Discharge antilipid therapy
2. Operative Care (Process)
   a. Use of at least one internal mammary artery
3. Risk-Adjusted Operative Mortality
4. Postoperative Morbidity: Absence of Any Serious Complication
   a. Renal insufficiency
   b. Deep sternal wound infection
   c. Re-exploration for any cause
   d. Stroke
   e. Prolonged ventilation/intubation

Specific Measure Selection

In addition to these nine major principles, the QMTF also considered evolving new trends in health care quality assessment, including the use of bundled measures and "all or none" scoring as advocated by the Institute for Healthcare Improvement and the Institute of Medicine [1, 37]. Consider a bundle of care measures for a particular condition, such as acute myocardial infarction. If experts agree that all components of this bundle (eg, aspirin after acute myocardial infarction, β-blockade, 90-minute door-to-balloon time, statin on discharge) are important for optimal patient care, then the desired benchmark performance is compliance with *all* components. Failure to achieve one component of the bundle results in no credit. Partial credit not only sets too low a goal but also requires subjective decisions about how to weight the various components of the bundle.

Although the all or none approach in essence assigns equal weights to each component of the bundle, it is preferable to regard them as a group of important measures that are *all* essential to providing the highest quality care. By analogy, it would be impossible to weight the relative importance of the heart, kidneys, and liver to the human body. They all perform quite different tasks but all must work in concert for optimal bodily function. Significant failure of any one of these organs is potentially fatal.

The QMTF ultimately chose eleven individual quality measures grouped within four domains (Table 3). This includes all relevant CABG process and outcomes measures currently endorsed by the NQF. Because of the credibility of the NQF process, we did not conduct additional statistical analyses to determine whether any of these measures could be eliminated, although subsequent pilot studies did not demonstrate substantial correlation among these measures. This suggests that they provide complementary rather than redundant information.

Several of these domains were scored using the all or none principle or, in the case of complications, the corresponding "any or none" principle:

1. *Perioperative Medical Care Process Measure:* All or none compliance with the use of four specific medications (preoperative β-blockade and postoperative aspirin, β-blockade, and lipid-lowering therapy) shown to be associated with improved short or long-term outcomes for CABG patients. These are typically ordered by the surgical care team (staff and resident physicians, physician assistants, nurse practitioners) or cardiologists, often through the use of standardized order sheets.
2. *Operative Process Measure:* Use of the IMA, the single most important and universally accepted process measure in CABG surgery.
3. *Risk-Adjusted Operative Mortality:* The most important outcomes measure, and one for which CABG surgery is particularly well suited because of its frequency and the availability of excellent risk models.
4. *Postoperative Risk-Adjusted Major Morbidity:* Serious complications can be devastating for patients and costly for payers. The STS QMTF morbidity measure is the risk-adjusted rate of patient discharge from a given institution with any of the following five major complications: stroke, deep sternal wound infection, reexploration for any cause, prolonged intubation/ventilation, or renal insufficiency. Definitions of these five morbidities are available from the STS and NQF Websites [38, 39].

The following describes the QMTF rationale for selection of these measures and for the rejection of several others, in the context of the principles established previously.

Perioperative Medical Care

To assess preoperative and postoperative medical care, four NQF-endorsed process measures were selected, all of which are included as data elements in the STS NCD. These include preoperative β-blockade and postoperative aspirin, β-blockade, and lipid-lowering therapy. All these measures are supported by extensive studies, either specifically pertaining to CABG surgery or to the secondary prevention of disease progression in patients with established coronary atherosclerosis [40–45]. Each measure is also included in the 2006 American College of Cardiology (ACC)/American Heart Association (AHA) Guidelines for Secondary Prevention for Patients with Coronary and Other Atherosclerotic Vascular Disease [46].

The QMTF discussed the problem of legitimate exclusions to process measures, as noted previously. Two options for dealing with such exclusions were considered. Ideally, a full list of acceptable exclusions would be agreed upon, included in the STS NCD instrument, and documented as present by the provider when appropriate; however, how to make such an approach operational proved to be problematic. There were concerns regarding what constituted legitimate exclusions and how to prevent gaming of such exclusions. The second option, which we chose, is to assume that the percentage of

Downloaded from ats.ctsnetjournals.org by on August 4, 2008

0333
09/15/08

patients with legitimate exclusions to each process measure should not vary substantially among programs (in contrast to case mix, which can be quite variable). Accordingly, consistent with current NQF specifications, only a few exclusions are recognized for these medical process measures and for the operative process and postoperative outcome measures. The three discharge medication measures are calculated only among patients who survive until hospital discharge; the IMA measure excludes patients undergoing repeat CABG surgery; and the permanent stroke measure excludes patients with a previous cerebrovascular accident.

Because of this limited number of recognized exclusions, all programs will fall short of 100% compliance with the entire bundle of perioperative measures for all patients, but no program should be disproportionately disadvantaged. In a pilot study of data from more than 500 STS NCD participants (Part 2 of this report), application of this all or none approach to perioperative process measures produced a variable and relatively symmetric distribution of compliance percentages. Given that each of these 4 medical process measures was deemed by the QMTF to be efficacious and important for the care of CABG patients, it is noteworthy that current all or none compliance rates vary substantially among STS NCD participant programs. Hence, there is significant room for process improvement. Furthermore, none of these measures would require any additional funding or resources by institutions. They require only the will to change, a standardized order set, and an audit mechanism.

Operative Care

For a surgical procedure regarded as being relatively standardized, operative processes of care for CABG vary widely among cardiac surgery programs. For many of these processes, there is no generally accepted gold standard. Examples of such practice variation include: on-pump versus off-pump CABG; conduct of cardiopulmonary bypass including temperature, hematocrit, flow rates, anticoagulation management, and the use of heparin-bonded circuits; hemostatic and antiinflammatory adjuncts such as aprotinin; single aortic cross clamp versus side clamp; and cardioplegia composition, temperature, and route of administration. For many of these areas, it would be difficult to select a performance benchmark that had broad support, and that could be implemented by most programs without substantially altering otherwise successful operative protocols. This could have the potential for producing significant unintended negative consequences.

We chose not to base our operative quality measure on such indicators that are often a matter of individual preference. However, there is one measure of CABG operative process quality—use of single or multiple IMA—whose importance has been universally recognized for well over two decades [47, 48]. There may be no other single surgical measure that so positively impacts the long-term survival of CABG patients, and it is for this reason that use of at least one IMA was chosen as the operative process measure. Consistent with the NQF definition, exclusion is permitted for repeat CABG procedures.

Risk-Adjusted Operative Mortality

This is the most familiar and widely used of all quality measurements [2], and it has broad acceptance as a valid measure among providers, regulators, and payers. We use the NQF operative mortality definition adapted from the STS NCD. It includes all deaths occurring in-hospital, regardless of timing, as well as all deaths occurring within 30 days of surgery regardless of venue, unless clearly unrelated to the operation.

Postoperative Risk-Adjusted Major Morbidity

Studies by Hannan [49] and Silber [50] and their colleagues suggest that complications and readmissions, which are delayed complications, may measure different aspects of care than does mortality. Furthermore, the same serious complication may result in death at one institution because of "failure to rescue," whereas superior care at another institution may result in patient salvage. For all these reasons, we chose to include a bundle of NQF morbidity measures as a separate outcomes domain in addition to operative mortality.

Patients, providers, and payers have a common goal after CABG surgery—discharge from the hospital alive, and without the occurrence of *any* serious postoperative complication. We selected five postoperative complications from the NQF cardiac surgery measure set (Table 2), all of which are derived from and defined by the STS NCD. These include stroke, renal insufficiency, deep sternal wound infection, reexploration for any cause, and prolonged intubation/ventilation. There are several NQF-approved exclusions for renal failure, stroke, and prolonged ventilation. Because absence of all such complications is the desired outcome, they are again considered as a bundle, in this case any or none. If even one major complication occurs, no credit is received for the bundle. A hierarchical risk model is developed using this dichotomous morbidity measure (1 = presence of *any* of the five major complications, 0 = no major complications) as the dependent variable, and an adjusted any or none morbidity rate is determined (see Part 2 and Technical Appendix).

Measures Considered but Not Included

Two structural measures (database participation and procedural volume) are included in the NQF cardiac surgery measure set but were not specifically chosen for inclusion in our quality score. As all our chosen measures will be derived from the STS NCD, participation in this database will be required for all programs that are rated, and thus this structural measure is included de facto. The other NQF-endorsed structural measure is procedural volume. Based on the studies cited previously, the volume-outcome relationship for CABG is weak. Furthermore, volume is most useful as a surrogate for outcome when accurate determination of the latter is impractical. In the case of CABG, we have highly credible, direct

Downloaded from ats.ctsnetjournals.org by on August 4, 2008

0334
09/15/08

measures of both risk-adjusted mortality and morbidity. For all these reasons, we have chosen not to include volume as a structural measure.

Three NQF cardiac surgery process measures deal with the selection of appropriate preoperative antibiotics, their timing of administration, and duration of use. Because these are not currently included in the STS NCD, they were not selected for our quality measure set. In addition, compliance with these measures is already being closely monitored through multiple other quality measurement and improvement initiatives (eg, Surgical Infection Prevention Project, Surgical Care Improvement Project, American College of Surgeons National Surgical Quality Improvement Program, Joint Commission on Accreditation of Healthcare Organizations).

Finally, although the ACC/AHA endorses the use of angiotensin-converting enzyme inhibitors or angiotensin-receptor blockers for secondary prevention of atherosclerotic coronary disease [46], they are not NQF-endorsed and are therefore not included in our measure set.

Conclusion

The QMTF selected a set of 11 individual quality measures within four domains of care. These are nationally recognized metrics that are also consistent with the guiding principles established by the STS QMTF. This measure set will be the foundation for a comprehensive, composite quality scoring methodology for cardiac surgery. The QMTF envisions this as a dynamic process that will undergo progressive refinements over time.

Part 2 of this report describes the statistical considerations for analyzing and combining these measures and for using the resulting composite scores to characterize provider performance [51].

References

1. Institute of Medicine. Performance measurement: accelerating improvement. Washington, DC: The National Academies Press; 2006.
2. Shahian DM, Normand SL, Torchiana DF, et al. Cardiac surgery report cards: comprehensive review and statistical critique. Ann Thorac Surg 2001;72:2155–68.
3. Shahian DM. Improving cardiac surgery quality—volume, outcome, process? JAMA 2004;291:246–8.
4. Shahian DM, Blackstone EH, Edwards FH, et al. Cardiac surgery risk models: a position article. Ann Thorac Surg 2004;78:1868–77.
5. Birkmeyer JD, Dimick JB, Birkmeyer NJ. Measuring the quality of surgical care: structure, process, or outcomes? J Am Coll Surg 2004;198:626–32.
6. Dimick JB, Welch HG, Birkmeyer JD. Surgical mortality as an indicator of hospital quality: the problem with small sample size. JAMA 2004;292:847–51.
7. Birkmeyer JD, Siewers AE, Finlayson EVA, et al. Hospital volume and surgical mortality in the United States. N Engl J Med 2002;346:1128–37.
8. Shahian DM, Normand SL. The volume-outcome relationship: from Luft to Leapfrog. Ann Thorac Surg 2003;75:1048–58.
9. Peterson ED, Coombs LP, DeLong ER, Haan CK, Ferguson TB. Procedural volume as a marker of quality for CABG surgery. JAMA 2004;291:195–201.
10. Shroyer AL, Marshall G, Warner BA, et al. No continuous relationship between Veterans Affairs hospital coronary artery bypass grafting surgical volume and operative mortality. Ann Thorac Surg 1996;61:17–20.
11. Gibbons RJ, Smith S, Antman E. American College of Cardiology/American Heart Association clinical practice guidelines: Part I: where do they come from? Circulation 2003;107:2979–86.
12. Werner RM, Asch DA. The unintended consequences of publicly reporting quality information. JAMA 2005;293:1239–44.
13. Bradley EH, Herrin J, Elbel B, et al. Hospital quality for acute myocardial infarction: correlation among process measures and relationship with short-term mortality. JAMA 2006;296:72–8.
14. Cohen IB. Florence Nightingale. Sci Am 1984;250:128–37.
15. Iezzoni LI. Risk adjustment for measuring health care outcomes. Chicago, IL: Health Administration Press; 2003.
16. Spiegelhalter DJ. Surgical audit: statistical lessons from Nightingale and Codman. J R Stat Soc (series A) 1999;162:45–58.
17. Mallon WJ. Ernest Amory Codman: the end result of a life in medicine. Philadelphia, PA: WB Saunders Company; 2000.
18. Passaro E Jr, Organ CH Jr. Ernest A. Codman: the improper Bostonian. Bull Am Coll Surg 1999;84:16–22.
19. Codman EA. A study in hospital efficiency. As demonstrated by the case report of the first two years of a private hospital. Oakbrook Terrace, IL: Joint Commission on Accreditation of Healthcare Organizations; 1995.
20. Edwards FH. Evolution of the Society of Thoracic Surgeons National Cardiac Surgery Database. J Invasive Cardiol 1998;10:485–8.
21. Berwick DM. Public performance reports and the will for change. JAMA 2002;288:1523–4.
22. Landon BE, Normand SL, Blumenthal D, Daley J. Physician clinical performance assessment: prospects and barriers. JAMA 2003;290:1183–9.
23. Schneider EC, Epstein AM. Influence of cardiac-surgery performance reports on referral practices and access to care—a survey of cardiovascular specialists. N Engl J Med 1996;335:251–6.
24. Burack JH, Impellizzeri P, Homel P, Cunningham JN Jr. Public reporting of surgical mortality: a survey of New York State cardiothoracic surgeons. Ann Thorac Surg 1999;68:1195–200.
25. Dranove D, Kessler D, McClellan M, Satterthwaite M. Is more information better? The effects of "report cards" on health care providers. J Polit Econ 2003;111:555–88.
26. Jones RH. In search of the optimal surgical mortality. Circulation 1989;79:I132–6.
27. Edwards FH, Peterson ED, Coombs LP, et al. Prediction of operative mortality after valve replacement surgery. J Am Coll Cardiol 2001;37:885–92.
28. Nowicki ER, Birkmeyer NJ, Weintraub RW, et al. Multivariable prediction of in-hospital mortality associated with aortic and mitral valve surgery in Northern New England. Ann Thorac Surg 2004;77:1966–77.
29. Shahian DM, Edwards FH, Peterson ED. Risk models for cardiac valve surgery. ACC Curr J Rev 2005;14:52–6.
30. Institute of Medicine. To err is human: building a safer health system. Washington, DC: National Academies Press; 1999.
31. Institute of Medicine. Crossing the quality chasm: a new health system for the 21st century. Washington, DC: National Academies Press; 2001.
32. Torchiana DF, Meyer GS. Use of administrative data for clinical quality measurement. J Thorac Cardiovasc Surg 2005;129:1223–5.
33. Mack MJ, Herbert M, Prince S, Dewey TM, Magee MJ, Edgerton JR. Does reporting of coronary artery bypass

Downloaded from ats.ctsnetjournals.org by on August 4, 2008

0335
09/15/08

grafting from administrative databases accurately reflect actual clinical outcomes? J Thorac Cardiovasc Surg 2005;129:1309–17.
34. Welke KF, Ferguson TB Jr, Coombs LP, et al. Validity of the Society of Thoracic Surgeons National Adult Cardiac Surgery Database. Ann Thorac Surg 2004;77:1137–9.
35. Khanderia U, Townsend KA, Eagle K, Prager R. Statin initiation following coronary artery bypass grafting: outcome of a hospital discharge protocol. Chest 2005;127:455–63.
36. Daley J. Criteria by which to evaluate risk-adjusted outcomes programs in cardiac surgery. Ann Thorac Surg 1994; 58:1827–35.
37. Nolan T, Berwick DM. All-or-none measurement raises the bar on performance. JAMA 2006;295:1168–70.
38. The Society of Thoracic Surgeons. STS National Database. Available at: www.sts.org/sections/stsnationaldatabase/datamanagers/adultcardiacdb. Accessed Sep 6, 2006.
39. National Quality Forum. National voluntary consensus standards for cardiac surgery. Available at: www.qualityforum.org/pdf/reports/cardiac.pdf. Accessed, Sep 6, 2006.
40. Denton TA, Fonarow GC, LaBresh KA, Trento A. Secondary prevention after coronary bypass: the American Heart Association "Get with the Guidelines" program. Ann Thorac Surg 2003;75:758–60.
41. Ferraris VA, Ferraris SP, Moliterno DJ, et al. The Society of Thoracic Surgeons practice guideline series: aspirin and other antiplatelet agents during operative coronary revascularization (executive summary). Ann Thorac Surg 2005;79: 1454–61.
42. Ferguson TB Jr, Peterson ED, Coombs LP, et al. Use of continuous quality improvement to increase use of process measures in patients undergoing coronary artery bypass graft surgery: a randomized controlled trial. JAMA 2003;290:49–56.
43. Ferguson TB Jr, Coombs LP, Peterson ED. Preoperative beta-blocker use and mortality and morbidity following CABG surgery in North America. JAMA 2002;287:2221–7.
44. Lazar HL. Role of statin therapy in the coronary bypass patient. Ann Thorac Surg 2004;78:730–40.
45. Okrainec K, Platt R, Pilote L, Eisenberg MJ. Cardiac medical therapy in patients after undergoing coronary artery bypass graft surgery: a review of randomized controlled trials. J Am Coll Cardiol 2005;45:177–84.
46. Smith SC Jr, Allen J, Blair SN, et al. AHA/ACC guidelines for secondary prevention for patients with coronary and other atherosclerotic vascular disease: 2006 Update: endorsed by the National Heart, Lung, and Blood Institute. Circulation 2006;113:2363–72.
47. Loop FD, Lytle BW, Cosgrove DM, et al. Influence of the internal-mammary-artery graft on 10-year survival and other cardiac events. N Engl J Med 1986;314:1–6.
48. Lytle BW, Blackstone EH, Sabik JF, Houghtaling P, Loop FD, Cosgrove DM. The effect of bilateral internal thoracic artery grafting on survival during 20 postoperative years. Ann Thorac Surg 2004;78:2005–12.
49. Hannan EL, Racz MJ, Walford G, et al. Predictors of readmission for complications of coronary artery bypass graft surgery. JAMA 2003;290:773–80.
50. Silber JH, Rosenbaum PR, Schwartz JS, Ross RN, Williams SV. Evaluation of the complication rate as a measure of quality of care in coronary artery bypass graft surgery. JAMA 1995;274:317–23.
51. O'Brien SM, Shahian DM, DeLong ER, et al. Quality measurement in adult cardiac surgery: Part 2—Statistical considerations in composite measure scoring and provider rating. Ann Thorac Surg 2007;83:S13–26.

Downloaded from ats.ctsnetjournals.org by on August 4, 2008

0336
09/15/08

Quality Measurement in Adult Cardiac Surgery: Part 1—Conceptual Framework and Measure Selection

David M. Shahian, Fred H. Edwards, Victor A. Ferraris, Constance K. Haan, Jeffrey B. Rich, Sharon-Lise T. Normand, Elizabeth R. DeLong, Sean M. O'Brien, Cynthia M. Shewan, Rachel S. Dokholyan and Eric D. Peterson

Ann Thorac Surg 2007;83:3-12
DOI: 10.1016/j.athoracsur.2007.01.053

Updated Information & Services	including high-resolution figures, can be found at: http://ats.ctsnetjournals.org/cgi/content/full/83/4_Supplement/S3
References	This article cites 43 articles, 33 of which you can access for free at: http://ats.ctsnetjournals.org/cgi/content/full/83/4_Supplement/S3#BIBL
Citations	This article has been cited by 3 HighWire-hosted articles: http://ats.ctsnetjournals.org/cgi/content/full/83/4_Supplement/S3#otherarticles
Subspecialty Collections	This article, along with others on similar topics, appears in the following collection(s): **Education** http://ats.ctsnetjournals.org/cgi/collection/education **Professional affairs** http://ats.ctsnetjournals.org/cgi/collection/professional_affairs
Permissions & Licensing	Requests about reproducing this article in parts (figures, tables) or in its entirety should be submitted to: http://www.us.elsevierhealth.com/Licensing/permissions.jsp or email: healthpermissions@elsevier.com.
Reprints	For information about ordering reprints, please email: reprints@elsevier.com



Downloaded from ats.ctsnetjournals.org by on August 4, 2008

GUIDELINES FOR STANDARDS IN CARDIAC SURGERY

The following statement is an updated version of guidelines that were first published by the American College of Surgeons in 1991. The revised statement was developed by the Advisory Council for Cardiothoracic Surgery and approved by the College's Board of Regents in October 1996.

Preamble

This report provides guidelines to be used by hospital executives and appropriate medical staff only. It places no value judgment on existing successful programs or on the treatment of individual patients.

While current standards of practice form the basis of this report, it is recognized that large programs in cardiac surgery grow from smaller ones. Hospitals and their staffs should exercise their own discretion in approving programs based on local need and the responsibility for achieving a good standard of practice.

While attention is directed primarily to open-heart surgery, the proposed standards should apply to closed-heart operations as well as to operations on the great vessels within the chest.

In borderline situations, in which the number of open-heart operations does not meet the established guidelines, the American College of Surgeons recommends the use of peer review.

Professional team

Specification of the qualifications for cardiac surgeons in an established practice is beyond the scope of these guidelines. Surgeons practicing cardiac surgery should be certified or awaiting certification by the American Board of Thoracic Surgery or its Canadian equivalent within five years after completion of an approved residency program in cardiac surgery. It is recommended that hospital committees for staff accreditation exercise their judgments for privileges based on the nature of the cardiothoracic residency or postresidency experiences of the applicant.

A team approach with a minimum of two qualified cardiac surgeons is recommended to provide adequate and continuous perioperative care as well as assistance in the OR. It is recognized that, depending on the particular setting and situation, the assistant on a particular case may vary in experience and qualification.

Hospital operative volume–Adult cardiac surgery

The 1975 report of the Inter-Society Commission on Heart Disease Resources recommended that cardiac surgical programs in a *hospital* should perform at least 200 procedures annually. This recommendation was based on the premise of a hospital dedicating 1 operating room to cardiac surgery and functioning at 80 percent capacity (4 cases per week x 52 weeks = 200 per year). While there are no presently available data linking an *individual surgeon's* patient volume and hospital mortality rate, there are data to suggest that an annual volume of at least 100 to 125 open heart procedures (including coronary artery bypass procedures, valve replacements, and other operations requiring the use of cardiopulmonary bypass) per *hospital* is necessary from a quality standpoint and that there is a greater variation in adjusted mortality rates for teams

doing lower volumes of procedures as compared with those doing a high volume. While 100 to 125 cases per year per *hospital* appears sufficient from a quality standpoint, it is likely that considerably more, and at least 200 procedures per year as previously recommended, are necessary in order for a program to function efficiently.

Congenital heart surgery

Surgery for congenital heart disease, especially in infants, requires a setting that readily meets the complex and special needs of this group of patients. These requirements include a cardiac surgeon experienced in the operative and perioperative management of such patients. There should be a pediatric cardiologist, an anesthesia team, perfusionists, intensive care nurses, and appropriate intensive care facilities for the treatment of infants and children. At a hospital where congenital heart operations are performed, a total of 100 congenital heart operations (both open and closed, not including neonatal ductus ligations) should be done. The occasional management of an infant or child with congenital heart disease by an otherwise busy and well-functioning adult cardiac surgical team is strongly discouraged.

Hospital facilities and personnel

It is urged that hospital committees for staff accreditation use peer review to determine that adequate standards of practice are maintained in terms of case frequency and results. A registry for the recording of cardiac surgical results is mandatory.

The complex operating room environment required by cardiac surgery in terms of equipment and instruments requires constant improvement in technique and proper indoctrination of personnel. Such educational programs should be under the direction of a clearly designated individual with particular interest and skill in cardiac surgery. Operating room nurses and technicians specializing in cardiac surgery are important. It should be mandatory that operating room nurses and technicians be assigned to cardiac surgery sufficiently often to develop and maintain the skills required for proficient performance in this area.

Anesthesia for cardiac surgical patients encompasses a variety of special problems. To ensure technical competence, frequent changing of the anesthesiologists assigned to cardiac surgery should be avoided.

The operation of a heart-lung machine should be performed by a specially trained nurse or technician under the supervision of the operating surgeon. A perfusionist certified by the American Board of Cardiovascular Perfusion is recommended. Perfusionists who are not certified should have at least two years of experience under supervision in an active clinical program in open-heart surgery and have a thorough background in operating room sterile techniques, perfusion physiology, the use of monitoring equipment, and a general understanding of commonly performed cardiac surgical procedures. The primary responsibility for determining the capability of the perfusionist remains with the cardiac surgeon.

Cardiac surgeons must be primarily responsible for the postoperative care of their patients, including that provided in the intensive care unit. Portions of that care may be shared with others, such as nurses and other physicians. However, only the cardiac surgeon is fully cognizant of all aspects of a given patient's condition and retains the responsibility for the continuity of care, which includes the preoperative status, the operative management, and the postoperative care.

Intensive care nursing of cardiac surgical patients is recognized as a true specialty involving skills in dealing with cardiac and respiratory emergencies. Assignment to cardiac surgical patients should be sufficiently often to maintain competence in this area of nursing. The surgeon should participate in the supervision of cardiac intensive care unit nurses.

The operating room, intensive care unit, and other facilities must conform to standards mandated by the Joint Commission on Accreditation of Health Care Organizations.

The nature of cardiac surgery makes it mandatory that diagnostic facilities be available to the surgical team. A proper cardiac catheterization laboratory must be available for hemodynamic and cine' angiographic studies. This laboratory should be under the direction of a qualified specialist and be accessible for preoperative elective studies, postoperative elective studies, and emergency procedures on a 24-hour basis.

Standard laboratory studies should be available on a 24-hour basis, including blood-gas analysis.

A blood bank facility with full resources under the direction of qualified specialists in this field is mandatory.

An intensive care facility must be available for all patients following cardiac surgery, and in some instances, for patients who are severely ill, preoperatively. This should be a limited-access area that is off limits to nonparticipating personnel and should have facilities for the adequate isolation of septic patients.

Patient follow-up

Proper patient follow-up is an integral part of surgical treatment. An effective follow-up system for patients having open-heart surgery is the responsibility of the surgical team. The team should be able to demonstrate that it has an adequate follow-up system and that patients are seen as often as necessary during the immediate postdischarge period and, subsequently, are followed up at appropriate intervals.

Bibliography

1. Crawford FA, Anderson RP, Clark RE, et al, for the Ad Hoc Committee on Cardiac Surgery Credentialing of The Society of Thoracic Surgeons: Volume requirements for cardiac surgery credentialing: A critical examination. *Ann Thorac Surg*, 61:12-16, 1996.

2. Clark RE, and the Ad Hoc Committee on Cardiac Surgery Credentialing of the Society of Thoracic Surgeons: Outcome as a function of annual coronary artery bypass graft volume. *Ann Thorac Surg*, 61-20-26, 1996.

3. Hannan EL. Siu AL, Kumar D, et al: The decline in coronary artery bypass graft surgery mortality in New York State. The role of surgeon volume. *JAMA*, 273:209- 13, 1995.

4. Shroyer ALW, Marshall G, Warner BA, et al: No continuous relationship between Veterans Affairs hospital coronary artery bypass grafting surgical volume and operative mortality. *Ann Thorac Surg*, 61:17-20, 1996.

5. Luft HS, Romano PS. Chance, continuity, and change in hospital mortality rates: coronary artery bypass graft patients in California patients, 1983 to 1989. *JAMA*, 270:331-337, 1993.

Bulletin of the American College of Surgeons
Vol. 82, No. 2, February 1997

Guidelines

This page and all contents are Copyright © 1996-2000 by the American College of Surgeons, Chicago, IL 60611-3211

Loraine Shea (HCGW)

From: Clough, Ellen [eclough@sts.org]
Sent: Monday, November 12, 2007 5:32 PM
To: Loraine Shea (HCGW)
Subject: RE: information requested

STS does not endorse a particular number. Sorry I could not be of more help in this.

Regards,

Ellen R. Clough, Ph.D.

Evidence Based Surgery Manager
Society of Thoracic Surgeons
312-202-5832
eclough@sts.org

From: Black, Rachel **On Behalf Of** STS
Sent: Monday, November 12, 2007 1:53 PM
To: Clough, Ellen
Subject: FW: information requested

From: Loraine Shea (HCGW) [mailto:lshea@hcogw.org]
Sent: Monday, November 12, 2007 12:44 PM
To: STS
Subject: information requested

Could you please indicate if there have been any updated guidelines for the minimum number of Open Heart Surgeries that "should" be done at any one institution to insure quality. Currently I have ACS guidelines from 1996 which indicate a range of 100-125 and 2004 AHA guidelines indicating the need for close monitoring of institutions performing less than 100. Is there any number currently endorsed by STS as a minimum number for an organization or individual surgeon? Your assistance is greatly appreciated in this matter.

Loraine Shea

Executive Director
Heart Center of Greater Waterbury
203-575-5571

lshea@hcogw.org

Saint Mary's Health System Disclaimer:
The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

ORIGINAL ARTICLE

Volume-Outcome Relationship for Coronary Artery Bypass Grafting in an Era of Decreasing Volume

Rocco Ricciardi, MD, MPH; Beth A. Virnig, PhD, MPH; James W. Ogilvie Jr, MD; Peter S. Dahlberg, MD; Harry P. Selker, MD, MSPH; Nancy N. Baxter, MD, PhD

Hypothesis: We hypothesized that the recent reduction in procedure volume for coronary artery bypass grafting (CABG) has led to an increase in the in-hospital mortality rate.

Design: Hospital discharge data from the Nationwide Inpatient Sample from January 1, 1988, through December 31, 2003.

Setting: A 20% random sample of patients admitted to US hospitals.

Patients: All patients who underwent CABG or percutaneous transluminal coronary interventions. Facilities performing CABG were assigned to standard volume cutoffs.

Main Outcome Measures: Rates of cardiac procedures and the proportion of hospitals meeting standard volume cutoffs, as well as the CABG mortality rate.

Results: During our 16-year study period, the rate of CABG increased from 7.2 cases per 1000 discharges in 1988 to 12.2 cases in 1997 but then decreased to 9.1 cases in 2003, while the rate of percutaneous interventions tripled. For CABG, the proportion of high-volume hospitals declined from 32.5% in 1997 to 15.5% in 2003. Despite shifts between high- and low-volume hospitals, the CABG mortality rate steadily declined from 5.4% in 1988 to 3.3% in 2003. Hospitals performing the lowest volume of CABG experienced the largest decrease in the in-hospital mortality rate.

Conclusions: Since 1997, CABG volume has declined in the setting of a decrease in in-hospital mortality. A lower mortality rate in the setting of reduced CABG volume is a counterintuitive finding, suggesting that procedure volume is an insufficient predictor of outcome on which to base regionalization strategies.

Arch Surg. 2008;143(4):338-344

Author Affiliations:
Department of Surgery, Medical School (Drs Ricciardi, Virnig, Ogilvie, and Dahlberg), and Division of Health Services Research, School of Public Health (Dr Virnig), University of Minnesota, Minneapolis; Division of Clinical Care Research, Department of Medicine, New England Medical Center, Tufts University School of Medicine, Boston, Massachusetts (Dr Selker); and Department of Surgery, St Michael's Hospital, University of Toronto, Toronto, Ontario, Canada (Dr Baxter).
Dr Ricciardi is now with the Department of Colon and Rectal Surgery, Lahey Clinic, Tufts University, Burlington, Massachusetts.

THE RELATIONSHIP BETWEEN increased hospital coronary artery bypass grafting (CABG) volume and lower mortality has been consistently observed in the clinical literature.[1-15] The robustness of this association has led some investigators to suggest that postsurgical morbidity and mortality could be reduced substantially if hospitals with little working experience in cardiac techniques stopped performing procedures such as CABG.[16-18] Other researchers estimate that the mortality rate for CABG could be reduced by 1486 deaths per year if all patients undergoing CABG were referred to hospitals that perform more than 500 CABG operations per year.[19,20] As a result, several organizations and the lay press encouraged health care purchasers to consider CABG volume when selecting providers.[21] The Leapfrog Group,[22] a health care purchasing group of more than 170 companies and organizations, established the standard of 500 CABG operations per year as a quality criterion for selecting providers.

CME available online at www.jamaarchivescme.com and questions on page 330

See Invited Critique at end of article

During the past 2 decades, the introduction and refinement of percutaneous coronary revascularization techniques have considerably affected the care of patients with coronary artery disease. The resulting drop in the number of CABG operations provides an opportunity to evaluate the effect of decreasing procedure volume on patient outcomes. These changes have led us to question what happens to the volume-outcome relationship when volume decreases significantly. Our study had the following initial aims: (1) to de-

0343
09/15/08

fine national trends in the volume of coronary revascularization techniques performed surgically (CABG) or by percutaneous transluminal coronary intervention (PTCI) and (2) to define trends in valve replacement and repair (VRR) to correct for potential database sampling bias. Next, we characterize trends in hospital volume for CABG (based on established criteria for volume[13]) to characterize the proportion of patients treated at low-, mid-, and high-volume hospitals. Therefore, 2 additional aims were the following: (3) to record mortality by year and by CABG volume to evaluate the effect of declining CABG volume on the well-defined volume-outcome relationship and (4) to quantify the difference in mortality between high- and low-volume hospitals.

METHODS

DATA SOURCES

We obtained hospital discharge data from the Nationwide Inpatient Sample (NIS) for 16 years (January 1, 1988, through December 31, 2003) via the Healthcare Cost and Utilization Project of the Agency for Healthcare Research and Quality. The NIS, the largest source of all-payer hospital discharge information in the United States, is a unique and powerful tool that includes data from about 7 million hospital stays per year in 1000 hospitals located in 35 states, approximating a 20% stratified sample of US community hospitals. Other researchers have used NIS data to review trends in surgical care and outcomes,[23] volume-outcome relationships,[13] and disparities in care.[24] A data use agreement is held by the Agency for Healthcare Research and Quality; in addition, our study protocol was considered exempt by the University of Minnesota Institutional Review Board.

PATIENTS

We used diagnostic codes from the *International Classification of Diseases, Ninth Revision* (*ICD-9*) to identify all patients who underwent CABG (codes 36.10-36.19),[13] VRR (codes 35.11, 35.21, 35.22, 35.12, 35.23, and 35.24),[15] or PTCI (codes 36.01, 36.02, 36.04, 36.05, 36.06, 36.07, and 36.09) from 1988 through 2003.

HOSPITAL VOLUME

The NIS contains hospital identifiers that permit calculation of hospital-level volume. Volumes of CABG were calculated separately in each year for each facility reporting CABG. Based on previously published methods,[13] we included all hospitals performing at least 12 CABG operations per year. Prior work by Rathore et al[13] identified significant volume-outcome effects using the following categories of annual volume: high (≥500 CABG operations), mid (250-499 operations), and low (12-249 operations); the high-volume cut point (500 operations) was selected as a minimum threshold for quality standards by the Leapfrog Group[22] during the period of our analysis. Therefore, we adopted these volume cutoffs to divide hospitals into 3 groups.

IN-HOSPITAL MORTALITY

The NIS contains information on vital status at the time of discharge. We determined the in-hospital mortality rate for all patients undergoing CABG during our study period. We also calculated the mean mortality rate by hospital volume group (high, mid, and low) and for each quarter of our study period (1988-1991, 1992-1995, 1996-1999, and 2000-2003). The NIS does not include 30-day mortality rates, so the in-hospital mortality rate was the single outcome that we calculated.

COMORBIDITY

To control for changes in patient comorbidity over time, we adjusted for comorbidity using the modification of the Charlson Comorbidity Index by Deyo et al.[25] Briefly, we ascertained the presence of 17 comorbid conditions and then weighted them according to the original study by Pompei et al.[26] An elevated Charlson Comorbidity Index has been shown to correlate with increased 1-year mortality.[26] In addition, we calculated the proportion of patients having a diagnosis of diabetes mellitus to adjust for risk during our 16-year study period. In a study[27] of administrative database coding accuracy, upcoding of diabetes mellitus was not noted over time.

STATISTICAL ANALYSIS

To compare categorical variables (patient characteristics, proportion of hospitals, and mortality) between high-, mid-, and low-volume hospitals, we used the χ^2 test. We used the t test to compare continuous variables.

We used the joinpoint regression program[28] from the Surveillance Epidemiology and End Results program of the National Cancer Institute to evaluate whether volume and mortality were variable over time. We estimated statistical significance (P value) using Monte Carlo methods and maintained the overall asymptotic significance level using Bonferroni correction.[29]

We used logistic regression analysis to determine the effect of study period (1988-1991, 1992-1995, 1996-1999, and 2000-2003) on the probability of mortality while controlling for comorbidity, payer status, patient sex, and patient age. Study period and payer status (Medicare, Medicaid, private, or other) were modeled as categorical variables, with comorbidity and patient age as continuous variables. To determine if the relationship between volume and mortality was consistent throughout our study period, we tested for an interaction between hospital volume (using the published cutoffs) and year of surgery on mortality. To identify potential changes in the relationship between hospital volume and mortality over time, we calculated odds ratios for mortality after adjusting for identified covariates. We then compared the odds ratios for mortality between high-volume and low-volume hospitals for 1988-1991 (quarter 1) and then plotted the results.

For statistical analyses, we used commercially available software (SAS version 9.13; SAS Institute, Cary, NC). All statistical tests were 2-sided, and $P \leq .05$ was considered statistically significant.

RESULTS

PATIENT CHARACTERISTICS

For our 16-year study period, we found NIS discharge abstracts for 108 087 386 patients: CABG was performed in 1 082 218 patients (1.0%), VRR in 186 483 patients (0.2%), and PTCI in 1 589 942 patients (1.5%) (**Table 1**). During our study period, 2 858 643 (CABG, VRR, or PTCI) procedures were performed. The mean age of all patients was 64.6 years; patients who underwent VRR and CABG were slightly older. About half of all patients were enrolled in Medicare. The mean Charlson Comorbidity Index score was 1.02, and the highest

0344
09/15/08

Table 1. Patient Characteristics by Procedure[a]

Characteristic	Total (N=2 858 643)	Procedure		
		CABG (n=1 082 218)	VRR (n=186 483)	PTCI (n=1 589 942)
Age, mean (SD), y	64.6 (0.007)	65.8 (0.010)	65.7 (0.020)	63.6 (0.009)
Sex, %				
Male	67.5	70.6	59.2	66.3
Female	32.5	29.4	40.8	33.7
Missing	<0.01	<0.01	<0.01	<0.01
Payer, %				
Medicare	52.0	54.8	61.0	48.7
Medicaid	3.7	3.4	4.3	3.7
Private	38.6	36.0	29.4	41.2
Self or other	5.5	5.0	4.6	5.9
Missing	0.3	0.8	0.6	0.5
Diabetes mellitus, %	22.3	24.1	13.1	22.2
≥3 Comorbidities, %	5.6	6.8	4.6	4.9
Charlson Comorbidity Index score, mean (SD)	1.02 (0.0007)	1.08 (0.0010)	0.94 (0.0030)	0.99 (0.0010)

Abbreviations: CABG, coronary artery bypass grafting; PTCI, percutaneous transluminal coronary intervention; VRR, valve replacement or repair.
[a] $P<.001$ for all comparisons across procedures.

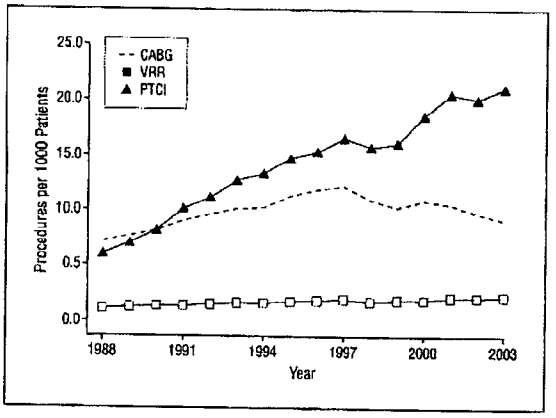


Figure 1. Coronary artery bypass grafting (CABG), valve replacement or repair (VRR), and percutaneous transluminal coronary intervention (PTCI) per 1000 patients per year.

score was for patients who underwent CABG. Diabetes mellitus was present in 24.1% of all patients undergoing CABG; its prevalence increased from 14.0% in 1988 to 31.5% in 2003.

PROCEDURE TRENDS

The number of CABG operations increased from 37 838 in 1988 to 87 160 in 1997 but decreased to 72 939 in 2003. The rate of CABG increased from 7.2 procedures per 1000 hospitalized patients in 1988 to 12.2 procedures per 1000 patients in 1997 and then declined to 9.1 procedures per 1000 patients in 2003 ($P<.001$) (**Figure 1**). Our joinpoint trend analysis revealed an increase in the rate of CABG over time until 1996 (slope, 0.60; $P<.001$). After that, our analysis revealed a reduction in the rate of CABG (slope, −0.36; $P<.001$). In contrast, the number of VRR procedures increased from 5908 in 1988 to 17 408 in 2003. The rate of VRR gradually increased from 1.1 procedures per 1000 patients in 1988 to 2.2 procedures per 1000 patients in 2003: this increase was consistent over time (our joinpoint trend analysis revealed a slow increase, without a major change in the trend [slope, 0.07; $P<.001$]).

The number of PTCI procedures increased considerably during our study period, from 31 713 in 1988 to 168 831 in 2003. The rate of PTCI increased from 6.0 procedures per 1000 patients in 1988 to 21.2 procedures per 1000 patients in 2003 (Figure 1). Our joinpoint trend analysis revealed a rapid increase in the rate of PTCI until 1993 (slope, 1.36; $P<.001$), with a more gradual increase in the ensuing years (slope, 0.84; $P<.001$). As a result of the combined decrease in CABG and increase in PTCI, the overall ratio of CABG to PTCI procedures decreased from 1.2:1 in 1988 to 0.4:1 in 2003.

HOSPITAL CABG VOLUME

The number of hospitals routinely performing CABG ranged from 119 to 233 during our study period. Overall, 52.0% of patients received care at high-volume (≥500 CABG operations per year) hospitals. Patients treated at high-volume hospitals were slightly older (mean age, 65.9 years) but were less likely to be male (70.3%) compared with patients treated at other hospitals (**Table 2**). High-volume hospitals treated a larger proportion of Medicare patients, but low-volume hospitals treated more patients with Medicaid insurance. In addition, high-volume hospitals treated a higher proportion of patients with diabetes mellitus, as well as a higher proportion of patients with 3 or more comorbidities and with higher mean Charlson Comorbidity Index scores.

The proportion of high-volume hospitals increased from 17.7% in 1988 to a peak of 32.5% in 1997 (the year of the peak volume of CABG) but then decreased to 15.5% in 2003. Conversely, the proportion of low-volume (12-249 CABG operations per year) hospitals decreased from 49.6% in 1988 to a nadir of 35.5% in 1997 but increased to 52.4% in 2003 (**Figure 2**). The number of patients

0345
09/15/08

Table 2. Patient Characteristics by Hospital Volume[a]

Characteristic	Hospital Volume		
	High (n=562 619)	Mid (n=339 796)	Low (n=179 645)
Age, mean, y	65.9	65.8	65.3
Sex, %			
Male	70.3	71.2	70.4
Female	29.7	28.8	29.6
Missing	<0.005	<0.005	<0.005
Payer, %			
Medicare	56.1	54.6	52.4
Medicaid	3.0	3.3	4.8
Private	36.0	36.0	35.0
Self or other	3.9	5.5	7.4
Missing	1.0	<0.6	0.4
Diabetes mellitus, %	24.7	22.9	24.2
≥3 Comorbidities, %	7.2	6.2	6.8
Charlson Comorbidity Index score, mean	1.12	1.03	1.07

[a]Two hundred fifty-eight patients were excluded from the hospital volume calculations. $P<.001$ for all comparisons across hospital volumes.

undergoing CABG treated at high-volume hospitals increased from 16 878 (44.6%) in 1988 to 54 983 (63.1%) in 1997 but then decreased to 29 886 (41.0%) in 2003. Conversely, the number of patients treated at low-volume hospitals decreased from 7500 (19.8%) in 1988 to 9757 (11.2%) in 1997 but then increased to 17 945 (24.6%) in 2003.

CABG IN-HOSPITAL MORTALITY

In-hospital CABG mortality decreased from 5.4% in 1988 to 3.3% in 2003 (**Figure 3**). Our joinpoint trend analysis revealed a drop in mortality for CABG throughout our study period, with a more rapid decrease before 1993 (slope, −0.26; $P<.001$) compared with 1994 onward (slope, −0.09; $P<.001$). Our logistic regression analysis revealed a statistically significant reduction in mortality from 1988 to 2003 (odds ratio, 0.41; 95% confidence interval, 0.38-0.41; $P<.001$) that was not explained by changes in patient age, patient sex, payer status, or comorbidity. The overall Charlson Comorbidity Index score increased during our study period (from 0.6 in 1988 to 1.3 in 2003, $P<.001$), and the percentage of patients with 3 or more comorbidities rose from 1.2% in 1988 to 9.4% in 2003 ($P<.01$). The percentage of patients with diabetes mellitus rose from 14.0% in 1988 to 31.5% in 2003 ($P<.001$). When we excluded comorbidity from our model, we still noted a statistically significant reduction in mortality over time (odds ratio, 0.53; 95% confidence interval, 0.50-0.57; $P<.001$).

In 1988, CABG mortality in high-volume hospitals was 4.9%; in 2003, it was 3.1%. We noted a statistically significant trend toward reduced mortality in high-volume hospitals from 1990 onward ($P<.001$). Similarly, in mid-volume hospitals, mortality decreased from 5.6% in 1988 to 3.4% in 2003. A statistically significant trend toward reduced mortality in mid-volume hospitals was observed throughout our study period ($P<.002$). In low-volume hospitals, mortality decreased from 5.9% in 1998 to 3.5% in 2003. Therefore, we also noted a statistically significant trend toward reduced mortality in low-volume hospitals throughout our study period ($P<.001$).

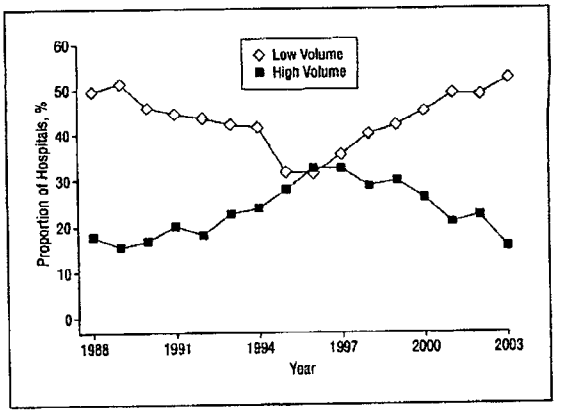


Figure 2. Proportions of coronary artery bypass grafting low-volume or high-volume hospitals by year of procedure.

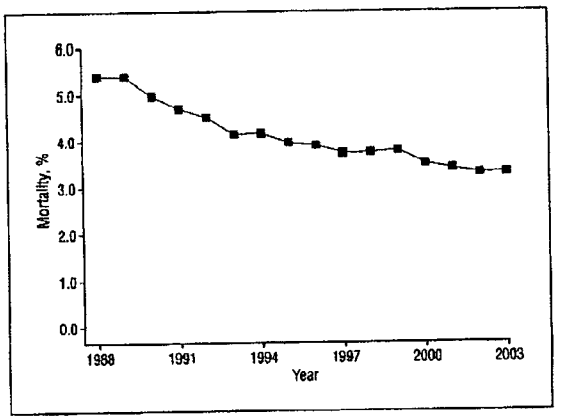


Figure 3. Overall mortality rates by year for patients undergoing coronary artery bypass grafting.

When we analyzed mortality by quarter of our study period (1988-1991, 1992-1995, 1996-1999, and 2000-2003), we observed a statistically significant difference in mortality between high-volume and low-volume hospitals, a difference that was not explained by patient characteristics or by comorbidities ($P<.001$) (**Table 3**). In addition, we identified a statistically significant interaction between quarter and hospital volume in our logistic regression model predicting mortality, indicating that the relationship between hospital volume and mortality changed over time ($P<.05$). Therefore, the difference in mortality across volume thresholds changed during the study period. The odds ratio for mortality revealed that mortality significantly decreased for all cutoffs of hospital volume over time compared with low-volume hospitals in 1988-1991. In addition, a plot of our odds ratios illustrated that the difference in mortality between high-volume and low-volume hospitals narrowed during the most recent quarter (2000-2003) (**Figure 4**).

0346
09/15/08

Table 3. Patient Mortality by Hospital Volume and Quarter of the Study Period[a]

Quarter	Hospital Volume, %			P Value
	High	Mid	Low	
1988-1991	4.9	5.1	5.5	<.002
1992-1995	3.9	4.3	4.8	<.001
1996-1999	3.7	3.9	4.2	<.001
2000-2003	3.2	3.5	3.7	<.001

[a] *P* value indicates significance for comparisons across all hospital volumes.

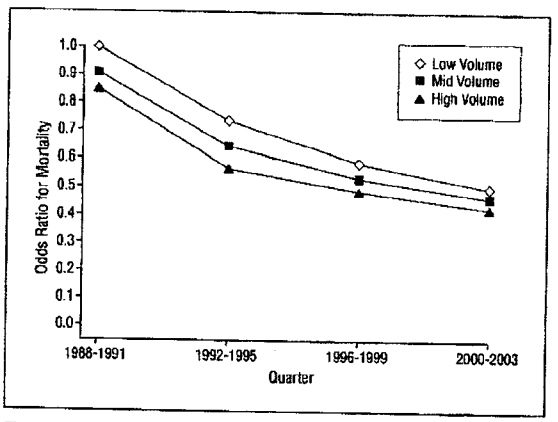


Figure 4. Odds ratios for coronary artery bypass grafting mortality compared with low-volume hospitals at the beginning of the study period. Rates are per quarter of the study period.

COMMENT

Our data confirm marked changes in CABG volume over time in the United States. Although the volumes of PTCI and VRR rose during our study period, the volume of CABG has been decreasing since its peak in 1997. Similarly, a population-based study[30] in Washington State found that CABG operations decreased 19% from 1997 to 2001. Explanations for the reduced rate of CABG surgery include improvements in minimally invasive approaches to coronary revascularization,[31] enhancements in PTCI techniques, the development of drug-impregnated stents,[32] and the advent of new anticoagulant agents.[33,34] In addition, behavioral, societal, and medical efforts at prevention may have reduced the overall proportion of patients with cardiovascular risk factors and, consequently, with coronary artery disease.[35]

The effect of decreased CABG volume has not been evaluated in the literature, to our knowledge, until our study. It stands to reason that the decreasing CABG volume has an effect on patient outcome. However, in addition to the overall reduction in CABG operations, our data demonstrate marked reductions in the proportion of institutions classified as high-volume hospitals and in the proportion of patients treated at the Leapfrog Group's high-volume hospitals. If a causal relationship exists between a high procedure volume and a good outcome, then findings of (1) an overall reduction in CABG volume and (2) a reduction in the proportion of patients treated at high-volume hospitals should affect mortality. Specifically, with a decline in CABG volume, one would predict a rise in mortality since 1997. Instead, our study reveals a significant reduction in mortality in the face of reduced aggregate procedure volume.

As overall CABG volume declined from 1997 onward, overall CABG mortality also significantly declined from 3.7% in 1997 to 3.3% in 2003. This counterintuitive finding may be explained by (1) a dissemination of improved quality care practices to the community or (2) a shift of once high-volume hospitals, with presumed lower mortality rates because of structural variables that remained constant, into the low-volume group. A definitive explanation cannot be obtained from our data. We also found significant improvement across all volume groups over time, as well as overall improvements in the mortality rate since 1997, despite the fact that fewer patients were treated at high-volume hospitals. Therefore, care of patients undergoing CABG has improved independent of volume. Previous research confirmed a dissemination of improved quality care practices at multiple institutions in the area of CABG surgery.[36] Given the reduction in CABG volume and the dramatic increase in patients treated at low-volume hospitals, regionalization strategies were not responsible for the improvements in the mortality rate that we identified.

Our data indicate that in-hospital mortality rates and, possibly, quality care practices are improving everywhere independent of CABG volume. In fact, the low-volume hospitals had the most substantial reduction in CABG mortality. In 2003, the absolute difference in mortality between high-volume and low-volume centers was small. This finding should challenge the setting of any arbitrary volume cut point: positive effects on patient outcome are multifactorial and are inadequately described by procedure volume. In addition, the in-hospital mortality rate after CABG may have diminished to such low levels that it is no longer a useful marker of quality. It may still be valuable in identifying outliers, but in terms of evaluating quality of care in further CABG outcome studies, other end points may be more valuable.

Our use of an administrative database for analysis of medical services has limitations and strengths. First, *ICD-9* procedure coding was consistently recorded throughout our 16-year study period and is known to be highly accurate. Yet, despite the noted accuracy of *ICD-9* coding, a significant limitation of our study is the lack of all potential medical items in the hospital record. In addition, we were unable to directly compare in-hospital mortality rates with 30-day mortality rates; however, these 2 rates have been shown to be highly correlated.[37] Second, we noted a secular trend toward higher comorbidity coding; however, the results of our logistic regression model were similar with and without adjustment for comorbidities. Our data represent a large sample of CABG operations in the United States, not restricted to subjects enrolled in Medicare. Therefore, we believe that our

0347
09/15/08

results provide generalizable population-based estimates of the CABG volume-outcome relationship.

In conclusion, our study revealed a significant decrease in CABG volume since 1997 in the setting of a significant rise in PTCI. Also since 1997, the number of patients undergoing CABG treated at high-volume hospitals and the proportion of high-volume hospitals have decreased significantly. Despite this reduction in patients undergoing CABG at high-volume hospitals, the overall pooled CABG mortality decreased significantly during the study period. Reduced CABG volume in the setting of decreased mortality is a counterintuitive finding given the robust converse relationship between volume and outcome. Therefore, our findings have important implications for our understanding of the volume-outcome relationship and should dampen enthusiasm for regionalization of CABG care based solely on volume.

Accepted for Publication: September 19, 2006.
Correspondence: Rocco Ricciardi, MD, MPH, Department of Colon and Rectal Surgery, Lahey Clinic, Tufts University, 41 Mall Rd, Burlington, MA 01805 (rocco.ricciardi@lahey.org).
Author Contributions: Dr Ricciardi had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. *Study concept and design:* Ricciardi, Virnig, and Baxter. *Analysis and interpretation of data:* Ricciardi, Virnig, Ogilvie, Dahlberg, Selker, and Baxter. *Drafting of the manuscript:* Ricciardi, Virnig, Selker, and Baxter. *Critical revision of the manuscript for important intellectual content:* Ricciardi, Virnig, Ogilvie, Dahlberg, Selker, and Baxter. *Statistical analysis:* Ricciardi and Virnig.
Financial Disclosure: None reported.
Funding/Support: This study and Dr Ricciardi were supported by the University of Minnesota Academic Health Center's Clinical Scholars Research Grant.
Role of the Sponsor: The University of Minnesota Academic Health Center had no involvement in the design or conduct of the study; data management or analysis; or manuscript preparation, review, or authorization for submission.
Additional Contributions: Mary E. Knatterud, PhD, provided editorial support.

REFERENCES

1. Birkmeyer JD, Siewers AE, Finlayson EV, et al. Hospital volume and surgical mortality in the United States. *N Engl J Med.* 2002;346(15):1128-1137.
2. Kelly JV, Hellinger FJ. Heart disease and hospital deaths: an empirical study. *Health Serv Res.* 1987;22(3):369-395.
3. Nallamothu BK, Saint S, Ramsey SD, Hofer TP, Vijan S, Eagle KA. The role of hospital volume in coronary artery bypass grafting: is more always better? *J Am Coll Cardiol.* 2001;38(7):1923-1930.
4. Hannan EL, Kilburn H Jr, Bernard H, O'Donnell JF, Lukacik G, Shields EP. Coronary artery bypass surgery: the relationship between in-hospital mortality rate and surgical volume after controlling for clinical risk factors. *Med Care.* 1991; 29(11):1094-1107.
5. Hannan EL, O'Donnell JF, Kilburn H Jr, Bernard HR, Yazici A. Investigation of the relationship between volume and mortality for surgical procedures performed in New York State hospitals. *JAMA.* 1989;262(4):503-510.
6. Peterson ED, Coombs LP, DeLong ER, Haan CK, Ferguson TB. Procedural volume as a marker of quality for CABG surgery. *JAMA.* 2004;291(2):195-201.
7. Showstack JA, Rosenfeld KE, Garnick DW, Luft HS, Schaffarzick RW, Fowles J. Association of volume with outcome of coronary artery bypass graft surgery [published correction appears in *JAMA.* 2987;257(18):2438). *JAMA.* 1987;257 (6):785-789.
8. Grumbach K, Anderson GM, Luft HS, Roos LL, Brook R. Regionalization of cardiac surgery in the United States and Canada: geographic access, choice, and outcomes. *JAMA.* 1995;274(16):1282-1288.
9. Farley DE, Ozminkoski RJ. Volume-outcome relationships and in-hospital mortality: the effect of changes in volume over time. *Med Care.* 1992;30(1):77-94.
10. Riley G, Lubitz J. Outcomes of surgery among the Medicare aged: surgical volume and mortality. *Health Care Financ Rev.* 1985;7(1):37-47.
11. Luft HS, Bunker JP, Enthoven AC. Should operations be regionalized? the empirical relation between surgical volume and mortality. *N Engl J Med.* 1979; 301(25):1364-1369.
12. Banta D, Bos M. The relation between quantity and quality with coronary artery bypass graft (CABG) surgery. *Health Policy.* 1991;18(1):1-10.
13. Rathore SS, Epstein AJ, Volpp KG, Krumholz HM. Hospital coronary artery bypass graft surgery volume and patient mortality. *Ann Surg.* 2004;239(1):110-117.
14. Begg CB, Cramer LD, Hoskins WJ, Brennan MF. Impact of hospital volume on operative mortality for major cancer surgery. *JAMA.* 1998;280(20):1747-1751.
15. Carey JS, Danielsen B, Gold JP, Rossiter SJ. Procedure rates and outcomes of coronary revascularization procedures in California and New York. *J Thorac Cardiovasc Surg.* 2005;129(6):1276-1282.
16. Halm EA, Lee C, Chassin MR. *How Is Volume Related to Quality in Health Care? A Systematic Review of the Research Literature.* Washington, DC: Institute of Medicine; 2000.
17. Dudley RA, Johansen KL, Brand R, Rennie DJ, Milstein A. Selective referral to high-volume hospitals: estimating potentially avoidable deaths. *JAMA.* 2000; 283(9):1159-1166.
18. Birkmeyer JD, Lucas FL, Wennberg DE. Potential benefits of regionalizing major surgery in Medicare patients. *Eff Clin Pract.* 1999;2(6):277-283.
19. Birkmeyer JD, Finlayson EV, Birkmeyer CM. Volume standards for high-risk surgical procedures: potential benefits of the Leapfrog initiative. *Surgery.* 2001; 130(3):415-422.
20. Birkmeyer JD, Dimick JB. The Leapfrog Group's patient safety practices, 2003: the potential benefits of universal adoption. http://www.leapfroggroup.org/media/file/Leapfrog-Birkmeyer.pdf. Accessed November 12, 2005.
21. Milstein A, Galvin RS, Delbanco SF, Salber P, Buck CR Jr. Improving the safety of health care: the Leapfrog initiative [published correction appears in *Eff Clin Pract.* 2001;4(2):9. *Eff Clin Pract.* 2000;3(6):313-316.
22. The Leapfrog Group for patient safety Web site. Informing choices: rewarding excellence: getting health care right. http://www.leapfroggroup.org. Accessed January 16, 2008.
23. Dimick JB, Walness RM, Cowan JA, Upchurch GR Jr, Knol KA, Colletti LM. National trends in the use and outcomes of hepatic resection. *J Am Coll Surg.* 2004;199(1):31-38.
24. Shen JJ, Washington EL, Aponte-Soto L. Racial disparities in the pathogenesis and outcomes for patients with ischemic stroke. *Manag Care Interface.* 2004; 17(3):28-34.
25. Deyo RA, Cherkin DC, Ciol MA. Adapting a clinical comorbidity index for use with *ICD-9-CM* administrative databases. *J Clin Epidemiol.* 1992;45(6):613-619.
26. Pompei P, Charlson ME, Ales K, MacKenzie CR, Norton M. Relating patient characteristics at the time of admission to outcomes of hospitalization. *J Clin Epidemiol.* 1991;44(10):1063-1069.
27. Miller DR, Safford MM, Pogach LM. Who has diabetes? best estimates of diabetes prevalence in the Department of Veterans Affairs based on computerized patient data. *Diabetes Care.* 2004;27(suppl 2):B10-B21.
28. Statistical Research & Applications Branch: Joinpoint home Web site. Joinpoint regression program. http://srab.cancer.gov/joinpoint/. Accessed January 16, 2008.
29. Kim HJ, Fay MP, Feuer EJ, Midthune DN. Permutation tests for joinpoint regression with applications to cancer rates [published correction appears in *Stat Med.* 2001;20:655]. *Stat Med.* 2000;19(3):335-351.
30. Ulrich MR, Brock DM, Ziskind AA. Analysis of trends in coronary artery bypass grafting and percutaneous coronary intervention rates in Washington State from 1987 to 2001. *Am J Cardiol.* 2003;92(7):836-839.
31. Kiemeneij F, Serruys PW, Macaya C, et al. Continued benefit of coronary stenting versus balloon angioplasty: five-year clinical follow-up of Benestent-I trial. *J Am Coll Cardiol.* 2001;37(6):1598-1603.
32. Morice MC, Serruys PW, Sousa JE, et al. A randomized comparison of a sirolimus-eluting stent with a standard stent for coronary revascularization. *N Engl J Med.* 2002;346(23):1773-1780.
33. Leon MB, Baim DS, Popma JJ, et al; Stent Anticoagulation Restenosis Study Investigators. A clinical trial comparing three antithrombotic-drug regimens after coronary artery stenting. *N Engl J Med.* 1998;339(23):1665-1671.

0348
09/15/08

34. Schömig A, Neumann FJ, Walter H, et al. Coronary stent placement in patients with acute myocardial infarction: comparison of clinical and angiographic outcome after randomization to antiplatelet or anticoagulation therapy. *J Am Coll Cardiol.* 1997;29(1):28-34.
35. Multiple Risk Factor Intervention Trial Research Group. Multiple Risk Factor Intervention Trial: risk factor changes and mortality results. *JAMA.* 1982;248 (12):1465-1677.
36. O'Connor GT, Plume SK, Olmstead EM, et al; Northern New England Cardiovascular Disease Study Group. A regional intervention to improve the hospital mortality associated with coronary artery bypass graft surgery. *JAMA.* 1996;275 (11):841-846.
37. Likosky DS, Nugent WC, Clough RA, et al. Comparison of three measurements of cardiac surgery mortality for the Northern New England Cardiovascular Disease Study Group. *Ann Thorac Surg.* 2006;81(4):1393-1395.

INVITED CRITIQUE

It has been assumed by many, based on previous studies,[1,2] that there is a linkage between hospital cardiac surgical case volumes and outcomes, whereby improved outcomes are associated with high-volume centers. Regionalization strategies and recommendations, adopted by state certificate of need regulations and health care industry consortia (eg, the Leapfrog Group), are largely predicated on these assumptions in that they espouse concentrating bypass surgery procedural volumes in the interest of improving quality and outcomes. Findings from this article suggest that such traditional volume-outcome tenets may be overly simplistic and inaccurate in assessing current CABG practices. In an analysis of the Society of Thoracic Surgeons' National Cardiac Surgery Database, DiSesa et al[3] recently reported that, although certificate of need regulations have been successful in increasing hospital CABG volumes, their effect on procedural mortality or morbidity seems to be negligible. There is growing experiential evidence that hospital-based quality control, monitoring, and best-practice programs may have a more significant effect on outcomes.

It is intriguing that Dr Ricciardi and colleagues found that lower-volume CABG centers have recently experienced reduced mortality rates, fueling the notion that lower-volume community centers with rigorous quality control mechanisms may be better able to provide superior perioperative care than traditional high-volume academic centers. Although difficult to evaluate objectively, high-volume academic centers should not underestimate the negative effect of recently enforced restricted residency hours on the quality of perioperative care readily available to high-acuity postoperative patients.

Coronary artery bypass grafting has been selected as an index operation for this and other outcome analyses presumably because of its high volume, high acuity, and expense. One must be cautious, however, in applying the conclusions of such analyses based on generally routine operations to other less frequently performed, more technically complex, and specialized cardiac operations (eg, complex mitral valve repair, aortic root or arch reconstructions, and Norwood procedures). It would seem that operative outcomes among such operations might better adhere to traditional volume-outcome assumptions.

David D. Yuh, MD

Accepted for Publication: January 3, 2007.
Correspondence: Dr Yuh, Division of Cardiac Surgery, Department of Surgery, Johns Hopkins University, 600 N Wolfe St, Blalock Bldg, Room 618, Baltimore, MD 21287 (dyuh@surg.jhmi.jhu.edu).
Financial Disclosure: None reported.

1. Rosenthal GE, Vaughan-Sarrazin MS, Hannan EL. In-hospital mortality following coronary artery bypass surgery in Veterans Health Administration and private sector hospitals. *Med Care.* 2003;41(4):522-535.
2. Wu C, Hannan EL, Ryan TJ, et al. Is the impact of hospital and surgeon volumes on the in-hospital mortality rate for coronary artery bypass surgery limited to patients at high-risk? *Circulation.* 2004;110(7):784-789.
3. DiSesa VJ, O'Brien SM, Welke KF, et al. Contemporary impact of state certificate-of-need regulations for cardiac surgery: an analysis using the Society of Thoracic Surgeons' National Cardiac Surgery Database. *Circulation.* 2006;114 (20):2122-2129.

0349
09/15/08

© Health Research and Educational Trust
DOI: 10.1111/j.1475-6773.2007.00740.x
RESEARCH ARTICLE

Health Care Outcomes

The CABG Surgery Volume–Outcome Relationship: Temporal Trends and Selection Effects in California, 1998–2004

James P. Marcin, Zhongmin Li, Richard L. Kravitz, Jian J. Dai, David M. Rocke, and Patrick S. Romano

Objective. To investigate the temporal trends in the volume–outcome relationship in coronary artery bypass graft (CABG) surgery in California from 1998 to 2004, and to assess the selection effects on this relationship by using data from periods of voluntary and mandatory hospital reporting.

Data Sources. We used patient-level clinical data collected for the California CABG Mortality Reporting Program (CCMRP, a voluntary reporting program with between 68 and 81 hospitals) from 1998 to 2002 and the California CABG Outcomes Reporting Program (CCORP, a mandatory reporting program with 121 and 120 hospitals) from 2003 to 2004.

Study Design. The patient was the primary unit of analysis, and in-hospital mortality was the primary outcome. We used hierarchical logistic regression models (generalized linear mixed models) to assess the association of hospital annual volume with hospital mortality while controlling for detailed patient-level covariates in each of the 7 years.

Data Collection Methods. All data were systematically collected, reviewed for accuracy, and validated by the State of California's Office of Statewide Health Planning and Development (OSHPD).

Principal Findings. We found that during the period of voluntary hospital reporting (1998–2002), with the exception of 1998, higher volume hospitals had significantly lower risk-adjusted in-hospital mortality rates, on average, than lower volume hospitals (1998 odds ratio [OR] per 100 operations performed = 0.962, 95 percent confidence interval [CI]: 0.912–1.015; 1999 OR = 0.955, 95 percent CI: 0.920–0.991; 2000 OR = 0.942, 95 percent CI: 0.897–0.989; 2001 OR = 0.935, 95 percent CI: 0.887–0.986; 2002 OR = 0.946, 95 percent CI: 0.899–0.997). We also found that in the period of mandatory reporting (2003 and 2004) there was no volume–outcome relationship (2003 OR = 0.997, 95 percent CI: 0.939–1.058; 2004 OR = 0.984, 95 percent CI: 0.915–1.058) and that this lack of association was not due to a reporting bias from the addition of data from hospitals that did not originally contribute during the voluntary program.

0350
09/15/08

Conclusions. In California, where no state regulations support regionalization of CABG surgeries, a weak volume–outcome relationship was present from 1998 to 2002, but was absent in 2003 and 2004. The disappearance of the volume–outcome association was temporally related to the implementation of a statewide mandatory CABG surgery reporting program.

Key Words. Volume–outcome relationship, coronary artery bypass graft surgery, regionalization of services, risk adjustment, multilevel modeling

---

The association between the quantity of care that a physician or hospital provides and the quality of care that patients receive has been rigorously studied by clinicians and health services researchers (Luft, Bunker, and Enthoven 1979; Birkmeyer et al. 2003; Gandjour, Bannenberg, and Lauterbach 2003). This "volume–outcome" relationship has been documented for a wide variety of medical conditions and surgical procedures at the physician, clinical team, and hospital level of care (Halm, Lee, and Chassin 2002; Elixhauser, Steiner, and Fraser 2003). In a report reviewing the volume–outcome relationship published by the Institute of Medicine, the authors noted that 77 percent of the published volume–outcome studies had demonstrated a significant relationship between higher physician and hospital volumes and better health outcomes (Hewitt et al. 2001).

The volume–outcome relationship has been most intensely studied for patients receiving coronary artery bypass grafting (CABG) surgery, perhaps because regionalization is a particularly promising policy strategy to improve care for high-risk elective surgery. Although many studies have found that hospitals performing relatively more CABG surgeries have better outcomes (Luft, Bunker, and Enthoven 1979; Birkmeyer et al. 2002, 2003; Hannan et al. 2003; Peterson et al. 2004), the importance of this relationship for health policy

---

Address correspondence to James P. Marcin, M.D., M.P.H., Department of Pediatrics, UC Davis Children's Hospital and the Center for Health Services Research in Primary Care, 2516 Stockton Boulevard, Sacramento, CA 95817. Zhongmin Li, Ph.D., is with the Department of Internal Medicine, UC Davis Division of General Medicine, UC Davis, and the Health Quality and Analysis Division, OSHPD, Sacramento, CA. Richard L. Kravitz, M.D., M.S.P.H., is with the Department of Internal Medicine, UC Davis Division of General Medicine, and the Center for Health Services Research in Primary Care, Sacramento, CA. Jian J. Dai, Ph.D., is with the Institute for Data Analysis and Visualization, UC Davis, Davis, CA. David M. Rocke, Ph.D., is with the Division of Biostatistics, UC Davis, Davis, CA. Patrick S. Romano, M.D., M.P.H., is with the Department of Internal Medicine, Department of Pediatrics, UC Davis Division of General Medicine, and the Center for Health Services Research in Primary Care, Sacramento, CA.

0351
09/15/08

remains controversial. First, several recent studies using robust statistical methods and careful risk adjustment have found either minor or insignificant hospital CABG volume–outcome relationships, or no relationship at all (Christiansen and Morris 1997; Shahian et al. 2001; Kalant and Shrier 2004; Peterson et al. 2004). Second, studies of regionalization policies have been inconclusive regarding their impact on improving care (Vaughan-Sarrazin et al. 2002; Nobilio and Ugolini 2003). Third, there is some evidence that the observed volume–outcome association may reflect selective referral of patients to high-quality surgeons and hospitals, rather than greater experience leading to improved skills (Luft et al. 1990; Escarce et al. 1999).

In addition, the effect of public reporting of CABG surgery performance on the volume–outcome relationship is unknown. In several studies, the publication of CABG surgery quality reports has been associated with reduced CABG mortality (Hannan et al. 1995; Rosenthal, Quinn, and Harper 1997; Romano and Zhou 2004) and enhanced quality improvement efforts, particularly for low-quality and low-volume outliers (Bentley and Nash 1998; Rainwater, Romano, and Antonius 1998; Chassin 2002). Therefore, public performance data may help stimulate standardization of procedures, improved training, acquisition of better equipment, and diffusion of innovation, thereby improving outcomes among low-quality and low-volume outliers and attenuating the volume–outcome relationship. Further, as some of the studies that have reported a significant volume–outcome relationship used data from voluntary reporting programs, selection bias could have contributed to misestimation of the volume effect (Clark 1996; Christian et al. 2003; Peterson et al. 2004). For example, the volume–outcome relationship could be overestimated if nonparticipating low-volume hospitals had better than average outcomes or if nonparticipating high-volume hospitals had worse than average outcomes.

The goal of this study was to investigate the volume–outcome relationship for CABG surgery in California from 1998 to 2004, a period during which public reporting of CABG outcomes transitioned from a voluntary basis to a state-mandated program. We analyze data from the California CABG Mortality Reporting Program (CCMRP), a voluntary reporting program with between 68 and 81 participating nonfederal hospitals from 1998 to 2002, and from the California CABG Outcomes Reporting Program (CCORP), a mandatory reporting program with 121 and 120 nonfederal hospitals from 2003 to 2004, respectively. Our objectives were (1) to use hierarchical logistic regression to determine whether hospitals performing more CABG surgeries have lower risk-adjusted mortality than hospitals performing fewer cases, and (2) to

0352
09/15/08

assess potential explanations for any change in the magnitude of the volume–outcome association between the voluntary reporting period (1998–2002) and the mandatory reporting period (2003 and 2004).

METHODS

The CCMRP was established in 1995 as a joint activity between the California Office of Statewide Health Planning and Development (OSHPD) and the Pacific Business Group on Health (PBGH). This voluntary program collected data from 1997 through 2002. The first CCMRP report was publicly released in July 2001 and presented data from 1997 to 1998 (Damberg, Chung, and Steimle 2001). The second report was released in August 2003 and presented data from 1999 (Damberg et al. 2003). The third report was released in February 2005 and presented data from 2000 to 2002 (Parker et al. 2005a). Beginning in 2003, data reporting became mandatory for all licensed nonfederal hospitals performing CABG surgery in California. The mandatory reporting program, referred to as the CCORP, published its first report in February 2006, based on data collected during 2003 (Parker et al. 2005b). The second CCORP report, to be published in 2007, will include physician-level data from 2003 to 2004.

The data used in this article include 5 years of data from the voluntary CCMRP (1998–2002) plus the first 2 years of data from the mandatory CCORP program (2003 and 2004). The data from 1997, the first year of the CCMRP, only included 34 hospitals and were therefore not included in these analyses. Further details on the CCMRP and CCORP reports including specifics on data collection, validation procedures, and statistical methods have been published (Parker et al. 2005a, b) and are available online (http://www.oshpd.ca.gov/hqad/outcomes/clinical.htm).

Data Elements

CCMRP and CCORP collect patient-level data elements defined by the Society of Thoracic Surgeons (STS) in its National Adult Cardiac Surgery database (Welke et al. 2004) as well as other state programs (Table 1) (Shroyer et al. 2003; Massachusetts Data Analysis Center [MASS-DAC] 2004; New York State Department of Health 2004; New Jersey Department of Health and Senior Services 2005; Pennsylvania Health Care Cost Containment Council 2005). To ensure the quality and comparability of data submitted, OSHPD

0353
09/15/08

Table 1: Risk Factors Included in the CCMRP and CCORP CABG Risk-Adjustment Models Compared with Other Risk-Adjustment Models

Risk Factor / *Dependent Variable*	*CCMRP 1998–2002* *Inpatient Mortality*	*CCORP 2003–2004** *Inpatient and Operative Mortality*	*STS†* *30-Day Mortality*	*NY‡* *Inpatient Mortality*	*NJ* *Operative Mortality*	*PA* *30-Day Mortality*	*MA§* *30-Day Mortality*
Race	✓	✓	✓				
Gender	✓	✓	✓	✓		✓	✓
Age	✓	✓	✓	✓	✓	✓	✓
Body mass index	✓	✓	✓•				
Status of procedure	✓	✓	✓			✓‖	✓
Creatinine (mg/dl)	✓	✓	RF	RF	RF	RF	RF
Hypertension	✓	✓	✓				✓
Dialysis	✓	✓	✓	✓	✓	✓	
Peripheral vascular disease	✓	✓	✓	✓			✓
Cerebrovascular disease	✓	✓	✓	✓			
Cerebrovascular accident		✓	✓		✓		
Diabetes	✓	✓	✓			✓	✓
Chronic lung disease	✓	✓	✓	✓	✓	✓	
Immunosuppressive treatment		✓	✓		✓		
Hepatic failure		✓					
Arrhythmia type	✓	✓					
Myocardial infarction	✓	✓	✓	✓	✓		✓
Cardiogenic shock	✓	✓	✓	✓		✓	✓
Congestive heart failure	✓	✓			✓		
NYHA Class IV	✓	✓	✓				
Prior cardiac surgery	✓**	✓	✓		✓	✓	✓
PTCA	✓		✓				
Ejection fraction	✓	✓	✓	✓			✓
	✓	✓	✓	✓			

0354
09/15/08

Left main disease (% stenosis)	√	√	√	√		
Number of diseased vessels	√	√				
Mitral insufficiency	√	√				
c-statistic	0.828	0.854[**]	0.78	0.803	0.765	0.772	Not available

Note:

*Although the CCORP public reports use operative (inpatient or 30-day) mortality as the outcome measure, for this manuscript we used only inpatient mortality and kept all risk factors unchanged for a fair comparison across years.

[†]STS model also includes "PTCA with 6 hours."

[‡]NY model also includes "unstable hemodynamic state" and "extensively calcified aorta."

[§]MA uses a multilevel, hierarchical model and includes "prior PTCA."

[¶]Body surface area.

[‖]MediQual measure.

[**]On bypass pump only.

[††]*c*-statistic reported for inpatient mortality.

CCMRP, California Coronary Artery Bypass Graft Mortality Reporting Program; CCORP, California CABG Outcomes Reporting Program; STS, Society of Thoracic Surgeons; NY, New York; NJ, New Jersey; PA, Pennsylvania; MA, Massachusetts; RF, renal failure; NYHA, New York Heart Association; PTCA, percutaneous transluminal coronary angioplasty.

0355
09/15/08

provided hospitals with training sessions and written guidance in the form of a data collection handbook.

Data Quality Review and Verification

The data submitted by each hospital for both the CCMRP and CCORP were systematically reviewed for completeness, data errors, and data discrepancies. The first step was to compare each hospital's specific rates for each data element to the state average. Invalid, missing, and abnormally high- or low-risk mean values and prevalences were identified. Reports were then generated for each hospital with discrepancies and each of these hospitals was asked to check for possible coding errors. The second step was to link the CCMRP and CCORP data with the State of California's Patient Discharge Data (PDD) to conduct further validation. This matched data set was used to generate additional reports to alert hospitals with apparent discrepancies in the number of isolated CABG surgeries performed or the number of in-hospital deaths. The relevant hospitals were contacted and asked to check the cases by reviewing medical records.

The PDD-CCMRP and PDD-CCORP linkages were also used to verify selected risk factors. Although the selected risk factors reviewed varied between years, they generally included the prevalence of cardiogenic shock, the use of percutaneous transluminal coronary angioplasty, the need for dialysis, myocardial infraction, and whether the surgery was considered a "salvage" case. The specific findings of these discrepancy reports and the hospital reconciliations are summarized in the CCMRP and CCORP reports (Parker et al. 2005a, b). Finally, independent medical record audits were undertaken for the CCORP data, but not the CCMRP data. Details of the audit, the audit results, and subsequent interventions are available in the CCORP report (Parker et al. 2005b).

Risk Adjustment Model

Multivariable logistic regression models were used to determine the relationship between each of the demographic and preoperative risk factors and the likelihood of in-hospital mortality. Details regarding risk model development are available elsewhere (Parker et al. 2005a, b). Briefly, the risk models were developed for the CCMRP and CCORP data separately. Table 1 lists the factors used in the risk adjustment compared with the factors included in the STS model and models used by the states of New York, New Jersey, Pennsylvania, and Massachusetts. The coefficients were developed on the patients

0356
09/15/08

included in the data sets without any missing variables (more than 89 percent of the cases in both data sets) to ensure that the effects of risk factors were estimated based on the most complete data available. Then, for all patient fields that were incomplete, parameters were imputed using the lowest risk category, so that there were no missing data in any of the seven final data sets (one for each year).

Volume–Outcome Models

To assess the association between annual hospital volume of isolated CABGs and risk-adjusted mortality, annual hospital volume (the only fixed effects hospital-level variable) was specified in three ways. First, we entered annual volume as a continuous variable for each year-specific model. Second, we entered annual volume as a quadratic (linear plus squared term) for each year-specific model to evaluate a possible curvilinear relation between mortality and volume. Third, we dichotomized volume using two volume thresholds that we selected before any analyses. By this method, hospitals were dichotomized as performing fewer than 250 or at least 250 CABG cases/year, as well as hospitals performing fewer than 450 or at least 450 cases/year, consistent with previously used volume thresholds (Birkmeyer et al. 2003; Parker et al. 2005a, b). Of note, a hospital could therefore be categorized as low volume in one year and high volume in another year if the number of CABG procedures crossed the specified volume threshold. Finally, to assess whether other transformations should be considered, for each year as well as for all years combined, we generated scatterplots of observed mortality versus volume and of risk-adjusted mortality versus volume, and produced locally weighted least squares (LOWESS) curves for visual inspection (Cleveland 1979; Royston 1991).

For data collected during the mandatory reporting program in 2003 and 2004, we conducted separate analyses on the 86 and 85 hospitals, respectively, that had previously reported data during any of the 5 years of the voluntary reporting period (CCMRP). This was done to assess potential explanations for any change in the magnitude of the volume–outcome association between the voluntary reporting period (1998–2002) and the mandatory reporting period (2003 and 2004).

Statistical Methods

The CABG volume–outcome relationship was analyzed with a hierarchical logistic regression model (PROC GLIMMIX, SAS, version 9.1) with hospital-

0357
09/15/08

specific random intercepts. These models are increasingly used in health services research to analyze multilevel data, such as patient data that are aggregated by hospital (Christiansen and Morris 1997; Shahian et al. 2001), and provide several theoretical and statistical advantages. These models are more appropriate for using patient data to make inferences at the hospital level by adjusting for the "clustering" of patients with similar characteristics (Christiansen and Morris 1997; Shahian et al. 2001). To aid in the visual inspection of the volume–mortality scatterplots, LOWESS curves were fitted to the data using *Stata*, version 9.2 (Cleveland 1979; Royston 1991).

RESULTS

Overall hospital volume and mortality data are presented in Table 2. During the voluntary reporting program years of 1998, 1999, 2000, 2001, and 2002, the number of hospitals contributing data were 68, 81, 76, 71, and 70, respectively. During the mandatory program years of 2003 and 2004, the number of hospitals performing CABG surgeries was 121 and 120, respectively. Of these hospitals, 86 and 85, respectively, had previously participated in at least one of the years during the prior voluntary program. The median annual hospital CABG volume generally decreased over the years studied; from its peak in 2000, the median annual hospital CABG volume fell to 120 for all

Table 2: Overall Volume, Mortality, Hospital Volume, and Hospital Mortality Rates, by Year

				Hospital Volume (n)			*Hospital Mortality Rate (%)*		
Year	*Patients (n)*	*Hospitals (n)*	*Overall Mortality (%)*	*Median*	*Mean*	*Range*	*Median*	*Mean*	*Range*
1998	17,459	68	2.70	178	257	45–1,289	3.02	3.19	0.00–8.05
1999	21,973	81	2.83	196	271	58–1,597	3.03	3.32	0.00–8.28
2000	21,109	76	2.63	217	278	50–1,531	2.88	3.23	0.00–10.48
2001	18,550	71	2.84	197	261	38–1,237	2.94	3.37	0.60–15.00
2002	17,728	70	2.66	187	253	29–1,062	2.76	3.16	0.00–10.34
2003 (v)*	16,420	81	2.25	151	203	25–992	2.29	2.49	0.00–5.71
2003 (m)†	21,272	121	2.34	140	176	25–992	2.50	2.58	0.00–10.34
2004 (v)*	14,562	80	2.77	128	182	4–975	2.76	3.02	0.00–9.62
2004 (m)†	19,133	120	2.73	120	159	4–975	2.58	2.94	0.00–11.54

*2003 (v) and 2004 (v) = 2003 and 2004 data from the hospitals that participated at least 1 year in the voluntary reporting program.

†2003 (m) and 2004 (m) = 2003 and 2004 data from the hospitals that participated in the mandatory reporting program.

0358
09/15/08

hospitals, and 121 for those 85 hospitals that had previously reported during the voluntary reporting program.

Table 3 shows that when hospital volume was entered as a continuous variable, there was a statistically significant association between higher

Table 3: Results of Hierarchical Multivariable Regression, Assessing Association between In-Hospital Mortality and Hospital Annual Volume

Year	*Volume Effect*	*SE*	*p-Value*	*OR*	*95% CI*
Annual volume as a continuous variable (per 100 patients per year)					
1998	−0.039	0.027	0.154	0.962	0.912–1.015
1999	−0.046	0.019	0.017	0.955	0.920–0.991
2000	−0.060	0.025	0.020	0.942	0.897–0.989
2001	−0.067	0.027	0.015	0.935	0.887–0.986
2002	−0.055	0.027	0.041	0.946	0.899–0.997
2003 (v)*	−0.007	0.032	0.826	0.993	0.932–1.058
2003 (m)†	−0.003	0.030	0.911	0.997	0.939–1.058
2004 (v)*	−0.026	0.034	0.448	0.974	0.911–1.042
2004 (m)†	−0.016	0.037	0.658	0.984	0.915–1.058
Annual volume > 250 (< 250 is reference group)					
1998	−0.077	0.155	0.619	0.926	0.684–1.254
1999	−0.199	0.112	0.079	0.820	0.659–1.020
2000	−0.423	0.132	0.002	0.655	0.506–0.849
2001	−0.348	0.143	0.017	0.706	0.534–0.934
2002	−0.292	0.132	0.031	0.747	0.576–0.968
2003 (v)*	0.007	0.159	0.965	1.007	0.737–1.376
2003 (m)†	0.086	0.141	0.544	1.089	0.827–1.435
2004 (v)*	−0.001	0.160	0.995	0.999	0.731–1.366
2004 (m)†	0.163	0.162	0.317	1.177	0.856–1.618
Annual volume > 450 (< 450 is reference group)					
1998	−0.286	0.203	0.164	0.751	0.505–1.119
1999	−0.263	0.140	0.064	0.769	0.584–1.011
2000	−0.323	0.202	0.114	0.724	0.487–1.076
2001	−0.533	0.204	0.011	0.587	0.394–0.873
2002	−0.327	0.174	0.064	0.721	0.513–1.013
2003 (v)*	0.050	0.208	0.810	1.052	0.699–1.582
2003 (m)†	0.016	0.206	0.940	1.016	0.678–1.522
2004 (v)*	−0.106	0.204	0.605	0.900	0.603–1.341
2004 (m)†	−0.050	0.231	0.829	0.951	0.605–1.495

Reported are the coefficients and statistics for volume, years 2000–2004. Data for covariates are not shown.

*2003 (v) and 2004 (v) = 2003 and 2004 data from the hospitals that participated at least 1 year in the voluntary reporting program.

†2003 (m) and 2004 (m) = 2003 and 2004 data from the hospitals that participated in the mandatory reporting program.

CI, confidence interval.

0359
09/15/08

hospital volume and lower mortality in 1999, 2000, 2001, and 2002. While this association was not statistically significant in 1998, the OR associated with hospital volume was similar when compared to the four following years; however, there were fewer patients in the 1998 cohort. To give an example of the magnitude of this association, in the year 2000, the OR associated with each additional 100 CABG procedures performed was 0.942. Therefore, a hospital with the median in-hospital mortality rate of 2.88 percent would be expected to have its mortality rate drop by 0.17 percentage point to 2.71 percent if it performed 100 additional procedures. During 2003 and 2004, there was no significant volume–outcome association among either the hospitals that had previously reported during the voluntary program or the entire set of hospitals reporting in the mandatory program.

When hospital volume was entered as a quadratic term (linear plus squared), the squared term was not significant in eight of the nine models. In the year-specific model for 2000, the squared term was significant with a coefficient = 0.000002, 95 percent confidence interval [CI]: 0.0000007–0.0000033, $p = .004$.

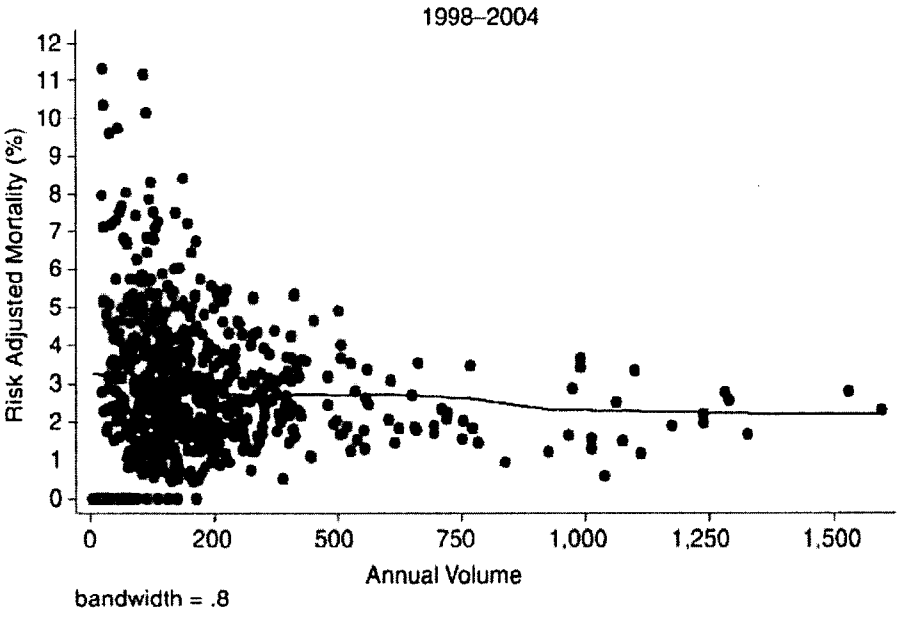
When annual hospital volume was dichotomized as fewer than 250 cases versus 250 or more, a significant association was found between volume and outcome during the years, 2000–2002. This association disappeared during the mandatory reporting years, 2003 and 2004, with ORs of 1.007 (95 percent CI: 0.737–1.376) and 0.999 (95 percent CI: 0.731–1.366) for the hospitals that had participated in the voluntary program, and 1.089 (95 percent CI: 0.827–1.435) and 1.177 (95 percent CI: 0.856–1.618) for all hospitals performing CABG surgeries, respectively. This suggests that this loss of association did not result from including hospitals that had not participated in the voluntary program.

When annual hospital volume was dichotomized as fewer than 450 cases versus 450 or more, the ORs for mortality among high-volume hospitals compared with low-volume hospitals ranged from 0.587 to 0.769 from 1998 to 2002. For the years 2003 and 2004, the ORs were 1.016 and 0.951, respectively, for all hospitals and 1.052 and 0.900, respectively, for hospitals that had previously reported during the voluntary, CCMRP reporting period. Of note, only six hospitals during the mandatory program performed 450 or more cases/year.

Finally, upon visual inspection of scatterplots and LOWESS curves of observed mortality and hospital volume, and risk-adjusted mortality and hospital volume, we found no evidence of nonlinear associations or evidence to suggest that other transformations or dichotomization thresholds should be considered. Figure 1 shows the scatterplot of risk-adjusted mortality versus annual volume for all years, 1998–2004. The scatterplots and LOWESS curves

0360
09/15/08

Figure 1: Risk-Adjusted Mortality versus Annual Volume for all Years, 1998–2004. A LOWESS Curve Has Been Fitted to the Data for Visual Inspection



for observed mortality and risk-adjusted mortality for individual years are available in the electronic version for publication (Appendices A and B).

DISCUSSION

In California, we found that the hospital volume–outcome relationship for CABG surgery was consistent but small during the years 1998–2002, and that this relationship disappeared in 2003 and 2004. We found that the use of data collected during a voluntary statewide reporting program (1998–2002) appeared to yield unbiased estimates of the volume effect. That is, when we assessed the volume–outcome relationship for 2003 and 2004, conducting separate analyses on all hospitals as well as those hospitals that had previously participated in the voluntary reporting program, we found similar results. The disappearance of the volume–outcome relationship resulted, in part, from improved risk-adjusted outcomes among lower volume hospitals. It is unknown whether the overall improvement in mortality, especially at low-volume hospitals, during this study period was partially attributable to the state's public reporting of CABG surgery performance data. Low-volume hospitals

0361
09/15/08

may have implemented improved training programs, quality improvement activities, or other innovations to improve outcomes; these interventions may have been stimulated partially by the prospect of mandatory public reporting.

The policy implications of the volume–outcome association are important. If a clinically significant volume–outcome association exists, then legislators and policy makers should establish minimum volume guidelines and/or promote the regionalization of such services, as the New York Department of Health has done for many years. More patients would then receive care in higher volume centers, and average quality of care would improve. There are data that support this policy direction. Two large observational studies (Grumbach et al. 1995; Vaughan-Sarrazin et al. 2002) have compared outcomes of patients after CABG surgery in areas of high regionalization (e.g., Canada and New York) to areas of low regionalization (e.g., California). These reports have suggested that higher volume centers have lower mortality rates and that areas of high regionalization have better outcomes and less variability in outcomes when compared with areas of low regionalization. However, both of these studies used administrative data, which are inferior in their ability to risk adjust (Wray et al. 1997). Second, the data used in these analyses were from 1987–1989 (Grumbach et al. 1995) to 1994–1999 (Vaughan-Sarrazin et al. 2002) when overall CABG surgery mortality was higher and the volume–outcome association was more pronounced.

Our finding that the volume–outcome relationship has diminished over time is consistent with previous reports (Sowden, Deeks, and Sheldon 1995; Clark 1996; Kalant and Shrier 2004). In a recent literature review, Kalant and Shrier (2004) found that studies from the 1980s demonstrated that the risk of death after CABG surgery was 3–5 percent less at high-volume centers than at low-volume centers. Studies since 1990, on the other hand, have generally found that the risk of death after CABG surgery is between 0 and 3 percent less at high-volume centers (Kalant and Shrier 2004). These and other authors suggest that this trend is due to both general advances in medicine and maturation of the CABG procedure (Shahian and Normand 2003; Kalant and Shrier 2004). Peterson et al. (2004) analyzed data from 2000 to 2001 using the STS National Cardiac Database and found only a very small volume–outcome association, corresponding to a reduction in mortality of 0.07 percent for every additional 100 CABG surgeries performed (Peterson et al. 2004). Birkmeyer et al. 2002 also found a <2 percent difference in adjusted mortality between very low- and very high-volume hospitals performing CABG surgery in a national sample of Medicare patients. The most current data and systematic reviews of the CABG volume–outcome relationship conclude that caution

0362
09/15/08

should be exercised to avoid overinterpreting the significant findings of previous studies and that hospital volume may no longer be an adequate quality metric for CABG surgery (Sowden, Deeks, and Sheldon 1995; Sowden and Sheldon 1998; Shahian and Normand 2003; Kalant and Shrier 2004).

Using databases in which hospitals voluntarily report performance data to estimate the volume–outcome relationship could lead to selection bias. Several analyses reporting significant volume–outcome associations have used such databases (Clark 1996; Christian et al. 2003; Peterson et al. 2004). Bias could be introduced if either low- or high-volume hospitals not participating in the voluntary program had worse than average outcomes, resulting in either an under- or overestimation of the volume–outcome relationship, respectively. While other studies have shown that nonparticipating entities tend to have worse outcomes than participating entities (McCormick et al. 2002), ours is the first study that directly evaluated this potential bias for the CABG surgery volume–outcome relationship. Although we found the hospitals that did not participate in the voluntary program tended to be smaller and have higher observed mortality rates, including them in the full analyses did not significantly change the lack of volume–outcome association during the mandatory reporting program. These previously nonparticipating hospitals had similar risk-adjusted mortality rates in 2003 and 2004 as those previously participating hospitals, on average.

It is also possible that in California, the introduction of a mandatory CABG surgery outcome reporting program stimulated quality improvement efforts, particularly among low-quality outliers. While several studies have suggested that the publication of CABG surgery reports has been associated with reductions in CABG mortality (Hannan et al. 1995; Rosenthal, Quinn, and Harper 1997) and improvements in quality of care (Bentley and Nash 1998; Rainwater, Romano, and Antonius 1998; Chassin 2002), it is unknown whether the observed reduction in hospital mortality, particularly among hospitals performing fewer than 250 surgeries/year, and the recent lack of a volume–outcome association in California reflects such improvements. Clearly, other factors may have contributed to this temporal finding, including patient selection, standardization of procedures, improved training, better equipment, and diffusion of innovation. Of note is the fact that expected mortality rates remained stable among low-volume hospitals throughout the study period, arguing against the possibility of low-volume hospitals inflating clinical risk factors during the mandatory program. It is also not known whether our findings reflect trends in other states or nationally, or whether they might be limited to states with public reporting programs or those that

0363
09/15/08

collect clinical data. Another limitation of our study is that we only examined 7 years of data, and the absence of the volume–outcome association may not be sustained. In addition, relative to other states, California has low-volume CABG centers, and there may be a volume–outcome association above the volumes reflected in the California data. Finally, our risk-adjustment models, although based on detailed clinical data similar to those collected in New York and New Jersey, may have omitted unidentified confounders.

Although many studies have supported the existence of an association between CABG hospital volume and mortality, this association has decreased with time, and in our analyses of the most recent California data, the relationship has disappeared. Our findings, in combination with the findings of other researchers, challenge the proposition that regionalizing services will result in improved quality of care, and raise questions about the validity of the Leapfrog Group's Evidence-based Hospital Referral standards for CABG volume. Other interventions, such as public reporting and collaborative quality improvement, may foster resolution of outcome disparities between low- and high-volume hospitals. Future analyses are clearly warranted to investigate whether the volume outcome association still exists for other cardiovascular procedures or in other states that do not impose regionalization.

ACKNOWLEDGMENT

This work was supported, in part, by a contract from the State of California's Office of Statewide Health Planning and Development, Agreement 03-4275.

Disclosures: The authors have no conflicts of interests or financial interests to disclose.

Disclaimers: None.

REFERENCES

Bentley, J. M., and D. B. Nash. 1998. "How Pennsylvania Hospitals Have Responded to Publicly Released Reports on Coronary Artery Bypass Graft Surgery." *Joint Commission Journal on Quality Improvement* 24 (1): 40–9.

Birkmeyer, J. D., A. E. Siewers, E. V. Finlayson, T. A. Stukel, F. L. Lucas, I. Batista, H. G. Welch, and D. E. Wennberg. 2002. "Hospital Volume and Surgical Mortality in the United States." *New England Journal of Medicine* 346 (15): 1128–37.

Birkmeyer, J. D., T. A. Stukel, A. E. Siewers, P. P. Goodney, D. E. Wennberg, and F. L. Lucas. 2003. "Surgeon Volume and Operative Mortality in the United States." *New England Journal of Medicine* 349 (22): 2117–27.

Chassin, M. R. 2002. "Achieving and Sustaining Improved Quality: Lessons from New York State and Cardiac Surgery." *Health Affairs (Millwood)* 21 (4): 40–51.

Christian, C. K., M. L. Gustafson, R. A. Betensky, J. Daley, and M. J. Zinner. 2003. "The Leapfrog Volume Criteria May Fall Short in Identifying High-Quality Surgical Centers." *Annals of Surgery* 238 (4): 447–55; discussion 55–7.

Christiansen, C. L., and C. N. Morris. 1997. "Improving the Statistical Approach to Health Care Provider Profiling." *Annals of Internal Medicine* 127 (8, part 2): 764–8.

Clark, R. E. 1996. "Outcome as a Function of Annual Coronary Artery Bypass Graft Volume." *Annals of Thoracic Surgery* 61 (1): 21–6.

Cleveland, W. S. 1979. "Robust Locally Weighted Regression and Smoothing Scatterplots." *Journal of the American Statistical Association* 74: 829–36.

Damberg, C. L., R. E. Chung, and A. E. Steimle. 2001. "The California Report on Coronary Artery Bypass Graft Surgery: 1997–1998 Hospital Data." Technical Report. San Francisco: Pacific Business Group on Health and the California Office of Statewide Health Planning and Development.

Damberg, C. L., B. Danielsen, J. P. Parker, A. G. Castles, and A. E. Steimle. 2003. "The California Report on Coronary Artery Bypass Graft Surgery: 1999 Hospital Data." Technical Report. San Francisco: Pacific Business Group on Health and the California Office of Statewide Health Planning and Development.

Elixhauser, A., C. Steiner, and I. Fraser. 2003. "Volume Thresholds and Hospital Characteristics in the United States." *Health Affairs (Millwood)* 22 (2): 167–77.

Escarce, J. J., R. L. Van Horn, M. V. Pauly, S. V. Williams, J. A. Shea, and W. Chen. 1999. "Health Maintenance Organizations and Hospital Quality for Coronary Artery Bypass Surgery." *Medical Care Research and Review* 56 (3): 340–62; discussion 63–72.

Gandjour, A., A. Bannenberg, and K. W. Lauterbach. 2003. "Threshold Volumes Associated with Higher Survival in Health Care: A Systematic Review." *Medical Care* 41 (10): 1129–41.

Grumbach, K., G. M. Anderson, H. S. Luft, L. L. Roos, and R. Brook. 1995. "Regionalization of Cardiac Surgery in the United States and Canada." *Journal of the American Medical Association* 274 (16): 1282–8.

Halm, E. A., C. Lee, and M. R. Chassin. 2002. "Is Volume Related to Outcome in Health Care? A Systematic Review and Methodologic Critique of the Literature." *Annals of Internal Medicine* 137 (6): 511–20.

Hannan, E. L., A. L. Siu, D. Kumar, H. Kilburn Jr., and M. R. Chassin. 1995. "The Decline in Coronary Artery Bypass Graft Surgery Mortality in New York State. The Role of Surgeon Volume." *Journal of the American Medical Association* 273 (3): 209–13.

Hannan, E. L., C. Wu, T. J. Ryan, E. Bennett, A. T. Culliford, J. P. Gold, A. Hartman, O. W. Isom, R. H. Jones, B. McNeil, E. A. Rose, and V. A. Subramanian. 2003. "Do Hospitals and Surgeons with Higher Coronary Artery Bypass Graft Surgery Volumes Still Have Lower Risk-Adjusted Mortality Rates?" *Circulation* 108 (7): 795–801.

Hewitt, M. E., D. B. Petitti, National Cancer Policy Board (U.S.), National Research Council (U.S.), and Division on Earth and Life Studies. 2001. *Interpreting the*

0365
09/15/08

Volume–Outcome Relationship in the Context of Cancer Care. Washington, DC: National Academy Press.

Kalant, N., and L. Shrier. 2004. "Volume and Outcome of Coronary Artery Bypass Graft Surgery: Are More and Less the Same?" *Canadian Journal of Cardiology* 20 (1): 81–6.

Luft, H. S., J. P. Bunker, and A. C. Enthoven. 1979. "Should Operations Be Regionalized?" *New England Journal of Medicine* 301 (25): 1364–9.

Luft, H. S., D. W. Garnick, D. H. Mark, D. J. Peltzman, C. S. Phibbs, E. Lichtenberg, and S. J. McPhee. 1990. "Does Quality Influence Choice of Hospital?" *Journal of the American Medical Association* 263 (21): 2899–906.

Massachusetts Data Analysis Center (MASS-DAC). 2004. *Adult Coronary Artery Bypass Graft Surgery in the Commonwealth of Massachusetts January 1–December 31, 2002* [accessed on May 4, 2007]. Boston: Department of Health Care Policy, Harvard Medical School. Available at http://www.massdac.org/reports/CABG%202004.pdf

McCormick, D., D. U. Himmelstein, S. Woolhandler, S. M. Wolfe, and D. H. Bor. 2002. "Relationship between Low Quality-of-Care Scores and HMOs' Subsequent Public Disclosure of Quality-of-Care Scores." *Journal of the American Medical Association* 288 (12): 1484–90.

New Jersey Department of Health and Senior Services. 2005. "Cardiac Surgery in New Jersey 2002." Technical Report, June.

New York State Department of Health. 2004. "Adult Cardiac Surgery in New York State 2000–2002 [accessed on May 4, 2007]." Available at http://www.health.state.ny.us/nysdoh/heart/pdf/2000–2002_cabg.pdf

Nobilio, L., and C. Ugolini. 2003. "Different Regional Organisational Models and the Quality of Health Care: The Case of Coronary Artery Bypass Graft Surgery." *Journal of Health Services Research and Policy* 8 (1): 25–32.

Parker, J. P., Z. Li, C. L. Damberg, B. Danielsen, J. Marcin, J. Dai, and A. E. Steimle. 2005a. *The California Report on Coronary Artery Bypass Graft Surgery 2000–2002 Hospital Data.* San Francisco: California Office of Statewide Health Planning and Development and the Pacific Business Group on Health.

Parker, J. P., Z. Li, B. Danielsen, J. Marcin, J. Dai, G. Mahendra, and A. E. Steimle. 2005b. *The California Report on Coronary Artery Bypass Graft Surgery 2003 Hospital Data.* San Francisco: California Office of Statewide Health Planning and Development and the Pacific Business Group on Health.

Pennsylvania Health Care Cost Containment Council. 2005. "Pennsylvania's Guide to Coronary Artery Bypass Graft Surgery 2003 Information About Hospitals and Cardiothoracic Surgeons [accessed on May 4, 2007]." Available at http://www.phc4.org/reports/cabg/03/docs/cabg2003report.pdf

Peterson, E. D., L. P. Coombs, E. R. DeLong, C. K. Haan, and T. B. Ferguson. 2004. "Procedural Volume as a Marker of Quality for CABG Surgery." *Journal of the American Medical Association* 291 (2): 195–201.

Rainwater, J. A., P. S. Romano, and D. M. Antonius. 1998. "The California Hospital Outcomes Project: How Useful Is California's Report Card for Quality Improvement?" *Joint Commission Journal on Quality Improvement* 24 (1): 31–9.

0366
09/15/08

Romano, P. S., and H. Zhou. 2004. "Do Well-Publicized Risk-Adjusted Outcomes Reports Affect Hospital Volume?" *Medical Care* 42 (4): 367–77.

Rosenthal, G. E., L. Quinn, and D. L. Harper. 1997. "Declines in Hospital Mortality Associated with a Regional Initiative to Measure Hospital Performance." *American Journal of Medical Quality* 12 (2): 103–12.

Royston, P. 1991. "Lowess Smoothing." *Stata Technical Bulletin*, pp. 7–9.

Shahian, D. M., and S. L. Normand. 2003. "The Volume–Outcome Relationship: From Luft to Leapfrog." *Annals of Thoracic Surgery* 75 (3): 1048–58.

Shahian, D. M., S. L. Normand, D. F. Torchiana, S. M. Lewis, J. O. Pastore, R. E. Kuntz, and P. I. Dreyer. 2001. "Cardiac Surgery Report Cards: Comprehensive Review and Statistical Critique." *Annals of Thoracic Surgery* 72 (6): 2155–68.

Shroyer, A. L., L. P. Coombs, E. D. Peterson, M. C. Eiken, E. R. DeLong, A. Chen, T. B. Ferguson Jr., F. L. Grover, and F. H. Edwards. 2003. "The Society of Thoracic Surgeons: 30-Day Operative Mortality and Morbidity Risk Models." *Annals of Thoracic Surgery* 75 (6): 1856–64; discussion 64–5.

Sowden, A. J., J. J. Deeks, and T. A. Sheldon. 1995. "Volume and Outcome in Coronary Artery Bypass Graft Surgery: True Association or Artefact?" *British Medical Journal* 311 (6998): 151–5.

Sowden, A. J., and T. A. Sheldon. 1998. "Does Volume Really Affect Outcome?" *Journal of Health Services Research and Policy* 3 (3): 187–90.

Vaughan-Sarrazin, M. S., E. L. Hannan, C. J. Gormley, and G. E. Rosenthal. 2002. "Mortality in Medicare Beneficiaries following Coronary Artery Bypass Graft Surgery in States with and without Certificate of Need Regulation." *Journal of the American Medical Association* 288 (15): 1859–66.

Welke, K. F., T. B. Ferguson Jr., L. P. Coombs, R. S. Dokholyan, C. J. Murray, M. A. Schrader, and E. D. Peterson. 2004. "Validity of the Society of Thoracic Surgeons National Adult Cardiac Surgery Database." *Annals of Thoracic Surgery* 77 (4): 1137–9.

Wray, N. P., J. C. Hollingsworth, N. J. Peterson, and C. M. Ashton. 1997. "Case-Mix Adjustment Using Administrative Databases: A Paradigm to Guide Future Research." *Medical Care Research and Review* 54 (3): 326–56.

SUPPLEMENTARY MATERIAL

The following supplementary material for this article is available:

Appendix A: Scatter-plots of Observed Hospital Mortality versus Hospital Annual Volume, Years 1998–2004.

Appendix B: Scatter-plots of Risk-Adjusted Hospital Mortality versus Hospital Annual Volume, Years 1998–2004.

This material is available as part of the online article from: http://www.blackwell-synergy.com/doi/abs/10.1111/j.1475-6773.2007.00740.x (this link will take you to the article abstract).

0367
09/15/08

Please note: Blackwell Publishing is not responsible for the content or functionality of any supplementary materials supplied by the authors. Any queries (other than missing material) should be directed to the corresponding author for the article.

0368
09/15/08

CARDIOVASCULAR

Limitations of Hospital Volume as a Measure of Quality of Care for Coronary Artery Bypass Graft Surgery

Karl F. Welke, MD, Mitchell J. Barnett, PharmD, MS, Mary S. Vaughan Sarrazin, PhD, and Gary E. Rosenthal, MD

Division of Cardiothoracic Surgery, Oregon Health and Science University, Portland, Oregon; and Center for Research in the Implementation of Innovative Strategies in Practice (CRIISP), Iowa City VA Medical Center, and Department of Internal Medicine, Division of General Internal Medicine, University of Iowa Carver College of Medicine, Iowa City, Iowa

Background. While prior research has found an inverse relationship between hospital volume and mortality after coronary artery bypass graft surgery (CABG), the use of volume as a proxy for quality and a means for selecting hospitals is controversial. The objective of this study is to quantify the relationship between hospital volume alone and CABG mortality.

Methods. A retrospective cohort of 948,093 Medicare patients undergoing CABG in 870 US hospitals from 1996 to 2001 was categorized into quintiles, based on hospital CABG volume. Hospitals were also classified by volume criterion proposed by the Leapfrog Group. Logistic regression was used to adjust hospital mortality rates (in-hospital or within 30 days after CABG) for patient characteristics; discrimination of the volume categories was assessed by the *c* statistic.

Results. The range in risk-adjusted mortality for hospitals within the quintiles was substantial: 1% to 17% at very low, 2% to 12% at low, 2% to 10% at medium, 2% to 9% at high, and 3% to 11% at very high volume hospitals. Moreover, volume alone was a poor discriminator of mortality (*c* statistic = 0.52). Similar variation in adjusted mortality was seen within the Leapfrog low-volume (1% to 17%) and high-volume groups (2% to 11%), and the Leapfrog criterion was a poor discriminator of mortality (*c* statistic = 0.51). Of the 660 low-volume Leapfrog hospitals, 253 (38%) had risk-adjusted mortality rates that were similar to or lower than the overall risk-adjusted mortality of high-volume hospitals (5.2%).

Conclusions. Volume alone, as a discriminator of mortality, is only slightly better than a coin flip (*c* statistic of 0.50).

(Ann Thorac Surg 2005;80:2114–20)
© 2005 by The Society of Thoracic Surgeons

Many authors have reported an inverse relationship between hospital surgical volume and perioperative mortality after coronary artery bypass graft surgery (CABG) [1–5]. These reports have received broad attention and have led many to propose volume as a proxy for quality of care. The Leapfrog Group, a consortium of 140 private and public purchasers of health insurance providing benefits to 34 million people, is encouraging patients to undergo CABG at hospitals that perform more than 450 procedures per year [6, 7]. The lay media and consumer groups are reporting hospital volumes and suggesting hospital CABG volume as a factor in patient choice [8, 9].

Much about the volume outcomes relationship remains unexamined, however. While nearly all prior studies of CABG have found statistically significant relationships between volume and mortality, these studies have typically utilized large health care databases and had exceptional statistical power to detect small differences across different categories of volume. Moreover, few studies have clearly articulated the strength of volume as a predictor of mortality and how patients should weigh it when choosing a hospital. Since patients are being encouraged to make their choice of hospital in part based on surgical volume, such information is essential, particularly for patients who may need to travel considerable distances to higher volume hospitals and leave their local support systems.

The purpose of this study is to quantify the strength of hospital volume as a predictor of an individual patient's risk of mortality after CABG, both in absolute terms and relative to the strength of previously validated approaches of risk-adjusting CABG hospital mortality rates. Such approaches may help illuminate the potential utility of volume as a marker of hospital quality, particularly for large employers and health plan administrators who have been encouraged to use volume as a criterion in selective contracting.

Patients and Methods

The study was designed as a retrospective cohort analysis using data derived from the Medicare Provider and Analysis Review (MEDPAR) Part A public use data files, which were obtained from the Center for Medicare and

Accepted for publication May 10, 2005.

Address correspondence to Dr Welke, Division of Cardiothoracic Surgery L353, Oregon Health and Science University, 3181 SW Sam Jackson Park Rd, Portland, OR 97239-3098; e-mail: welkek@ohsu.edu.

© 2005 by The Society of Thoracic Surgeons
Published by Elsevier Inc

0003-4975/05/$30.00
doi:10.1016/j.athoracsur.2005.05.017

0369
09/15/08

Medicaid Services. The MEDPAR Part A files include data available on the Uniform Billing-92 hospital discharge abstract for all Medicare beneficiaries discharged from acute care hospitals with the exception of patients enrolled in risk-bearing health maintenance organizations. The files are matched quarterly to the Medicare enrollment database to obtain dates of death for Medicare beneficiaries who died after hospital discharge.

The eligible sample included 1,073,956 patients 65 years of age and older who underwent CABG in 1,174 US hospitals during a 6-year period from January 1, 1996, to December 31, 2001. Patients were identified on the basis of appropriate *International Classification of Diseases, 9th Clinical Modification* (ICD-9-CM) codes for CABG (36.10–36.19). Consistent with prior studies [3, 10], patients who underwent cardiac valve replacement at the time of CABG (n = 70,242, 6.5%) were excluded from analysis, as were 318 patients (0.03%) discharged from hospitals with 5 or fewer CABG procedures in the MEDPAR data because of the possibility that such cases could be ICD-9 CM coding errors rather than actual CABG procedures. Lastly, 55,621 patients (5.1%) who underwent CABG at 225 hospitals that did not perform CABG during all 6 years of the study period were excluded to minimize the impact of random variation in mortality rates and maximize the robustness of volume outcome relationships. These exclusions left a final sample of 948,093 patients who underwent CABG in 870 US hospitals.

Hospital volume was defined as the average number of CABG procedures performed per year in Medicare beneficiaries over the 6 years of the study and was analyzed using four approaches. First, volume was evaluated as a continuous variable. Second, hospital volume was categorized into quintiles by selecting whole-number division points that most closely sorted the sample into five equal-size patient cohorts: very low (fewer than 125 yearly), low (125 to 204 yearly), medium (205 to 299 yearly), high (300 to 449 yearly), and very high (more than 449 yearly). Third, a similar approach was used to apportion the sample into deciles. Fourth, hospitals were placed into high- and low-volume categories using the current criterion of the Leapfrog Group of 450 procedures per year. Because the Leapfrog criterion considers total volume, a cutpoint of 256 was used for the current sample, given that roughly 57% of CABG procedures in the United States are performed in Medicare beneficiaries [3].

The primary study endpoint was mortality that occurred within 30 days of surgery or during the index hospitalization for CABG. Secondary endpoints included mortality that occurred within 7, 14, 30, 90, and 365 days of surgery.

Several approaches were used to define the relationships between hospital volume and mortality. First, unadjusted mortality rates across volume groups were compared using the chi-square statistic for linear trend. Second, the discrimination of volume alone as a predictor of mortality was assessed by the *c* statistic (11, 12) as determined from univariate logistic regression analyses for each of the four approaches for analyzing hospital volume described above. The *c* statistic is numerically equivalent to the area under a receiver operator characteristic curve and represents the proportion of times that a given patient who died had a higher predicted risk of death (on the basis of hospital volume in this case) than a given patient who lived. The *c* statistic ranges from 0.5 to 1.0 and has been widely reported for multivariable models predicting mortality for patients undergoing CABG. A test with perfect discrimination has a *c* statistic of 1.0. A test with no discrimination has a *c* statistic of 0.5, namely, a coin flip. To maximize potential discrimination, the quintile and decile volume categorizations were modeled using indicator variables for individual volume categories, in lieu of a single ordinal variable. The *c* statistics were also determined for the primary (30-day or in-hospital mortality) and each of the secondary endpoints (7-, 14-, 30-, 90-, and 365-day mortality) using the four approaches for modeling hospital volume.

Table 1. Baseline Characteristics of the 948,093 Study Patients Undergoing Coronary Artery Bypass Graft Surgery (CABG)

Variable	Prevalence (%)
Patient demographics	
Mean age ± SD (years)	73.7 ± 5.5
Male	64.9
White	92.1
Patient comorbidities	
Congestive heart failure	21.3
Chronic obstructive pulmonary disease	15.3
Cerebral vascular disease	10.4
Diabetes mellitus	3.3
Peripheral vascular disease	8.9
Renal failure	2.9
Previous CABG	2.8
Primary diagnosis of acute myocardial infarction	19.8
Cardiac catheterization on the same day as CABG	9.2
Percutaneous coronary intervention on the same day as CABG	1.0
Intra-aortic balloon pump before CABG	3.0
Admission type	
Transfer into hospital	18.9
Admission through emergency room	18.6
Surgical priority	
Urgent	30.7
Emergent	26.6
30-day or in-hospital mortality	5.4

Similar analyses were conducted for demographic and clinical variables in the MEDPAR data that were independently ($p < 0.01$) related to mortality and for other hospital characteristics, including teaching status (membership in the Council of Teaching Hospitals) and type of ownership (government, for profit, and nonprofit).

Multivariable analyses examined the increase in model discrimination (ie, *c* statistic values) resulting from the

0370
09/15/08

Table 3. Discrimination (as Measured by the C Statistic) of Different Hospital Volume Categorizations for Predicting Mortality at Different Time Points After CABG

Measure of Mortality	Volume as Continuous Variable	Volume as Leapfrog Category (Dichotomous)	Volume as 5 Categories (Quintiles)	Volume as 10 Categories (Deciles)
30-day postoperative or in-hospital	0.53	0.52	0.52	0.53
7-day postoperative	0.53	0.53	0.53	0.53
14-day postoperative	0.53	0.52	0.53	0.53
30-day postoperative	0.53	0.52	0.53	0.53
90-day postoperative	0.52	0.52	0.52	0.53
365-day postoperative	0.52	0.51	0.52	0.52

(Table 1). Unadjusted mortality was directly related ($p < 0.001$) to hospital volume, based on the Leapfrog cutpoint of 256 procedures per year (5.9% versus 5.1%), hospital volume quintiles (6.4%, 5.6%, 5.6%, 5.1%, and 5.0%, respectively), and hospital volume deciles (6.5%, 6.0%, 5.6%, 5.6%, 5.6%, 5.3%, 4.9%, 5.1%, 5.3%, and 4.6%, respectively). Results were generally similar in analyses of risk-adjusted mortality rates (Table 2). Despite the statistical significance of this relationship, the wide variation in mortality rates at individual centers (Fig 1) led to considerable overlap of volume category mortality rate ranges. For example, when examining individual hospitals (n = 870), adjusted mortality ranged from 0.9% to 16.8%, with an interquartile range of 4.5% to 6.9%. Using the Leapfrog cutpoint, risk-adjusted mortality ranged from 0.9% to 16.8% in low-volume hospitals and from 2.0% to 10.6% in high-volume hospitals (Table 2). Of the 660 low-volume Leapfrog hospitals, 253 (38%) had risk-adjusted mortality rates that were similar or lower than the overall risk-adjusted mortality of high-volume hospitals (5.2%). Of the 210 high-volume hospitals, 52 (25%) had risk-adjusted mortality rates that were similar or higher than the overall risk-adjusted mortality (6.1%) of low-volume hospitals. Similarly, 209 (36%) of the 580 hospitals in the lowest two mortality quintiles had risk-adjusted mortality rates that were similar or lower than the overall risk-adjusted mortality of hospitals in the two highest volume quintiles, while 38 (23%) of the 164 hospitals in the highest two volume quintiles had similar or higher risk-adjusted mortality than the overall risk-adjusted mortality rate of hospitals in the two lowest volume quintiles.

Consistent with the overlap in hospital mortality rates, hospital volume alone had relatively poor discrimination for predicting mortality (Table 3). For example, *c* statistics for predicting 30-day or in-hospital mortality and other mortality endpoints ranged from 0.51 to 0.53 for the four approaches to analyzing volume. The *c* statistics for models based on hospital teaching status and ownership were roughly similar (0.51 for all endpoints). In contrast, the *c* statistic for the overall risk-adjustment model based on patient-level risk factors for predicting 30-day or in-hospital mortality was 0.71. The addition of volume to this model increased the *c* statistic marginally (0.002 for volume deciles, 0.002 for volume quintiles, and 0.001 for the Leapfrog volume threshold). Of the 16 patient level variables in the model, 11 (69%) had *c* statistics that were 0.53 or higher.

Comment

On average, higher volume hospitals had lower CABG mortality rates than lower volume hospitals. However,

Table 4. C Statistics for Several Previously Validated Multivariable Models for Risk-Adjusting Coronary Artery Bypass Graft Surgery Mortality Rates

Risk Adjustment Model	Type of Data[a]	Number of Variables	Measure of Mortality	C Statistic
Cleveland Health Quality Choice [18]	Clinical	16	In-hospital	0.81
Hannan, New York Administrative Database [19]	Administrative	16	In-hospital	0.72
Hannan, MEDPAR [17]	Administrative	5	In-hospital	0.73
New Jersey [20]	Clinical	10	In-hospital and 30 day postsurgical	0.79
New York [21]	Clinical	13	In-hospital	0.79
Pennsylvania [22]	Clinical	6	In-hospital	0.81
Pennsylvania [22]	Clinical	8	30 day postsurgical	0.77
Society of Thoracic Surgeons [23]	Clinical	28	30 day postsurgical	0.78
VA Cardiac Surgery Reporting System [24]	Clinical	10	30 day postsurgical	0.74
Vaughan Sarrazin, MEDPAR	Administrative	14	In-hospital or 30 day postsurgical	0.72

[a] Clinical denotes that the data used to derive the model were obtained from abstracting patients' medical records; administrative denotes that the data were obtained from administrative data files.

MEDPAR = Medicare Provides and Analysis Review; VA = Department of Veterans Affairs.

0371
09/15/08

4. Hannan EL, Wu C, Ryan TJ, et al. Do hospitals and surgeons with higher coronary artery bypass graft surgery volumes still have lower risk-adjusted mortality rates? Circulation 2003;108:795–801.
5. Christian CK, Gustafson ML, Betensky RA, Daley J, Zinner MJ. The Leapfrog volume criteria may fall short in identifying high-quality surgical centers. Ann Surg 2003;238:447–57.
6. Birkmeyer JD, Findlayson EVA, Birkmeyer CM. Volume standards for high-risk surgical procedures: potential benefits of the Leapfrog initiative. Surgery 2001;130:415–22.
7. The Leapfrog Group. Available at: http://www.leapfroggroup.org. Accessed February 4, 2005.
8. Healthscope. Available at: http://www.healthscope.org. Accessed February 4, 2005.
9. Healthgrades—the healthcare quality experts. Available at: http://www.healthgrades.com. Accessed February 4, 2005.
10. Birkmeyer JD, Stukel TA, Siewers AE, Goodney PP, Wennberg DE, Lucas FL. Surgeon volume and operative mortality in the United States. N Engl J Med 2003;349:2117–27.
11. Ash AS, Shwartz M. Evaluating the performance of risk-adjustment methods: dichotomous outcomes. In: Iezzoni LI, ed. Risk adjustment for measuring healthcare outcomes. 2nd ed. Chicago: Health Administration Press, 1997:427–70.
12. Agresti A. Categorical data analysis. New York: John Wiley & Sons, 1990:306–46.
13. Elixhauser A, Steiner C, Harris DR, Coffey RM. Comorbidity measures for use with administrative data. Med Care 1998; 36:8–27.
14. Ghali WA, Hall RE, Ash AS, Moskowitz MA. Evaluation of complication rates after coronary artery bypass surgery using administrative data. Meth Inform Med 1998;37:192–200.
15. Liang KY, Zeger SL. Longitudinal data analysis using generalized linear models. Biometrika 1986;73:13–22.
16. White H. A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. Econometrica 1980;48:817–30.
17. Hannan EL, Racz MJ, Jollis JG, Peterson ED. Using Medicare claims data to assess provider quality for CABG surgery. Does it work well enough? Health Serv Res 1997;31:659–78.
18. Rosenthal GE, Quinn L, Harper DL. Declines in hospital mortality associated with a regional initiative to measure hospital performance. Am J Med Qual 1997;12:103–12.
19. Hannan EL, Kiburn H Jr, Lindsey ML, Lewis R. Clinical versus administrative data bases for CABG surgery. Does it matter? Med Care 1992;30:892–907.
20. New Jersey Department of Health and Senior Services. Cardiac surgery in 2000 in New Jersey: technical report. Available at: http://www.state.nj.us/health/hcsa/documents/cardtechnical01.pdf. Accessed July 22, 2004.
21. New York State Department of Health. Adult Cardiac Surgery in New York State 1998-2000. Available at: http://www.health.state.ny.us/nysdoh/heart/pdf/1998-2000_cabg.pdf. Accessed February 4, 2005.
22. Pennsylvania Health Care Cost Containment Council. Pennsylvania's guide to coronary artery bypass graft surgery 2002: technical notes. Available at: http://www.phc4.org/reports/cabg/02/Technical%20Notes.pdf. Accessed February 4, 2005.
23. Shroyer AL, Coombs LP, Peterson ED, et al. The Society of Thoracic Surgeons: 30-day operative mortality and morbidity risk models. Ann Thorac Surg 2003;75:1856–65.
24. Grover FL, Shroyer ALW, Hammermeister K, et al. A decades experience with quality improvement in cardiac surgery using the Veterans Affairs and Society of Thoracic Surgeons national databases. Ann Surg 2001;234:464–74.
25. Peterson ED, Coombs LP, DeLong ER, Hann CK, Ferguson TB. Procedural volume as a marker of quality for CABG surgery. JAMA 2004;291:195–201.
26. Rathore SS, Epstein AJ, Volpp KGM, Krumholz HM. Hospital coronary artery bypass graft surgery volume and patient mortality, 1998–2000. Ann Surg 2004;239:110–7.
27. Inlander C, Findlay S. High-volume medical care provides best results. USA Today, July 15, 2002, Section A, page 13.
28. Chatzky J. How to find the best care. Money 2003;32(11):22.
29. Glance LG, Dick AW, Mukamel DB, Osler TM. Is the hospital volume-mortality relationship in coronary artery bypass surgery the same for low-risk versus high-risk patients? Ann Thorac Surg 2003;76:1155–62.
30. Krakauer H, Bailey RC, Skellan KJ, et al. Evaluation of the HCFA model for the analysis of mortality following hospitalization. Health Serv Res 1992;27:317–25.

CARDIOVASCULAR

INVITED COMMENTARY

Current thinking is that the informed patient is a better consumer of medical services. In an effort to help the consumer make better decisions related to their care, many groups are offering advice on choosing the best doctors or hospitals. Some groups such as Healthgrades.com or the Texas Health Care Information Council develop algorithms that involve using data from administrative databases, then passing it through a black-box algorithm to generate their rating system.

Others use a more simplistic system tied to factors such as reputation and patient volume. For the *US News and World Report* magazine and USNews.com, volume contributes one third of the final score. Other groups such as the Leapfrog Group use only volume for their recommendations. Using a single univariate analysis, they have decided that the best hospitals have a volume of 450 cases per year in cardiac surgery.

A number of recent publications have challenged the conclusion that using volume alone is a useful measure for determining the best hospitals. This article by Welke and colleagues [1] suggests that using only volume to select the best hospitals (based on mortality rate) is only marginally better than randomly selecting hospitals.

Using the Centers for Medicare Services Medicare Provider and Analysis Review (MEDPAR) part A public files, the authors created a dataset of nearly 1 million patients who underwent coronary artery bypass grafting. They proceeded to look at the relationship between volumes and outcomes (defined as mortality). After dividing the data into groups based on hospital volume using quintiles, deciles, high and low volume (based on Leapfrog criteria), and volume as a continuous variable, they analyzed the mortality rates measured for each group. Although there was a rough correlation of declining 30-day mortality with increasing volume within any group, the range of values nearly totally overlapped the adjacent groups. Further, the "c" statistic, which measures the ability of the model to discriminate accurately, was within the range of 0.51 to 0.53, essentially no better than randomly selecting hospitals (randomness has the value c = 0.50). This poor predictability held even looking at 7,

© 2005 by The Society of Thoracic Surgeons
Published by Elsevier Inc

0003-4975/05/$30.00
doi:10.1016/j.athoracsur.2005.07.010

World J. Surg. 29, 1222–1229 (2005)
DOI: 10.1007/s00268-005-7987-6



WORLD
Journal of
SURGERY
© 2005 by the Société
Internationale de Chirurgie

The Case Against Volume as a Measure of Quality of Surgical Care

Shukri F. Khuri, M.D.,[1] William G. Henderson, Ph.D.[2]

[1]Surgical Service, VA Boston Healthcare System, Harvard Medical School, Brigham and Women's Hospital, 1400 V.F.W. Parkway, West Roxbury, Boston, Massachusetts 02132, USA
[2]University of Colorado Health Outcomes Program, PO Box 6508, Aurora, CO 80045-0508, USA

Published Online: September 15, 2005

Abstract. Healthcare purchasers, represented by the Leapfrog Group, have attempted to set standards for "quality" of surgical care that include a minimum volume for each of five major surgical procedures, with the assumption that higher volumes in surgery bring better outcomes. The VA National Surgical Quality Improvement Program (NSQIP) is a validated, outcome-based program that prospectively collects clinical data on all major surgical operations in the VA, and builds validated risk-adjustment models that generate, for each hospital and each surgical specialty within a hospital, risk-adjusted outcomes expressed as O/E (observed to expected) ratios for 30-day mortality and morbidity. The O/E ratio has been validated as a reliable comparative measure of the quality of surgical care. Unlike retrospective studies that are based on administrative databases, NSQIP studies have failed to demonstrate a direct relationship between volume and risk-adjusted outcomes of surgery across various specialties. These studies have emphasized that the quality of *systems* of care was more important than volume in determining the overall quality of surgical care at an institution. High-volume hospitals could still deliver poor care in as much as low-volume hospitals could deliver good care. NSQIP studies have also underscored the major limitations of claims data and administrative databases in the provision of adequate risk-adjustment models that are crucial for volume–outcome studies. Therefore, volume should not be substituted for prospectively monitored and properly risk-adjusted outcomes as a comparative measure of the quality of surgical care.

Introduction

The cost of healthcare to employers has been increasing at an alarming pace over the past several years. In 1997, the average cost increase for large employers was 3%; in 2002 it rose to more than 13% (*Business Week*, November 18, 2002). Concerns about increasing costs and patient safety prompted the formation of the Leapfrog Group in 2000. Today, the Leapfrog Group is an alliance conglomeration of more than 150 public and private organizations (most of them Fortune 500 companies) that provide healthcare benefits to more than 34 million healthcare consumers in all 50 states (www.leapfroggroup.org). Recognizing that quality costs less, the group set standards for urban hospitals to meet before they would contract with them for the care of their employees. These "quality" standards included 24/7 coverage in intensive care units by intensivists, implementation of electronic physician order entry, and what was referred to as "evidence-based hospital referrals," a measure based on minimum volume requirements in five major operations that included coronary artery bypass grafting (500/year), esophagectomy (7/year, later increased to 13/year), and abdominal aortic aneurysmectomy (30/year, later increased to 50/year). The Leapfrog Group based its "evidence-based hospital referral" standard on a study by Birkmeyer et al. in which it was argued that more lives would be saved if patients were referred to high-volume as compared to low-volume hospitals [1].

Setting the volume criterion as a measure of *quality* of surgical care, as the Leapfrog Group has proposed, elevates the importance of the volume–outcome issue in surgery and has important implications for care. The purpose of this article is to build the case precisely *against* the use of volume criteria and to promote the use of risk-adjusted outcomes in setting standards for patient safety and quality of surgical care. The issue at hand is much more serious than a mere affirmation of whether increased surgical volume leads to better outcomes or of whether there is a minimum threshold of surgical workload below which the quality of surgical care is compromised. The issue at hand is the attempt, by the Leapfrog Group and others, to institute hospital-specific *quality* score cards based primarily on volume of surgical load. Allowing such standards to prevail means acceptance of the premise that low-volume hospitals deliver substandard care, and that good care can always be delivered by high-volume hospitals. Working from this premise involves passing very important qualitative judgments on specific healthcare provider institutions—judgments that would have far-reaching effects on the economic welfare and professional lives of the medical and paramedical employees at these institutions. In the Veterans Health Administration, the largest single-payer healthcare delivery system in the United States, specific comparative judgments on the quality of care of all 123 major surgical centers are being made by the VA's National Surgical Quality Improvement Program (NSQIP). This communication is based on lessons learned from the NSQIP, which teach us not only that volume of surgical

Correspondence to: Shukri F. Khuri, M.D., e-mail: shukri.khuri@med.va.gov

0373
09/15/08

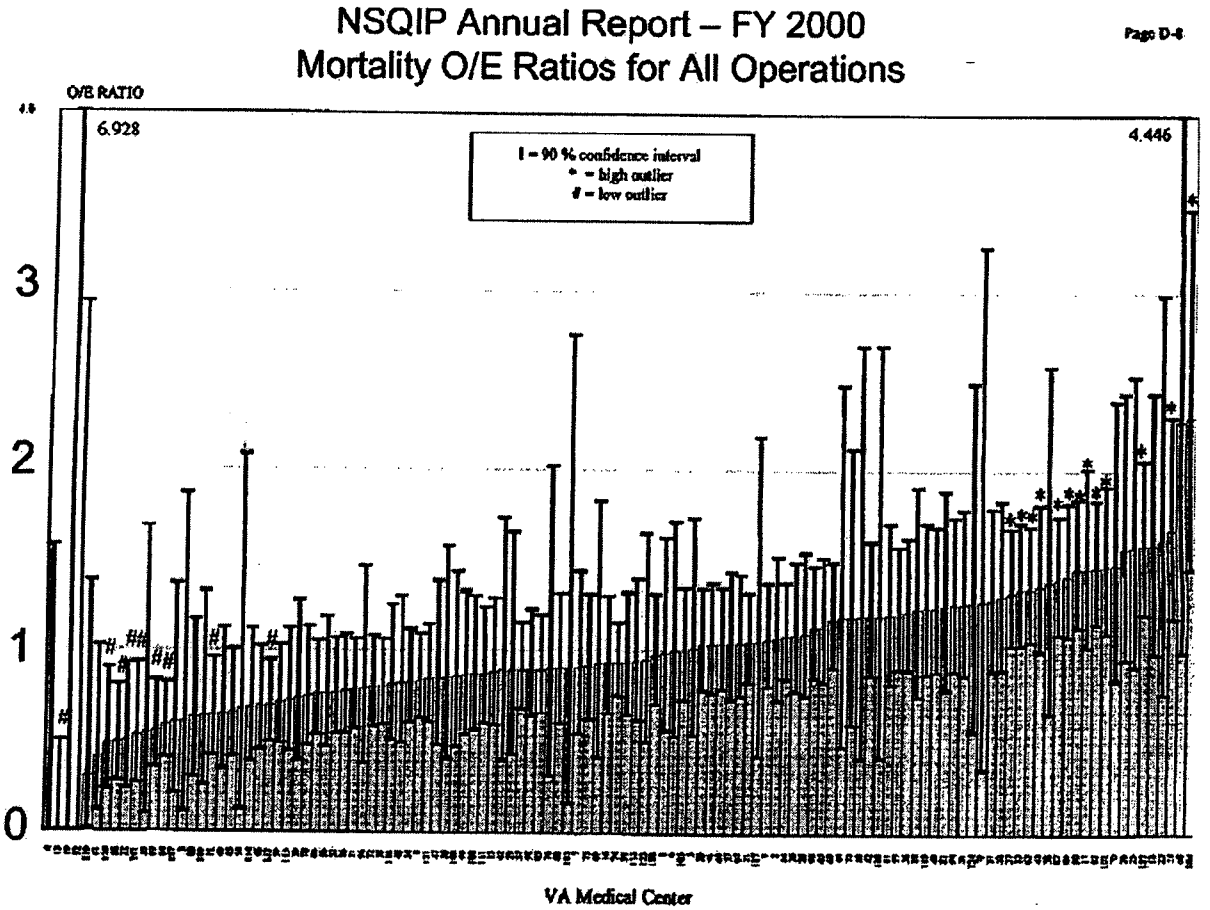


Fig. 1. Observed/expected (O/E) ratio for mortality for all operations at each of 128 VA medical centers as they appeared in the FY2000 Annual Report of the NSQIP. See text for description.

workload is unrelated to the quality of surgical care, but also that attempts at setting volume as a standard are flawed and, perhaps, more likely to hurt the quality of surgical care than to improve it.

Volume, Outcome, and Quality of Surgical Care in the NSQIP

The NSQIP Metric for the Assessment of the Quality of Surgical Care

The NSQIP is the first national, validated, outcome-based, risk-adjusted and peer-controlled program for the measurement and enhancement of the quality of surgical care that includes a range of surgical subspecialties [2]. It employs risk-adjusted 30-day outcomes of surgery as measures of the quality of surgical care. The NSQIP relies on a trained dedicated clinical nurse reviewer at each institution who uses a standardized protocol to prospectively collect, verify, and transmit to a national data coordinating center data on 52 preoperative patient risk factors (including laboratory variables), 15 intraoperative variables, and 32 thirty-day outcome variables on all major surgery. The NSQIP accrues nearly 105,000 major operations annually. As of September 30, 2003, the NSQIP database comprised data on more than 1.2 million operations in 9 surgical subspecialties. On an annual basis, models predictive of 30-day morbidity and mortality are created for various populations of patients from which, using the logit equation, *expected* morbidity or mortality rates are derived, based on the preoperative severity of illness of specific patient populations. Knowing the actual or *observed* morbidity and mortality rate of a specific patient population, an observed to expected ratio (the *O/E ratio*) for that patient population is then calculated to quantify and provide a comparative measure of the risk-adjusted outcome of that population. Figure 1 shows the O/E ratios for 30-day postoperative mortality of all operations at each medical center as they appeared in the FY2000 Annual Report of the NSQIP. The error bars represent the 90% confidence intervals. The hospitals are identified by code, each facility being privy only to its own code. The O/E ratio ranged from 0 to 2.3. An asterisk denotes a statistically significant high-outlier hospital, meaning that the hospital's mortality rate was significantly higher than expected based on the severity of illness of that hospital's patient population.

The implications drawn from using this method for the comparative assessment of quality of care are that high-outlier hos-

0374
09/15/08

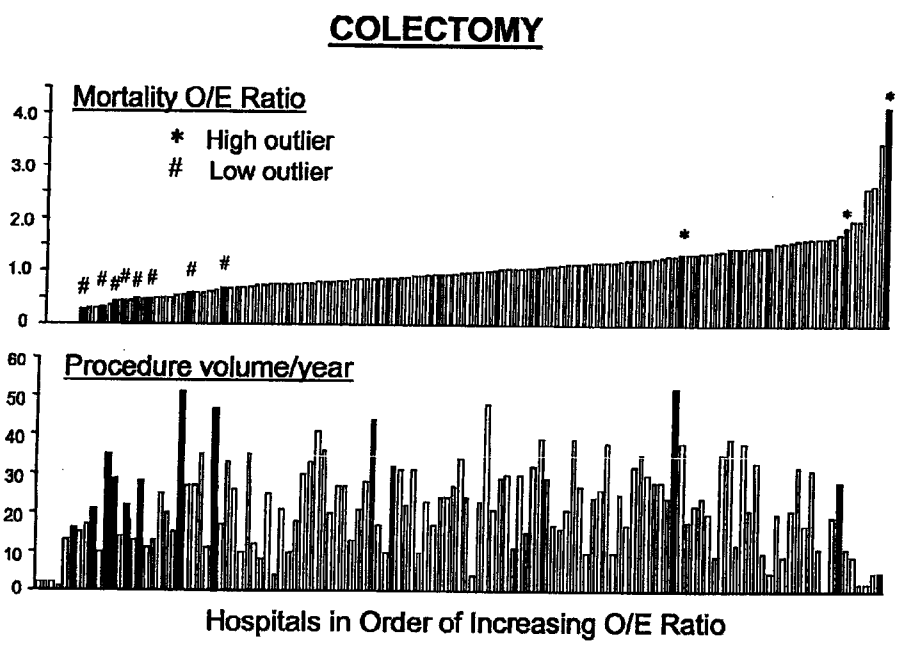


Fig. 2. The top panel shows the 30-day mortality O/E ratios for colectomy in 107 VA hospitals. The bottom panel shows the corresponding annual procedure volume for each hospital. High-outlier hospitals are marked with (*) and low-outlier hospitals are marked with (#).

pitals deliver inferior quality of care and low outlier hospitals deliver superior quality of care. One of the major accomplishments of the NSQIP is that it took these implications about quality of care one step further, conducting a validation study that included site visits by teams of surgeons, health services researchers, and nurses. This validation study demonstrated that, indeed, hospitals with significantly low mortality and morbidity O/E ratios had *superior* structures and processes of care, whereas hospitals with significantly high mortality and morbidity O/E ratios had *inferior* structures and processes of care [3]. The study validated the use of the O/E ratio as a measure of quality of VA surgical care. The NSQIP drives process improvement by feeding back to each surgical service in the VA reliable comparative data that allow providers and managers in these hospitals to compare their performance to that of their peers nationwide, and by identifying best practices in good performing hospitals and disseminating them to all VA hospitals. Since the NSQIP's application in 1991, VA surgery has witnessed a 27% reduction in 30-day mortality and a 45% reduction in 30-day morbidity.

Results of the Volume–Outcome Study

A major study was conducted by the NSQIP to address the debate regarding the regionalization of surgical care to high-volume centers only [4]. Only cardiac surgery and organ transplantation were regionalized in the VA at that time. The VA had been newly reorganized into 22 autonomous networks or Veterans Integrated Service Networks (VISNs), and a new cost allocation system had been implemented which favored primary care over tertiary care. This prompted a number of network directors to recommend closing low-volume surgical services, arguing that better quality surgical care would prevail in higher-volume hospitals. To address this possibility, the NSQIP examined the relation of surgical volume to risk-adjusted outcome in eight common operations: abdominal aortic aneurysm repair, infrainguinal vascular reconstruction, carotid endarterectomy, lung resection (lobectomy and pneumonectomy), open and laparoscopic cholecystectomy, colectomy, and total hip arthroplasty. We used four statistical analyses: (1) a simple Pearson correlation, (2) analysis of variance of risk-adjusted outcomes between hospitals divided in quartiles by volume, (3) mixed effects hierarchical modeling, which accounts for patient and hospital effects, and (4) automatic interaction detection analysis, which looks for a threshold of volume below which outcome is adversely affected. None of the resulting p values in the first three analyses were statistically significant, indicating no relationship between the 30-day mortality O/E ratio and procedure volume in any of the 8 operations examined [4].

Automatic interaction detection, the fourth analysis, also failed to identify a volume threshold below which risk-adjusted 30-day mortality was adversely affected in any of the eight operations. Figure 2 shows the relationship between volume and outcome in 16,181 colectomies performed in 132 VA hospitals. Shown on the top panel are the mortality O/E ratios for colectomy, each bar representing one participating hospital. In this and subsequent illustrations, high-outlier hospitals are marked with (*), and low outlier hospitals are marked with (#). The bottom panel shows the corresponding procedure volume for each hospital. Note that Hospital A, the hospital with the highest procedure volume (52 cases per year), was one of three high outliers, whereas Hospital B, with less than one third of these cases, was the lowest outlier—i.e., the best performer in the entire group.

0375
09/15/08

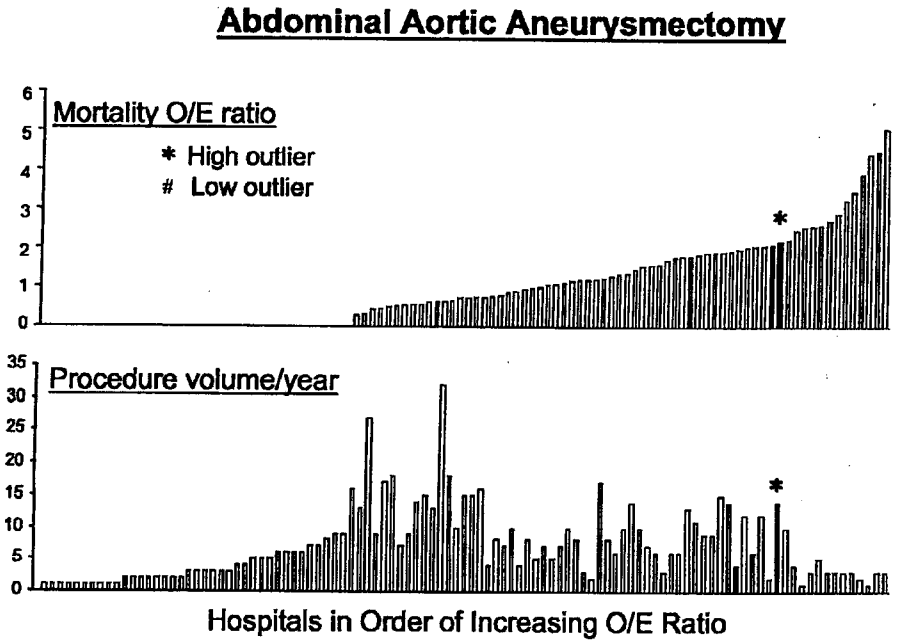


Fig. 3. The top panel shows the 30-day mortality O/E ratios for abdominal aortic aneurysmectomy in 107 VA hospitals. The bottom panel shows the corresponding annual procedure volume for each hospital. There was only one statistically high-outlier hospital (*) in which 14 operations were performed annually.

Additional Observations in Vascular Surgery. The lack of a specific relationship at the hospital level between volume of surgery and the O/E ratio, which the NSQIP has validated as a comparative measure of quality, can be appreciated more by examining the data from the three vascular operations studied. Shown on the top panel of Figure 3 are the mortality O/E ratios for abdominal aortic aneurysmectomy (AAA), again each bar representing one participating hospital. The bottom panel shows the corresponding annual procedure volume for each hospital. Note that there was only one statistically high-outlier hospital (with an O/E ratio of 2.0), which was *not* a low-volume hospital. In fact, this hospital performed more than the group's median number of operations per year. Although the hospitals on the high end of the O/E ratio scale tended to be low-volume hospitals, a relatively large number of low-volume hospitals did not have any mortality during the 3-year period of the study, indicating good performance and giving them an O/E ratio of zero throughout the three years. A scattergram of the same data (Fig. 4) shows the wide variance in the relationship between the number of AAA cases per year per center and the risk-adjusted 30-day mortality rate. Both Figures 3 and 4 show that the only statistically significant high-outlier at the 90% confidence interval was not a low-volume hospital, and that a fairly large number of low-volume hospitals achieved good quality, with O/E ratios of less than 1. Figure 5 shows no correlation between the number of AAA cases per hospital per year and the *expected* mortality rate, which is an indication of the severity of illness of the patient population. Note that a number of low-volume hospitals operated on high-risk patients. The scattergram shows that low-volume hospitals were as likely to operate on high-risk patients as high-volume hospitals were. The same observations were made in comparisons between case load and mortality O/E ratio in carotid endarterectomy (Fig. 6) and infrainguinal reconstruction operations (Fig. 7), where, as another example, a hospital performing 43 operations per year was a statistically low-outlier whereas a similar hospital, performing 47 operations per year, was a statistically high-outlier. Figure 8 again shows no

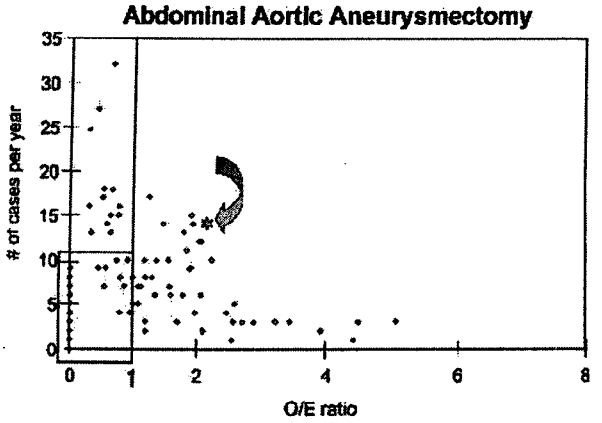


Fig. 4. A scattergram of the same data shown in Figure 3, illustrating the wide variance in the relationship between the number of abdominal aortic aneurysmectomy cases per year per center and the risk-adjusted 30-day mortality rate. The arrow points to the only statistically significant high-outlier hospital. The rectangle in the left corner shows the low-volume hospitals that achieved O/E ratios of less than 1.

0376
09/15/08

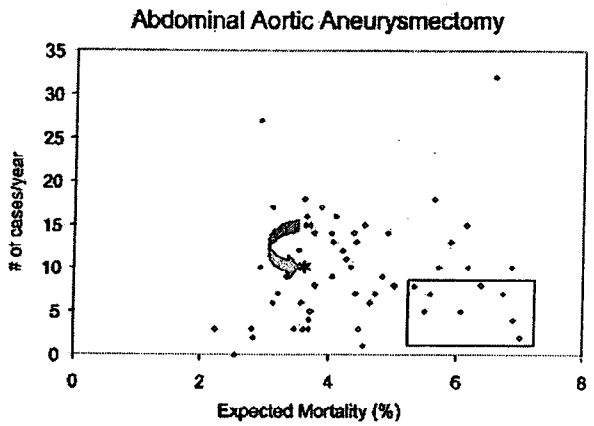


Fig. 5. The relationship between the number of abdominal aortic aneurysmectomy cases per hospital per year and the *expected* mortality rate, which is an indication of the severity of illness of the patient population. The high-outlier hospital is indicated by an arrow. The rectangle in the lower right contains the low-volume hospitals that operated on high-risk patients.

obvious direct relationship between the number of infrainguinal reconstructions performed in a hospital and the severity of illness of the respective patient population, as indicated by the expected mortality rate. In fact, the figure shows that the sickest patients were operated on in relatively low-volume hospitals, and that the only high-volume hospital operating on sick patients was a poor performer, with a statistically high O/E ratio.

It is obvious from these data that one would be committing a major error in assuming that surgeons in a relatively low-volume hospital only perform surgery on low-risk patients and cannot achieve good outcomes even in high-risk patients. More importantly, referring high-risk patients to high-volume hospitals does not prevent these patients from having poor outcomes secondary to suboptimal care. Therein lies the fallacy of using the volume standard as the only measure of quality of surgical care.

Limitations of Studies Making the Case for Referral Based on Volume

In light of what we have learned from the NSQIP, we would like now to address critically key studies that have demonstrated a direct relationship between volume and outcome of surgery, in particular the study on which the Leapfrog Group has based its volume standards. Almost all major studies that have found a direct relationship between volume and outcomes in noncardiac surgery have been based on claims and administrative databases. In contrast, the NSQIP, which has failed to show such a relationship, is based on clinical data collected by a trained nurse. The NSQIP has examined whether the information contained in the VA administrative database was adequate for proper risk adjustment of outcomes after surgery. In a recently published study, Best et al. compared patient preoperative variables and 30-day morbidity in the NSQIP database, which they designated the gold standard, to the corresponding variables in the VA's Patient Treatment File (PTF), which they designated the test criterion [5]. The authors calculated both the sensitivity and the positive predictive value of the PTF in depicting risk factors and postoperative outcomes. To justify replacing the NSQIP with the PTF, each of these indicators should have a value equal to or exceeding 0.9. The values obtained were far from 0.9. The average sensitivity and positive predictive value of the PTF in depicting all the preoperative risk factors contained in the NSQIP were 0.27 and 0.34, respectively. Worse still, the average sensitivity and positive predictive value of the PTF in depicting the postoperative outcomes were 0.25 and 0.23, respectively. These findings prompt us to conclude that studies employing administrative databases in the elucidation of the relationship between volume and outcomes of surgery are likely to be flawed because of their inability to adjust adequately for patient severity of illness.

The Leapfrog Group has justified its use of volume criteria by the study of Birkmeyer et al., which attempted to calculate, from previously published studies, the numbers of lives saved if patients in those studies had been referred to high-volume hospitals only [1]. Seventy-five percent of the lives saved were calculated on the basis of two studies that had shown a direct relationship between volume and outcome, one in abdominal aortic aneurysmectomy in the VA [6], and one in CABG in the State of New York [7]. The VA study used by Birkmeyer et al. in their analysis had employed the PTF for risk adjustment. When the NSQIP data on the same patients were analyzed a few years later, no relationship between volume and outcome could be elicited, as stated above. Likewise, the New York State study used by Birkmeyer et al. in their analysis was also supplanted a few years later by a paper by Sollano, from the same group, that showed no relationship between volume and outcome of CABG [8]. Thus, the construct on which the Leapfrog Group has based its volume criteria is at best questionable, and in our opinion, is flawed [9].

A recent study by Birkmeyer et al. [10] based on Medicare claims data showed the mortality rate was higher among patients at low-volume hospitals compared to high-volume hospitals. However, risk adjustment was based on only a few patient risk factors from administrative data, and the models had relatively low C-indexes. Furthermore, their data indicated that large numbers of patients were treated at low- to moderate-volume hospitals, and that many patients and their families would need to be transported at unknown large expense and hardship to satisfy the recommendation that all patients receive treatment at high-volume hospitals.

When in the State of Maryland the Johns Hopkins Hospital reports excellent outcomes in complex surgical procedures, it is probably not because it has the highest volume in the state [11]. Considering that quality is determined first by systems of care, it is more likely that the Johns Hopkins Hospital has the highest volume because it has superior and expert systems of care, which ultimately attract complex and other surgical referrals.

Adverse Impact of Applying the Volume Standard as a Measure of Quality

Using the volume standard as a quality criterion in surgery, as advocated by the Leapfrog Group, is more likely to compromise the quality of surgical care than to improve it: first, it mitigates the chance of assessing and improving systems of care within a specific surgical service. The NSQIP experience, which also includes numerous studies, publications, and site visits to a wide variety of surgical services, has as its premise that quality lies first in well-

0377
09/15/08

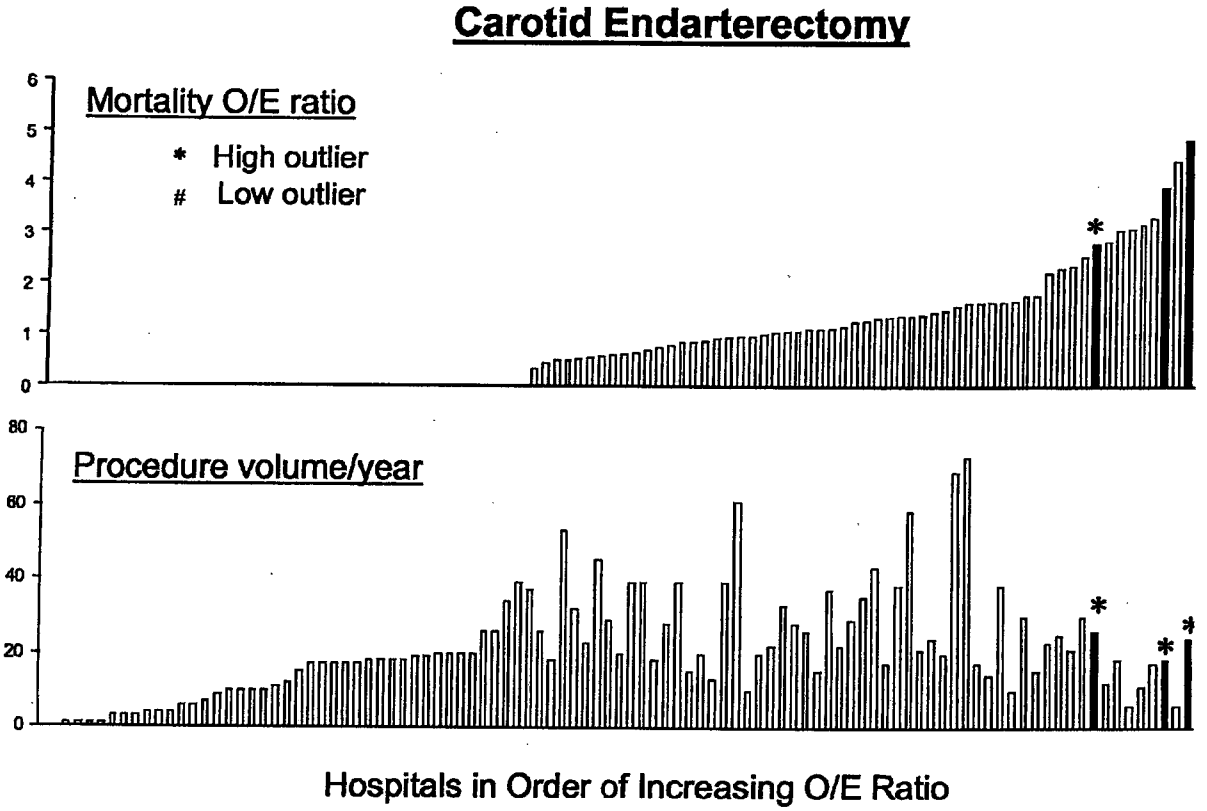


Fig. 6. The top panel shows the 30-day mortality O/E ratios for carotid endarterectomy in the hospitals that reported performing this procedure. The bottom panel shows the corresponding annual procedure volume for each hospital. There were three high-outlier hospitals, indicated by (*); the number of cases performed in these hospitals annually is shown in the corresponding barograph in the lower panel.

coordinated and optimally functioning systems of care. When a specific hospital is identified to be a statistically high-outlier, a methodic analysis of the various systems of care is routinely undertaken to uncover structures and processes that need to be improved. Using the volume standard instead of validated risk-adjusted outcome measures for the assessment of quality passes a potential false judgment on the quality of care of a specific surgical service and, in so doing, mitigates any chance for methodical assessment, and if need be improvement of systems on that service.

Second, applying the volume standard alienates and disenfranchises surgical providers in small hospitals, seriously compromising local quality improvement efforts in surgery in these hospitals. The NSQIP has taught us that efforts to improve the quality of care cannot succeed without the full endorsement and enthusiastic cooperation of the surgeons in the field.

Third, the volume standard cannot be applied to rural hospitals as readily as to urban hospitals. Applying this standard only to urban hospitals, as advocated by the Leapfrog Group, will cause unnecessary hardship to large numbers of patients who would have to travel for long distances to gain access to urban referral centers. It will also rob small hospitals and rural hospitals of their complex elective cases, limiting their experience in the management of these cases and still expecting them to attend to such cases when they present as emergencies, thus potentially compounding the compromise in the quality of surgical care.

Fourth, increasing referrals to high-volume hospitals may tax the capacity of those hospitals to deliver quality care, and thus may result in undesired access issues and poor outcomes of care. As we have demonstrated in the VA, referring patients to relatively high-volume hospitals does not prevent these patients from having poor outcomes and poor quality of care.

Is There a Volume Threshold that Might Influence the Quality of Surgical Care?

In trying to make the case against using the volume standard as a measure of quality, it is impossible to deny that outcomes of systems of surgical care are likely to be adversely affected if the volume of the surgery performed within these systems falls below a certain threshold level. Today, however, that threshold is elusive and very hard to determine. None of us would want to undergo a CABG procedure at an institution that performs only two or three such operations per year. At the crux of the volume-risk-adjusted-outcome relationship in the VA is whether a threshold volume below which quality is likely to be compromised can be determined. The mortality O/E ratio, which is used by the NSQIP as a comparative measure of quality, becomes statistically unsta-

0378
09/15/08

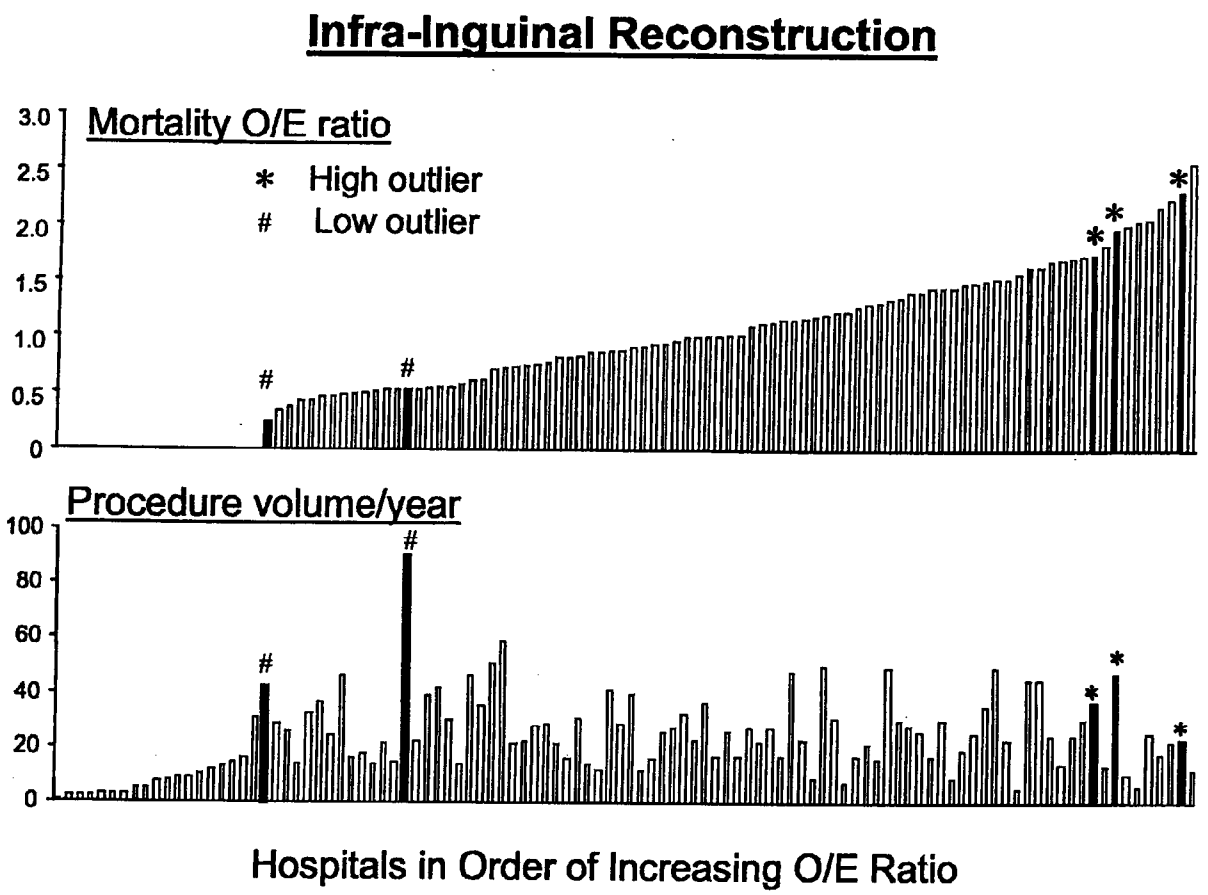


Fig. 7. The top panel shows the 30-day mortality O/E ratios for infrainguinal reconstruction procedures, and the bottom panel shows the corresponding annual procedure volume for each hospital. There were three high (*) and two low (#) outlier hospitals. The number of annual operations performed in each of these five hospitals is indicated in the corresponding barograph in the lower panel.

ble when the sample size is small. Because we found no relationship between volume and outcome O/E ratios in the VA, it is tempting to set as a "volume threshold" the sample size below which the outcome O/E ratio is no longer reliable in reflecting the comparative quality of care. This simple approach gets complicated by the wide variation in outcome event rates between operations and by numerous questions that are yet to be answered. For example, should the volume threshold be based on the total productivity of the system or the provider? Should it be based on numbers performed in a specific operation or on numbers performed within the specialty to which that operation belongs? The clusiveness of identifying valid "volume thresholds" below which the quality of surgical outcomes might be compromised provides another compelling reason for avoiding altogether the use of the volume standard as a measure of quality surgical care.

Conclusions.

1. Volume cannot be a proper measure of quality of surgical care. High-volume hospitals can deliver poor care and low-volume hospitals can deliver good care. Employing volume as a standard will not improve patient safety and is bound to alienate the surgical community and *adversely* affect the quality of surgical care.
2. In surgery, which in most cases revolves around a single episode of care with an expected and a measurable short-term outcome, there is no substitute for the use of properly risk-adjusted outcomes as the primary measures of the quality of surgical care. In this effort, there is also no substitute for the proper prospective acquisition and processing of patient clinical data by dedicated professionals using standardized and validated methodologies.
3. Quality standards in surgery should be set by surgeons, not by industry. The specialty boards in surgery are now struggling with the mandate from the Accreditation Council for Graduate Medical Education (ACGML) and the American Board of Medical Specialties (ABMS) to develop measures of surgeon competence that would be incorporated into the certification and re-certification processes. The American College of Surgeons (ACS) has teamed up with the NSQIP and demonstrated in a $5.6 million study funded by the Agency for Health Re-

0379
09/15/08

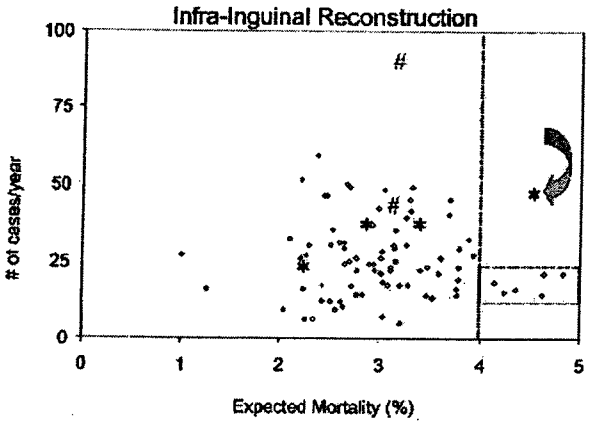


Fig. 8. The relationship between the number of infrainguinal reconstruction procedures per hospital per year and the *expected* mortality rate, which is an indicator of the severity of illness of the patient population. Of the 7 hospitals that had an expected mortality rate of more than 4%, 6 were low-volume hospitals. The seventh (indicated by the arrow) had a relatively high number of operations performed, but was still a high-outlier.

search and Quality that the NSQIP model was applicable to the private sector, as exemplified by 14 major academic community hospitals nationwide. The ACS Board of Regents has recently committed to the establishment of an infrastructure within the ACS that will make the NSQIP available to all hospitals nationwide. Only efforts of this nature have a chance to succeed in setting quality standards for the surgical profession.

4. Although the *raison d'être* for the coming together of the Leapfrog Group is to leverage power in purchasing healthcare, there is no doubt that the member companies genuinely care for the safety and quality of the healthcare of their employees. In that spirit, their employees would be better served if the Leapfrog Group and other groups of purchasers and insurers of healthcare would refrain from setting arbitrary and unvalidated standards for surgical care, and instead would team up with the surgical community in promoting initiatives like the NSQIP. Such collaborative efforts could make it possible for all surgical care provider institutions (whether low or high in volume, urban or rural, government or private) to prospectively collect and transmit reliable clinical patient data that would form the basis for true quality assessment initiatives.

Acknowledgments

The authors acknowledge with gratitude and appreciation the contribution to this work of all the participants in the VA National Surgical Quality Improvement Program. The editorial assistance of Nancy Healey is also acknowledged with gratitude.

References

1. Birkmeyer JD, Finlayson EVA, Birkmeyer CM. Volume standards for high-risk surgical procedures: potential benefits of the Leapfrog Initiative. Surgery 2001;130:415–422
2. Khuri SF, Daley J, Henderson W, et al. The Department of Veterans Affairs' NSQIP. The first national, validated, outcome-based, risk-adjusted, and peer-controlled program for the measurement and enhancement of the quality of surgical care. Ann. Surg. 1998;228:491–507
3. Daley J, Forbes MG, Young GJ, et al. Validating risk-adjusted surgical outcomes: site-visit assessment of process and structure. J. Am. Coll. Surg. 1997;185:341–351
4. Khuri SF, Daley J, Henderson W, et al. Relation of surgical volume to outcome in eight common operations. Results from the VA National Surgical Quality Improvement Program. Ann. Surg. 1999;230:414–432
5. Best WR, Khuri SF, Phelan M, et al. Identifying patient preoperative risk factors and postoperative adverse events in administrative databases: results from the Department of Veterans Affairs National Surgical Quality Improvement Program. J. Am. Coll. Surg. 2002;194:257–266
6. Kazmer A, Jacobs L, Perkins A, et al. Abdominal aortic aneurysm repair in Veterans Affairs Medical Centers. J. Vasc. Surg. 1996;23:191–200
7. Hannan EL, Kilburn H, Bernard H, et al. Coronary artery bypass surgery: the relationship between in hospital mortality rate and surgical volume after controlling for clinical risk factors. Med. Care 1991;26:1094–1107
8. Sollano JA, Gelijns AC, Moskowitz AJ, et al. Volume-outcome relationships in cardiovascular operations. New York State, 1990–1995. J. Thorac. Cardiovasc. Surg. 1999;117:419–428
9. Khuri SF. Invited commentary: Surgeons, not General Motors, should set standards for surgical care. Surgery 2001;130:429–431
10. Birkmeyer JD, Siewers AE, Finlayson EVA, et al. Hospital volume and surgical mortality in the United States. N. Engl. J. Med. 2002;346:1128–1137
11. Gordon T, Bowman HM, Tielsch JM, et al. Statewide regionalization of pancreaticoduodenectomy and its effect on in-hospital mortality. Ann. Surg. 1998;228:71–78

0380
09/15/08

Is Hospital Procedure Volume a Reliable Marker of Quality for Coronary Artery Bypass Surgery? A Comparison of Risk and Propensity Adjusted Operative and Midterm Outcomes

Anoar Zacharias, MD, Thomas A. Schwann, MD, Christopher J. Riordan, MD, Samuel J. Durham, MD, Aamir Shah, MD, Thomas J. Papadimos, MD, Milo Engoren, MD, and Robert H. Habib, PhD

Division of Cardiovascular Surgery, St. Vincent Mercy Medical Center, Toledo, Division of Cardiovascular Surgery, St. Luke's Hospital, Maumee, Departments of Surgery, Anesthesiology, and Medicine, Medical College of Ohio, Toledo, Ohio

Background. Worse operative mortality has been reported for hospitals with low versus high coronary artery bypass grafting surgery volumes. Despite a lack of comparisons beyond the early postoperative period and evidence of surgeon–volume confounding, some have suggested that regionalization of coronary artery bypass grafting in favor of high volume institutions is warranted.

Methods. We retrospectively compared operative mortality and 3-year survival in coronary artery bypass grafting patients (2001 to 2003) at a low-volume hospital (n = 504; 160 per year [median]) versus a high-volume hospital (n = 1,410; 487 per year) served by the same high-volume surgeon team. Covariate risk adjustment was done via multivariate and propensity modeling.

Results. The two hospital cohorts exhibited multiple demographic and risk factor differences. Unadjusted low-volume hospital vs high-volume hospital operative mortality was similar overall (2.38% vs 2.98%; $p = 0.59$) with nearly identical Society of Thoracic Surgeons observed-to-expected ratios (0.83 vs 0.82), irrespective of preoperative risk category. Hospital volume did not predict operative mortality (odds ratio, 95% confidence interval = 0.82; $p = 0.602$). At follow-up, a total of 28 low-volume hospital deaths (5.6%) and 135 high-volume hospital deaths (9.6%) occurred at similar surgery-to-death intervals ($p = 0.7$). Unadjusted 0 to 3-year survival was significantly worse for high-volume hospitals (risk ratio = 1.59; 1.06 to 2.39; $p = 0.026$). Yet procedure volume was not independently associated with worse midterm survival after covariate (risk ratio = 1.28; 0.84 to 1.96; $p = 0.247$) or propensity score (risk ratio = 1.11; 0.72 to 1.71; $p = 0.648$) adjustment.

Conclusions. Hospital and surgeon volume effects on coronary artery bypass grafting outcomes are interdependent, and therefore hospital coronary artery bypass grafting volume per se is not a reliable marker of quality. Instead, outcome quality markers should rely on thorough risk-adjustment based on detailed clinical databases, possibly including annual and cumulative surgeon volume.

(Ann Thorac Surg 2005;79:1961–9)
© 2005 by The Society of Thoracic Surgeons

A number of studies have correlated higher coronary artery bypass grafting (CABG) hospital volume to lower associated in-hospital or operative mortality [1–10], or both. It is thus proposed that hospital CABG volume is a reliable marker of CABG quality of care that is easily available to the public. In addition, The Leapfrog Group [11] has recommended that purchasers should preferentially contract with high-volume hospitals (> 450 per year) to avoid the potential for unnecessary deaths. Yet this position is not uniformly shared, and if adopted it will dramatically alter current delivery of cardiac surgery [12, 13]. To temper this, some have suggested that referrals from low-volume to high-volume hospitals should be restricted to high-risk procedures because, commensurate with perceived greater expertise at high-volume institutions, more lives are likely to be saved in such patients [14–18]. Others have found a significant advantage for high-volume hospitals irrespective of operative risk status, and also argue against such an approach [3, 4].

Recently, related studies based on two large clinical databases have reached differing conclusions. Peterson and colleagues [1] analyzed results from 267,089 isolated CABG procedures (2001 to 2002) from 439 United States hospitals participating in The Society of Thoracic Surgeons (STS). They found that hospital volume is only modestly associated with CABG outcome and may not be an adequate marker of surgical quality [1]. Hannan and colleagues [2] and Wu and colleagues [3], reporting on the 1997 to 1999 New York State isolated CABG experi-

Accepted for publication Dec 10, 2004.

Address reprint requests to Dr Habib, Cardiopulmonary Research, St. Vincent Mercy Medical Center, 2213 Cherry St, ACC Bldg, Suite 309, Toledo, OH 43608; e-mail: robert_habib@mhsnr.org.

© 2005 by The Society of Thoracic Surgeons
Published by Elsevier Inc

0003-4975/05/$30.00
doi:10.1016/j.athoracsur.2004.12.002

0381
09/15/08

Ann Thorac Surg
2005;79:1961–9

Abbreviations and Acronyms

CABG = coronary artery bypass grafting
CI = confidence Interval
CPB = cardiopulmonary Bypass
COPD = chronic obstructive pulmonary disease
HVH = High Volume Hospital
LVH = Low Volume Hospital
O/E = observed to expected ratio
OM = Operative Mortality
OR = odds ratio
ROC = receiver-operator-characteristic curve
RR = risk ratio
STS = The Society of Thoracic Surgeons

ence (N = 57,150), provided compelling data that high-volume hospitals continue to have lower in-hospital mortality [1], and the benefits are similar in low-risk versus moderate-to-high-risk CABG [3]. Importantly, both groups concur that hospital–volume outcome effects are confounded by a significant independent surgeon–volume effect [1–3].

To date, all studies exploring CABG volume effects on outcome have been limited to the consideration of early (in-hospital or 30-day) or operative mortality. Although obviously pertinent, it is not known whether the reported volume–outcome effects persist beyond the early postoperative period. The aims of this investigation were (1) to better define whether procedure volume effects are surgeon or institutional in origin, and (2) to explore whether procedure volume has longer term implications on outcome that extend beyond the early postoperative period. We compared operative (30-day) and midterm (3-year) mortality for two independent institutions served by the same team of high-volume surgeons: (1) a high-volume hospital (HVH) with a cardiac surgery program since 1975, and (2) a newer, smaller low-volume hospital (LVH) program started in 2001. We reasoned that this paradigm would allow us to objectively assess the impact of low versus high institutional CABG volume on outcome free of surgeon–volume confounding.

Patients and Methods

Patients

Study data is derived from the caseload of an experienced 5-surgeon team between January 1, 2001 and December 31, 2003. These surgeons performed a total of 3,115 open-heart operations during this 3-year period at three Toledo, Ohio area hospitals. Surgeon volume averaged 208 open heart operations (median, 178; range, 161 to 285) per surgeon per year. The corresponding number of isolated CABG procedures over this period was 2,269 (73%) including 1,410 done at HVH compared with 504 at LVH. The median (mean) CABG procedures per year were 487 (470) at HVH versus 160 (168) at LVH or approximately 1 to 3 LVH to HVH case-load ratio. The remaining 355 CABG operations were done at a third institution (data not analyzed; see Discussion).

All consecutive patients undergoing isolated CABG at LVH and HVH were analyzed. Patients were excluded if they had concomitant valve, other cardiac, or carotid surgery. The same perfusion team provided cardiopulmonary bypass services at LVH and HVH. With rare exception, normothermic bypass combined with cold blood cardioplegia was utilized for CABG at both hospitals. Off-pump CABG was similarly used at the two institutions (HVH versus LVH = 5.3% versus 4.2%; $p = 0.34$) with similar selective criteria. All patients had a valid United States social security number. The institutional review boards at both institutions approved research based on ongoing clinical cardiac surgery databases. The requirement for informed consent was waived.

Clinical Data and End Points

Clinical data on patients undergoing revascularization have been systematically abstracted and recorded in identical cardiac surgery databases at both hospitals. Both institutions participate in The STS national cardiac surgery database. The primary end points were all-cause operative mortality (30-day or in-hospital, whichever is longer) and 0 to 3-year mortality. The Social Security Death Index (conducted in August 2004) was used to determine timing of death used for mid-term survival analysis. Allowing for a 3-month lag, this corresponds to a follow-up between 5 and 41 months.

Statistical Analyses

Continuous data were expressed as mean ± standard deviation. Baseline variables were compared by using the Wilcoxon rank-sum test, *t* test, or the chi-square test as appropriate. Actual operative mortality (OM), risk-adjusted and observed-to-expected ratio of operative mortality data are reported as per the latest STS CABG risk model [19]. In addition, for LVH versus HVH, we used two tests to compare (1) overall OM and (2) OM for three STS risk-based sub-cohorts: (1) low risk (< 2%), (2) moderate risk (2% to 5%), and (3) high risk (> 5%). Effects of explanatory variables on OM were derived by logistic regression.

Low-volume hospital versus HVH midterm Kaplan-Meier [20] survival for the entire cohort and for the low, moderate, and high-risk cohorts were compared with (Breslow test) and without (log rank test) weighting. For the Breslow test, each test is weighted by the number of patients at risk in each of the comparison groups at any given time. Next, multivariable Cox proportional-hazards regression [21, 22] was done to assess the effects of explanatory variables on long-term mortality and their associated risk ratios. Regression model selection was done with backward elimination (Wald statistic, confirmed using forward and stepwise selection).

Potential confounding due to the unbalanced LVH versus HVH patient variables on outcome comparisons cannot be discounted, even after multivariate risk adjustment [23, 24]. To minimize these effects, we utilized LVH propensity score analysis derived via a nonparsimonious logistic regression model (LVH = 1, HVH = 0) [23, 24]. All

0382
09/15/08

the variables listed in Table 1 and their significant interactions were included in this model. The score was then incorporated into subsequent multivariate model analyses as a covariate. In case of OM, the population was divided to LVH propensity score quintiles and compared. A $p < 0.05$ cutoff was used to indicate significance (SPSS version 10.0, SPSS Inc, Chicago, IL).

Results

Demographics, Risk Factors, and Operative Data

The HVH and LVH cohorts exhibited similar gender and age distributions, whereas the majority of their preoperative risk factors and operative variables were significantly different (Table 1). African-Americans accounted for 7% of HVH patients versus only 1% of LVH patients, and more HVH patients were on Medicaid or uninsured. The LVH patients were characterized by a greater incidence of obesity, family history of coronary disease, angina, triple-vessel disease, emergent CABG, greater number of grafts, and consequently relatively longer bypass. Alternatively, the HVH cohort included more smokers (past and current), diabetes, insulin dependence, hypercholesterolemia, renal failure, dialysis dependence, hypertension, cerebrovascular disease, peripheral vascular disease, chronic obstructive pulmonary disease, myocardial infarction, unstable angina, as well as history of previous cardiovascular intervention including redo surgery. The relative imbalance in preoperative morbidity led to a significantly greater HVH cohort STS predicted mortality risk (HVH, 3.59%, LVH, 2.90%; $p < 0.001$).

Operative Mortality

Unadjusted OM was similar for the two hospitals (HVH vs LVH, 2.98% vs 2.38%; $p = 0.59$) (Table 2). The corresponding observed-to-expected ratio of mortality data of The STS risk model were 0.83 and 0.82, respectively. Separate comparisons of the low, moderate, and high-risk subgroups also indicated similar OM results for HVH and LVH irrespective of risk category. Hospital volume was not among the OM predictors by logistic regression, which included increasing age, longer cardiopulmonary bypass, insulin dependence, cerebrovascular disease, chronic obstructive pulmonary disease, emergencies, redo surgery, all-vein grafting, and coronary endarterectomy (see Table 3). Forcing hospital volume (HVH = 0, LVH = 1) as a covariate did not alter model prediction (OR = 0.82; range, 0.40 to 1.71; $p = 0.60$) as illustrated by the receiver operator characteristic curve comparison (Fig 1). Individual surgeons and Medicaid and uninsured status did not predict OM.

Midterm Survival

A total of 163 deaths (8.5%) have been documented in this CABG series including 28 of 504 LVH deaths (5.6%) and 135 of 1,410 HVH deaths (9.6%). Time of death for LVH (median, 37 days; interquartile range, 11 to 516 days) and HVH (median, 134 days; interquartile range, 23 to 433 days) was similar ($p = 0.7$). Follow-up in surviving patients was significantly shorter for LVH versus HVH (median, 621 days; interquartile range, 469 to 958 days vs median, 806 days; interquartile range, 537 to 1,064 days; $p < 0.0001$). This difference was largely due to the systematically increasing number of patients per year between 2001 and 2003 at LVH compared with a relatively unchanged HVH annual volume.

Unadjusted LVH versus HVH Kaplan-Meier survival for as much as approximately 1,100 days post-CABG are shown in Figure 2 (top); this indicated a significantly worse HVH survival (risk ratio, 95% confidence interval = 1.59; range, 1.06 to 2.39; $p = 0.026$ log rank and 0.020 Breslow). The LVH survival was superior at 1 year (95.6% vs 93.1%) and 3 years (91.5% vs 87.8%). The low STS risk LVH cohort showed a significantly better survival (Fig 2, bottom). Covariate adjustment via Cox regression analysis showed that hospital volume was not a significant predictor of 0 to 3-year mortality (Fig 3, top) (risk ratio = 1.28; range, 0.84 to 1.96; $p = 0.247$). Individual surgeons and Medicaid and uninsured status did not predict survival. The multivariate predictors of increased midterm mortality are detailed in Table 4, and these included increased age, vein only grafting, preoperative renal failure, longer cardiopulmonary bypass, preoperative myocardial infarction, chronic obstructive pulmonary disease, obesity, small patient size, diabetes, cerebrovascular disease, and congestive heart failure.

Propensity Analysis

For LVH patients, the median (interquartile range) LVH propensity score (0 = HVH, 1 = LVH) was 0.36 (range, 0.22 to 0.52) compared with 0.18 (range, 0.10 to 0.28) for HVH patients. The C-statistic (area under the receiver operator characteristic curve) for the propensity score model was 0.77, indicating good discrimination power (Fig 4). The LVH versus HVH OM across propensity score cohort quintiles showed no systematic or significant differences (Fig 5). Last, Cox regression analysis of 0 to 3-year survival using hospital and propensity score as the only covariates resulted in propensity score ($p = 0.0004$) being the only predictor of mortality, whereas hospital volume (risk ratio = 1.11; $p = 0.648$) was not (Table 4) (Fig 3, bottom). Using propensity scores, we were able to match 378 of 504 LVH patients (75%) to unique HVH matches. Kaplan-Meier survival for the propensity-matched HVH and LVH sub-cohorts were similar (risk ratio = 1.07; $p = 0.29$).

Comment

We demonstrate that, when served by the same high-volume surgeon, similar CABG operative and midterm (3-year) outcomes may be achieved in low-procedure volume institutions (LVH, a suburban community hospital) and high-procedure volume institutions (HVH, an urban community hospital). For 3-year data, we found that the unadjusted 0 to 3-year Kaplan-Meier survival after CABG was significantly better for LVH (Fig 2), but these differences are eliminated by risk-adjustment (Fig

Ann Thorac Surg
2005;79:1961–9

Table 1. Demographics, Risk Factors, and Operative Data of LVH and HVH Isolated CABG Patients

Variable	HVH (n = 1,410) %, Mean ± SD	LVH (n = 504) %, Mean ± SD	*p* Value
Demographics/Risk Factors			
Age (yrs)	64 ± 11	64 ± 11	0.87
Male	70%	73%	0.17
Caucasian	90%	94%	0.008
Black	7%	1%	< 0.0001
Hispanic/other	3%	5%	0.047
Medicaid/uninsured	8%	5%	0.02
Weight (kg)	88 ± 19	91 ± 19	0.003
BMI (kg/m^2)	30.0 ± 5.7	30.6 ± 5.8	0.014
BSA (m^2)	2.04 ± 0.25	2.08 ± 0.25	0.003
Obese (BMI > 30 kg/m^2)	42.7%	48.4%	0.03
Small (BSA < 1.8 m^2)	10.8%	14.9%	0.018
Smoker	70%	61%	0.0002
Current smoker	27%	20%	0.003
Family history of CAD	63%	80%	< 0.0001
Diabetes	38.2%	33.3%	0.05
Insulin-dependent	12.3%	8.13%	0.01
Hypercholesterolemia	73%	64%	0.0002
Renal failure	4.68%	1.98%	0.008
Dialysis	1.91%	0.60%	0.04
Hypertension	83%	71%	< 0.0001
Peripheral vascular disease	16.3%	6.94%	< 0.0001
Cerebrovascular disease	15.5%	11.9%	0.05
Chronic obstructive pulmonary disease	28.5%	13.5%	< 0.0001
Myocardial infarction	64.5%	52.8%	< 0.0001
Congestive heart failure	13.4%	8.73%	0.006
Angina	86%	80%	0.005
Unstable	35.9%	44.1%	0.0012
Triple vessel disease	73.8%	83.7%	< 0.0001
Left main disease > 50%	20.6%	23.4%	0.19
Ejection fraction (%)	48 ± 11	48 ± 11	0.38
Previous CV intervention	32.1%	23.0%	0.0001
Operative Data			
Emergent	6.52%	12.5%	< 0.0001
Redo surgery	6.52%	2.98%	0.003
Surgeon 1 (n, %)	236, 17%	86, 17%	0.92
Surgeon 2 (n, %)	384, 27%	116, 23%	0.08
Surgeon 3 (n, %)	471, 33%	162, 32%	0.64
Surgeon 4 (n, %)	246, 17%	89, 18%	0.97
Surgeon 5 (n, %)	73, 5%	51, 10%	< 0.001
No. of grafts	3.37 ± 1.02	3.58 ± 1.01	0.068
Arterial	1.56 ± 0.79	1.63 ± 0.98	< 0.001
Vein	1.82 ± 0.98	1.94 ± 0.98	0.024
ITA used	91%	93.8%	< 0.0001
All arterial grafting	10.2%	3.77%	0.06
All vein grafting	4.33%	7.34%	0.59
Aortic cross-clamp (min)	55 ± 21	58 ± 22	0.002
Time on cardiopulmonary bypass (min)	87 ± 31	90 ± 31	0.024

BMI = body mass index; BSA = body surface area; CAD = coronary artery disease; CV = cardiovascular; ITA = internal thoracic artery.

0384
09/15/08

Table 2. Comparison of Isolated Coronary Artery Bypass Grafting Operative Mortality Results at LVH and HVH

Variable	High-Volume Hospital (n = 1410) n/N, %	Low-Volume Hospital (n = 504) n/N, %	p Value
Overall OM (unadjusted)	42/1,410, 2.98%	12/504, 2.38%	0.59
STS predicted mortality (%, mean)	3.59%	2.90%	< 0.001
O/E (overall)	0.83	0.82	
OM by STS Risk Category			
Low (< 2%)	7/690, 1.01%	1/294, 0.34%	0.50
Moderate (2–5%)	10/443, 2.26%	2/135, 1.48%	0.84
High (> 5%)	25/235, 10.6%	9/63, 14.3%	0.62

O/E = observed to expected ratio; OM = operative mortality; STS = The Society of Thoracic Surgeons.

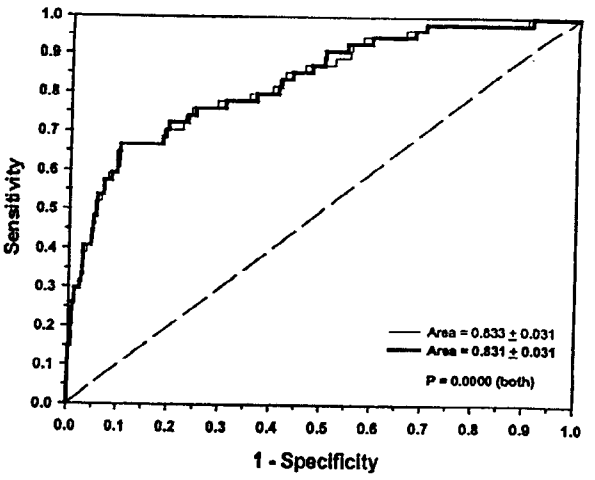


Fig 1. Receiver operator characteristic curve for predicting operative mortality for all patients as determined from logistic regression model (see Table 3) applied to all patients (thick line). *Forcing hospital (low-volume hospital = 1; high-volume hospital = 0) variable into the model did not significantly alter the model prediction power* (thin line).

3). These results were also confirmed by a non-parsimonious (ie, patient variables were included in the model irrespective of significance level) propensity score model analysis, which is less susceptible to residual confounding, or unaccounted for confounding [23, 24].

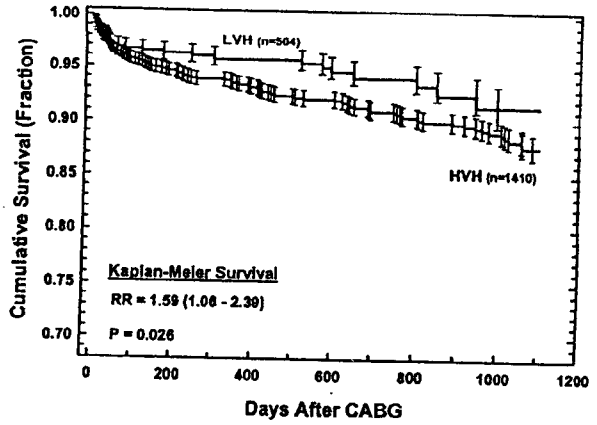
The role of hospital-procedure and surgeon-procedure volumes on CABG outcomes have been investigated by many [1–18]. With few exceptions [12, 13], studies had indicated that higher CABG surgery hospital and surgeons volumes are associated with lower mortality rates [1–10]. Consequently it was reasoned that a significant number of CABG deaths may be avoided if a policy of "regionalization" is adopted to avoid low-volume hospitals [14–18]. However, implementation of such procedure-volume guidelines may be unwarranted from a number of perspectives: (1) they equate low-volume hospitals with good outcomes to those of poorer quality of care; (2) they assume similarly higher quality of CABG care in all high-volume hospitals relative to all smaller programs; and (3) they do not, as has been proposed, appropriately account for potentially substantial surgeon-volume confounding effects [1–3]. Another concern is that a regionalization policy may cause significant disruption in the current delivery of care with thousands of patients being referred away from low-volume to high-volume hospitals. To ease this, some have recommended that such referrals be limited to high-risk patients [14], yet the appropriateness of this approach was recently challenged [2, 3].

Table 3. Predictors of Operative Mortality by Multivariate Logistic Regression Applied to All 1,914 Patients (Low-Volume Hospital and High-Volume Hospital Cohorts Combined)

Variables in the Equation	Odds Ratio	95.0% Confidence Interval	p Value
Constant	0.00		0.0000
Cardiopulmonary bypass (per 10 min increments)	1.15	1.08–1.21	0.0000
Emergency/salvage	4.45	2.03–9.76	0.0002
Age (per 10 yr increments)	1.58	1.03–1.09	0.0002
All vein grafting	3.77	1.72–8.27	0.0009
Chronic obstructive pulmonary disease	2.39	1.31–4.36	0.0047
Redo surgery	3.26	1.42–7.49	0.0052
Cerebrovascular disease	2.35	1.24–4.47	0.0090
Insulin-dependent diabetes	2.21	1.07–4.58	0.0320
Coronary endarterectomy	2.10	1.01–4.37	0.0482

Many prior studies exploring CABG volume–outcome effects relied on unadjusted (or incompletely adjusted) early or operative mortality that are easily accessible from administrative databases. Also, many of these analyses predicted worse CABG outcomes in small compared with large hospital programs [1–10]. It is noteworthy that the LVH versus HVH differences we found in unadjusted 0 to 3-year mortality (including a slightly lower [not significant] unadjusted OM in LVH patients) are contrary to these predictions. From the 1994 to 1999 national Medicare claims data, Birkmeyer and colleagues [5] showed a 1.3% absolute drop in CABG unadjusted OM from very low-volume (< 230) to very high-volume hospitals (≥ 850). Operative mortality of Medicare patients at low-volume hospitals (3.95%) and high-volume hospitals (4.08%) were similar. Hannan and colleagues [2] analyzed the clinical data from 30 New York State centers between 1997 and 1999, and they noted significantly decreased OM in high-volume compared with low-volume hospitals even after risk adjustment. Their statewide study is among the most complete analyses based on clinical data, yet only a small minority (< 3%) had their CABG done at low-volume centers due to New York State restrictions. A subsequent analysis of their data

Ann Thorac Surg
2005;79:1961–9



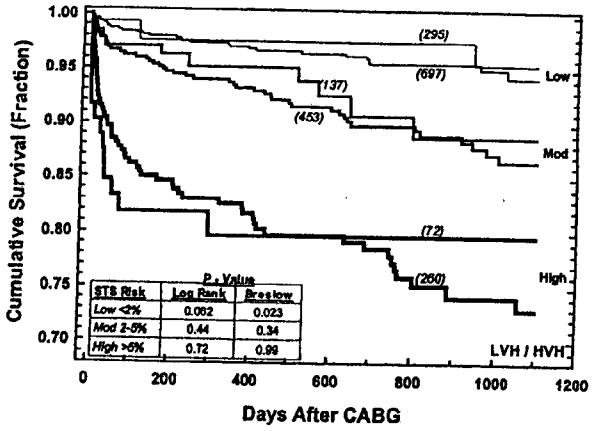
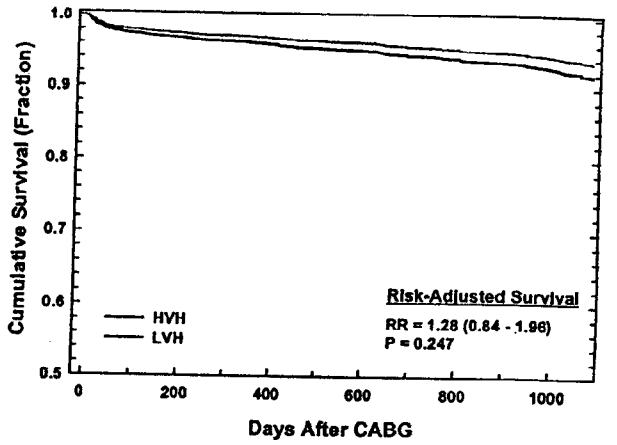


Fig 2. (Top) Comparison of cumulative unadjusted Kaplan-Meier survival for all low-volume hospital (LVH) *patients versus all high-volume hospital* (HVH) *patients. (Bottom) Comparison of unadjusted Kaplan-Meier survival for low-volume versus high-volume hospital in risk-based sub-cohorts (low-risk, moderate-risk, and high-risk) based on the latest Society of Thoracic Surgeons (STS) risk model [19]. (See Results section for details.)* (Error bars = *standard error.)* (CABG = *coronary artery bypass grafting;* RR = *risk ratio.)*



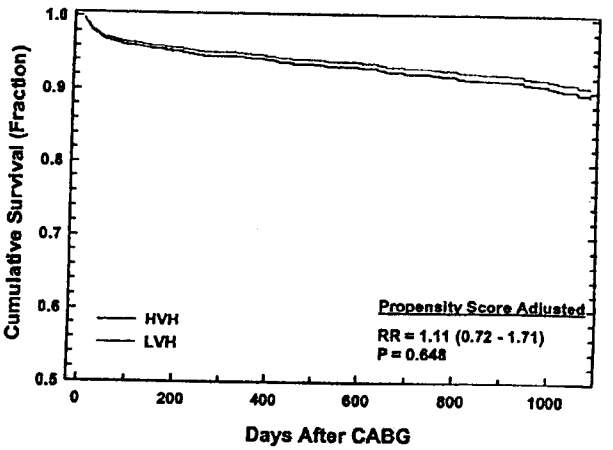


Fig 3. Risk-adjusted 0 to 3-year survival for low-volume hospital (LVH) versus high-volume hospital (HVH) derived by Cox proportional hazard regression analysis with multiple other risk factor and demographic covariates (top) and non-parsimonious propensity model score as a single covariate of hospital volume (bottom). Model predictors are shown in Table 4. (CABG = *coronary artery bypass grafting;* RR = *risk ratio.)*

showed that these volume effects were true for both low-risk as well as moderate-to-high-risk patients [3]. This was also true for our analysis (Table 2, Fig 1).

In contrast, Peterson and colleagues [1] analyzed the 2000 to 2001 isolated CABG outcomes of all participating hospitals in The STS national database. Although they reported a modest yet persistently greater operative mortality in low-volume programs, they concluded that hospital volume is not an adequate marker of quality of CABG care, and that other more clinically rigorous quality assessment instruments should be preferred [25]. They also indicated that the hospital–volume outcome effect was particularly nonsignificant in young (< 65 years) and low operative risk CABG patients. Our results do not conform to this STS analysis, despite the fact that both our institutions' data are included in their analysis.

Evidence that surgeon volume is a major confounding factor of hospital volume, CABG outcome effects were also presented in the New York State [2, 3] and The STS national [1] studies. The similar LVH and HVH outcomes we report for the same high-volume surgeon team implied that worse CABG outcomes in low-volume hospitals reported by others [1–10] may reflect low surgeon volume rather than hospital volume effects. Consequently, low-volume programs served by low-volume versus high-volume surgeons may be associated with significantly different outcomes.

As described in the Methods section, the same surgeon team also performed cardiac surgery at a third low-CABG volume institution (355 CABG for 2001 to 2003). This data was not included in the primary analysis to avoid potential confounding factors. First, 90% of all CABG procedures were performed by 2 of 5 surgeons (Table 1). Second, at this hospital, an independent perfusion team was utilized at this site, and nearly 35% of the

0386
09/15/08

Table 4. Predictors of Midterm (0–3 years) Mortality by Cox Regression Analysis Applied to All 1,914 Patients (Low-Volume Hospital and High-Volume Hospital Cohorts Combined)

Model/Variable	Hazard Ratio (95% Confidence Interval)	*p* Value
Unadjusted		
Hospital (HVH/LVH = 1/0)	1.59 (1.06–2.39)	0.0264
Covariate adjusted		
Age (10-yr increase)	1.54 (1.36–1.72)	0.0000
Vein only grafts	3.16 (2.03–4.92)	0.0000
Renal failure	3.01 (1.86–4.87)	0.0000
Time on bypass (10 min increase)	1.09 (1.05–1.13)	0.0000
History of myocardial infarction	2.14 (1.43–3.20)	0.0002
Chronic lung disease	1.74 (1.24–2.44)	0.0013
Obese		0.0348
Mild (BMI = 30–35 kg/m^2)	1.48 (1.01–2.18)	0.0449
Moderate (BMI = 35–40 kg/m^2)	1.35 (0.75–2.44)	0.3188
Severe (BMI > 40 kg/m^2)	2.37 (1.24–4.53)	0.0088
Small Size		0.0274
Small (BSA = 1.6–1.8 m^2)	1.67 (1.09–2.55)	0.0191
Very small (BSA < 1.6 m−)	1.84 (0.95–3.59)	0.0720
Diabetes	1.50 (1.08–2.08)	0.0164
Cerebrovascular disease	1.52 (1.06–2.18)	0.0224
Congestive heart failure	1.54 (1.06–2.23)	0.0238
Hospital (HVH/LVH = 1/0)	1.28 (0.84–1.96)	0.2466
Propensity adjusted		
Hospital (HVH/LVH = 1/0)	1.11 (0.72–1.71)	0.6476
Propensity score (0.1 increase)	0.12 (0.04–0.39)	0.0004

Covariate predictors were arranged by decreasing statistical significance.

BMI = body mass index; BSA = body surface area; HVH = high-volume hospital; LVH = low-volume hospital.

isolated CABG cases were done off-pump compared with about 5% at LVH and HVH. Third, nursing, anesthesia, and intensive care staffs were shared with other services. Last, the teaching aspect of this institution led to greater involvement of physicians from other services as well as greater input of residents and fellows in patient care. Importantly, despite these differences, the unadjusted OM (2.8%; 10 of 355) and observed-to-expected ratio (0.77) were similar to that of LVH and HVH (Table 2). These results at an even smaller and distinctly different cardiac surgery program underscore our primary result that institutional volume may not be an accurate marker of CABG quality, and argue in favor of surgeon experience being the more critical factor.

Limitations of the study include the fact that our practice is representative of only a subset of current practice paradigms in which the same surgeon team is entirely responsible for cardiac surgery at multiple independent hospitals including both low-volume and high-volume programs. Although this eliminated surgeon-volume confounding effects, it also limits the general applicability of the findings. The described LVH and HVH programs are independent institutions with signif-

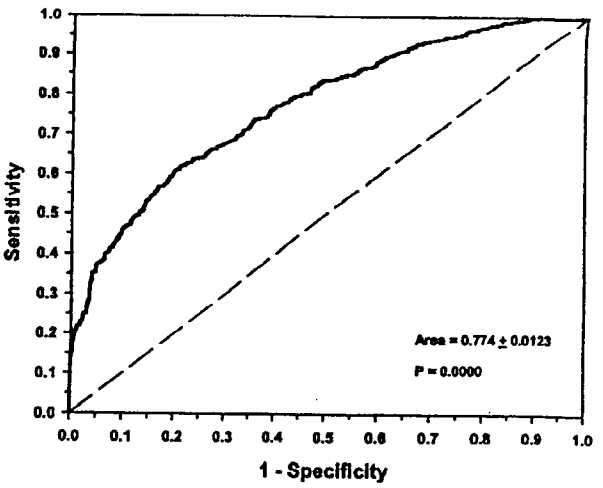


Fig 4. Receiver operator characteristic curve of low-volume hospital (LVH) propensity score as a predictor of LVH actual patients (high-volume hospital [HVH] cohort: 0.204 ± 0.138; LVH cohort: 0.431 ± 0.274; p < 0.0001). The propensity score is based on a non-parsimonious logistic regression model utilizing the variables listed in Table 1. The area ± standard error under the receiver operator characteristic curve was 0.774 ± 0.0123 (p < 0.0001) indicating good discrimination.

icant differences as well as important similarities that may contribute to outcomes. Briefly the HVH program is long-established (30 years) at an urban hospital and meets the high-volume Leapfrog Group criteria, whereas the LVH is a smaller suburban low-volume community hospital with roughly one third the procedure volume. Both hospitals have committed substantial resources including dedicated personnel, cardiovascular anesthesia, and operating rooms, as well as intensive care and step down units. Nursing and surgical assistant teams were similarly trained with equivalent operational guidelines.

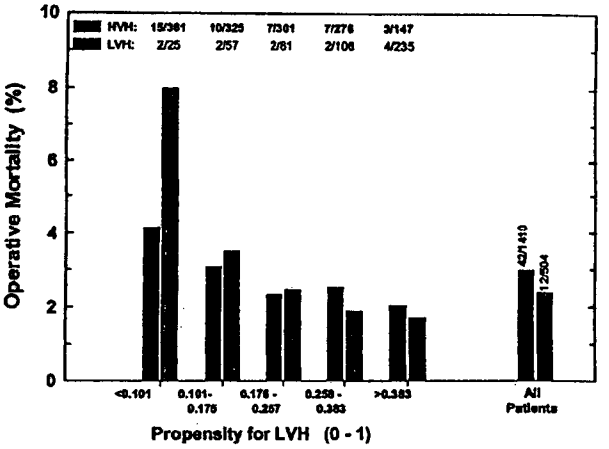


Fig 5. Comparison of low-volume hospital (LVH) versus high-volume hospital (HVH) unadjusted operative mortality in propensity score quintile groups. Overall operative mortality comparisons were shown for reference.

Yet their experience is distinct with about 50% of the nursing staff working at both hospitals. Surgical assistant overlap is minimal. The same perfusion team conducted all cardiopulmonary bypass duties at both institutions. There is no overlap in anesthesia.

The scope of this study and the similar procedure volumes among the surgeon team members do not allow for a meaningful direct assessment of surgeon volume effects. Annual surgeon volume, which was controlled for in our analysis, is only one measure of surgeon experience. Indeed, the question of whether the cumulative surgeon volume occurring over many years is a more appropriate volume measure, or at least should be concomitantly considered, was not addressed here or in any other study. Accordingly, future analyses should attempt to address the following question: Is annual surgeon volume equally important in determining quality of care for surgeons with many years of experience versus less experienced surgeons? Our study is not designed, nor sufficiently powered to address this question; all surgeons had comparable annual volumes.

In summary, when the same surgical team applies similar patient care standards and critical pathways, and emphasizes a team approach to cardiac surgery care, it is possible to achieve similar operative and midterm CABG outcomes at independent low-volume or high-volume cardiac surgery programs. Our analysis emphasized the importance of appropriate risk adjustments if comparisons are to be meaningful, which is only possible through detailed clinical databases [1, 25–28]. In conclusion, we find that hospital-volume and surgeon-volume effects are interdependent, which suggests that CABG outcomes are likely to be distinctly different for low-volume hospitals served by low-volume surgeons as opposed to high-volume surgeons. Therefore, hospital CABG volume per se should not be solely used as a marker of surgical quality. Instead, outcome quality markers should rely on thorough risk-adjustment, including surgeon volume factors. An analysis of CABG outcomes for all low-volume hospitals participating in The STS national database that includes annual (and possibly cumulative) surgeon volume as a covariable is warranted to unequivocally address this contention.

This research was supported by Saint Vincent Mercy Medical Center (Toledo, OH) institutional and departmental funds.

References

1. Peterson ED, Coombs LP, DeLong ER, Haan CK, Ferguson TB. Procedural volume as a marker of quality for CABG surgery. JAMA 2004;291(2):195–201.
2. Hannan EL, Wu C, Ryan TJ, et al. Do hospitals and surgeons with higher coronary artery bypass graft surgery volumes still have lower risk-adjusted mortality rates? Circulation 2003;108:795–801.
3. Wu C, Hannan EL, Ryan TJ, Bennett E, et al. Is the impact of hospital and surgeon volumes on the in-hospital mortality rate for coronary artery bypass graft surgery limited to patients at high risk? Circulation 2004;110(7):784–9.
4. Goodney PP, Lucas FL, Birkmeyer JD. Should volume standards for cardiovascular surgery focus only on high-risk patients? Circulation 2003;107:384–7.
5. Birkmeyer JD, Siewers AE, Finlayson EVA, et al. Hospital volume and surgical mortality in the United States. N Engl J Med 2002;346:1128–37.
6. Birkmeyer JD, Finlayson EV, Birkmeyer CM. Volume standards for high-risk surgical procedures: potential benefits of the Leapfrog initiative. Surgery 2001;130:415–22.
7. Daley J. Invited commentary: quality of care and the volume-outcome relationship-what's next for surgery? Surgery 2002;131:16–8.
8. Hannan EL, Siu AL, Kumar D, et al. The decline in coronary artery bypass graft surgery mortality in New York State: the role of surgeon volume. JAMA 1995;273:209–13.
9. Hannan EL, O'Donnell JF, Kilburn H Jr, et al. Investigation of the relationship between volume and mortality for surgical procedures performed in New York State hospitals. JAMA 1989;262:503–10.
10. Showstack JA, Rosenfeld KE, Garnick DW, et al. Association of volume with outcome of coronary artery bypass graft surgery: scheduled vs nonscheduled operations. JAMA 1987; 257:785–9.
11. Leapfrog Group. Evidence-based hospital referral. Washington, DC: Leapfrog Group. Available at: http://www.leapfroggroup.org/FactSheets/EHR_FactSheet.pdf. Accessed September, 11, 2004.
12. Sollano JA, Gelijns AC, Moskowitz AJ, et al. Volume-outcome relationships in cardiovascular operations: New York State, 1990-1995. J Thorac Cardiovasc Surg 1999;117:419–28.
13. Shroyer AL, Marshall G, Warner BA, et al. No continuous relationship between Veterans Affairs hospital coronary artery bypass grafting surgical volume and operative mortality. Ann Thorac Surg 1996;61:17–20.
14. Nallamothu BK, Saint S, Ramsey SD, et al. The role of hospital volume in coronary artery bypass grafting: is more always better? J Am Coll Cardiol 2001;38:1923–30.
15. Dudley RA, Johansen KL, Brand R, et al. Selective referral to high-volume hospitals: estimating potentially avoidable deaths. JAMA 2000;283:1159–66.
16. Luft HS. Better for whom? Policy implications of acting on the relation between volume and outcome in coronary artery bypass grafting. J Am Coll Cardiol 2001;38:1931–3.
17. Luft HS, Bunker JP, Enthoven AC. Should operations be regionalized? The empirical relation between surgical volume and mortality. N Engl J Med 1979;301:1364–9.
18. Maerki SC, Luft HS, Hunt SS. Selecting categories of patients for regionalization: implications of the relationship between volume and outcome. Med Care 1986;24:148–58.
19. Shroyer AL, Coombs LP, Peterson ED, et al. The Society of Thoracic Surgeons: 30-day operative mortality and morbidity risk models. Ann Thorac Surg 2003;75:1856–65.
20. Kaplan EL, Meier P. Nonparametric estimation from incomplete observations. J Am Stat Assoc. 1958;53:457–81.
21. Cox D. Regression models and life tables. J R Stat Soc B. 1972;34:187–220.
22. Cain KC, Lange NT. Approximate case influence for the proportional hazards regression model with censored data. Biometrics 1984;40:493–9.
23. Rubin DB. Estimating causal effects from large data sets using propensity scores. Ann Intern Med 1997;127:757–63.
24. Blackstone EH. Comparing apples and oranges. J Thorac Cardiovasc Surg. 2002;123:8–15.
25. Ferguson TB, Peterson ED, Coombs LP, et al. for The Society of Thoracic Surgeons and the STS NCD. Use of continuous quality improvement to increase use of process measures in patients undergoing coronary artery bypass graft surgery: a randomized controlled trial. JAMA 2003;290:49–56.
26. Edwards FH, Clark RE, Schwartz M. Practical considerations in the management of large multi-institutional databases. Ann Thorac Surg 1994;58:1841–4.
27. Ferguson TB Jr, Dziuban SW Jr, Edwards FH, et al. Commit-

0388
09/15/08

tee to establish a national database in cardiothoracic surgery, The Society of Thoracic Surgeons. The STS National Database: current changes and challenges for the new millennium. Ann Thorac Surg 2000;69:680–91.

28. Roques F, Nashef SAM, Michel P, et al. Risk factors and outcome in European cardiac surgery: analysis of the EuroSCORE multinational database of 19030 patients. Eur J Cardiothorac Surg 1999;15:816–23.

INVITED COMMENTARY

In this article, Zacharias and associates report a review of coronary bypass surgery experiences in a single geographic area in which a group of five surgeons operated at four different hospital systems. When the risk-adjusted survival outcomes from three of these hospitals of varying surgical volumes were compared, the authors concluded that hospital and surgeon volumes were not predictors of mortality.

This is an extremely important and timely contribution, as the authors address a statistical database controversy relating to hierarchical modeling. With this type of statistical approach, a model is developed in which the impact of the experience and quality of the surgeon and the experience and quality of the hospital setting are interrelated. The decision to apply or not apply this type of modeling has been a raging issue within the statistical and epidemiological and public health arenas. This type of distinction is important and very germane to reporting results in cardiothoracic surgery. Simply stated, with this type of modeling, the impact of a given surgeon's skill and the outcome parameters related to the hospital staff, systems, and resources are separated with the magic of a hierarchical or nested modeling technique.

Many reports have included dozens of hospitals and hundreds of surgeons, either validating this author's conclusion or reaching the opposite conclusion regarding the importance of surgeon and hospital-volume interaction. Many carefully done non-hierarchical prior studies have shown that poorly performing low-volume hospitals and surgeons achieve poor results and that high-volume hospitals and surgeons generally obtain better results. The questions arise as to outcome when a low volume, less skilled surgeon practices in either a high-volume excellent hospital system or a low-volume less excellent hospital. The opposite situation, when a high-volume excellent quality surgeon practices in either a high-volume excellent hospital system or a low-volume less excellent hospital is also problematic. Simply stated, is it possible to separate the surgical skill and experience from the staff-related and system-related parameters that determine surgical mortality and morbidity by using a risk-adjusted statistical model.

So, why should we care? Why is this so timely and deserving of the attention of all American heart surgeons? The United States Department of Health and Human Services and its health care major payer, The Centers for Medicare and Medicaid Services (CMS), the agency which guides national Medicare and Medicaid reimbursement and sets the stage for many commercial and managed care payers, has widely "discussed" that they will pursue a strategy known as "pay for performance." As such, the health care reimbursement dollar will be adjusted such that hospital and physician providers achieving statistically better outcomes, as defined by The National Quality Forum (NQF) and CMS standards, will be financially incentivized. When working within a budget-neutral reimbursement environment, those surgeons and hospitals achieving poorer outcomes, again as defined by CMS and NQF standards, will be paid less.

Clearly, hospitals and physicians have always wanted their outcomes to be optimal, to provide the highest quality patient care while serving all sectors of the payer mix. However, in an era of falling reimbursement and progressively tighter health care dollars, how these outcomes are calculated and how the hospital and physician components come together will likely come under great focus.

What should we do? Understanding is an important first step. To be sure that you and your health care systems understand that the data collection and reporting mechanisms are important and work to make them accurate and timely. To press for a robust data validation and auditing system so that all start from a level playing field of data accuracy. To explore multiple types of statistical models based on the outcome parameters of more than simply perioperative death, but long-term survival, postoperative events, and quality of life. Finally, to work with your health care system to understand those outcome predictors that may be unique to your specific working environment, and truly optimize care aimed at quality and patient safety. After all, eliminating outcome differences based upon volume, hospital resources, and surgical care is what we are all about!

Jeffrey P. Gold, MD

The Medical University of Ohio at Toledo
College of Medicine
Raymon H. Mulford Library
3045 Arlington Ave
Toledo, OH 43614-5805
e-mail: jgold@mco.edu

© 2005 by The Society of Thoracic Surgeons
Published by Elsevier Inc

0003-4975/05/$30.00
doi:10.1016/j.athoracsur.2005.02.029

Procedural Volume as a Marker of Quality for CABG Surgery

Eric D. Peterson, MD, MPH
Laura P. Coombs, PhD
Elizabeth R. DeLong, PhD
Constance K. Haan, MD
T. Bruce Ferguson, MD

Context There have been recent calls for using hospital procedural volume as a quality indicator for coronary artery bypass graft (CABG) surgery, but further research into analysis and policy implication is needed before hospital procedural volume is accepted as a standard quality metric.

Objective To examine the contemporary association between hospital CABG procedure volume and outcome in a large national clinical database.

Design, Setting, and Participants Observational analysis of 267 089 isolated CABG procedures performed at 439 US hospitals participating in the Society of Thoracic Surgeons National Cardiac Database between January 1, 2000, and December 31, 2001.

Main Outcome Measure Association between hospital CABG procedural volume and all-cause operative mortality (in-hospital or 30-day, whichever was longer).

Results The median (interquartile range) annual hospital-isolated CABG volume was 253 (165-417) procedures, with 82% of centers performing fewer than 500 procedures per year. The overall operative mortality was 2.66%. After adjusting for patient risk and clustering effects, rates of operative mortality decreased with increasing hospital CABG volume (0.07% for every 100 additional CABG procedures; adjusted odds ratio [OR], 0.98; 95% confidence interval [CI], 0.96-0.99; $P=.004$). While the association between volume and outcome was statistically significant overall, this association was not observed in patients younger than 65 years or in those at low operative risk and was confounded by surgeon volume. The ability of hospital volume to discriminate those centers with significantly better or worse mortality was limited due to the wide variability in risk-adjusted mortality among hospitals with similar volume. Closure of up to 100 of the lowest-volume centers (ie, those performing ≤150 CABG procedures/year) was estimated to avert fewer than 50 of 7110 (<1% of total) CABG-related deaths.

Conclusion In contemporary practice, hospital procedural volume is only modestly associated with CABG outcomes and therefore may not be an adequate quality metric for CABG surgery.

JAMA. 2004;291:195-201 www.jama.com

THE ASSOCIATION BETWEEN HOSpitals' coronary artery bypass graft (CABG) surgery volume and outcome has been the subject of multiple investigations.[1-17] Based on these studies, the Center for Medicare & Medicaid Services (CMS) and the Leapfrog Group have proposed using hospital volume as an indicator of CABG quality.[18-20] Prior studies of the association between volume and outcome, however, generally have been based on administrative data sources, have reflected selected patient populations, and often have not adequately accounted for patient case mix, patient clustering, and other methodological concerns. Before hospital surgery volume is accepted as a standard quality metric, further research into issues related to both analysis and policy implication is warranted.

We undertook a contemporary examination of the association between hospital CABG procedural volume and outcome using clinical data available from the Society of Thoracic Surgeons (STS) National Cardiac Database. Specifically, we considered whether hospital CABG volume was associated with operative mortality after accounting for patient case mix. Second, we examined the extent to which patient clustering within centers and site variance issues affected this association. Third, we determined how the association varied as a function of patient age and predicted surgical risk. Fourth, we determined whether the association between hospital volume and outcome was influenced by individual surgeon volume. Finally, we investigated the potential health policy implications of using hospital volume as a quality indicator. This included determining the ability of hospital volume to discriminate high-mortality outliers, as well as investigating the potential number of lives saved if low-volume centers were systematically closed.

For editorial comment see p 246.

METHODS

Data Source

The STS National Cardiac Database was established in 1989 to report surgical outcomes following cardiothoracic surgical procedures.[21-23] The database cur-

Author Affiliations: Outcomes Research and Assessment Group, Duke Clinical Research Institute, Durham, NC (Drs Peterson, Coombs, and DeLong); University of Florida Health Science Center, Jacksonville (Dr Haan); LSU Health Sciences Center, New Orleans, La (Dr Ferguson).
Corresponding Author and Reprints: Eric D. Peterson, MD, MPH, Outcomes Research and Assessment Group, Duke Clinical Research Institute, Box 17969, Durham, NC 27715 (e-mail: Peter016@mc.duke.edu).

©2004 American Medical Association. All rights reserved.

Downloaded from www.jama.com at St Mary's Hospital, on May 22, 2007

0390
09/15/08

rently captures clinical information from nearly two thirds of all US bypass procedures from more than half of all centers performing adult cardiac surgery. Sites enter patient data using uniform definitions (available online at http://www.sts.org) and certified software systems. This information is sent semiannually to the STS Data Warehouse and Analysis Center at the Duke Clinical Research Institute. There, a series of data quality checks are performed before a site's data are aggregated into the national sample. While participation in the STS database is voluntary, data completeness is high, with overall preoperative risk factors missing in fewer than 5% of submitted cases.[24] The accuracy of submitted data has further been confirmed in independent comparison of hospital CABG surgery volume and mortality rates reported to the STS vs those reported to the CMS.[24]

Patient Population

We examined isolated CABG surgery procedures, excluding those combined with valve or other major surgical interventions, performed between January 1, 2000, and December 31, 2001, at hospitals reporting to the STS. We excluded 12 centers (2.7% of total STS centers) that reported fewer than 30 CABG procedures in a year and that had evidence for incomplete reporting. Inclusion of the 223 cases from these 12 centers had no measurable impact on the study's measured association between CABG procedural volume and outcome.

Statistical Analysis

Our primary outcome measure was all-cause operative mortality, defined as in-hospital or 30-day mortality, whichever was longer. Major morbidity was defined as any of 5 postoperative in-hospital complications: stroke, reoperation for any reason, need for mechanical ventilation for more than 24 hours following surgery, renal failure, or deep sternal wound infection.[25]

Hospital-isolated CABG annual case volume was averaged over a 2-year period (2000 and 2001) to increase its stability. In the overall analysis, volume was considered to be a continuous variable. For display purposes, patient and hospital characteristics and unadjusted outcomes were categorized by annual hospital procedural volume (≤150, 151 to 300, 301 to 450, and >450). These break points were chosen to form 4 fairly equal-sized hospital samples while maintaining similar volume differences among the groups.

The effect of hospital volume on unadjusted outcomes was tested using standard logistic regression. Expected mortality rates for patients were calculated using a logistic regression model that included 28 previously identified preoperative risk factors[25] and year of surgery. The C-index for this model in the study population was 0.78. Risk-adjusted mortality rates for each hospital were calculated by dividing the observed mortality rate by the expected mortality rate at the hospital and multiplying by the overall (national) bypass mortality rate. Additionally, hierarchical logistic regression was used to account for patient clustering within centers (SAS Macro GLIMMIX).[26] These analyses included clinical risk factors, procedure year, and hospital procedural volume as a fixed effect and included random intercepts for sites. To supplement this analysis, a hospital-level weighted least-squares regression of risk-adjusted mortality on volume was used to correct for nonconstant variance associated with hospital sample size, as reflected by hospital volume.[27] This method assigned greater weight to observations with smaller variance.

Because many previous studies have focused on Medicare populations (ie, those with patients aged ≥65 years) while others have specifically investigated the effect of hospital volume as a function of patient risk,[13,15] we also tested for interactions between hospital volume and patient age (<65 years and ≥65 years) and expected risk for patients in our hierarchical analyses. We also used our hierarchical analysis to test the hospital volume × surgeon volume interaction. While the STS database does not contain the names of individual surgeons, it does contain an encrypted primary surgeon identifier that can be aggregated within and among hospital locations to approximate annual surgeon volume.

Finally, we also examined health policy implications of hospital volume. We first determined the degree to which hospital volume identified "mortality outlier" hospitals as determined by their significance in a hierarchical logistic regression model containing patient characteristics but not volume. Specifically, we used a hospital-level standard logistic regression model to test whether hospital procedural volume could discriminate mortality outliers. Second, we assessed the potential number of lives saved from closure of either the lowest hospital volume quartile in the STS database (≤150 CABG procedures per year), or alternatively using the Leapfrog-proposed referral criteria of fewer than 500 procedures per year.[28] In these calculations, we assumed that all these patients could safely be transferred from low- to higher-volume centers without risk and that the patients would assume the expected risk predicted for the higher-volume site once there. All statistical analyses were performed using SAS release 8.2 (SAS Institute Inc, Cary, NC), with $P<.05$ considered statistically significant.

RESULTS

Between 2000 and 2001, 267089 isolated CABG procedures were performed at 439 STS hospitals. Average hospital procedural volumes ranged from 39 to 1754 isolated CABG procedures (median, 253; interquartile range, 165-417). Eighteen percent of STS centers performed 500 or more procedures per year.

TABLE 1 displays patient and hospital characteristics as a function of hospital volume. Compared with higher-volume centers, lowest-volume hospitals (ie, those performing ≤150 procedures per year [n=98]) were more likely to operate on nonwhite patients, as well as on patients with chronic lung disease, prior stroke, recent myocardial infarction, left main artery disease, and

©2004 American Medical Association. All rights reserved.

Downloaded from www.jama.com at St Mary's Hospital, on May 22, 2007

0391
09/15/08

emergent or salvage settings. Based on preoperative risk factors, the average expected surgical mortality risk ranged from 3.0% for hospitals performing 150 cases or fewer to 2.6% for those performing more than 450 cases. The Pacific and West South Central regions tended to have more low-volume hospitals per region, while New England, and the Mid-Atlantic, South Atlantic, and East South Central regions had more high-volume centers.

Hospital Volume and Outcomes

Overall, there were 7110 deaths (2.66%). Overall unadjusted mortality declined from 3.5% for hospitals in the lowest-volume group to 2.4% for hospitals in the highest-volume group ($P<.001$ for trend) (TABLE 2). Rates of prolonged ventilation and renal failure also declined significantly ($P<.001$ for both) with increasing hospital procedural volume. Reoperation, stroke, and rates of deep sternal wound infection were generally constant across volume group, as was postoperative length of stay (median, 5 days for all volume groups).

After adjusting for preoperative clinical risk, year of surgery, and patient clustering within centers, hospital mortality declined significantly as a function of hospital procedural volume, ranging from 3.1% for centers performing 150 or fewer cases per year to 2.4% for those performing more than 450 cases per year. When looking at hospital volume as a continuous variable, absolute rates of mortality decreased by 0.07% for every 100 additional CABG cases per year (adjusted odds ratio [OR], 0.98; 95% confidence interval [CI], 0.96-0.99; $P=.004$).

Although the relationship between hospital procedural volume and risk-adjusted mortality was statistically significant, there was wide variance in results observed among individual centers, particularly in the low-volume category (FIGURE 1). While part of this variance is inherent, due to sample-size effects, the association between hospital volume and outcome persisted after correcting for nonconstant variance among sites by means of weighted least squares ($P=.001$).

Effect of Volume on Outcome in Patient Subgroups

The absolute effect of hospital volume was more apparent in elderly patients (FIGURE 2). In patients aged 65 years and older, there was a 1.0% difference in observed mortality rates between low- (≤150) and high-volume (>450) hospitals that was only slightly diminished after adjustment for risk ($P<.001$). In contrast, among those younger than 65 years, observed mortality declined by only 0.3% and was insignificant after adjustment for risk ($P=.53$).

Similarly, patients with intermediate and high expected preoperative risk demonstrated consistently lower mortality when treated at higher-volume centers (TABLE 3). In contrast, among those with expected operative risk of less than 1.5%, there was no volume effect in either observed or adjusted mortality rates. A formal test for volume × patient risk interaction in the logistic regression model was significant ($P=.002$).

Surgeon and Hospital Volume

TABLE 4 demonstrates the effect of hospital and surgeon volume on risk-adjusted operative mortality rates. While there was colinearity between

Table 1. Patient and Hospital Characteristics*

Characteristic	Hospital CABG Volume, Procedures per Year			
	≤150	151-300	301-450	>450
No. of patients	16929	60064	61720	128376
No. of hospitals	98	151	91	99
Demographic				
Age, median (IQR), y	66.0 (57-73)	66.0 (57-74)	66.0 (58-74)	66.0 (57-74)
Nonwhite race	19.6	12.7	16.0	10.7
Men	71.3	72.1	70.7	71.3
Clinical				
Chronic lung disease	20.7	18.2	15.6	16.3
Prior stroke	7.6	6.6	7.3	6.6
Hypertension	71.8	71.2	72.3	71.9
Diabetes	29.7	28.1	28.6	27.9
Prior bypass	7.3	8.1	8.2	7.7
LVEF, median (IQR)	50.0 (43-50)	50.0 (45-50)	50.0 (40-50)	50.0 (45-50)
Left main artery disease >50%	26.0	23.2	26.2	21.2
3-Vessel disease	76.9	75.3	75.2	75.3
NYHA class IV	18.8	19.6	20.8	21.6
Myocardial infarction <21 d	25.7	25.4	24.9	24.4
Emergent/salvage	5.42	4.6	4.2	3.8
Preoperative risk, %†	3.0	2.7	2.8	2.6
Hospital				
Teaching hospital	21.7	11.5	25.0	39.0
Region				
New England	1.1	0.7	3.3	6.0
Mid-Atlantic	4.4	4.7	12.0	14.0
South Atlantic	12.0	10.1	15.2	22.0
East North Central	23.9	27.0	21.7	25.0
East South Central	5.4	4.7	9.8	10.0
West North Central	10.9	18.2	12.0	8.0
West South Central	13.0	9.5	6.5	1.0
Mountain	8.7	9.5	4.4	3.0
Pacific	20.7	15.5	15.2	11.0

Abbreviations: CABG, coronary artery bypass graft; IQR, interquartile range; LVEF, left ventricular ejection fraction; NYHA, New York Heart Association.
*All values are percentages unless otherwise indicated.
†Based on Society of Thoracic Surgeons Mortality model.[25]

©2004 American Medical Association. All rights reserved.

Downloaded from www.jama.com at St Mary's Hospital, on May 22, 2007

0392
09/15/08

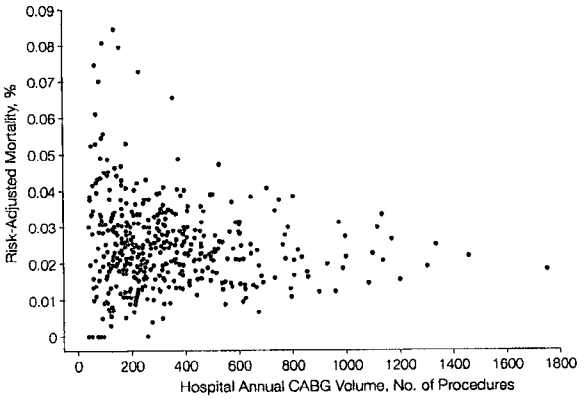
these factors, both surgeon volume and hospital volume were significant predictors of mortality. Combined, the highest mortality rates (3.3%) were observed when patients were treated by low-volume surgeons at low-volume hospitals and best results (2.4%) were obtained by high-volume surgeons at high-volume hospitals.

Table 2. Unadjusted Outcomes

Outcome	Hospital CABG Volume, Procedures per Year			
	≤150	151-300	301-450	>450
Operative mortality*	3.5	2.7	2.9	2.4
Reoperation	5.6	4.8	5.6	5.2
Renal failure*†	3.9	3.6	3.8	3.5
Prolonged ventilation*†	8.4	7.2	7.3	6.0
Stroke	1.5	1.6	1.7	1.6
Sternal wound infection	0.7	0.6	0.6	0.6
Mortality and major morbidity*†	15.9	13.8	14.2	12.9

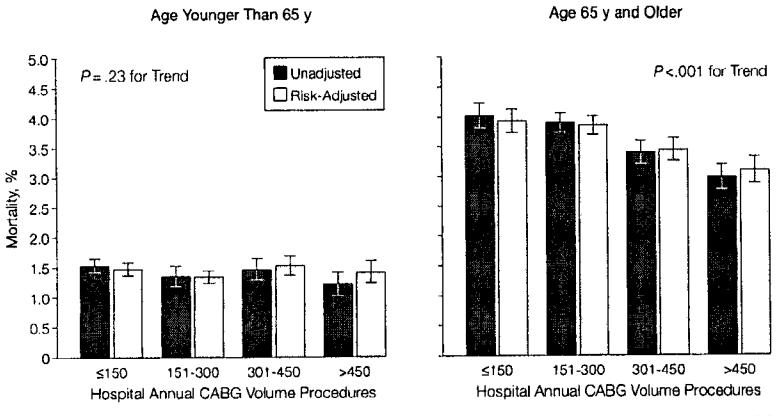
Abbreviation: CABG, coronary artery bypass graft.
*$P<.001$ for continuous trend from standard logistic regression between hospital volume and outcome.
†As defined in Society of Thoracic Surgeons model.[25]

Figure 1. Risk-Adjusted Hospital Mortality Rates by CABG Procedural Volume



Each dot represents a hospital reporting data to the Society of Thoracic Surgeons National Cardiac Database. CABG indicates coronary artery bypass graft.

Figure 2. Unadjusted and Risk-Adjusted Mortality by Patient Age Group



Error bars indicate 95% confidence intervals. CABG indicates coronary artery bypass graft.

Policy Implications

The use of hospital procedural volume was of limited value in discriminating those hospitals with significantly better or worse risk-adjusted mortality outcomes ("outlier centers") (C-index, 0.60 and 0.67, respectively). In fact, as procedural volume dropped, a hospital's likelihood of being singled out as a center with significantly better or worse outcomes declined due to increasing variance associated with the measurement of end point at low-volume sites.

An upper boundary for the potential numbers of lives saved by closure of low-volume CABG centers was also estimated. If 25% of STS hospitals with the lowest annual CABG volume (≤150 procedures) were closed and their patients undergoing CABG surgery were safely transferred to another, higher-volume center, then approximately 45 CABG procedural deaths could be averted annually among all 439 STS centers. If the criteria for selective referral were based on Leapfrog's referral criteria of 500 cases per year,[18] 82% of STS centers would close and the high-end estimate of avertable CABG deaths would be 212 per year.

Validity of STS Data

In order to determine the validity of STS data for patients aged 65 years and older, we performed a systematic comparison with data supplied to the CMS. There were 415 centers that released data to the STS and the CMS; more cases (96330 vs 78788) were reported to the STS, likely due to nonreporting of health maintenance organization and managed care cases to the CMS. The reported mortality rates were 4.50% and 4.48%, respectively. Reported mortality rates among centers that performed 150 or fewer procedures per year were 5.06% and 4.91% according to the STS and the CMS, respectively, while corresponding rates for centers that performed more than 150 cases per year were 4.39% and 4.35%. Thus, we

©2004 American Medical Association. All rights reserved.

Downloaded from www.jama.com at St Mary's Hospital, on May 22, 2007

0393
09/15/08

Table 3. Association Between Hospital CABG Volume and Mortality, by Expected Risk

Expected Risk, %*	Hospital CABG Volume, Procedures per Year							
	Unadjusted Mortality Rate, % (95% CI)				Adjusted Mortality Rate, % (95% CI)†			
	≤150	151-300	301-450	>450	≤150	151-300	301-450	>450
<1.5	0.9 (0.7-1.1)	0.6 (0.5-0.7)	0.8 (0.7-0.9)	0.7 (0.6-0.8)	0.7 (0.5-0.9)	0.5 (0.4-0.6)	0.6 (0.5-0.7)	0.5 (0.4-0.6)
1.5-3.0	3.0 (2.5-3.5)	2.4 (2.2-2.6)	2.3 (2.1-2.5)	2.0 (1.9-2.1)	3.1 (2.6-3.6)	2.5 (2.3-2.7)	2.4 (2.2-2.6)	2.1 (1.9-2.3)
3.1-5.0	5.6 (4.6-6.6)	4.6 (4.1-5.1)	4.8 (4.3-5.3)	3.8 (3.5-4.1)	6.3 (5.3-7.3)	5.2 (4.7-5.7)	5.4 (4.9-5.9)	4.2 (3.9-4.5)
>5.0	12.3 (10.9-13.7)	10.8 (10.1-11.5)	11.1 (10.4-11.8)	10.1 (9.6-10.6)	11.3 (10.0-12.6)	10.7 (10.0-11.4)	10.9 (10.2-11.6)	10.3 (9.8-10.8)

Abbreviations: CABG, coronary artery bypass graft; CI, confidence interval.
*Based on Society of Thoracic Surgeons Mortality model.[25]
†Results further adjusted with risk group to ensure constant risk profiles.

doubt that our results were biased by underreporting or selective reporting to the STS.

We also systematically compared mortality rates among participants and nonparticipants in the STS. Mortality rates in participating sites were lower (4.5% vs 5.2%), but the differential mortality between lower-volume sites (≤150 CABG procedures/year) and higher-volume sites (≥151 CABG procedures/year) was larger in the STS sites than in nonparticipating sites (0.6% vs 0.1%, respectively). Thus, the association between volume and outcome may have been overestimated by focusing on STS sites.

COMMENT

The recent interest in using hospital procedure volume as a quality indicator for CABG surgery is understandable. This structural characteristic is readily available via administrative claims data, requires no complex adjustment techniques, is easily interpretable by the lay public, and is consistent with the common belief that "practice makes perfect."[20] However, our study indicates that hospital volume has only a modest association with risk-adjusted mortality and has important limitations as a quality metric for CABG surgery.

To date, there have been multiple analyses of volume and outcome for CABG surgery. Most[1-15] but not all[16,17] of these concluded that hospital procedural volume was associated with lower rates of hospital mortality. The largest analysis of the association between volume and outcome was conducted by Birkmeyer et al.[14] Using national Medicare claims data from 1994 to 1999, they found a 1.3% absolute difference in unadjusted rates of mortality between the lowest to highest quartiles of hospital volume.[14] While their study was geographically inclusive, it was limited to patients aged 65 years or older, could not adequately adjust data for potential differences in case mix, and did not control for patient clustering within sites or for site variance issues.

Table 4. Risk-Adjusted Mortality, by Hospital and Surgeon Volume*

Surgeon CABG Volume, Procedures per Year	Hospital CABG Volume, Procedures per Year				
	≤150	151-300	301-450	>450	Overall
10-85	3.3	3.2	2.8	2.9	2.9
86-138	3.0	2.7	2.7	2.6	2.6
≥139	NA†	2.9	2.4	2.4	2.4
Overall	3.2	2.7	2.8	2.5	

Abbreviations: CABG, coronary artery bypass graft.
*Mortality rates are presented as percentages.
†Accurate assessment not possible due to insufficient overlap of high-volume surgeons in hospitals with very low procedural volume.

One of the most complete evaluations of CABG volume-outcome relationships performed using clinical data was completed by Hannan et al.[9] Using data from 30 centers performing CABG surgery in New York from 1997 to 1999, the study by Hannan et al also noted significant differences in risk-adjusted mortality among low- and high-volume hospitals. The study, however, was limited to a single state where a strict certificate-of-need program limits the number of low-volume centers (ie, <3% of all patients receive CABG surgery at centers performing <300 procedures per year).

Our contemporary analysis using clinical data from the STS National Cardiac Database found an association between procedural volume and unadjusted mortality similar to that found in past analyses. Our study, however, expanded on these prior analyses using contemporary analytic techniques to properly account for clinical factors, differences in site variability, and clustering within sites. We found that, compared with high-volume hospitals, low-volume hospitals tended to operate on patients with higher risk and under more emergent conditions (Table 1). Reasons for these differences may include adverse selection,[7,10] variance in clinical coding among hospitals, or a differential threshold for surgery due to altered center experience and/or institutional financial pressure.

We also found that the association between hospital volume and mortality was not constant among all patients. In particular, the volume-outcome effect was nonsignificant in patients younger than 65 years and in those with low preoperative risk (Figure 2, Table 3). These results imply that prior analyses performed exclusively in Medicare patients would

©2004 American Medical Association. All rights reserved.

Downloaded from www.jama.com at St Mary's Hospital, on May 22, 2007

0394
09/15/08

inflate the volume-outcome effect. Additionally, it is presumed that while young, low-risk patients would be the group most likely to use public information from CABG quality metrics, these are also the patients in whom hospital volume had no measurable association with outcome.

We further demonstrated that associations between hospital volume and outcome were confounded by the concomitant effects of surgeon volume (Table 4). These results expand those previously reported from a single state[9] to a national cohort. Even if a patient elected to receive surgery at a high-volume center, their risk-adjusted mortality rates could vary from 2.4% to as much as 2.9%, depending on whether or not their actual procedure was performed by a low- vs a high-volume surgeon.

Our study further demonstrates the limitations of using hospital volume as an indicator of the quality of CABG surgery. Hospital volume had generally poor predictive accuracy as a means of identifying hospitals with significantly better or worse CABG mortality rates (C-index, <0.7). Similarly, using volume as a sole referral criterion for selecting a provider would unfairly defer cases from nearly half of very–low-volume centers with outcomes equal or better than overall STS mortality results (Figure 1).

Regardless of its value at the level of the individual center, some still have argued for using hospital-volume limits for their "aggregate societal good." A study from California estimated that up to 27% of deaths at low-volume centers may be averted with selective referral.[29] In contrast, our study estimated that the total number of lives saved by eliminating up to 100 low-volume STS hospitals (25% of total sites) would be less than 1% from deaths (n=45). If Leapfrog-proposed referral criteria of 500 or more cases per year were applied, up to four fifths of STS sites would be closed while fewer than 3% of national STS CABG mortality events would potentially be averted.

This study does not fully preclude the use of procedural volume in certain roles. In particular, the small but consistent association between hospital procedural volume and outcomes should be considered when prospectively determining the need for new programs.[30] Additionally, given that quality assessment based on comparison of risk-adjusted outcomes is limited at low-volume sites due to wide 95% CIs surrounding their outcome estimates, it seems reasonable to monitor low-volume centers using trend analyses of multiyear adjusted outcomes to ensure quality of care.

Several limitations should be noted. While this study represents the largest clinical evaluation of hospital volume to date, the STS National Cardiac Database currently collects data from roughly half of all US surgical centers. Participating centers tend to be larger and have slightly better outcomes than nonparticipating centers. However, unadjusted results in this study were similar to those from prior studies. Our evaluation of surgeon volume was limited to a blinded proxy and may underestimate this impact. Third, while our study indicated that low-volume centers may have been more willing to operate on higher-risk patients, it could not determine whether this lower threshold for case selection was indicative of better or worse patient care. Further study of the appropriateness of case selection by hospital volume would be indicated. Finally, our study was not designed to isolate specific clinical mechanisms for the association between volume and outcome. Differences in surgical teams, quality of postoperative care, surgical techniques, and other unmeasured factors all may contribute to the effect observed in this study.

In this national study we found that hospital procedural volume was only modestly associated with risk-adjusted CABG mortality rates; however, there were many low-volume hospitals with low mortality rates and some high-volume centers with rates higher than expected. This study suggests that hospital CABG surgery volume is best considered as a surrogate for quality in a setting where other more direct process and outcome assessments are not available.[20] Instead it seems more reasonable to support the continued growth of national clinical databases, which are capable not only of tracking risk-adjusted surgical care patterns and outcomes, but also of improving them.[23,31]

Author Contributions: Dr Peterson, as principal investigator of this study, had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analyses.
Study concept and design: Peterson, DeLong, Haan, Ferguson.
Acquisition of data: Peterson, Ferguson.
Analysis and interpretation of data: Peterson, Coombs, DeLong, Haan.
Drafting of the manuscript: Peterson, Coombs.
Critical revision of the manuscript for important intellectual content: Peterson, Coombs, DeLong, Haan, Ferguson.
Statistical expertise: Peterson, Coombs, DeLong.
Obtained funding: Peterson, Ferguson.
Administrative, technical, or material support: Ferguson.
Study supervision: Peterson.
Role of the Sponsor: This study was sponsored by the Society of Thoracic Surgeons (STS). Specifically, the Duke Clinical Research Institute (DCRI) has a contract with the STS to be their National Cardiac Data Warehouse and Analysis Center (Dr Peterson, principal investigator of this subcontract). In this role, the DCRI independently harvests data from each participating STS center, creates a national analysis database, and performs statistical analyses. The proposal for this study was submitted by Dr Peterson to the STS national database publications committee (a 6-member board representing both the STS and the DCRI). After approval, the manuscript was reviewed by the coauthors and a final version approved by the publications committee.

REFERENCES

1. Luft HS, Bunker JP, Enthoven AC. Should operations be regionalized? the empirical relation between surgical volume and mortality. *N Engl J Med.* 1979; 301:1364-1369.
2. Flood AB, Scott WR, Ewy W. Does practice make perfect? II: the relation between volume and outcomes and other hospital characteristics. *Med Care.* 1984;22:115-125.
3. Riley G, Lubitz J. Outcomes of surgery among the Medicare aged: surgical volume and mortality. *Health Care Financ Rev.* 1985;7:37-47.
4. Kelly JV, Hellinger FJ. Physican and hospital factors associated with mortality of surgical patients. *Med Care.* 1986;24:785-800.
5. Maerki SC, Luft HS, Hunt SS. Selecting categories of patients for regionalization: implications of the relationship between volume and outcome. *Med Care.* 1986;24:148-158.
6. Hughes RG, Hunt SS, Luft HS. Effects of surgeon volume and hospital volume on quality of care in hospitals. *Med Care.* 1987;25:489-503.
7. Showstack JA, Rosenfeld KE, Garnick DW, et al. Association of volume with outcome of coronary artery bypass graft surgery: scheduled vs nonscheduled operations. *JAMA.* 1987;257:785-789.
8. Hannan EL, O'Donnell JF, Kilburn H Jr, et al. Investigation of the relationship between volume and mortality for surgical procedures performed in New York State hospitals. *JAMA.* 1989;262:503-510.

©2004 American Medical Association. All rights reserved.

Downloaded from www.jama.com at St Mary's Hospital, on May 22, 2007

0395
09/15/08

9. Hannan EL, Wu C, Ryan TJ, et al. Do hospitals and surgeons with higher coronary artery bypass graft surgery volumes still have lower risk-adjusted mortality rates? *Circulation.* 2003;108:795-801.
10. Grumbach K, Anderson GM, Luft HS, et al. Regionalization of cardiac surgery in the United States and Canada: geographic access, choice, and outcomes. *JAMA.* 1995;274:1282-1288.
11. Hannan EL, Siu AL, Kumar D, et al. The decline in coronary artery bypass graft surgery mortality in New York State: the role of surgeon volume. *JAMA.* 1995; 273:209-213.
12. Clark RE, the Ad Hoc Committee on Cardiac Surgery Credentialing of the Society of Thoracic Surgeons. Outcome as a function of annual coronary artery bypass graft volume. *Ann Thorac Surg.* 1996;61: 21-26.
13. Nallamothu BK, Saint S, Ramsey SD, et al. The role of hospital volume in coronary artery bypass grafting: is more always better? *J Am Coll Cardiol.* 2001; 38:1923-1930.
14. Birkmeyer JD, Siewers AE, Finlayson EV, et al. Hospital volume and surgical mortality in the United States. *N Engl J Med.* 2002;346:1128-1137.
15. Goodney PP, Lucas FL, Birkmeyer JD. Should volume standards cardiovascular surgery focus only on high-risk patients? *Circulation.* 2003;107:384-387.
16. Sollano JA, Gelijns AC, Moskowitz AJ, et al. Volume-outcome relationships in cardiovascular operations: New York State, 1990-1995. *J Thorac Cardiovasc Surg.* 1999;117:419-428.
17. Shroyer AL, Marshall G, Warner BA, et al. No continuous relationship between Veterans Affairs hospital coronary artery bypass grafting surgical volume and operative mortality. *Ann Thorac Surg.* 1996;61:17-20.
18. Birkmeyer JD, Finlayson EV, Birkmeyer CM. Volume standards for high-risk surgical procedures: potential benefits of the Leapfrog initiative. *Surgery.* 2001; 130:415-422.
19. Daley J. Invited commentary: quality of care and the volume-outcome relationship—what's next for surgery? *Surgery.* 2002;131:16-18.
20. Epstein AM. Volume and outcome—is it time to move ahead. *N Engl J Med.* 2002;346:1161-1163.
21. Edwards FH. Evolution of the Society of Thoracic Surgeons National Cardiac Surgery Database. *J Invasive Cardiol.* 1998;10:485-488.
22. Edwards FH, Clark RE, Schwartz M. Practical considerations in the management of large multi-institutional databases. *Ann Thorac Surg.* 1994;58: 1841-1844.
23. Ferguson TB Jr, Dziuban SW Jr, Edwards FH, et al, Committee to Establish a National Database in Cardiothoracic Surgery, the Society of Thoracic Surgeons. The STS National Database: current changes and challenges for the new millennium. *Ann Thorac Surg.* 2000;69:680-691.
24. Welke K, Peterson ED, Ferguson TB, et al. Validity of the Society of Thoracic Surgeons National Adult Cardiac Database. *Ann Thorac Surg.* In press.
25. Shroyer AL, Coombs LP, Peterson ED, et al. The Society of Thoracic Surgeons: 30-Day Operative Mortality and Morbidity Risk Models. *Ann Thorac Surg.* 2003;75:1856-1864.
26. Littell RC, Miliken GA, Stroup WW, et al. *SAS System for Mixed Models.* Cary, NC: SAS Institute Inc; 1996:426.
27. Draper NR, Smith H. *Applied Regression Analysis.* 3rd ed. Hoboken, NJ: Wiley-Interscience; 1998: 217.
28. Leapfrog Group. The Leapfrog Group fact sheet. Available at: http://www.leapfroggroup.org/FactSheets/LF_FactSheet.pdf. Accessed April 15, 2003.
29. Dudley RA, Johansen KL, Brand R, et al. Selective referral to high-volume hospitals: estimating potentially avoidable deaths. *JAMA.* 2000;283:1159-1166.
30. Chassin MR. Assessing strategies for quality improvement. *Health Aff (Millwood).* 1997;16:151-161.
31. Ferguson TB, Peterson ED, Coombs LP, et al, for the Society of Thoracic Surgeons and the STS NCD. Use of continuous quality improvement to increase use of process measures in patients undergoing coronary artery bypass graft surgery: a randomized controlled trial. *JAMA.* 2003;290:49-56.

Life is not an exact science, it is an art.
—Samuel Butler (1835-1902)

©2004 American Medical Association. All rights reserved.

Downloaded from www.jama.com at St Mary's Hospital, on May 22, 2007

0396
09/15/08

BMC Surgery

BioMed Central

Research article

Open Access

Early efficacy of CABG care delivery in a low procedure-volume community hospital: operative and midterm results

Thomas J Papadimos*, Robert H Habib, Anoar Zacharias, Thomas A Schwann, Christopher J Riordan, Samuel J Durham and Aamir Shah

Address: Department of Anesthesiology, Medical College of Ohio, 3000 Arlington Avenue, Toledo, OH 43614, USA

Email: Thomas J Papadimos* - TPapadimos@mac.com; Robert H Habib - robert_habib@mhsnr.org; Anoar Zacharias - anoar_zacharias@mhsnr.org; Thomas A Schwann - thomas_schwann@mhsnr.org; Christopher J Riordan - christopher_riordan@mhsnr.org; Samuel J Durham - samuel_durham@mhsnr.org; Aamir Shah - aamir_shah@mhsnr.org

* Corresponding author

Published: 02 May 2005

BMC Surgery 2005, 5:10 doi:10.1186/1471-2482-5-10

Received: 27 January 2005

Accepted: 02 May 2005

This article is available from: http://www.biomedcentral.com/1471-2482/5/10

© 2005 Papadimos et al; licensee BioMed Central Ltd.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

Background: The Leapfrog Group recommended that coronary artery bypass grafting (**CABG**) surgery should be done at high volume hospitals (>450 per year) without corresponding surgeon-volume criteria. The latter confounds procedure-volume effects substantially, and it is suggested that high surgeon-volume (>125 per year) rather than hospital-volume may be a more appropriate indicator of CABG quality.

Methods: We assessed 3-year isolated CABG morbidity and mortality outcomes at a low-volume hospital (LVH: 504 cases) and compared them to the corresponding Society of Thoracic Surgeons (**STS**) national data over the same period (2001–2003). All CABGs were performed by 5 high-volume surgeons (161–285 per year). "Best practice" care at LVH – including effective practice guidelines, protocols, data acquisition capabilities, case review process, dedicated facilities and support personnel – were closely modeled after a high-volume hospital served by the same surgeon-team.

Results: Operative mortality was similar for LVH and STS (**OM**: 2.38% vs. 2.53%), and the corresponding LVH observed-to-expected mortality (**O/E** = 0.81) indicated good quality relative to the STS risk model (O/E<1). Also, these results were consistent irrespective of risk category: O/E was 0, 0.9 and 1.03 for very-low risk (<1%), low risk (1–3%) and moderate-to-high risk category (>3%), respectively. Postoperative leg wound infections, ventilator hours, renal dysfunction (no dialysis), and atrial fibrillation were higher for LVH, but hospital stay was not. The unadjusted Kaplan-Meier survival for the LVH cohort was 96%, 94%, and 92% at one, two, and three years, respectively.

Conclusion: Our results demonstrated that high quality CABG care can be achieved at LVH programs if 1) served by high volume surgeons and 2) patient care procedures similar to those of large programs are implemented. This approach may prove a useful paradigm to ensure high quality CABG care and early efficacy at low volume institutions that wish to comply with the Leapfrog standards.

0397

09/15/08

Background

For many years investigators have studied the relationship between the outcomes of high procedure-volume institutions with those of low procedure-volume institutions. This has been especially true for coronary artery bypass grafting (CABG) surgery with varied results [1-11]. Indeed, recent studies have indicated that low volume-procedure institutions performing CABG surgery may have good outcomes particularly if associated with high volume surgeons (> 125 cases per year) [12-15].

In this report we review our experience with a recently initiated small community hospital cardiac surgery program modeled after a similar high volume practice in the region. In this paradigm a group of high volume cardiac surgeons expanded their practice, protocols, and procedures to include the smaller institution. We reasoned that this paradigm can be used successfully by low volume hospitals. We tested this contention by comparing the operative and midterm results of an LVH to the national data as reported for the Society of Thoracic Surgeons (STS) National Cardiac Database over the same period.

Methods

Patients

We retrospectively reviewed the initial 504 patients of a new cardiac surgery program undergoing isolated CABG between February 1, 2001 – December 31, 2003 at Saint Luke's Hospital (Maumee, Ohio), a 189-bed community hospital in Northwest Ohio. The information was extracted from a local database. Patients were excluded if they had concomitant valve, other cardiac, or carotid surgery. Institutional Review Board approval was obtained for this ongoing clinical cardiac surgery database research. The requirement for informed consent was waived by the Institutional Review Board.

Clinical data / end points

Clinical data on patients undergoing revascularization have been systematically abstracted and recorded in a dedicated cardiac surgery database, and are regularly reported to the STS national cardiac surgery database. The primary end points were operative mortality and morbidity (complications and length of hospital stay), and those were compared to the STS 2001–2003 data. In addition, LVH 0- to 3-year all-cause mortality for survival data was collected and combined via the Social Security Death Index (conducted in August 2004). Allowing for a 3-month lag, this corresponds to a follow-up between 5 and 41 months.

Statistical analysis

Continuous data were expressed as mean ± SD. Baseline variables were compared by use of the Wilcoxon rank-sum test, t-test, or the χ^2 test as appropriate. Actual, risk-adjusted and observer-to-expected operative mortality (OM, Adj. OM, and O/E, respectively) data are reported as per the latest STS CABG risk model [16]. Effects of explanatory variables on OM were derived by logistic regression. Survival was compared with Kaplan-Meier analysis (log rank test) and multivariable Cox proportional-hazards regression. The latter was done to assess the effects of the varying death hazard on long-term mortality predictors and their associated risk ratios (RR). Regression model selection was done with backward elimination (Wald statistic – confirmed using forward and stepwise selection). A $P < 0.05$ cutoff was used to indicate significance (SPSS version 10.0, SPSS Inc., Chicago, IL).

Results

A total of 504 CABG procedures were performed in the initial 35 months of this new cardiac surgery program. This LVH population demonstrated a similar distribution of age and gender to that of the STS, whereas race and body mass index differed significantly (Table 1). Our LVH patients had a higher incidence of three vessel disease, obesity, preoperative myocardial infarction and family history of coronary artery disease. The STS cohort exhibited more peripheral vascular disease, chronic obstructive pulmonary disease, angina, preoperative renal failure, hypercholesterolemia, congestive heart failure, and trended toward more cerebral vascular accidents ($p = .06$). These differences in preoperative morbidity led to a lower STS predicted mortality risk in our population, 2.94% vs. 3.13%. The LVH cohort had a relatively greater incidence of emergencies, use of internal mammary arteries, use of intra-aortic balloon pumps, and blood transfusions. The incidence of elective cases, redo surgery, and off-pump procedures were less than the STS. Total CPB (cardiopulmonary bypass) and cross-clamp times were shorter.

Our LVH operative mortality (OM) did not statistically differ from the STS (2.38% vs. 2.53%). The corresponding O/E morality ratio was 0.81 and adjusted OM was 1.9%. Multivariate OM predictors were age, emergency status, and time on cardiopulmonary bypass (Table 2). The patients in the very low risk (<1%) and low risk (1–3%) categories fared better than the STS with actual mortality rates and O/E mortality ratios of 0%, 0.0 and 0.9%, 0.52, respectively. The moderate to high-risk category (>3%) had an actual mortality rate (7.3%) and an O/E mortality ratio (1.03) that were comparable to the STS.

Compared to the STS data, post-operative complications of leg wound infection, prolonged ventilation, renal dysfunction (no dialysis), and atrial fibrillation occurred more frequently at our LVH (Table 3). Also, LVH had a greater rate of 30-day readmissions. However, total length of stay, post-operative length of stay, post-operative

0398
09/15/08

Table 1: Patient Demographics, Risk Factors and Operative Data

Variable	Study Site n mean ± SD	2001–2003 % median (25%–75%)	STS (2001–03) % median (25%–75%)	P-Value
No. of Patients	504		448841	
Demographics/Risk Factors				
Age (yrs)	64 ± 11	65 (56–72)	66 (57–74)	
Male	368	73.0	71.3	.433
Caucasian	474	94.0	87.1	<.001
Black	5	1	5.17	<.001
Hispanic/Other	25	4.96	6.84	
BSA (m2)	2.08 ± 0.25	2.08 (1.89–2.26)	1.95 (1.82 – 2.13)	<.001
Obese (BMI>35 kg/m2)	103	20.4	13.4	<.001
Current Smoker	101	20	22.1	.295
Family History of CAD	403	80	43.2	<.001
Diabetes	168	33.30	35.0	.469
Insulin-dependent	41	8.13	10.47	.102
Hypercholesterolemia	323	64	68.49	.038
Renal Failure	10	1.98	5.20	.002
Hypertension	358	71	74.78	.060
Peripheral Vascular Disease	35	6.94	15.80	<.001
Cerebrovascular Disease	60	11.90	13.21	.425
COPD	68	13.50	18.61	.004
Myocardial Infarction	266	52.80	45.53	<.001
Congestive Heart Failure	44	8.73	13.80	<.001
Unstable	222	44.10	47.05	.193
Arrhythmia (any)	42	8.30	9.43	.443
Triple Vessel Disease	422	83.70	74.63	<.001
Left Main Disease >50%	118	23.40	24.54	.594
Ejection Fraction (%)	48 ± 11	50 (40–55)	50 (40–60)	
Previous CV intervention	116	23.00	20.36	.155
Operative Data				
Elective	129	25.60	51.88	<.001
Emergent	63	12.50	4.10	<.001
Redo Surgery	15	2.98	8.93	<.001
No. of Grafts	3.58 ± 1.01			
Arterial	1.63 ± 0.98			
Vein	1.94 ± 0.98			
ITA Used	473	93.80	89.84	.004
Left ITA used	471	93.50	89.34	.004
Aortic Cross-Clamp (min)	58 ± 22	55 (45–68)	63 (47 – 83)	.004
Perfusion time (min)	90 ± 31	85 (70–106)	94 (73 – 119)	
Off-pump	21	4.17	20.48	<.001
STS Predicted Mortality (%)	2.94 ± 5.0		3.13	

Ejection fraction was available in 464 patients. CV intervention = any cardiovascular intervention (surgery, angioplasty, or stenting). The urgent cases (197/504) are not compared in the STS database.

ventilator hours, strokes, sepsis, pneumonia, urinary tract infection, and sternal wound infection were similar.

Unadjusted Kaplan-Meier survival was 96%, 94 %, and 92% at 1, 2, and 3 years, respectively (Figure 1), which was comparable to the STS. Effects of six patient variables on survival are shown in Figure 2. Gender and diabetes did not affect midterm survival, while survival for older (> 65 years) patients, cerebral vascular disease, longer time on CPB, and higher STS predicted operative mortality risk all exhibited significantly worse midterm survival.

Predictors of 0–3 year mortality were derived by multivariate (proportional hazard) Cox regression analysis and included longer time on CPB (RR = 1.15), all vein grafts (RR = 5.74), cerebral vascular disease (RR = 3.79), age (RR

0399
09/15/08

Table 2: Multivariate predictors of operative mortality by logistic regression applied to 504 patients

Variables	B	S.E.	Wald	Sig.	OR	95%C.I. Lower	Upper
Age (yr)	.092	.035	6.942	.008	1.096	1.024	1.173
Emergency	1.312	.674	3.788	.052	3.712	.991	13.908
Time on CPB (min)	.026	.007	13.421	.000	1.027	1.012	1.041
Constant	-12.977	2.788	21.673	.000	.000		

Table 3: Operative Outcomes

Variable	Study Site n mean (SD)	2001–03 % median (25%–75%)	STS (2001–03) % median (25%–75%)	P – value
Intra-aortic Balloon pump (any)	73	14.5	9.2	<.001
Blood Transfusion (Any)	256	50.8	45.3	.014
Complication				
ReOp Bleeding	14	2.78	2.50	.798
Perioperative myocardial infarction	3	0.60	1.07	.414
Sternal wound infection	1	0.20	0.47	.578
Leg wound infection	14	2.78	0.70	<.001
Septicemia	7	1.39	1.03	.570
Urinary Infection	9	1.79	1.67	.973
Permanent Stroke	4	0.79	1.53	.242
Transient Stroke	7	1.39	0.93	.406
Post-Op Ventilator (hours)	23.2 80.3	6.3 (4.0–15.8)	21.73	
Ventilator Prolonged (>24 hrs)	53	10.5	7.5	.012
Pneumonia	15	2.98	2.87	.989
Renal Failure	34	6.75	3.47	<.001
Atrial Fibrillation	144	28.6	19.9	<.001
Operative Mortality	12	2.38	2.53	.940
Total LOS (days)	8.59 6.11	7 (5–10)	8.97	
Post-Op LOS (days)	6.45 5.27	5 (4–7)	6.87	
30-day Readmission	59	11.7	8.4	.009

= 1.63 per 10 years), redo surgery (RR = 3.46), and congestive heart failure (RR = 2.48). Preoperative renal failure approached significance (RR = 3.81, p = .078) (Table 4).

Discussion

While many researchers have found hospitals with higher CABG volumes to be associated with better outcomes, there has been significant interest in the potentially confounding influence of cardiothoracic surgeon procedure-volumes on this association [1,2,5,11,13-17]. Four states (California, New York, New Jersey, and Pennsylvania), which represent a quarter of the US population, have rigorous reporting systems for CABG procedures based on risk-adjusted mortality alone. In these states the Leapfrog standard includes only those hospitals in the top quartile. These "top" hospitals had overall mortality rates of 1.7% compared with 4.1% in the lower quartiles. In the rest of the nation, volume (>450 cases per annum) and mortality rates below 2.7% comprise the Leapfrog standard [18]. The use of standard risk-adjusted mortality rates may become the benchmark if rigorous outcomes measurement systems are implemented throughout the United States. Risk adjustment makes surgeon procedure volume very important. In this way, certain cases may be restricted to particular procedure volume surgeons, thus patient redistribution to regional centers may not be necessary.

Three recent studies of note have highlighted the critical importance of surgeon procedure volume [13-15]. Peterson et al found that hospital procedure-volume, as a quality marker in CABG surgery, was to be only modestly associated with risk-adjusted CABG mortality rates [14]. In fact, these researchers clearly identified many low-volume hospitals with low mortality rates and several high

0400
09/15/08

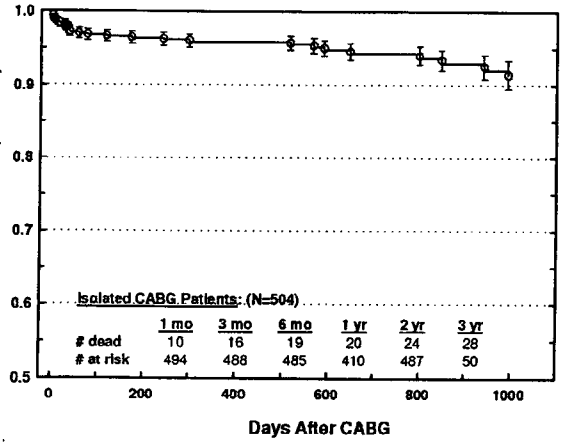


Figure 1
Kaplin-Meyer survival curve for 504 LVH CABG patients. Bars = standard error.

volume centers with higher than expected rates. In addition, Wu et al indicated that high volume cardiothoracic surgeons were associated with a lower risk of death for both low-risk and moderate-to-high risk CABG patients [15] and Birkmeyer et al demonstrated that the observed associations between hospital volume and operative mortality were modulated by surgeon volume [13].

The establishment of the STS National Cardiac Database has facilitated quality of care comparisons of cardiac surgery programs relative to national statistics [19-21]. The Center for Medicare and Medicaid Services (CMS) and the Leapfrog group have suggested that hospital volume be used as the indicator of the quality of CABG outcomes [22-24]. However, an insightful review of the evidence by Shahian and Normand lends merit to the argument that CABG surgery is so pervasive that its well-recognized techniques and well-understood pathophysiology make provision for its transportability to low volume institutions in the hands of skilled, high volume surgeons [25]. The recent Peterson et al investigation of the STS database accounted for clinical factors, differences in site variability and clustering within sites. They documented that (1) low volume institutions tended to operate more often on patients under emergent conditions, (2) the association between hospital volume and mortality was different for younger (<65 years) vs. older (>65 years) patients, (3) the hospital volume and outcome associations were confounded by the concomitant effect of surgeon volume, and (4) hospital volume per se was a poor predictor of CABG outcome [14].

In view of the above studies the issue of volume as a "proxy" yields itself to discussion. Some have criticized hospital volume as a crude indicator of surgical quality in that hospital volume is only a proxy for low mortality (high quality) [26-29]. Volume must be examined from the perspective of, not only the hospital, but also of the surgeon. The procedure volume of surgeons is an important proxy for quality CABG care. In this light, our example of a high quality, low volume center should not be unexpected, especially when our LVH used high volume surgeons.

Our study site was a small, low procedure volume hospital located in an increasingly affluent suburban community with a large rural catchment area. This accounted for the large number of Caucasians and the under-representation of African-Americans. The increased body surface area and excessive obesity that occurred in our population was to be expected according to findings that indicate Ohio is near the leading edge of the obesity experience in the United States [30,31]. The study site patients had more significant family histories of coronary artery disease (CAD), but we cannot comment as to the extent of the effect of genetic predisposition versus social impact (overeating, smoking, lack of exercise) had upon this finding. However, the extent of obesity, and family histories of CAD could account for the significant deviation from the STS in regard to triple vessel disease and history of myocardial infarction.

The relatively recent initiation of this cardiac surgery program and its rural catchment area may account for the distribution of cases (fewer elective and redo surgeries, but more emergent cases) because: (1) the cardiac surgery program was actually put into place to support interventional cardiology, (2) the cadre of cardiologists was not as well established at this location and had fewer elective cases posted, (3) the proximity to several rural hospitals allowed rural emergent cases (whether initially presenting to the study site emergently or becoming emergent during their rural hospital stay) to receive expeditious care, (4) the surgeons did not have an office in the immediate area and this affected their contribution of elective cases to the institution, and (5) a newly established program would have less opportunity to perform redo surgeries.

The surgeons at the study location were very experienced and were strong advocates of mammary and radial artery use [32], and this is reflected in their shorter aortic cross-clamp (perfusion) times and their use of internal mammary grafts as compared to the STS. However, the surgical group was less enthusiastic for the use of off-pump coronary artery bypass procedures. The increased use of intra-aortic balloon pumps and blood transfusions in our population may be attributed to the increased severity of

0401
09/15/08

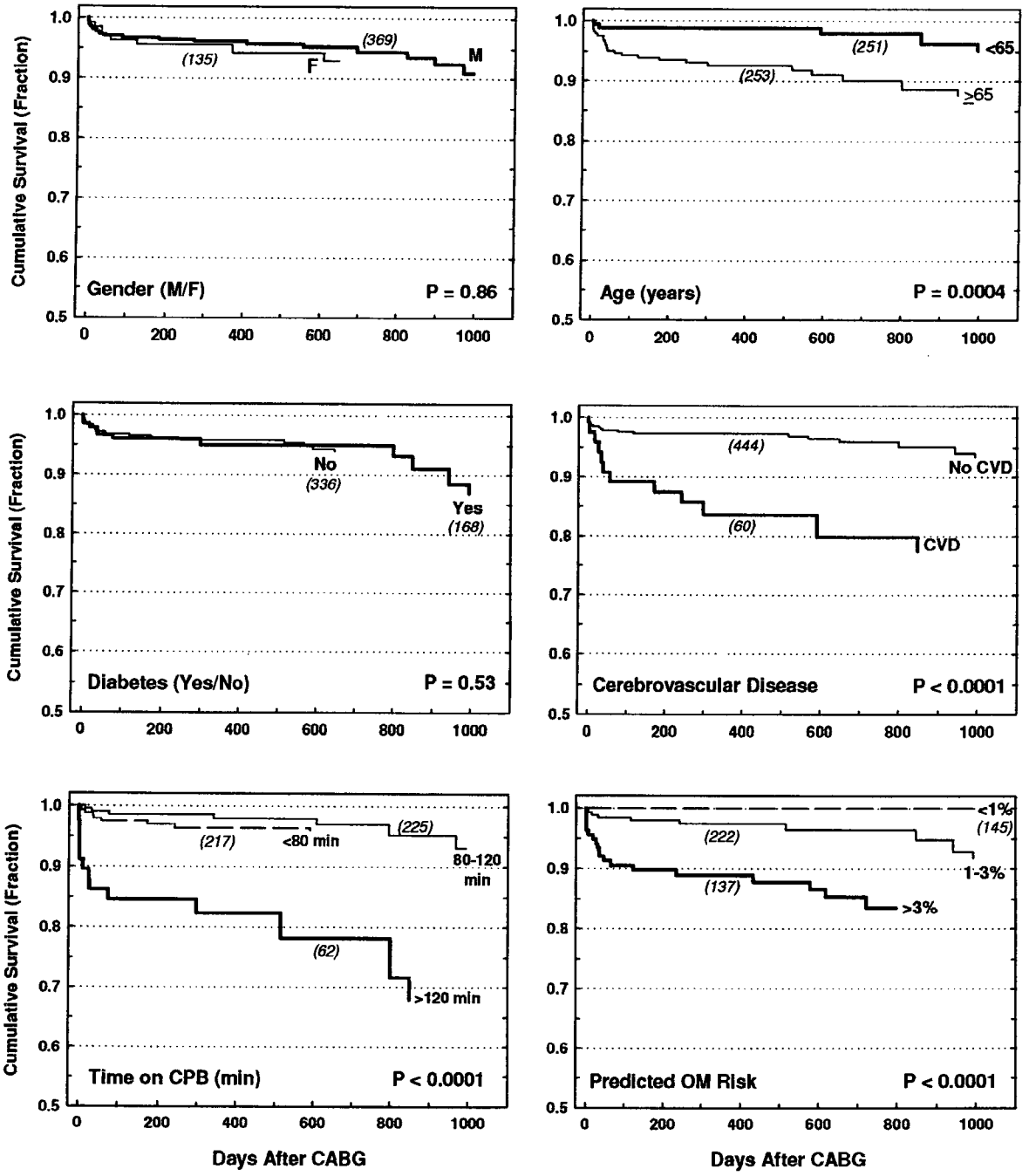


Figure 2
Effects of gender, age, diabetes, cerebrovascular disease, time on CPB, and operative mortality (OM) on midterm survival. P value reflects log-rank test results.

0402
09/15/08

Table 4: Predictors of 0 – 3 year mortality derived by Multivariate (proportional hazard) Cox regression analysis.

Variables	B	SE	Wald	Risk Ratio	P-value	95%	C.I.
Time on CPB (per 10 minutes)	0.02	0.00	16.26	0.0001	1.15	1.08	1.23
All vein grafts	1.75	0.55	10.15	0.0014	5.74	1.96	16.82
Cerebrovascular Disease	1.33	0.43	9.82	0.0017	3.79	1.65	8.72
Age (per 10 years)	0.06	0.02	8.28	0.0040	1.63	1.20	1.91
Redo Surgery	1.24	0.55	5.00	0.0254	3.46	1.17	10.26
Congestive Heart Failure	0.91	0.45	4.07	0.0435	2.48	1.03	6.00
Pre-operative Renal Failure	1.34	0.76	3.11	0.0779	3.81	0.86	16.86

95% C.I = 95% confidence interval; CPB = cardiopulmonary bypass;
Predictors are arranged by decreasing Wald statistic

illness as represented by an increased percentage of emergent cases, preoperative myocardial infarctions, and triple vessel disease.

The postoperative complications of renal dysfunction (no dialysis), prolonged ventilation greater than 24 hours, leg wound infection, atrial fibrillation, and 30-day readmission deviated from the STS. Postoperative renal dysfunction was not associated with an increased need for dialysis. The higher rate of renal dysfunction may be linked to a higher incidence of emergent cases done soon after cardiac catheterization. Such prompt surgeon response may not allow sufficient time for elimination of the contrast dye that may exacerbate the associated nephropathy [33].

Postoperative atrial fibrillation in our population is greater than the STS, but is within the range reported by others [34,35]. This may be related to the greater incidence of emergent cases and shorter catheterization-to-surgery times. The latter may have compromised the efficacy our implementation of the amiodarone prophylaxis protocol in high-risk atrial fibrillation patients.

The prolonged rate of postoperative ventilation may be a function of anesthesiology practice. In the evening the cardiothoracic anesthesiologist covers the intensive care unit by beeper. Although protocols are in place regarding extubation and the anesthesiologist can be consulted at any hour, we have found that there is reluctance to extubate patients between midnight and 0600 on the part of the staff. However, this did not influence the length of stay or the rate of pneumonia.

The cardiovascular surgical assistants hired at the study location initially had limited experience with the surgical care of leg wounds. Their ability to care intra-operatively and post-operatively for leg wounds has improved and is under a continuous quality improvement process. The extent of obesity and emergent cases in our population may be a contributing factors to poor wound healing. Also, the emergent cases arrive in the operating room on many occasions after administration of antiplatelet drugs and this may contribute to postoperative hematoma formation and infection at the leg wound sites.

An increased 30-day readmission rate of the study site was also noted. The surgeons initiating this cardiac surgery program had heightened awareness as to potential patient complications in a "new" program and did not hesitate to readmit a patient of questionable physiologic status.

In our paradigm a group of high volume surgeons from a high volume hospital (HVH) established a new LVH cardiothoracic surgery program providing practice guidelines, protocols and data acquisition capabilities. In addition, the physical layout of the cardiac surgery wing and the organization of the cardiovascular intensive care unit (CVU) within a dedicated heart center were of paramount importance. It included two cardiac catheterization suites with a 10 bed holding area, two operating suites were immediately adjacent to an eight-bed CVU used as intensive care, step-down and floor beds if capacity permitted ("one-stop" for all patients). An experienced critical care nursing staff was recruited from the HVH. In addition, two anesthesiologists/intensivists with transesophageal echocardiography skills were dedicated exclusively to the heart center. They were responsible for the pre-, intra-, and postoperative critical care of all the patients. The CVU model was one that involved the cardiac surgeon as the primary physician; however the anesthesiologists were consulted on every case to support the global care given to the patient. This was particularly beneficial to the surgeons because their practice involved three institutions in addition to their office practice. Also, daily group rounds included a surgeon, anesthesiologist,

0403
09/15/08

nurse, respiratory therapist, and pharmacist. Each month a meeting was held, not only for case review, but to assess the program's performance against the STS database.

Clearly, surgeon procedure-volume examination will cause controversy [36-38], but studies of risk-adjusted data indicate that surgeon volume is of significant importance [13,14,16,17]. In the setting of a LVH where there are more emergent and high risk patients [14] there should be a continuous quality improvement effort in place to ensure "best practice", evidence-based care is offered to patients [12].

Conclusion

We demonstrated that high quality CABG care with good outcomes can be achieved at a LVH program provided that that it is served by high volume cardiac surgeons and backed up by a highly trained, dedicated support team, and a sophisticated data acquisition capability and review process. This approach may prove a useful paradigm to ensure high quality CABG care and early efficacy at low volume institutions that wish to be compliant with Leapfrog recommendations.

Competing interests

The author(s) declare that they have no competing interests.

Authors' contributions

Drs. Papadimos and Habib wrote the abstract, methods, background, discussion, results, discussion and conclusions. Drs. Zacharias, Schwann, Riordan, Durham, and Shah assisted in writing the results section.

Acknowledgements

none.

References

1. Showstack JA, Rosenfeld KE, Garnick DW, Luft HS, Schaffarzick RW, Fowles J: **Association of volume with outcome of coronary artery bypass graft surgery.** *JAMA* 1987, **257**:785-789.
2. Hannan EL, O'Donell JF, Kilburn H Jr, Bernard HR, Yazici A: **Investigation of the relationship between volume and mortality for surgical procedures performed in New York state hospitals.** *JAMA* 1989, **262**:503-510.
3. Zelen J, Bilfinger TV, Anagnostopoulos CE: **Coronary artery bypass grafting. The relationship of surgical volume, hospital location, and outcome.** *N Y State J Med* 1991, **91**:290-292.
4. Grumbach K, Anderson GM, Luft HS, Roos LL, Brook R: **Regionalization of cardiac surgery in Canada. Geographic access, choice, and outcomes.** *JAMA* 1995, **274**:1282-1288.
5. Hannan EL, Siu AL, Kumar D, Kilburn H, Chassin MR: **The decline in coronary artery bypass graft surgery mortality in New York State. The role of surgeon volume.** *JAMA* 1995, **273**:209-213.
6. Clark RE, Crawford FA, Anderson RP, Grover FL, Kouchoukos NT, Waldhaussen JA: **Outcome as a function of annual coronary artery bypass graft volume.** *Ann Thorac Surg* 1996, **61**:21-26.
7. Tu JV, Naylor CD: **Coronary artery bypass mortality rates in Ontario: a Canadian approach to quality assurance in cardiac surgery: Steering Committee of the Provincial Adult Cardiac Care Network of Ontario.** *Circulation* 1996, **94**:2429-2433.
8. Shroyer ALW, Marshall G, Warner BA, Johnson RR, Guo W, Grover FL, Hammermeister KE: **No continuous relationship between Veterans Affairs hospital coronary artery bypass grafting surgical volume and operative mortality.** *Ann Thorac Surg* 1996, **61**:17-20.
9. Sollano JA, Gelijns AC, Moskowitz AJ, Heitjan DF, Culliname S, Saha T, Chen JM, Roohan PJ, Reemtsma K, Shields EP: **Volume-outcome relationships in cardiovascular operations: New York state, 1990–1995.** *J Thorac Cardiovasc Surg* 1999, **117**:419-430.
10. Nallamothu BK, Saint S, Ramsey SD, Hofer TP, Vijan S, Eagle KA: **The role of hospital volume n coronary artery bypass grafting: Is more always better?** *J Am Coll Cardiol* 2001, **38**:1923-1930.
11. Birkmeyer JD, Siewers AE, Finlayson VA, Stukel TA, Lucas FL, Batista I, Welch HG, Wennberg DE: **Hospital volume and surgical mortality in the United States.** *N Engl J Med* 2002, **346**:1128-1137.
12. Fergusen BT, Peterson ED, Coombs LP, Eiken MC, Carey ML, Grover FL, DeLong ER: **Use of continuous quality improvement to increase use of process measures in patients undergoing coronary artery bypass graft surgery. A randomized controlled trial.** *JAMA* 2003, **290**:49-56.
13. Birkmeyer JD, Stukel TA, Siewers AE, Goodney PP, Wennberg DE, Lucas FL: **Surgeon volume and operative mortality in the United States.** *N Engl J Med* 2003, **349**:2117-2127.
14. Peterson ED, Coombs LP, De Long ER, Haan CK, Ferguson BT: **Procedural volume as a marker of quality for CABG surgery.** *JAMA* 2004, **291**:195-201.
15. Wu C, Hannan EL, Ryan TJ, Bennett E, Culliford AT, Gold JP, Isom WO, Jones PH, McNeil B, Rose EA, Subramanian VA: **Is the impact of hospital and surgeon volumes on the in-hospital mortality rate for coronary artery bypass graft surgery limited to patients at high risk?** *Circulation* 2004, **110**:784-789.
16. Hannan EL, Wu C, Ryan TJ, Bennett E, Culliford AT, Gold JP, Hartman A, Isom WO, Jones PH, McNeil B, Rose EA, Subramanian VA: **Do hospitals and surgeons with coronary artery bypass graft surgery volumes still have lower risk-adjusted mortality rates?** *Circulation* 2003, **108**:795-801.
17. Hannan EL, Kilburn H, Bernard H, O'Donnell JF, Lukacik G, Shields EP: **Coronary artery bypass surgery: the relationship between in-hospital mortality rate and surgical volume after controlling for risk factors.** *Med Care* 1991, **29**:1094-1097.
18. Birkmeyer JD, Dimick JB: **Potential benefits of the new Leapfrog standards: effect of process and outcome measures.** *Surgery* 2004, **135**:569-575.
19. Ferguson BT, Dziuban SW, Edwards FH, Eiken MC, Shroyer AL, Pairolero PC, Anderson RP, Grover FL: **The STS national database: Current changes and challenges for the new millennium.** *Ann Thorac Surg* 2000, **69**:680-691.
20. Edwards FH, Clark RE, Schwartz M: **Practical considerations in the management of large multi-institutional databases.** *Ann Thorac Surg* 1994, **58**:1841-1844.
21. Edwards FH, Carey JS, Grover FL, Bero JW, Hartz RS: **Impact of gender on coronary bypass operative mortality.** *Ann Thorac Surg* 1998, **66**:125-131.
22. Birkmeyer JD, Finlayson EVA, Birkmeyer CM: **Volume standards for high-risk surgical procedures: Potential benefits of the Leapfrog program.** *Surgery* 2001, **130**:415-422.
23. Daley J: **Invited commentary: Quality of care and the volume-outcome relationship – What's next for surgery?** *Surgery* 2002, **131**:16-18.
24. Epstein AM: **Volume and outcome – it is time to move ahead.** *N Engl J Med* 2002, **346**:1161-1164.
25. Shahian DM, Normand ST: **The volume-outcome relationship: From Luft to Leapfrog.** *Ann Thorac Surg* 2003, **25**:1048-1058.
26. Khuri SF: **Invited commentary: surgeons, not General Motors, should set standards for surgical care.** *Surgery* 2001, **130**:429-431.
27. Russel TR: **Invited commentary: volume standards for high-risk operations: an American College of Surgeons' view.** *Surgery* 2001, **130**:423-424.
28. Dudley RA, Johansen KL: **Invited commentary: physician responses to purchaser quality initiatives for surgical procedures.** *Surgery* 2001, **130**:425-428.
29. Christian CK, Gustafson ML, Betensky RA, Daley J, Sinner MJ: **The Leapfrog volume criteria may fall short in identifying high-quality surgical centers.** *Ann Surg* 2003, **238**:447-455.

0404
09/15/08

30. Mokdad AH, Ford ES, Bowman BA, Dietz WH, Vinicor F, Bales VS, Marks JS: **Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001.** *JAMA* 2003, **289**:76-79.
31. Whitaker RC: **Predicting preschooler obesity at birth: the role of materal obesity in early pregnancy.** *Pediatrics* 2004, **114**:e29-36.
32. Zacharias A, Habib RH, Schwann TA, Riordan CJ, Durham SJ, Shah A: **Improved survival with radial artery versus vein conduits in coronary artery bypass surgery with left internal thoracic artery to left anterior descending artery grafting.** *Circulation* 2004, **109**:1489-1496.
33. Provenchère S, Plantefève G, Hufnagel G, Vicaut E, de Vaumas C, Lecharny JB, Depoix JP, Vrtovsnik F, Desmonts JM, Philip I: **Renal dysfunction after cardiac surgery with normothermic cardiopulmonary bypass: Incidence, risk factors, and effect on clinical outcome.** *Anesth Analg* 2003, **96**:1258-1264.
34. Leitch JW, Thomson D, Baird DK, Harris PJ: **The importance of age as a predictor of atrial fibrillation and flutter after coronary artery bypass grafting.** *J Thorac Cardiovasc Surg* 1990, **100**:338-342.
35. Creswell LL, Schuessler RB, Rosenbloom M, Cox JL: **Hazards of postoperative atrial arrhythmias.** *Ann Thorac Surg* 1993, **56**:539-549.
36. Shahian DM: **Improving cardiac surgery quality – volume, outcome, process?** *JAMA* 2004, **291**:246-249.
37. Berwick DM: **Public performance reports and the will for change.** *JAMA* 2002, **288**:1523-1524.
38. Landon BE, Normand SL, Blumenthal D, Daley J: **Physician clinical performance barriers: Prospects and barriers.** *JAMA* 2003, **290**:1183-1189.

Pre-publication history

The pre-publication history for this paper can be accessed here:

http://www.biomedcentral.com/1471-2482/5/10/prepub

Publish with **BioMed Central** and every scientist can read your work free of charge

"BioMed Central will be the most significant development for disseminating the results of biomedical research in our lifetime."

Sir Paul Nurse, Cancer Research UK

Your research papers will be:

- available free of charge to the entire biomedical community
- peer reviewed and published immediately upon acceptance
- cited in PubMed and archived on PubMed Central
- yours — you keep the copyright

Submit your manuscript here:
http://www.biomedcentral.com/info/publishing_adv.asp

BioMedcentral

0405
09/15/08

APR 21 2004

Volume and outcome of coronary artery bypass graft surgery: Are more and less the same?

THIS MATERIAL MAY BE PROTECTED BY COPYRIGHT LAW (TITLE 17 U.S.CODE)
NOV 15 2006
CATHOLIC MEDICAL CENTER MANCHESTER, NH APR - 5 2004

Norman Kalant MD PhD[1], Ian Shrier MD PhD[2]

N Kalant, I Shrier. Volume and outcome of coronary artery bypass graft surgery: Are more and less the same? Can J Cardiol 2004;20(1):81-86.

BACKGROUND: Despite the relatively high degree of regionalization of coronary artery bypass graft surgery in Canada, support is expressed for even further centralization of this procedure. The finding that the risk-adjusted mortality rate is lower at high volume hospitals is the basis for the decision to centralize. The goal of this study was to determine if current evidence supports the extension of such a policy.

METHODS: A systematic review of the literature (1980 to 2002) provided mortality and surgical volume studies on 21 patient cohorts. For 16 of these, the published information permitted division of each cohort into those who had surgery at high or low volume hospitals. The target level for division was 200 cases per year; the level achieved was 200±44 (mean±SD). The odds ratio (OR) was calculated from the observed and expected mortality ratios. In seven studies, volume had been treated as a continuous variable; the effect of volume was expressed as OR per 100 patients in four of these studies.

RESULTS: A plot of OR against year of surgery showed a progressive increase from 0.55 (favouring high volume) in 1972 to 0.95±0.07 for the past few years. All estimates of OR per 100 patients were very close to 1.0, also indicating little or no effect of volume on mortality.

INTERPRETATION: These results are compatible with the concept that with time the lower mortality associated with high volume has been virtually eliminated. It is hypothesized that this development is explained by a multifaceted learning curve, improved surgical training and technical advances. Therefore, the current evidence does not provide a basis for further regionalization of cardiac bypass surgery

Key Words: *Coronary artery bypass graft; Perioperative mortality; Regionalization; Volume of surgery*

Le volume et l'issue d'un pontage aortocoronarien : Plus ou moins donnent-ils le même résultat ?

HISTORIQUE : Malgré une régionalisation relativement élevée des pontages aortocoronariens au Canada, une centralisation encore plus marquée de l'intervention est proposée. L'observation selon laquelle le taux de mortalité rajusté au risque est plus faible dans les hôpitaux à fort volume justifie cette recommandation. La présente étude vise à déterminer si les données probantes actuelles soutiennent l'élargissement de la politique.

MÉTHODOLOGIE : Une analyse systématique de la documentation scientifique (entre 1980 et 2002) a permis de colliger des études sur la mortalité et le volume d'opérations dans 21 cohortes de patients. Dans 16 d'entre elles, l'information publiée a permis de diviser chaque cohorte en ceux qui ont été opérés dans des hôpitaux à fort et à faible volume. Le taux cible de division était de 200 cas par année. Le taux obtenu était de 200±44 (moyenne±ÉT). Le risque relatif (RR) était calculé d'après les risques de mortalité observés et prévus. Dans sept études, le volume avait été traité comme une variable continue. Dans le cadre de quatre de ces études, l'effet du volume était exprimé à titre de RR pour 100 patients.

RÉSULTATS : Le schéma du RR par rapport à l'année de l'opération indiquait une augmentation progressive de 0,55 (en faveur d'un volume élevé) en 1972 à 0,95±0,07 au cours des quelques dernières années. Toutes les évaluations du RR pour 100 patients se rapprochaient énormément du 1,0, ce qui indiquait également un effet minime sinon inexistant du volume sur la mortalité.

INTERPRÉTATION : Ces résultats sont compatibles avec le concept selon lequel au fil du temps, le taux de mortalité moins élevé associé aux hôpitaux à fort volume est virtuellement éliminé. Il est allégué que cette évolution s'explique par une courbe d'apprentissage polyvalente, une amélioration de la formation chirurgicale et les progrès techniques. Par conséquent, les données probantes actuelles n'étayent pas la régionalisation supplémentaire des pontages aortocoronariens.

In 1979, Luft et al (1) published a seminal article showing that hospitals performing a large number of certain operations had lower perioperative death rates than those conducting a smaller number. Subsequent studies confirmed this observation, but over time the results became more variable. Although the presence of such a relationship is subject to several interpretations (2), the most obvious is that at high volume hospitals, the personnel gain experience and become adept more rapidly than at low volume institutions (3,4). The improvement is thus seen as a manifestation of the learning process. It has been proposed that fewer lives would be lost during surgery and that society as a whole would benefit by concentrating the procedures that show such a volume-outcome relationship, at high volume hospitals, through selective referral or regionalization (4,5). In 1978, McGregor and Pelletier (5) calculated that both operative mortality and cost of coronary artery bypass graft (CABG) surgery would fall as the volume increased to 50 per year, but that there would be no benefit obtained from further increases. These concerns have been extended to individual surgeons, because restriction of the procedure to high volume surgeons might further improve the overall results (6). A recent report on the state of health care in Canada specifically emphasized the desirability of further regionalization of CABG surgery (7), and it was stated publicly that having too many centres undertaking heart surgery may result in unnecessary complications and deaths (8).

[1]*Department of Medicine, Sir Mortimer B Davis – Jewish General Hospital, Montreal;* [2]*Department of Medicine, McGill University, Montreal;* [3]*Centre for Clinical Epidemiology and Community Studies, Sir Mortimer B Davis – Jewish General Hospital, and McGill University, Montreal, Quebec*

Correspondence: Dr Norman Kalant, Jewish General Hospital, 3755 ch de la Cote-Ste Catherine, Montreal, Quebec H3T 1E2. Telephone 514-340-8222 ext 4705, fax 514-340-7508, e-mail nkalant@med.jgh.mcgill.ca

Received for publication November 21, 2002. Accepted April 10, 2003

©2004 Pulsus Group Inc. All rights reserved

0406
09/15/08

On the other hand, in a review of papers published from 1979 to 1992, Sowden et al (9) found that although initially the mortality rate was greater at low volume hospitals, during that interval the increasing thoroughness of adjustment for case mix and surgical improvements with time appeared to diminish the volume effect. Because of the policy implications for hospitals and surgeons, it is important to be certain that the volume-outcome relationship still holds, and that the causal explanation is correct. One of the factors that complicates decision making is the generalization from one or several surgical procedures to 'surgery' or from myocardial infarction to 'health care' (10). The objective of the present work is to determine if the current literature supports a policy of further extension of regionalization; it is confined to CABG surgery.

METHODS

Selection of papers for review

The Medline, HealthSTAR and Cochrane Collaboration databases were searched (January 1, 1980 to October 1, 2002) for English-language articles concerned with the quantitation of the relationship between the volume of surgery (hospital and/or surgeon) and the perioperative mortality for CABG surgery. Combinations of the following key words were used: CABG, bypass or by-pass, coronary, hospital volume, surgeon volume, high volume, low volume, mortality or postoperative mortality, death. Interpreting the search goal broadly, all articles of potential interest (including reviews) were retained. Each author independently reviewed the full text form of the retrieved articles and transcribed the required data onto a standardized form: year(s) in which patient cohort underwent surgery, source of patients, CABG volume at individual hospitals or the range of volumes in the groups of hospitals defined by the author(s), number and CABG volume of surgeons, and criteria used for case mix adjustment. Actual (observed), expected and adjusted mortality rates were recorded when available. The outcome of interest was perioperative death rates, expressed as odds ratio (OR) or as the regression coefficient of mortality on volume and other independent variables. The references of each article were scanned and those that appeared relevant were added to the initial list. Several review articles were of particular interest (9,11-14). Finally, the Science Citation Index was searched for papers that cited the key articles retrieved by other search methods. Disagreements concerning data entries or acceptability for inclusion in the review were resolved by consensus.

Analysis

The studies were separated into two groups, depending on whether volume had been treated as a dichotomous or a continuous variable in the regression analysis.

Volume as a dichotomous variable: The choice of volume at which to segregate high and low volume institutions is arbitrary; however, many authors have set the level at or near 200 cases per year. Using the same dividing point, the observed mortality rate/expected mortality rate (O/E) was calculated for seven patient cohorts from information provided; using these ratios, the OR was calculated for each volume group. The information was insufficient to permit such calculation in eight other cohorts: division into high and low volume hospitals had been made in the range of 100 cases per year to 230 cases per year in seven of these cohorts while in the eighth cohort, the high and low volumes were separated by a wide gap because the authors compared the five lowest volume with the five highest volume hospitals. The division into high and low volumes was not altered in these cases.

Volume as a continuous variable: The OR, obtained by exponentiation of the coefficient for volume (15), was taken from the original reports or calculated from available data. The OR calculated in this way referred to the probability of mortality when hospital volume was increased by a single additional patient (ie, it was the OR for [x+1]/x patients, where x was any number of patients at the low volume and x+1 was the number of patients at the high volume. To provide a more clinically relevant OR, the OR per 100 additional patients was reported:

$$OR=\exp^{(\text{coefficient}\times 100)}.$$

RESULTS

Studies selected

The selection process yielded studies of the mortality-volume relationship in 21 patient cohorts, aggregated to hospitals, to surgical teams or to both. Seven other studies were excluded for the following reasons:

a) Use of the same data set in several publications, as noted by Sowden et al (9), including cohorts from 1972 (1,16-18), 1986 (19,20) and 1989 (21,22). Only the most recent study from each of these groups was included.

b) Insufficient number of statistical units. Williams et al (23) examined the relationship of hospital volume to surgical mortality in five hospitals. They acknowledged that their failure to detect a correlation may have been due to the small number of hospitals.

c) Methodological problems. Nallamothu et al (24), in a novel approach, tested the hypothesis that the degree of benefit of a high hospital volume may be related to the level of risk facing the patient. After risk stratification of the patients and separation of hospitals into low volume (less than 200 patients per year) and high volume (greater than 200 per year) groups, the rates were lower at the high volume hospitals for the two risk strata 2% to 5% and 5% to 20%, but not for the stratum greater than 20%. Methodological questions place the significance of this work in doubt (25). (i) The risk strata into which patients were segregated were rather wide, particularly at the higher levels; thus one could not be certain that the mean and distribution of risk scores were the same in the two groups considered to be at the same level. (ii) The study population was confined to nonemergent patients and therefore was not representative of the whole CABG population. (iii) There was some doubt whether an analysis of variance should have preceded the series of χ^2 tests; if the F value was not significant then the multiple paired comparisons may not have been appropriate. This is especially important because the volume effect occurred in the moderate but not the high risk groups. For these reasons, the results were not included in the present review.

Some papers compared two or more patient populations that differed in location (26) or in year of surgery (22,27). These were considered independent cohorts and included as such in the analysis.

Analysis

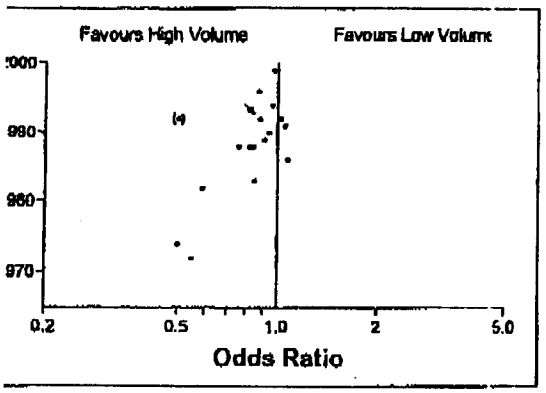
Table 1 shows studies based on multiple logistic regression with hospital volume as the categorical, independent variable

0407
09/15/08

ABLE 1
orrelation of hospital volume of coronary artery bypass grafting (CABG) surgery and adjusted mortality rate: Volume as ategorical variable

rf	Year of surgery	Source of data	Case mix adjustment criteria	Patients (n)	Hospitals (n)	Low volume* cut off
†	1972	US, CPHA	Age, sex	6469	111	150
	1974 to 76	US, CPHA	Age, sex, comorbidity	17,165	182	200
	1982	US, CPHA	Age, sex	29,486	107	150
	1983	Calif, CHFC	Age, sex, ethnicity, AMI, CHF, angiogram	18,986	77	200
‡	1986	NY State, SPARCS	Age, sex, ethnicity, emergency comorbidities	9774	223	223
	1987 to 89	NY	Age, sex	38,569	31	200‡
	1987 to 89	Calif	Age, sex	61,746	111	200‡
	1987 to 89	Canada	Age, sex	18,278	15	200‡
†	1989	NY State, SPARCS	Approximately 40 risk factors	12,269	30	200‡
	1990	NY State, SPARCS	Approximately 40 risk factors	13,946	30	200‡
	1991	NY State, SPARCS	Approximately 40 risk factors	14,944	30	200‡
	1992	NY State, SPARCS	Approximately 40 risk factors	15,733	30	200
	1990 to 95	NY State, SPARCS	Age, sex, ethnicity, payer status	97,107	31	200
	1992 to 96	Canada, CIHI	Age, sex, comorbidities, severity of illness indicators (CHF, AMI, prior CABG, angioplasty, etc)	50,357	23	<298§
		excluding Quebec				>656
	1994 to 99	US, CMMS	Age 65 to 99, fee-for-service	809,038	1068	230
	1999	HCA	Age, sex, tobacco, COPD, IDDM, ARF, cardiogenic shock, HT, AMI, etc	16,988	72	100

oundary between low and high volume groups; †One or more excluded articles used the same surgical cohort (see text); ‡OR for death was obtained by recalculation a cutoff of 200; §Authors compared the five lowest volume hospitals with the five highest volume hospitals. AMI Acute myocardial infarction; ARF Acute renal failure; lif California; CHF Congestive heart failure; CHFC California Health Facilities Commission; CIHI Canadian Institute for Health Information; CMMS Center for ledicare and Medicaid Services; COPD Chronic obstructive pulmonary disease; CPHA Commission on Professional and Hospital Facilities; HCA Hospital Corporation America; HCUP Hospital Cost and Utilization Project; HT Hypertension; IDDM Insulin-dependent diabetes mellitus; LVEF Left ventricular ejection fraction; f New York; PVD Peripheral vascular disease; Ref Reference; RF Renal failure; SPARCS Statewide Planning and Research Cooperative System; US United States



gure 1) Odds ratio for perioperative mortality following coronary tery bypass graft surgery, in high volume hospitals relative to low vol- ne hospitals. Each symbol represents a cohort of patients, with the ratio xted against the midpoint of the time interval during which members of e cohort underwent surgery. (•) is odds ratio of 1992 cohort (22) with u volume cutoff at 200 patients per year; these data are derived from o hospitals and 135 patients. →• indicates corresponding value for cut- at 225 patients per year, derived from three hospitals and 345 patients

id risk-adjusted mortality rate as the dependent variable of terest. The OR values corresponding to the regression analy- s show a continuous increase with time (Figure 1) and, for e past 10 years, a clustering about a value of 1.0, indicating at the risk-adjusted mortality was essentially equal at high and low volume hospitals. The value for the 1992 cohort (22) is an outlier; because it was derived from two hospitals with a combined patient population of 135, the estimate is very unstable. By placing the cutoff at 225, there are three hospitals with 345 patients in the low volume group, the estimate is more stable, and the result falls within the range of the other cohorts. In seven investigations of hospital volume-mortality relationships, volume was a continuous independent variable in the logistic regression (Table 2). In three studies in which logarithm of volume was used in place of volume in the regression, the coefficient of volume was negative, indicating a decrease in mortality rate as volume increased. There remain four estimates of OR per 100 patients for hospital volume-mortality relationship; all are very close to 1.0.

Three reports that did not have sufficient detail to permit inclusion in the analysis and are not presented in the tables nevertheless deserve comment. In two, presented as letters to the editor, the regression of risk-adjusted mortality on hospital volume deviated from linearity because of an increase in scatter of the data at low volumes (28,29). In both cases, the writers took these regression lines as evidence of a volume-mortality effect at low volumes. However, the increased scatter can be accommodated in a Poisson regression without assuming a volume-mortality relationship (30). The third (31) found an inverse relationship between hospital CABG volume and mortality rate ($P<0.02$) when risk adjustment was based only on age. After more extensive risk adjustment in a multivariate model, logistic regression showed no relationship and hospital CABG volume was not a predictor of mortality. Poisson regression did not reveal a volume relationship or evidence of a threshold for a volume effect.

0408
09/15/08

TRANSMISSION VERIFICATION REPORT

TIME : 11/21/2006 10:39
NAME :
FAX :
TEL :
SER.# : BROK4J976162

DATE,TIME	11/21 10:39
FAX NO./NAME	97095753
DURATION	00:00:00
PAGE(S)	00
RESULT	BUSY
MODE	STANDARD

BUSY: BUSY/NO RESPONSE

Saint Mary's
HOSPITAL
Your Regional Health Care Center

FACSIMILE TRANSMISSION

From: Health Sciences Library
St. Mary's Hospital
56 Franklin St.
Waterbury, CT 06706
Voice: (203) 709-6408
Fax: (203) 709-7738

To: The Heart Center

Page 1 of ___

Requested Article

Please Note: If not receiving properly, please notify us immediately by calling (203) 709-6408. This information is released for your professional use and is privileged. If the reader of this message is not the intended recipient, or an agent responsible for delivering it to the intended recipient, you are hereby notified that you have received document in error and that any review, dissemination, distribution or copying of this message is strictly prohibited. If you have received this communication in error, please notify us immediately by telephone.

TABLE 2
Correlation of hospital volume of coronary artery bypass grafting (CABG) and adjusted mortality rate: Volume as continuous variable

Ref	Year of surgery	Source of data	Case mix adjustment criteria	Patients (n)	Hospitals (n)	Coefficient of hospital volume	OR/100 patients
52	1977	National Centre for Health Services Research	Disease stage, age, sex, teaching hospital region, insurance coverage, hospital size	3883	28	−0.005 for volume in 100s	0.995
53	1979 to 80	US, CMMS	Age, sex, emergency, diagnosis, region, medications	6157	990	−0.149 for $\log_{10}$(volume)	–
54	1982	US, CPHA	Patient-related, hospital organization, hospital environment	29,503	120	−1.7543 for log(volume)	–
94	1980 to 87	US, HCUP	Patient (general), patient (diagnosis specific), hospital organization instrumental	146,890	62	−1.263 for log(volume)	–
20	1988	SPARCS, NY State	Patient (age, sex), diagnosis, stage of disease, hospital organization	9774	27	−0.0003	0.970
22	1989	SPARCS, NY State	Surgical risk factors, log(volume)	12,448	30	−0.0014	0.970
33	1991 to 95	NY State	Sex, age, hospital volume	97,137	31	0.0014/100,000 cases	1.001

CMMS Centre for Medicare and Medicaid Services; CPHA Commission on Professional and Hospital Facilities; HCUP Hospital Cost and Utilization Program; NY New York; Ref Reference; SPARCS Statewide Planning and Research Cooperative System; US United States

TABLE 3
Correlation of hospital volume of CABG and adjusted mortality rate: Volume as continuous variable

Ref	Year of surgery	Source of patient data	Case mix adjustment criteria	Patients (n)	Surgeons (n)	Coefficient of surgeon volume	OR/100 patients
Volume as a continuous variable							
52	1977	US, HCUP	Age, sex, insurance, multiple diagnoses, teaching hospital, disease stage	3883	99	0.007 for volume in 100s	1.007
54	1982	CPHA	Age, sex, procedure, diagnosis	29,503	120	−4.2107	<0.001
20	1988	NY State	Age, sex, race, emergency, multiple diagnosis, disease status	9774	353	−0.0018	0.835
55	1991 to 93	Society of Thoracic Surgeons		120,377	160	−0.0003	N/A
22	1989	NY State	AMI, obesity, medications, previous surgery, angina, age, sex	12,448	126	−0.52 for log(surgeon volume)	0.97
Volume as a categorical variable							
27	1989	NY State	Age, sex, race, LVEF, diabetes, etc	12,531	125	Low volume cutoff 200	0.47
27	1990	NY State	Age, sex, race, LVEF, diabetes, etc	14,003	130	200	0.54
27	1991	NY State	Age, sex, race, LVEF, diabetes, etc	15,016	136	200	0.5
27	1992	NY State	Age, sex, race, LVEF, diabetes, etc	15,637	136	200	0.72

AMI Acute myocardial infarction; CABG Coronary artery bypass grafting; CPHA Commission on Professional and Hospital Facilities; HCUP Hospital Cost and Utilization Program; LVEF Left ventricular ejection fraction; NY New York; US United States

Of five studies of the surgeon volume-mortality relationship in which the volume was considered a continuous variable, three gave an OR per 100 patients close to 1.0, one gave an OR against the hypothesis (ie, strongly favouring low surgeon volume), and one (volume expressed as the logarithm of volume) supported the hypothesis (ie, it favoured high volumes) (Table 3). Analysis of four cohorts, with volume as a categorical variable, gave OR values clearly favouring high volumes. There is no obvious explanation for these differences; thus, the results remain inconclusive for surgeon volume.

DISCUSSION

Despite continuing concern about the volume-outcome relationship in CABG surgery, some of the questions raised by the early work remain unanswered: Is there an inverse correlation between the volume of CABG surgery performed at a hospital and the quality of the outcome? If so, does volume decrease mortality or does low mortality attract more patients? Should the presence of such a correlation lead to a policy change designed to concentrate CABG surgery in a small number of high volume hospitals? Similar questions pertain to the volume of these procedures done by individual surgeons.

Is there a volume-outcome relationship? Two recent reviews have concluded that such a relationship does exist (6,32). Our results indicate that though a relationship was evident during the early years of CABG surgery, its magnitude diminished over time, virtually to zero. Comparison of these reviews with

0411
09/15/08

rs shows several important differences which may explain the ntrasting conclusions: (i) In both preceding works, CABG is ne of a variety of procedures studied; attention is focused on the lationship as a generalized phenomenon and on its policy plications rather than on its magnitude. (ii) Although pub-hed in 2000, the report of Dudley et al (6) includes no data m CABG performed after 1990 and thus neglects much relet int information. (iii) The conclusion of Halm et al (32) with gard to CABG is based on the median difference in mortality tween low and high volume hospitals. Of the eight publica-ns they analyzed, three did not provide such information on edetermined volume categories (31,33,34), and presumably re excluded from the median; because two of these (31,33) re the only ones that showed no dependence of outcome on lume, their omission may have biased the summary statistic. v) The major difference between the preceding reviews and e present one is in the role ascribed to time. Halm et al (32) ce both the time-related decrease in the difference between gh and low volume hospitals, and the absence of correlation tween outcome and short term fluctuation in volume at indi-lual hospitals (34); they interpret these observations as evi-nce of fixed differences in quality between high and low lume hospitals. Our results show the extension of improve-nt over time to the point of eliminating the difference tween high and low volume outcomes. This appears to be compatible with the concept of fixed differences.

ature of volume-outcome relationship: It is apparent that a cor-lation between volume and outcome may indicate (i) depend-ce of outcome on volume (improvement with practice),) dependence of volume on outcome (skill attracts more tients), (iii) correlation of both variables to a third factor ne use of CABG-specific, beneficial procedures in high vol-ne hospitals), or (iv) a combination of these. There is some direct evidence compatible with the improvement with actice hypothesis: Cromwell et al (35) found a 26.5% crease in operating time, associated with increasing volume, ring the first 12 years of hospital experience with CABG; e reduction occurred rapidly for the first few years, then pered off in a manner compatible with the traditional view of learning curve. It may reasonably be assumed that this con-buted to the overall decrease in operative mortality during e past 20 years (36,37). On the other hand, Luft et al (38) tained some evidence in support of the second alternative, t expressed doubt about the methodology used. Thus, the idence is weak for each of the two principal explanations for olume-outcome effect, and it is therefore surprising that sev-al observers base their recommendations on the implicit sumption that volume determines outcome (32,39).

If that assumption is made (explicitly), one can offer a rea-nable explanation of the temporal change in the effect of lume on outcome. We suggest that, during the early period CABG surgery, one would expect an individual hospital to ve a composite learning curve derived from individual sur-ons interacting with the curve of the hospital support staff; is would be reflected in a volume-mortality effect. As the sur-al technique spreads, a learning curve would be generated in w locations, with an increase in complexity of the combined rve. When diffusion of the technique was completed, as aining of new surgeons changed from learning by doing to rning under the direction of experienced surgeons in estab-hed programs, and as each hospital and surgical team ached its quality plateau, the volume effect would diminish in importance, becoming undetectable by present methods of assessment. The dichotomy of the results shown in Table 2 is explained by this hypothesis, because all the data supporting a volume effect were obtained before 1990.

Implications for policy: Two of the concepts that policy makers would apply routinely in an ideal world are: i) new policies governing medical practice, like medical practice itself, should be based on the best available evidence, so that decision-makers may be reasonably confident that implementation of a new policy will have the effect desired; ii) the implementation of a new policy should be accompanied by a planned evaluation of its effects, as advocated by proponents of continuous quality improvement (40). In the case of CABG, regionalization has been carried out in a number of jurisdictions, primarily to reduce costs; evidence to support this decision was provided by earlier studies of the volume-outcome relationship. Currently, there are calls for further regionalization; this raises two questions: i) The findings of Sowden et al (9), together with ours, suggests that the evolution of CABG surgery has reduced the importance of the earlier evidence. Individual studies may still show a small effect of volume on outcome but the overall pattern of results does not. Consequently, the combined evidence does not provide support for a policy of expanded regionalization. ii) It is possible that concentration in large centres has contributed to the improvement of outcome with time; however, there have been no prospective studies of planned regionalization, so there is no hard evidence of the benefits of the policy. On the contrary, it has been suggested by Houghton (12) that simply increasing the number of patients is very unlikely to improve the outcome of a hospital; it might be preferable to determine what it is that successful hospitals do differently from unsuccessful ones, and to implement these procedures in all hospitals (41). This has been accomplished by the techniques of continuous quality improvement (42).

The Cardiac Care Network of Ontario has recently decided to add three centres for cardiac surgery with the same volume criteria as those adopted in establishing the network: 500 cases per year per centre and 150 operations per year per surgeon. The results of the network are of the highest quality; however, because a number of factors may contribute to outcome, one cannot ascribe the Ontario results to the volume criteria. If the decision to add three (rather than four or five) centres is determined by the requirement for 500 cases per year, the planners may wish to reexamine this decision in the light of our results.

Limitations: There are two sources of error in the work described that are of potential concern. As with all such reviews, there is no certainty that all relevant articles have been found. That we independently found all the CABG related studies uncovered by Halm et al (32) and other recent papers is reassuring. The second concern is that of the statistical analysis. There have been criticisms of some of the statistical methods used in previous studies of the volume-outcome relationship: Goldstein and Spiegelhalter (43) and Grunkemeier et al (44) have noted that the error in the data is probably much greater than the analysts have allowed for; others have advocated the use of Poisson regression instead of multiple logistic regression (30), and of hierarchical methods in place of regression methods (45-47). Without access to the raw data, we could not test these ideas and therefore we accepted the statistical approaches of the original studies.

0412
09/15/08

Summary: We have extended the finding of Sowden et al (9) that the strength of the relationship between volume of CABG surgery and adjusted mortality rate has decreased over the past two to three decades, so that for surgery performed now there does not appear to be a measurable advantage to a high volume. Consequently, the current situation does not provide a basis for extension of the regionalization which has already been engineered.

REFERENCES

1. Luft HS, Bunker JP, Enthoven AC. Should operations be regionalized? N Engl J Med 1979;301:1364-9.
2. Luft HS. The relation between surgical volume and mortality: An exploration of causal factors and alternative models. Med Care 1980;18:940-59.
3. Flood AB, Scott WR, Ewy W. Does practice make perfect? Part I: The relation between hospital volume and outcome for selected diagnostic categories. Med Care 1984;22:98-114.
4. Flood AB, Scott WR, Ewy W. Does practice make perfect? Part II: The relation between volume and outcomes and other hospital characteristics. Med Care 1984;22:115-25.
5. McGregor M, Pelletier G. Planning of specialized health facilities. Size vs cost and effectiveness in heart surgery. N Engl J Med 1978;299:179-81.
6. Dudley AD, Johansen KL, Brand R, Rennie DJ, Milstein A. Selective referral to high-volume hospitals. Estimating potentially avoidable deaths. JAMA 2000;283:1159-66.
7. Health Care in Canada, Annual Report 2001. Ottawa: Canadian Institute for Health Information, 2001.
8. Derfel A. Quebec lacks heart-specialty facilities: Report. The Montreal Gazette May 9 2001;Section A.
9. Sowden AJ, Deeks JJ, Sheldon TA. Volume and outcome in coronary artery bypass graft surgery: True association or artifact? BMJ 1995;311:151-5.
10. Hannan EL. The relation between volume and outcome in health care. N Engl J Med 1999;340:1677-9.
11. Banta D, Bos M. The relation between quantity and quality with coronary artery bypass graft (CABG) surgery. Health Policy 1991;18:1-10.
12. Houghton A. Variation in outcome of surgical procedures. Brit J Surg 1994;81:653-60.
13. Crawford FA Jr, Anderson RP, Clark RE, et al. Volume requirements for cardiac surgery credentialling: A critical examination. Ann Thorac Surg 1996;67:12-6.
14. Slavin LF, Best MA, Aron DC. To regionalize or not to regionalize. That is the question. B Part 1. Endocrinologist 2000;10:205-10.
15. Rosner B. Fundamentals of Biostatistics. Boston: PWS Publishers, 1986;404-8.
16. Maerki SC, Mhsa M, Luft HA, Hunt SS. Selecting categories of patients for regionalization. Med Care 1986;24:148-58.
17. Sloan FA, Perrin JM, Valvona A. In-hospital mortality of surgical patients: Is there an empiric basis for standard setting? Surgery 1986;99:446-53.
18. Rosenfeld K, Luft HS, Garnick DW, McPhee SJ. Changes in patient characteristics and surgical outcomes for coronary artery bypass surgery 1972-82. Am J Public Health 1987;77:498-500.
19. Zelen J, Bilfinger TV, Anagnostopoulos CE. Coronary artery bypass grafting: The relationship of surgical volume, hospital location and outcome. NY State J Med 1991;91:290-2.
20. Hannan EL, O'Donnell, Kilburn H, et al. Investigation of the relationship between volume and mortality for surgical procedures performed in New York State hospitals. JAMA 1989;262:503-10.
21. Hannan EL, Kilburn H, O'Donnell JF, et al. Adult open heart surgery in New York State. An analysis of risk factors and hospital mortality rates. JAMA 1990;264:2768-74.
22. Hannan EL, Kilburn H, Racz M, et al. Improving the outcomes of coronary artery bypass surgery in New York State. JAMA 1994;271:761-6.
23. Williams SV, Nash DB, Goldfarb N. Differences in mortality from coronary artery bypass graft surgery at five teaching hospitals. JAMA 1991;266:810-5.
24. Nallamothu BK, Saint S, Ramsey SD, et al. The role of hospital volume in coronary artery bypass grafting: Is more always better? J Am Coll Cardiol 2001;38:1923-30.
25. Luft HS. Better for whom? Policy implications of acting on the relation between volume and outcome in coronary artery bypass grafting. J Am Coll Cardiol 2001;38:1931-3.
26. Grumbach K, Anderson GM, Luft HS, Roos LL, Brook R. Regionalization of cardiac surgery in the United States and Canada. JAMA 1995;274:1282-8.
27. Hannan EL, Siu AL, Kumar D, Kilburn H Jr, Chassin MR. The decline in coronary artery bypass graft surgery mortality in New York State. JAMA 1995;273:209-13.
28. Luft HS, Parker JD. Volume and mortality in coronary artery bypass grafting. BMJ 1995;311:1304-5. (Lett)
29. Parsonnet V, Bernstein AD. Outcome versus volume in coronary bypass operations. Ann Thorac Surg 1996;61:1874-80.
30. Pert SB. Coronary artery bypass grafting volume and mortality. Ann Thorac Surg 1996;62:940-51.
31. Shroyer ALW, Marshall G, Warner BA, et al. No continuous relationship between veterans affairs hospital coronary artery bypass grafting surgical volume and operative mortality. Ann Thorac Surg 1996;61:17-20.
32. Halm EA, Lee C, Chassin MR. How is volume related to quality in health care? A systematic review of the research literature. Appendix C. In: Hewitt M, ed. Interpreting the Volume-Outcome Relationship in the Context of Health Care Quality. Washington: Committee on Quality of Health Care in America and National Cancer Policy Board of the Institute of Medicine, May 2000.
33. Sollano JA, Gellins AC, Moskowitz AJ, et al. Volume outcome relationships in cardiovascular operations: New York State, 1990-1995. J Thorac Cardiovasc Surg 1999;117:419-30.
34. Farley DE, Ozminkowski RJ. Volume-outcome relationships and in-hospital mortality: The effect of changes in volume over time. Med Care 1992;30:77-94.
35. Cromwell J, Mitchell JB, Stason WB. Learning by doing CABG surgery. Med Care 1990;28:6-18.
36. Tu JV, Sykora K, Naylor CD. Assessing the outcomes of coronary artery bypass graft surgery: How many risk factors are enough? Steering comm tee of the Cardiac Care Network of Ontario. J Am Coll Cardiol 1997;30:1317-23.
37. Weintraub WS, Culver JM, Jones EL, et al. Improving cost and outcome of coronary surgery. Circulation 1998;98(Suppl II):II23-8.
38. Luft HS, Hunt SS, Maerki SC. The volume outcome relationship: Practice makes perfect or selective referral patterns? Health Serv Res 1987;2:157-82.
39. Epstein AM. Volume and outcome: It is time to move ahead. N Engl J Med 2002;345:1161-4.
40. Langley GJ, Nolan KM, Nolan TW, Norman CL, Provost LP. The Improvement Guide. San Francisco: Jossey-Bass, 1996.
41. Donabedian A. Volume, quality and the regionalization of health care services. Med Care 1984;22:95-7.
42. Malenka DJ, O'Connor GT. A regional collaborative effort for CQI for cardiovascular disease. Jt Comm J Qual Improv 1995;21:627-33.
43. Goldstein H, Spiegelhalter DJ. League tables and their limitations: Statistical issues in comparisons of institutional performance. J R Statist Soc A 1996;159:385-443.
44. Grunkemeier GL, Zerr KJ, Jin R. Cardiac surgery report cards: Making the grade. Ann Thorac Surg 2001;72:1845-8.
45. Christiansen CL, Morris CN. Improving the statistical approach to health care: Provider profiling. Ann Inter Med 1997;127:764-8.
46. Shahian DM, Normand S-L, Torchiana DF, et al. Cardiac surgery report cards: Comprehensive review and statistical critique. Ann Thorac Surg 2001;72:2155-68.
47. Rothwell PM. Interpretations in variations in outcome in audit of clinical interventions. Lancet 2000;355:4-5.
48. Showstack JA, Rosenfeld KE, Garnick DW, Luft HS, Schaffarzick RW, Fowler J. Association of volume with outcome of coronary artery bypass graft surgery. Scheduled vs non-scheduled operations. JAMA 1987;257:785-9.
49. Ghali WA, Quan H, Brant R. Coronary artery bypass grafting in Canada: Hospital mortality rates, 1992-1995. CMAJ 1998;159:926-30.
50. Birkmeyer JD, Siewers AE, Finlayson EV. Hospital volume and surgical mortality in the United States. N Engl J Med 2002;346:1128-37.
51. Brown PP, Mack MJ, Simon AW, et al. Comparing clinical outcomes in high-volume and low-volume off-pump coronary bypass operation programs. Ann Thorac Surg 2001;72(Suppl):S1009-15.
52. Kelly JV, Hellinger FJ. Heart disease and hospital deaths: An empirical study. Health Serv Res 987;22:369-95.
53. Riley G, Lubitz J. Outcomes of surgery among the Medicare aged: Surgical volume and mortality. Health Care Financ Rev 1985;7:37-47.
54. Hughes RG, Hunt SS, Luft HS. Effects of surgeon volume and hospital volume on quality of care in hospitals. Med Care 1987;25:489-503.
55. Clark RE, Crawford FA Jr, Anderson RP, Grover FL, Kouchoukos NT, Waldhausen JA. Outcome as a function of annual coronary artery bypass graft volume. Ann Thorac Surg 1996;61:21-6.

0413
09/15/08

JAMA®
The Journal of the American Medical Association

Vol. 291 No. 2, January 14, 2004
Original Contribution

TABLE OF CONTENTS >

Procedural Volume as a Marker of Quality for CABG Surgery

Eric D. Peterson, MD, MPH; Laura P. Coombs, PhD; Elizabeth R. DeLong, PhD; Constance K. Haan, MD; T. Bruce Ferguson, MD

JAMA. 2004;291:195-201.

ABSTRACT

Context There have been recent calls for using hospital procedural volume as a quality indicator for coronary artery bypass graft (CABG) surgery, but further research into analysis and policy implication is needed before hospital procedural volume is accepted as a standard quality metric.

Objective To examine the contemporary association between hospital CABG procedure volume and outcome in a large national clinical database.

Design, Setting, and Participants Observational analysis of 267 089 isolated CABG procedures performed at 439 US hospitals participating in the Society of Thoracic Surgeons National Cardiac Database between January 1, 2000, and December 31, 2001.

Main Outcome Measure Association between hospital CABG procedural volume and all-cause mortality (in-hospital or 30-day, whichever was longer).

Results The median (interquartile range) annual hospital-isolated CABG volume was 253 (165- procedures, with 82% of centers performing fewer than 500 procedures per year. The overall op mortality was 2.66%. After adjusting for patient risk and clustering effects, rates of operative m decreased with increasing hospital CABG volume (0.07% for every 100 additional CABG procedu adjusted odds ratio [OR], 0.98; 95% confidence interval [CI], 0.96-0.99; P = .004). While the a between volume and outcome was statistically significant overall, this association was not obser patients younger than 65 years or in those at low operative risk and was confounded by surgeor The ability of hospital volume to discriminate those centers with significantly better or worse mo limited due to the wide variability in risk-adjusted mortality among hospitals with similar volume of up to 100 of the lowest-volume centers (ie, those performing ≤150 CABG procedures/year) w estimated to avert fewer than 50 of 7110 (<1% of total) CABG-related deaths.

Conclusion In contemporary practice, hospital procedural volume is only modestly associated outcomes and therefore may not be an adequate quality metric for CABG surgery.

JAMA
• Online Fea
This Art
• Abstract
• PDF
• Send to a f
• Save in My
• Save to cit
• Permission
Citing A
• Citation m
• Citing artic HighWire
• Citing artic (41)
• Contact me article is ci
Related
• Related art
• Similar art
Topic C
• Quality of
• Surgical In
• Cardiovasc Cardiothor
• Cardiovasc Interventic
• Revascular
• Alert me o topic

0414
09/15/08

INTRODUCTION

Jump to
- Top
- Introductio
- Methods
- Results
- Comment
- Author infc
- References

The association between hospitals' coronary artery bypass graft (CABG) surgery volume and outcome has been the subject of multiple investigations.[1-17] Based on these studies, the Center for Medicare & Medicaid Services (CMS) and the Leapfrog Group have proposed using hospital volume as an indicator of CABG quality.[18-20] Prior studies of the association between volume and outcome, however, generally have been based on administrative data sources, have reflected selected patient populations, and often have not adequately accounted for patient case mix, patient clustering, a methodological concerns. Before hospital surgery volume is accepted as a standard quality metr research into issues related to both analysis and policy implication is warranted.

We undertook a contemporary examination of the association between hospital CABG procedura and outcome using clinical data available from the Society of Thoracic Surgeons (STS) National (Database. Specifically, we considered whether hospital CABG volume was associated with opera mortality after accounting for patient case mix. Second, we examined the extent to which patien clustering within centers and site variance issues affected this association. Third, we determined association varied as a function of patient age and predicted surgical risk. Fourth, we determinec the association between hospital volume and outcome was influenced by individual surgeon volu Finally, we investigated the potential health policy implications of using hospital volume as a qua indicator. This included determining the ability of hospital volume to discriminate high-mortality as well as investigating the potential number of lives saved if low-volume centers were systemat closed.

METHODS

Jump to
- Top
- Introductio
- Methods
- Results
- Comment
- Author infc
- References

Data Source

The STS National Cardiac Database was established in 1989 to report surgical outcomes following cardiothoracic surgical procedures.[21-23] The database currently captures clinical information from nearly two thirds of all US bypass procedures from more than half of all centers performing adult cardiac surgery. Sites enter patient data using uniform definitions (available online at http://www.sts.org) and certified software systems. This information is sent semiannually to the STS Data Warehouse an Center at the Duke Clinical Research Institute. There, a series of data quality checks are perform a site's data are aggregated into the national sample. While participation in the STS database is data completeness is high, with overall preoperative risk factors missing in fewer than 5% of sul cases.[24] The accuracy of submitted data has further been confirmed in independent comparison CABG surgery volume and mortality rates reported to the STS vs those reported to the CMS.[24]

Patient Population

We examined isolated CABG surgery procedures, excluding those combined with valve or other surgical interventions, performed between January 1, 2000, and December 31, 2001, at hospita reporting to the STS. We excluded 12 centers (2.7% of total STS centers) that reported fewer th CABG procedures in a year and that had evidence for incomplete reporting. Inclusion of the 223 from these 12 centers had no measurable impact on the study's measured association between procedural volume and outcome.

0415
09/15/08

Statistical Analysis

Our primary outcome measure was all-cause operative mortality, defined as in-hospital or 30-da mortality, whichever was longer. Major morbidity was defined as any of 5 postoperative in-hospi complications: stroke, reoperation for any reason, need for mechanical ventilation for more thar following surgery, renal failure, or deep sternal wound infection.[25]

Hospital-isolated CABG annual case volume was averaged over a 2-year period (2000 and 2001) increase its stability. In the overall analysis, volume was considered to be a continuous variable. display purposes, patient and hospital characteristics and unadjusted outcomes were categorize annual hospital procedural volume (≤150, 151 to 300, 301 to 450, and >450). These break poin chosen to form 4 fairly equal-sized hospital samples while maintaining similar volume difference the groups.

The effect of hospital volume on unadjusted outcomes was tested using standard logistic regres Expected mortality rates for patients were calculated using a logistic regression model that inclu previously identified preoperative risk factors[25] and year of surgery. The C-index for this model study population was 0.78. Risk-adjusted mortality rates for each hospital were calculated by di observed mortality rate by the expected mortality rate at the hospital and multiplying by the ove (national) bypass mortality rate. Additionally, hierarchical logistic regression was used to accour patient clustering within centers (SAS Macro GLIMMIX).[26] These analyses included clinical risk fa procedure year, and hospital procedural volume as a fixed effect and included random intercept To supplement this analysis, a hospital-level weighted least-squares regression of risk-adjusted on volume was used to correct for nonconstant variance associated with hospital sample size, as by hospital volume.[27] This method assigned greater weight to observations with smaller varianc

Because many previous studies have focused on Medicare populations (ie, those with patients a years) while others have specifically investigated the effect of hospital volume as a function of p risk,[13, 15] we also tested for interactions between hospital volume and patient age (<65 years ar years) and expected risk for patients in our hierarchical analyses. We also used our hierarchical test the hospital volume x surgeon volume interaction. While the STS database does not contain names of individual surgeons, it does contain an encrypted primary surgeon identifier that can b aggregated within and among hospital locations to approximate annual surgeon volume.

Finally, we also examined health policy implications of hospital volume. We first determined the which hospital volume identified "mortality outlier" hospitals as determined by their significance hierarchical logistic regression model containing patient characteristics but not volume. Specifica used a hospital-level standard logistic regression model to test whether hospital procedural volu discriminate mortality outliers. Second, we assessed the potential number of lives saved from cl either the lowest hospital volume quartile in the STS database (≤150 CABG procedures per year) alternatively using the Leapfrog-proposed referral criteria of fewer than 500 procedures per yea these calculations, we assumed that all these patients could safely be transferred from low- to h volume centers without risk and that the patients would assume the expected risk predicted for higher-volume site once there. All statistical analyses were performed using SAS release 8.2 (SA Institute Inc, Cary, NC), with $P<.05$ considered statistically significant.

RESULTS

Jump to
· Top

Between 2000 and 2001, 267 089 isolated CABG procedures were performed at

0416
09/15/08

• Introductio
• Methods
• Results
• Comment
• Author infc
• References

439 STS hospitals. Average hospital procedural volumes ranged from 39 to 1754 isolated CABG procedures (median, 253; interquartile range, 165-417). Eighteen percent of STS centers performed 500 or more procedures per year.

Table 1 displays patient and hospital characteristics as a function of hospital volume. Compared with higher-volume centers, lowest-volume hospitals (ie, those performing ≤ procedures per year [n = 98]) were more likely to operate on nonwhite patients, as well as on p with chronic lung disease, prior stroke, recent myocardial infarction, left main artery disease, an emergent or salvage settings. Based on preoperative risk factors, the average expected surgical risk ranged from 3.0% for hospitals performing 150 cases or fewer to 2.6% for those performinç than 450 cases. The Pacific and West South Central regions tended to have more low-volume hc region, while New England, and the Mid-Atlantic, South Atlantic, and East South Central regions high-volume centers.

View this table:
[in this window]
[in a new window]

Table 1. Patient and Hospital Characteristics*

Hospital Volume and Outcomes

Overall, there were 7110 deaths (2.66%). Overall unadjusted mortality declined from 3.5% for l in the lowest-volume group to 2.4% for hospitals in the highest-volume group ($P<.001$ for trend 2). Rates of prolonged ventilation and renal failure also declined significantly ($P<.001$ for both) \ increasing hospital procedural volume. Reoperation, stroke, and rates of deep sternal wound infe were generally constant across volume group, as was postoperative length of stay (median, 5 da volume groups).

View this table:
[in this window]
[in a new window]

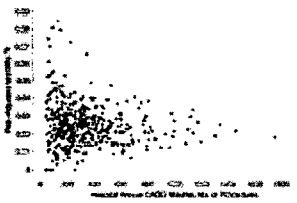
Table 2. Unadjusted Outcomes

After adjusting for preoperative clinical risk, year of surgery, and patient clustering within centei mortality declined significantly as a function of hospital procedural volume, ranging from 3.1% fe performing 150 or fewer cases per year to 2.4% for those performing more than 450 cases per \ When looking at hospital volume as a continuous variable, absolute rates of mortality decreased for every 100 additional CABG cases per year (adjusted odds ratio [OR], 0.98; 95% confidence i [CI], 0.96-0.99; $P = .004$).

Although the relationship between hospital procedural volume and risk-adjusted mortality was s significant, there was wide variance in results observed among individual centers, particularly in volume category (Figure 1). While part of this variance is inherent, due to sample-size effects, tl association between hospital volume and outcome persisted after correcting for nonconstant var among sites by means of weighted least squares ($P = .001$).

Figure 1. Risk-Adjusted Hospital Mortality Rates by CAB(

0417
09/15/08



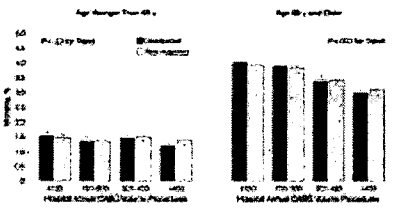
View larger version (21K):
[in this window]
[in a new window]

Procedural Volume

Each dot represents a hospital reporting data to the Socie Thoracic Surgeons National Cardiac Database. CABG indi coronary artery bypass graft.

Effect of Volume on Outcome in Patient Subgroups

The absolute effect of hospital volume was more apparent in elderly patients (Figure 2). In patie 65 years and older, there was a 1.0% difference in observed mortality rates between low- (≤150 high-volume (>450) hospitals that was only slightly diminished after adjustment for risk (P<.00 contrast, among those younger than 65 years, observed mortality declined by only 0.3% and wa insignificant after adjustment for risk (P = .53).



View larger version (40K):
[in this window]
[in a new window]

Figure 2. Unadjusted and Risk-Adjusted Mortality by Pat Group

Error bars indicate 95% confidence intervals. CABG indica coronary artery bypass graft.

Similarly, patients with intermediate and high expected preoperative risk demonstrated consiste mortality when treated at higher-volume centers (Table 3). In contrast, among those with expec operative risk of less than 1.5%, there was no volume effect in either observed or adjusted mor rates. A formal test for volume x patient risk interaction in the logistic regression model was sign = .002).

View this table:
[in this window]
[in a new window]

Table 3. Association Between Hospital CABG Volume and Mortality, by Ex Risk

Surgeon and Hospital Volume

Table 4 demonstrates the effect of hospital and surgeon volume on risk-adjusted operative mort rates. While there was colinearity between these factors, both surgeon volume and hospital volu significant predictors of mortality. Combined, the highest mortality rates (3.3%) were observed patients were treated by low-volume surgeons at low-volume hospitals and best results (2.4%) obtained by high-volume surgeons at high-volume hospitals.

0418
09/15/08

View this table:
[in this window]
[in a new window]

Table 4. Risk-Adjusted Mortality, by Hospital and Surgeon Volume*

Policy Implications

The use of hospital procedural volume was of limited value in discriminating those hospitals with significantly better or worse risk-adjusted mortality outcomes ("outlier centers") (C-index, 0.60 respectively). In fact, as procedural volume dropped, a hospital's likelihood of being singled out center with significantly better or worse outcomes declined due to increasing variance associated measurement of end point at low-volume sites.

An upper boundary for the potential numbers of lives saved by closure of low-volume CABG cent also estimated. If 25% of STS hospitals with the lowest annual CABG volume (≤150 procedures) closed and their patients undergoing CABG surgery were safely transferred to another, higher-v center, then approximately 45 CABG procedural deaths could be averted annually among all 43S centers. If the criteria for selective referral were based on Leapfrog's referral criteria of 500 case year,[18] 82% of STS centers would close and the high-end estimate of avertable CABG deaths wc 212 per year.

Validity of STS Data

In order to determine the validity of STS data for patients aged 65 years and older, we performe systematic comparison with data supplied to the CMS. There were 415 centers that released dat STS and the CMS; more cases (96 330 vs 78 788) were reported to the STS, likely due to nonre health maintenance organization and managed care cases to the CMS. The reported mortality ra 4.50% and 4.48%, respectively. Reported mortality rates among centers that performed 150 or procedures per year were 5.06% and 4.91% according to the STS and the CMS, respectively, wl corresponding rates for centers that performed more than 150 cases per year were 4.39% and 4 Thus, we doubt that our results were biased by underreporting or selective reporting to the STS.

We also systematically compared mortality rates among participants and nonparticipants in the Mortality rates in participating sites were lower (4.5% vs 5.2%), but the differential mortality be lower-volume sites (≤150 CABG procedures/year) and higher-volume sites (≥151 CABG procedu was larger in the STS sites than in nonparticipating sites (0.6% vs 0.1%, respectively). Thus, th association between volume and outcome may have been overestimated by focusing on STS site

COMMENT

Jump to
- Top
- Introductio
- Methods
- Results
- Comment
- Author infc
- References

The recent interest in using hospital procedure volume as a quality indicator for CABG surgery is understandable. This structural characteristic is readily available via administrative claims data, requires no complex adjustment techniques, is easily interpretable by the lay public, and is consistent with the common belief that "practice makes perfect."[20] However, our study indicates that hospital volume has only a modest association with risk-adjusted mortality and has important limitations as a quality metric for CABG surgery.

To date, there have been multiple analyses of volume and outcome for CABG surgery. Most[1-15] l all[16-17] of these concluded that hospital procedural volume was associated with lower rates of hc

0419
09/15/08

mortality. The largest analysis of the association between volume and outcome was conducted b Birkmeyer et al.[14] Using national Medicare claims data from 1994 to 1999, they found a 1.3% al difference in unadjusted rates of mortality between the lowest to highest quartiles of hospital vo While their study was geographically inclusive, it was limited to patients aged 65 years or older, adequately adjust data for potential differences in case mix, and did not control for patient clust within sites or for site variance issues.

One of the most complete evaluations of CABG volume-outcome relationships performed using c data was completed by Hannan et al.[9] Using data from 30 centers performing CABG surgery in N from 1997 to 1999, the study by Hannan et al also noted significant differences in risk-adjusted among low- and high-volume hospitals. The study, however, was limited to a single state where certificate-of-need program limits the number of low-volume centers (ie, <3% of all patients rec surgery at centers performing <300 procedures per year).

Our contemporary analysis using clinical data from the STS National Cardiac Database found an association between procedural volume and unadjusted mortality similar to that found in past ar Our study, however, expanded on these prior analyses using contemporary analytic techniques t account for clinical factors, differences in site variability, and clustering within sites. We found th compared with high-volume hospitals, low-volume hospitals tended to operate on patients with l and under more emergent conditions (Table 1). Reasons for these differences may include adver selection,[7, 10] variance in clinical coding among hospitals, or a differential threshold for surgery c altered center experience and/or institutional financial pressure.

We also found that the association between hospital volume and mortality was not constant amc patients. In particular, the volume-outcome effect was nonsignificant in patients younger than 6 and in those with low preoperative risk (Figure 2, Table 3). These results imply that prior analys performed exclusively in Medicare patients would inflate the volume-outcome effect. Additionally presumed that while young, low-risk patients would be the group most likely to use public inforr from CABG quality metrics, these are also the patients in whom hospital volume had no measur association with outcome.

We further demonstrated that associations between hospital volume and outcome were confoun concomitant effects of surgeon volume (Table 4). These results expand those previously reporte single state[9] to a national cohort. Even if a patient elected to receive surgery at a high-volume c their risk-adjusted mortality rates could vary from 2.4% to as much as 2.9%, depending on whe not their actual procedure was performed by a low- vs a high-volume surgeon.

Our study further demonstrates the limitations of using hospital volume as an indicator of the qu CABG surgery. Hospital volume had generally poor predictive accuracy as a means of identifying with significantly better or worse CABG mortality rates (C-index, <0.7). Similarly, using volume referral criterion for selecting a provider would unfairly defer cases from nearly half of very-low- centers with outcomes equal or better than overall STS mortality results (Figure 1).

Regardless of its value at the level of the individual center, some still have argued for using hos volume limits for their "aggregate societal good." A study from California estimated that up to 2 deaths at low-volume centers may be averted with selective referral.[29] In contrast, our study es that the total number of lives saved by eliminating up to 100 low-volume STS hospitals (25% of sites) would be less than 1% from deaths (n = 45). If Leapfrog-proposed referral criteria of 500 cases per year were applied, up to four fifths of STS sites would be closed while fewer than 3% STS CABG mortality events would potentially be averted.

0420
09/15/08

This study does not fully preclude the use of procedural volume in certain roles. In particular, th but consistent association between hospital procedural volume and outcomes should be consider prospectively determining the need for new programs.[30] Additionally, given that quality assessm on comparison of risk-adjusted outcomes is limited at low-volume sites due to wide 95% CIs sur their outcome estimates, it seems reasonable to monitor low-volume centers using trend analys multiyear adjusted outcomes to ensure quality of care.

Several limitations should be noted. While this study represents the largest clinical evaluation of volume to date, the STS National Cardiac Database currently collects data from roughly half of a surgical centers. Participating centers tend to be larger and have slightly better outcomes than nonparticipating centers. However, unadjusted results in this study were similar to those from pr studies. Our evaluation of surgeon volume was limited to a blinded proxy and may underestimat impact. Third, while our study indicated that low-volume centers may have been more willing to on higher-risk patients, it could not determine whether this lower threshold for case selection wa indicative of better or worse patient care. Further study of the appropriateness of case selection hospital volume would be indicated. Finally, our study was not designed to isolate specific clinica mechanisms for the association between volume and outcome. Differences in surgical teams, qu postoperative care, surgical techniques, and other unmeasured factors all may contribute to the observed in this study.

In this national study we found that hospital procedural volume was only modestly associated w adjusted CABG mortality rates; however, there were many low-volume hospitals with low morta and some high-volume centers with rates higher than expected. This study suggests that hospit surgery volume is best considered as a surrogate for quality in a setting where other more direct and outcome assessments are not available.[20] Instead it seems more reasonable to support the growth of national clinical databases, which are capable not only of tracking risk-adjusted surgic patterns and outcomes, but also of improving them.[23, 31]

AUTHOR INFORMATION

Corresponding Author and Reprints: Eric D. Peterson, MD, MPH, Outcomes Research and Assessment Group, Duke Clinical Research Institute, Box 17969, Durham, NC 27715 (e-mail: Peter016@mc.duke.edu).

Jump to
- Top
- Introductio
- Methods
- Results
- Comment
- Author infc
- References

Author Contributions: Dr Peterson, as principal investigator of this study, had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analyses.

Study concept and design: Peterson, DeLong, Haan, Ferguson.

Acquisition of data: Peterson, Ferguson.

Analysis and interpretation of data: Peterson, Coombs, DeLong, Haan.

Drafting of the manuscript: Peterson, Coombs.

Critical revision of the manuscript for important intellectual content: Peterson, Coombs, DeLong, Ferguson.

0421
09/15/08

Statistical expertise: Peterson, Coombs, DeLong.

Obtained funding: Peterson, Ferguson.

Administrative, technical, or material support: Ferguson.

Study supervision: Peterson.

Role of the Sponsor: This study was sponsored by the Society of Thoracic Surgeons (STS). Sp the Duke Clinical Research Institute (DCRI) has a contract with the STS to be their National Carc Warehouse and Analysis Center (Dr Peterson, principal investigator of this subcontract). In this i DCRI independently harvests data from each participating STS center, creates a national analysi database, and performs statistical analyses. The proposal for this study was submitted by Dr Pet the STS national database publications committee (a 6-member board representing both the ST DCRI). After approval, the manuscript was reviewed by the coauthors and a final version approv publications committee.

Author Affiliations: Outcomes Research and Assessment Group, Duke Clinical Research Institu Durham, NC (Drs Peterson, Coombs, and DeLong); University of Florida Health Science Center, Jacksonville (Dr Haan); LSU Health Sciences Center, New Orleans, La (Dr Ferguson).

REFERENCES

Jump to
- Top
- Introducti
- Methods
- Results
- Comment
- Author inf
- Reference

1. Luft HS, Bunker JP, Enthoven AC. Should operations be regionalized? the empirical relation between surgical volume and mortality. *N Engl J Med.* 1979;301:1364-1369. ABSTRACT

2. Flood AB, Scott WR, Ewy W. Does practice make perfect? II: the relation between volume and outcomes and other hospital characteristics. *Med Care.* 1984;22:115-125. ISI | PUBMED

3. Riley G, Lubitz J. Outcomes of surgery among the Medicare aged: surgical volume and mortality. *Health Care Financ Rev.* 1985;7:37-47. PUBMED

4. Kelly JV, Hellinger FJ. Physican and hospital factors associated with mortality of surgical patie *Care.* 1986;24:785-800. ISI | PUBMED

5. Maerki SC, Luft HS, Hunt SS. Selecting categories of patients for regionalization: implications relationship between volume and outcome. *Med Care.* 1986;24:148-158. ISI | PUBMED

6. Hughes RG, Hunt SS, Luft HS. Effects of surgeon volume and hospital volume on quality of ca hospitals. *Med Care.* 1987;25:489-503. ISI | PUBMED

7. Showstack JA, Rosenfeld KE, Garnick DW, et al. Association of volume with outcome of coron bypass graft surgery: scheduled vs nonscheduled operations. *JAMA.* 1987;257:785-789. ABSTRAC

8. Hannan EL, O'Donnell JF, Kilburn H Jr, et al. Investigation of the relationship between volume mortality for surgical procedures performed in New York State hospitals. *JAMA.* 1989;262:503-5 ABSTRACT

9. Hannan EL, Wu C, Ryan TJ, et al. Do hospitals and surgeons with higher coronary artery bypa surgery volumes still have lower risk-adjusted mortality rates? *Circulation.* 2003;108:795-801. **FREE** FULL TEXT

10. Grumbach K, Anderson GM, Luft HS, et al. Regionalization of cardiac surgery in the United S Canada: geographic access, choice, and outcomes. *JAMA.* 1995;274:1282-1288. ABSTRACT

11. Hannan EL, Siu AL, Kumar D, et al. The decline in coronary artery bypass graft surgery mort New York State: the role of surgeon volume. *JAMA.* 1995;273:209-213. ABSTRACT

0422
09/15/08

12. Clark RE, the Ad Hoc Committee on Cardiac Surgery Credentialing of the Society of Thoracic Surgeons. Outcome as a function of annual coronary artery bypass graft volume. *Ann Thorac Su* 1996;61:21-26. **FREE** FULL TEXT

13. Nallamothu BK, Saint S, Ramsey SD, et al. The role of hospital volume in coronary artery by grafting: is more always better? *J Am Coll Cardiol.* 2001;38:1923-1930. **FREE** FULL TEXT

14. Birkmeyer JD, Siewers AE, Finlayson EV, et al. Hospital volume and surgical mortality in the States. *N Engl J Med.* 2002;346:1128-1137. **FREE** FULL TEXT

15. Goodney PP, Lucas FL, Birkmeyer JD. Should volume standards cardiovascular surgery focus high-risk patients? *Circulation.* 2003;107:384-387. **FREE** FULL TEXT

16. Sollano JA, Gelijns AC, Moskowitz AJ, et al. Volume-outcome relationships in cardiovascular operations: New York State, 1990-1995. *J Thorac Cardiovasc Surg.* 1999;117:419-428. **FREE** FUL

17. Shroyer AL, Marshall G, Warner BA, et al. No continuous relationship between Veterans Affa hospital coronary artery bypass grafting surgical volume and operative mortality. *Ann Thorac Su* 1996;61:17-20. **FREE** FULL TEXT

18. Birkmeyer JD, Finlayson EV, Birkmeyer CM. Volume standards for high-risk surgical procedu potential benefits of the Leapfrog initiative. *Surgery.* 2001;130:415-422. FULL TEXT | ISI | PUBMED

19. Daley J. Invited commentary: quality of care and the volume-outcome relationship—what's surgery? *Surgery.* 2002;131:16-18. FULL TEXT | ISI | PUBMED

20. Epstein AM. Volume and outcome—is it time to move ahead. *N Engl J Med.* 2002;346:1161- FULL TEXT

21. Edwards FH. Evolution of the Society of Thoracic Surgeons National Cardiac Surgery Databa *Invasive Cardiol.* 1998;10:485-488. ISI | PUBMED

22. Edwards FH, Clark RE, Schwartz M. Practical considerations in the management of large mul institutional databases. *Ann Thorac Surg.* 1994;58:1841-1844. ABSTRACT

23. Ferguson TB Jr, Dziuban SW Jr, Edwards FH, et al, Committee to Establish a National Datab Cardiothoracic Surgery, the Society of Thoracic Surgeons. The STS National Database: current c and challenges for the new millennium. *Ann Thorac Surg.* 2000;69:680-691. **FREE** FULL TEXT

24. Welke K, Peterson ED, Ferguson TB, et al. Validity of the Society of Thoracic Surgeons Natio Cardiac Database. *Ann Thorac Surg.* In press.

25. Shroyer AL, Coombs LP, Peterson ED, et al. The Society of Thoracic Surgeons: 30-Day Oper Mortality and Morbidity Risk Models. *Ann Thorac Surg.* 2003;75:1856-1864. **FREE** FULL TEXT

26. Littell RC, Miliken GA, Stroup WW, et al. *SAS System for Mixed Models.* Cary, NC: SAS Instit 1996:426.

27. Draper NR, Smith H. *Applied Regression Analysis.* 3rd ed. Hoboken, NJ: Wiley-Interscience;

28. Leapfrog Group. The Leapfrog Group fact sheet. Available at: http://www.leapfroggroup.org/FactSheets/LF_FactSheet.pdf. Accessed April 15, 2003.

29. Dudley RA, Johansen KL, Brand R, et al. Selective referral to high-volume hospitals: estimat potentially avoidable deaths. *JAMA.* 2000;283:1159-1166. **FREE** FULL TEXT

30. Chassin MR. Assessing strategies for quality improvement. *Health Aff (Millwood).* 1997;16:1 **FREE** FULL TEXT

31. Ferguson TB, Peterson ED, Coombs LP, et al, for the Society of Thoracic Surgeons and the S Use of continuous quality improvement to increase use of process measures in patients undergo coronary artery bypass graft surgery: a randomized controlled trial. *JAMA.* 2003;290:49-56. **FRE**

RELATED ARTICLES

This Week in *JAMA*
JAMA. 2004;291:155.
FULL TEXT

0423
09/15/08

Eur J Cardiothorac Surg 2006;29:20-25.
ABSTRACT | FULL TEXT

Limitations of Hospital Volume as a Measure of Quality of Care for Coronary Artery By| Graft Surgery
Welke et al.
Ann. Thorac. Surg. 2005;80:2114-2119.
ABSTRACT | FULL TEXT

Massachusetts Cardiac Surgery Report Card: Implications of Statistical Methodology
Shahian et al.
Ann. Thorac. Surg. 2005;80:2106-2113.
ABSTRACT | FULL TEXT

Long Segmental Reconstruction of Diffusely Diseased Left Anterior Descending Corona With Left Internal Thoracic Artery With or Without Endarterectomy
Fukui et al.
Ann. Thorac. Surg. 2005;80:2098-2105.
ABSTRACT | FULL TEXT

Should Coronary Artery Bypass Grafting Be Regionalized?
Nallamothu et al.
Ann. Thorac. Surg. 2005;80:1572-1581.
FULL TEXT

Fostering Rational Regulation of Patient Safety
Mello et al.
Journal of Health Politics, Policy and Law 2005;30:375-426.
ABSTRACT

Creatinine clearance and risk of early mortality in patients undergoing coronary artery grafting
Holzmann et al.
J Thorac Cardiovasc Surg 2005;130:746-746.
ABSTRACT | FULL TEXT

Quality and Quality Improvement in Forensic Mental Health Evaluations
Wettstein
jaapl 2005;33:158-175.
ABSTRACT | FULL TEXT

The Clinical Development of Percutaneous Heart Valve Technology: A Position Statem Society of Thoracic Surgeons (STS), the American Association for Thoracic Surgery (A the Society for Cardiovascular Angiography and Interventions (SCAI) Endorsed by the American College of Cardiology Foundation (ACCF) and the American Heart Associatio
Vassiliades et al.
JACC 2005;45:1554-1560.
FULL TEXT

The year in health care delivery and outcomes research
Krumholz
JACC 2004;44:1130-1136.
FULL TEXT

0424
09/15/08

A time of accelerated change in academic cardiovascular medicine: Implications for ac divisions of cardiology and their training programs
Califf et al.
JACC 2004;44:1957-1965.
ABSTRACT | FULL TEXT

Procedure rates and outcomes of coronary revascularization procedures in California a York
Carey et al.
J Thorac Cardiovasc Surg 2005;129:1276-1282.
ABSTRACT | FULL TEXT

The year in cardiovascular surgery
Jones
JACC 2004;43:1706-1714.
FULL TEXT

Is Hospital Procedure Volume a Reliable Marker of Quality for Coronary Artery Bypass A Comparison of Risk and Propensity Adjusted Operative and Midterm Outcomes
Zacharias et al.
Ann. Thorac. Surg. 2005;79:1961-1969.
ABSTRACT | FULL TEXT

The clinical development of percutaneous heart valve technology: A position statemen Society of Thoracic Surgeons (STS), the American Association for Thoracic Surgery (A the Society for Cardiovascular Angiography and Interventions (SCAI)
American College of Cardiology Foundation (ACCF) a et al.
J Thorac Cardiovasc Surg 2005;129:970-976.
FULL TEXT

The Clinical Development of Percutaneous Heart Valve Technology: A Position Statem Society of Thoracic Surgeons (STS), the American Association for Thoracic Surgery (A the Society for Cardiovascular Angiography and Interventions (SCAI)
Vassiliades et al.
Ann. Thorac. Surg. 2005;79:1812-1818.
FULL TEXT

Commentary: Quality Improvement and Psychiatric Fitness-for-Duty Evaluations of Ph
Wettstein
jaapl 2005;33:92-94.
FULL TEXT

Impact of Patient Risk on the Hospital Volume-Outcome Relationship in Coronary Arte Grafting
Nallamothu et al.
Arch Intern Med 2005;165:333-337.
ABSTRACT | FULL TEXT

Cardiac Surgery Risk Models: A Position Article
Shahian et al.
Ann. Thorac. Surg. 2004;78:1868-1877.
ABSTRACT | FULL TEXT

The volume-quality relationship: insufficient evidence for use as a quality indicator

0425
09/15/08

Sheldon
Qual Saf Health Care 2004;13:325-326.
FULL TEXT

Hospital Volume and Quality
Mariotto
JAMA 2004;291:2077-2077.
FULL TEXT

Improving Cardiac Surgery Quality--Volume, Outcome, Process?
Shahian
JAMA 2004;291:246-248.
FULL TEXT

© 2004 American Medical Association. All Rights Reserved.

APPENDIX 5.ii.

CT Women's Health, Connecticut Department of Public Health (pgs 34-45)

Cardiovascular Disease Issue Brief #2002- Connecticut Department of Public Health

"Strategies for Reducing the Door-to-Balloon Time in Acute Myocardial Infarction"- New England Journal of Medicine

"Reducing the Door-to-Balloon Time for Myocardial Infarction with ST-Segment Elevation"- New England Journal of Medicne

Cardiovascular Roundtable- CABG projections

Cardiovascular Roundtable- Valve Surgery projections

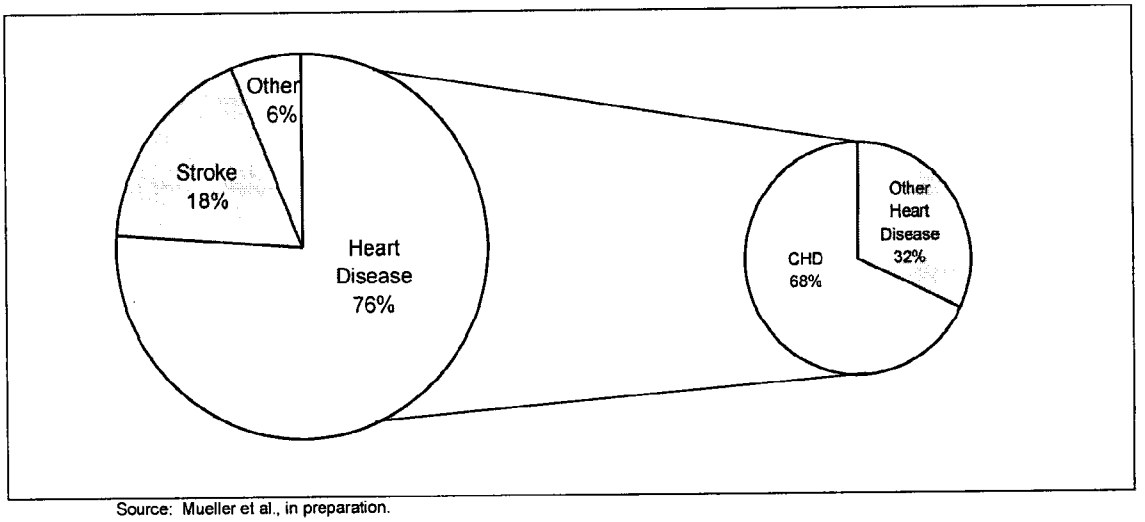
6. CORONARY HEART DISEASE

INTRODUCTION

Cardiovascular disease (CVD) is the leading cause of death and hospitalization for women in Connecticut, accounting for 44 percent of all female deaths in the state. Contrary to the belief that it is a man's disease, approximately 1,000 more women than men die from CVD each year in Connecticut. Despite women's concerns about cancer, nearly twice as many Connecticut women die from CVD than from all cancers combined (21,000 vs. 11,000 for years 1996-1998) (Mueller et al., in preparation). It is estimated that 1 in 2 women will eventually die from CVD compared with 1 in 25 who will eventually die from breast cancer (American Heart Association, 1996).

Cardiovascular disease encompasses heart disease, cerebrovascular disease (stroke) (*Chapter 7*), and other circulatory system disorders (Fig. 6-1). Heart disease accounts for 76 percent of the CVD female deaths and 69 percent of the CVD female hospitalizations in Connecticut. Stroke accounts for 18 percent of CVD female deaths and 18 percent of the CVD female hospitalizations in Connecticut (Connecticut Department of Public Health, Division of Policy, Planning, and Analysis, 2001). Heart disease includes congenital and valvular disorders, cardiomyopathies, congestive heart failure, and coronary heart disease (CHD), the latter being the most common form of heart disease.

FIGURE 6-1
CARDIOVASCULAR DISEASE DEATHS
Connecticut Females, 1996-1998



Source: Mueller et al., in preparation.

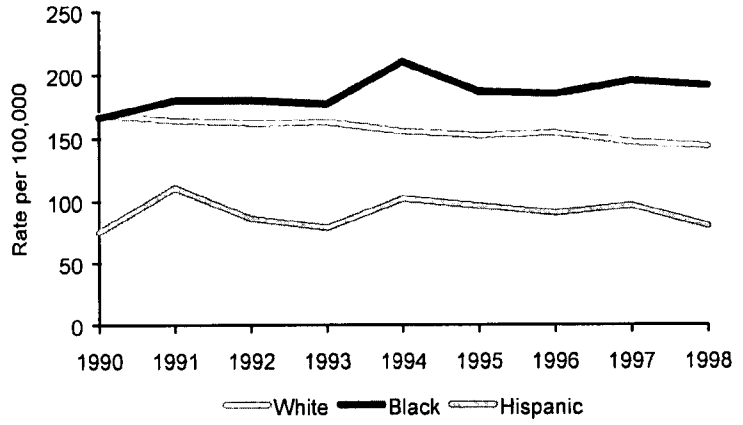
SCOPE OF THE PROBLEM

Coronary heart disease includes acute myocardial infarction (heart attack), angina pectoris (chest pains), and other forms of ischemic heart disease that occur when the flow of blood to the heart is restricted. It is the leading cause of CVD death and hospitalization in Connecticut women. During the three-year period from 1996 to 1998, 10,826 women died from CHD. During 1997, there were 9,813 hospitalizations due to CHD for women, which translates to an age-adjusted rate of 481 per 100,000 females. Hospitalization charges during 1997 exceeded $172 million (Connecticut Department of Public Health, Division of Policy, Planning, and Analysis, 2001).

From 1989 to 1998, there has been a significant downward trend in Connecticut female CHD mortality rates (Fig. 6-2), accounted for by the decrease in CHD deaths among white women. At the same time, the CHD death rate among black women has remained relatively unchanged. This results in a greater disparity in the mortality rate between black and white women. (Fig. 6-2, Table 6-1). The CHD death rates of Asian and Pacific Islander and Hispanic women were significantly lower than that of white women from 1996 to 1998.

Although the low death rates among Asian and Pacific Islander and Hispanic women may be partly due to under-reporting of these groups on death certificates (Rosenberg, 1999), low Hispanic mortality has been consistently seen in national surveys, and is still largely unexplained (Abraido-Lanza, et al., 1999). Contrary to the disparate black and Hispanic CHD mortality rates, the CHD age-adjusted hospitalization rates from 1993 to 1997 for black, non-Hispanic women and Hispanic women (respectively 557 and 520 per 100,000) were both significantly higher than for white, non-Hispanic women (479 per 100,000).

FIGURE 6-2
CORONARY HEART DISEASE
AGE-ADJUSTED DEATH RATES BY RACE AND ETHNICITY
Connecticut Females, 1990-1998



Source: Mueller et al., in preparation.
Notes: U.S. Census Bureau population estimates used for rate calculations. Rates adjusted to the 2000 U.S. standard million population.

TABLE 6-1
CORONARY HEART DISEASE DEATHS BY RACE AND ETHNICITY
Connecticut Females, 1989-1991 and 1996-1998

	1989-1991		1996-1998	
Race/Ethnicity	Number of Deaths	Age Adjusted Death Rate (per 100,000)	Number of Deaths	Age Adjusted Death Rate (per 100,000)
All races	10,857	172.1	10,826	150.0 *
White	10,318	170.1	10,224	147.5 *
African American/Black	454	179.7	575	189.9‡
Asian/Pacific Islander	10	†	22	46.8‡
Native American	13	†	2	†
Hispanic/Latina	118	97.6	157	88.2‡

Source: Mueller et al., in preparation.
* Change in rates from 1989-91 to 1996-98 period is statistically significant (p< .05).
† Statistics not calculated for fewer than 15 events.
‡ Rate significantly different from that of whites (p< .05)
Notes: U.S. Census Bureau population estimates used for rate calculations. Rates adjusted to the 2000 U.S. standard million population.

RISK FACTORS

Factors that increase the risk of developing CHD, but which cannot be changed, include advancing age and having a family history of heart disease. Other factors associated with an increased CHD risk, but which may be modified by life-style changes and pharmacologic therapy, include hypertension (high blood pressure), hypercholesterolemia (elevated cholesterol), diabetes mellitus, smoking, physical inactivity, poor diet, and obesity. Table 6-2 shows the relative impact of CHD risk factors for women, as well as the percentage of Connecticut women who responded positively to risk factor survey questions from the 1999 Behavioral Risk Factor Surveillance System (BRFSS) survey (Centers for Disease Control and Prevention, 2000).

Lifestyle Factors

Cigarette smoking is a leading cause of CHD in women. Smoking damages the inner arterial wall, raises blood pressure, and promotes intravascular clotting (thrombosis). It is estimated that more than 50 percent of heart attacks among middle-aged women are attributable to cigarette use (Willett et al., 1987). Female smokers have an 80 percent increased risk of developing CHD as compared with female nonsmokers (Table 6-2). The prevalence of cigarette smoking in Connecticut women was 21 percent in the 1999 BRFSS survey

Dietary factors affect CHD risk. Trans fatty acids have been linked to adverse lipid profiles and increased risk of CHD (Willet et al., 1993). Diets low in saturated fat and high in fruits, vegetables, whole grains, and fiber are associated with a reduced risk of CHD (Willet, 1996). CHD risk is lower in those who drink alcohol moderately (an average of one drink for women per day) than in nondrinkers, but it may raise blood pressure (Fuchs et al., 1995).

Diets high in saturated fat combined with physical inactivity can lead to excess weight and obesity. In addition to being a risk factor for CHD, obesity increases the incidence of other risk factors such as elevated cholesterol levels, high triglyceride levels, and increased likelihood of hypertension and diabetes mellitus. Overweight women are 40 percent more likely to develop CHD than those who are not (Table 6-2). Based upon the 1999 BRFSS data, 27 percent of Connecticut women were considered to be overweight (defined as a body mass index > 27.3.[1]

[1] Body mass index is calculated as weight in kilograms divided by height in meters, squared.

Psychosocial factors such as work stress, depression, or loneliness may cause individuals to be at a higher risk of developing heart disease, but their role is not yet clearly defined. That is, psychosocial factors may be interrelated to other health-related behaviors such as smoking, diet, or physical activity, which in turn may increase the risk of coronary heart disease. On the other hand, these factors may be independent and cause direct physiological changes (Hemingway et al., 1999).

Contributing Factors

Hypertension, or high blood pressure, is associated with a 50 percent increase in CHD risk over women without the condition (Table 6-2). Studies indicate a strong association between high levels of both systolic and diastolic blood pressure and risk of CHD in women (Whelton et al., 1996). Of particular concern for women is isolated systolic hypertension which has been associated with a sixfold to tenfold risk of CHD death over 15 years (Bittner, 2000). According to the 1999 BRFSS data, 21 percent of Connecticut women reported ever having been told that they had high blood pressure (defined as >140mm Hg systolic and as >90mm Hg diastolic).

Elevated low density lipoprotein (LDL) cholesterol and low high-density lipoprotein (HDL) are risk factors for CHD in women. LDL is the form in which cholesterol is transported to cells for membrane and steroid synthesis. High-density lipoprotein (HDL) helps remove cholesterol from body tissues and transports it to the liver for excretion. A high total cholesterol level (> 240 mg/dL) is associated with a 10 percent increase in CHD risk over women without the condition (Table 6.2), but is a less informative measure since it includes both LDLc and HDLc, which have opposite effects. During 1999, 82 percent of Connecticut female BRFSS respondents reported ever having their cholesterol tested. Of these, 27 percent indicated that they had been told that their cholesterol level was high. Triglycerides are fatty compounds found in LDL and HDL. Their role in CHD risk is unclear, but observational studies suggest they may be a particularly important risk factor in women.

Diabetes mellitus is one of the most important sex-specific risk factors for CHD. It significantly increases CHD risk among women by amplifying the effect of other risk factors. It is associated with a threefold to sevenfold elevation in CHD risk among women compared to nondiabetic women, whereas diabetic men have only a twofold to threefold elevation in risk compared to nondiabetic men. This sex-based difference may be due in part to a more deleterious effect of diabetes on lipids and blood pressure in women (Manson, 1996). Diabetes seems to increase atherosclerosis by changing the chemical makeup of some of the substances found in the blood (see Chapter 16, *Diabetes*).

TABLE 6-2
CORONARY HEART DISEASE RISK FACTORS

Risk Factor	Relative Risk (95% CI)	% CT Women Reporting Presence of Risk Factor
Diabetes mellitus	2.4 (1.9, 3.0)	4
Smoking	1.8 (1.5, 2.1)	21
Hypertension	1.5 (1.3, 1.8)	21
Overweight	1.4 (1.2, 1.6)	27
High cholesterol level	1.1 (0.9, 1.2)	27

Sources: Bittner, 1994; Centers for Disease Control and Prevention, 2000.
Note: CI = Confidence interval

PREVENTION

Prevention of CHD includes preventing the development of CHD, screening for existing risk factors, lifestyle modifications, or pharmacologic intervention. Recommendations include smoking cessation, weight management, increasing physical activity, incorporating a diet low in fat, reducing stress, and diagnosing and treating high blood pressure and high cholesterol levels. Adherence to a healthy lifestyle has been shown to reduce the risk of CHD in women by more than 80 percent (Stampfer, 2000).

Although elimination of smoking may not lead to reversal of atherosclerosis, it has been shown to reduce CHD risk close to that of women who have never smoked (Rich-Edwards et al., 1995).

A healthy diet that is low in fat and rich in fruits and vegetables has been shown to reduce the risk of heart disease by 7 percent to 9 percent. Such a diet works by reducing blood levels of homocysteine, an amino acid that has been linked to an increased risk of CHD (Appel et al., 2000). Dietary interventions, including salt-intake reduction, also play important roles in the reduction of hypertension.

Increased physical activity and loss of excess weight reduce CHD risk directly as well as indirectly. They are important in the control of other CHD risk factors such as hypertension, dyslipidemia (high LDLc, low HDLc), and diabetes. Hypertension and dyslipidemia can also be treated pharmacologically, thereby reducing CHD risk. Clinical trials indicate a 2 percent reduction in CHD rates for each 1 percent decrease in LDL cholesterol (Oberman, 2000).

Because of the increase in heart disease rates for postmenopausal women compared to premenopausal women, loss of estrogen as women age is thought to contribute to a higher risk of heart disease. Epidemiological studies have suggested that hormone replacement therapy (HRT) in postmenopausal women may afford protection from CHD. However, such effect may be confounded due to a "healthy woman selection bias" as documented by the Healthy Women's Study (Matthews et al., 1996). This study suggests that women who are wealthier and better educated (cardioprotective factors) are more likely to be prescribed HRT and to actually comply with the therapy, which may explain the protection attributed to HRT. Major clinical trials, such as the Women's Health Initiative, are currently underway to quantify the cardioprotective effect of HRT, but final results are not expected until 2006. The American Heart Association's most recent recommendation is *not* to initiate HRT for the sole purpose of primary coronary heart disease prevention, but to take into consideration the treatment's potential benefits and risks related to other diseases and conditions (Mosca et al., 2001).

While the use of HRT in primary prevention is still under investigation, the results of the Heart and Estrogen-progestin Replacement Study (HERS) do *not* support hormone replacement therapy for secondary prevention of CHD in postmenopausal women. Although the study showed an alteration in the lipid profile of postmenopausal women using HRT, there was no significant reduction in death or morbidity among women with established CHD. Therefore, women with existing CHD should not begin HRT, but those already receiving HRT may continue (Hully et al., 1998). The American Heart Association likewise advises against the prescription of HRT for the sole purpose of preventing heart attacks in women who already have CHD (Mosca et al., 2001).

Because of the long-term side effects of HRT, such as an increased risk of endometrial cancer and possibly breast cancer, pharmaceutical companies are developing selective estrogen receptor modulators (SERMs), often referred to as "designer estrogens," as an alternative. Without the negative effects to the breast and uterine tissues, these new drugs may help lower cholesterol and consequently the risk for CHD in postmenopausal women. With respect to CHD, SERMs have been shown to reduce levels of LDL cholesterol and the clotting protein fibrinogen, but to a lesser degree than HRT (Love et al., 1991; Walsh et al., 1998). Ongoing trials will determine the clinical impact of SERMs in women at risk for CHD (Barrett-Connor et al., 1998).

Secondary prevention refers to therapy to reduce mortality and recurrent CHD events in patients with established CHD. It is aimed at both control of risk factors and direct protection of coronary arteries from plaque development and eruption. Thus it involves many of the same factors as primary prevention.

In secondary prevention, aspirin therapy benefits women in both the acute and chronic phases of disease. Yet women are less likely than men to receive aspirin in the secondary prevention setting. Even after adjustment for age and other factors, there appears to be a systematic bias towards men receiving aspirin therapy more often than women. In addition to gender bias, women arriving at the emergency department with acute myocardial infarction may be at greater risk for delayed aspirin therapy because they tend to present with more atypical cardiac symptoms than men, such as neck, back, and jaw pain, nausea, and dizziness (Thoma et al., 2001).

Although beta-blocker therapy after myocardial infarction (heart attack) has been shown to decrease nonfatal myocardial infarction and sudden death by 20 to 30 percent regardless of the patient's sex, it tends to be underused (Yusuf et al., 1985). Clinical trials indicate that thrombolysis after acute myocardial infarction also reduces mortality rates among women and men, but women tend to have higher reinfarction rates than men (Bittner, 2000).

Use of diagnostic and therapeutic revascularization modalities may be related to sex differences in morbidity and mortality. Data from the Myocardial Infarction Triage and Intervention registry suggest that the gap in mortality between the sexes due to acute myocardial infarction is associated with a lower likelihood of women receiving CHD interventions. Women had twice the in-hospital mortality of men and were half as likely to undergo acute catheterization, angioplasty, or coronary bypass surgery (Kudenchuk et al., 1996). However, another study suggested that women were referred for bypass surgery at least as often as men when surgery offered the greatest survival benefits, while men were referred more often for surgery when it offered the least benefit relative to medical treatment (Bickell, 1992). From 1993 to 1997, a significantly higher proportion of Connecticut women hospitalized with AMI died than Connecticut men hospitalized with AMI (12% vs. 7%, respectively), and women were also significantly less likely to undergo percutaneous transluminal coronary angioplasty (15% vs. 21%) or coronary artery bypass graft operations (8% vs. 11%). Because the onset of CHD tends to occur later in women than in men, the older age of women may be a reason why fewer are referred for angioplasty or coronary artery bypass graft surgery. Results of surgery are usually poorer in older persons. Differences in procedure rates could also be due to differences in severity of coronary occlusion.

Cardiac rehabilitation after myocardial infarction reduces CHD risk. It includes exercise training, risk factor modification, and psychosocial and vocational counseling. Despite its benefits, women are less likely to enroll in these programs than men (7 percent vs. 13 percent) (Thomas et al., 1996).

In summary, there is compelling evidence that comprehensive risk factor interventions in women with CHD extend overall survival, improve quality of life, decrease or postpone the need for more invasive interventional procedures, and reduce the incidence of subsequent heart attacks. Therefore, women need to become more aware of heart disease, its risk factors, and its symptoms so that they can actively participate in risk reduction and disease prevention.

REFERENCES

Abraido-Lanza A.F., B.P. Dohrenwend, D.S. Ng-Mak, J.B. Turner. 1999. The Latino mortality paradox: a test of the "salmon bias" and healthy migrant hypotheses. *American Journal of Public Health* 89(10):1543-1548.

American Heart Association. 1996. *1997 Heart and Stroke Facts: Statistical Update*. Dallas, Texas: American Heart Association.

0433
09/15/08

Appel L.J., E.R. Miller, S.H. Jee, R Stolzenberg-Solomon, P. Lin, T. Erlinger, M.R. Nadeau, J. Selhub. 2000. Effect of dietary patterns on serum homocysteine. *Circulation* 102:852.

Barrett-Connor E., N.K. Wenger, D. Grady, et al. 1998. Hormone and nonhormone therapy for the maintenance of postmenopausal health: the need for randomized controlled trials of estrogen and raloxifene. *Journal of Womens Health* 7:839-847.

Bickell N.A., K.S. Pieper, K.L Lee, et al. 1992. Referral patterns for coronary artery disease treatment: gender bias or good clinical judgment? *Annals of Internal Medicine* 116:791-797.

Bittner V. 2000. Heart disease in women. *Clinical Reviews:* 62-66.

Bittner V. 1994. Cardiovascular disease in women. *Journal of Women's Health* 3:369-376.

Centers for Disease Control and Prevention. 1999, 2000. *Behavioral Risk Factor Surveillance System: Connecticut Statewide Survey Data - Weighted.* Atlanta: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Behavioral Surveillance Branch.

Connecticut Department of Public Health, Division of Policy, Planning, and Analysis. 2001. Unpublished data (see *Appendix D*).

Fuchs F.C., M.J. Stampfer, G.A. Colditz, E.L. Giozannucci, J.E. Manson, I. Kawachi, D.J. Hunter, P.E. Hankinson, C.H. Hennekens, B. Rosner, F.E. Speizer, W.C. Willett. 1995. A prospective study of alcohol consumption and mortality among women. *New England Journal of Medicine* 332:1245-1250.

Hemingway H., M. Marmot. 1999. Psychosocial factors in the etiology and prognosis of coronary heart disease: systematic review of prospective cohort studies. *British Medical Journal* 318:1460-1467.

Hulley S., D. Grady, T. Bush, et al. 1998. Randomized trial of estrogen plus progestin for secondary prevention of coronary heart disease in postmenopausal women. *Journal of the American Medical Association* 280:605-613.

Kudenchuk P., C. Maynard, J. Martin, M. Wirkus, W.D. Weaver. 1996. Comparison of presentation, treatment, and outcome of acute myocardial infarction in men versus women (the Myocardial Infarction Triage and Intervention Registry). *American Journal of Cardiology* 78:9-14.

Love R.R., D.A. Wiebe, P.A. Newcomb, et al. 1991. Effects of tamoxifen on cardiovascular risk factors in postmenopausal women. *Annals of Internal Medicine* 115:860-864.

Manson J.E., A. Spelsberg. 1996. Risk modification in the diabetic patient. In: Manson J.E., Ridker P.M., Gaziano J.M. (eds). *Prevention of Myocardial Infarction.* New York, NY: Oxford University Press; 241-273.

Matthews K.A., L.H. Kuller, R.R. Wing, E.N. Meilahn, P. Plantinga. 1996. Prior to use of estrogen replacement therapy, are users healthier than nonusers? *American Journal of Epidemiology* 143:971-978.

Mosca L., P. Collins, D. Herrington, et al. 2001. Hormone replacement therapy and cardiovascular disease: a statement for healthcare professionals from the American Heart Association. *Circulation* 104:499-503.

Mueller, L.M., M.M. Hynes, H. Li, and F. Amadeo. In preparation. *Mortality and Its Risk Factors in Connecticut, 1989-1998.* Hartford, CT: Connecticut Department of Public Health, Division of Policy, Planning, and Analysis (see *Appendix C*).

Oberman, A. Spring 2000. Role of lipids in the prevention of cardiovascular disease. *Clinical Reviews:* 10-15.

Rich-Edwards J.W., J.E. Manson, C.H. Hennekens, J.E. Buring. 1995. The primary prevention of coronary heart disease in women. *New England Journal of Medicine* 332:1758-1766.

Rosenberg H.M., J.D. Maurer, P.D. Sorlie, N.J. Johnson, M.F. MacDorman, D.L. Hoyert, J.F. Spitler, C. Scott. 1999. Quality of death rates by race and hispanic origin: a summary of current research, 1999. National Center for Health Statistics. Vital Health Stat 2(128).

Stampfer M.J., F.B. Hu, J.E. Manson, E.B. Rimm, W.C. Willett. 2000. Primary prevention of coronary heart disease in women through diet and lifestyle. *New England Journal of Medicine* 343:16-22.

0434
09/15/08

Thoma M.S., D.B. Diercks, C.S. Hampikian, J.D. Kirk. 2001. Gender and clinical presentation influence aspirin therapy in patients with acute myocardial infarction. *Academic Emergency Medicine* 8(5):556.

Thomas R.J., N.H. Miller, C. Lamendola, K. Berra, B. Hedback, J.L. Durstin, W. Haskell. 1996. National survey on gender differences in cardiac rehabilitation programs: patient characteristics and enrollment patterns. *Journal of Cardiopulmonary Rehabilitation* 16:402-412.

Walsh B.W., L.H. Kuller, R.A. Wild, et al. 1998. Effects of raloxifene on serum lipids and coagulation factors in healthy postmenopausal women. *Journal of the American Medical Association* 279:1445-1451.

Whelton P.K., J. He, L.J. Appel. 1996. Treatment and prevention of hypertension. In: Manson J.E., P.M. Ridker, J.M. Gaziano, C.H. Hennekens, eds. *Prevention of Myocardial Infarction.* New York, NY: Oxford University Press 154-171.

Willett W.C., A. Green, M.J. Stampfer, F.E. Speizer, G.A. Colditz, , B. Rosner, R.R. Monson, W. Stason, C.H. Hennekens. 1987. Relative and absolute excess risks of coronary heart disease among women who smoke cigarettes. *New England Journal of Medicine* 317:1303-1309.

Willett W.C., E.B. Lenart. 1996. Dietary factors. In: Manson J.E., P.M. Ridker, J.M. Gaziano, C.H. Hennekens, eds. *Prevention of Myocardial Infarction.* New York, NY: Oxford University Press 351-383.

Willett W.C., M.J. Stampfer, J.E. Manson, G.A. Colditz, F.E. Speizer, B.A. Rosner, L.A. Sampson, C.H. Hennekens. 1993. Intake of trans-fatty acid and risk of coronary heart disease among women. *Lancet* 341:581-585.

Yusuf S., R. Peto, J. Lewis, R. Collins, P. Sleight. 1985. Beta blockage during and after myocardial infarction: an overview of the randomized trials. *Progress in Cardiovascular Diseases* 27:335-371.

Issue Brief #2002-1
February, 2002

Cardiovascular Disease

Connecticut's Leading Killer

JOAN FOLAND, MHS, MPhil

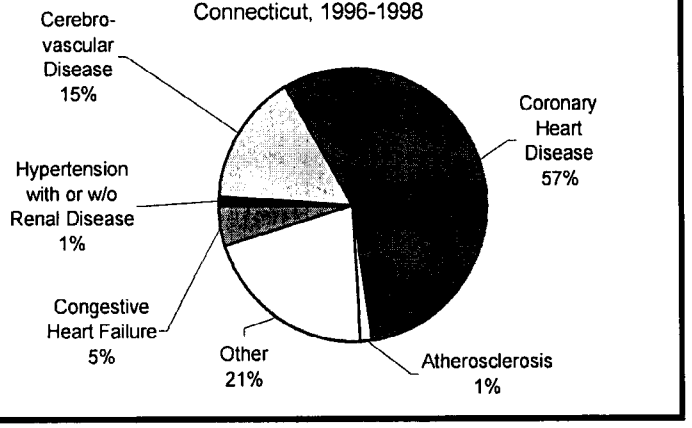
CONNECTICUT DEPARTMENT OF PUBLIC HEALTH

Introduction

Cardiovascular disease is Connecticut's leading killer. Among both women and men, and across all racial and ethnic groups, cardiovascular disease is the state's leading cause of mortality. More than 12,000 residents die annually of CVD, accounting for 42 percent of all deaths.

Cardiovascular disease (CVD) refers to a variety of diseases and conditions affecting the heart and blood vessels. The major cardiovascular diseases are coronary heart disease (CHD), cerebrovascular disease, and congestive heart failure (CHF) (Fig. 1).

FIGURE 1
Cardiovascular Disease Deaths
Connecticut, 1996-1998



Coronary heart disease refers to any condition that reduces the flow of blood to the heart muscle. The blockage of blood flow can lead to chest pain (angina), irregular heart beats, or death of the heart muscle (heart attack). Cerebrovascular disease, more commonly referred to as stroke,[a] occurs when the blood supply to a part of the brain is interrupted. Congestive heart failure is a heart disease condition that involves loss of pumping ability by the heart, generally accompanied by fluid accumulation in organs like the lungs. It occurs when the heart becomes progressively weaker due to conditions such as high blood pressure or heart attack.

Chronic diseases like CVD are among the most prevalent, costly, and preventable of all health problems. CVD is the leading cause of death and hospitalization for Connecticut men and women in all age groups above 45 years. CVD is also the most expensive medical condition, accounting for one-seventh of health spending. The challenge is to control the social, economic, and medical burden arising from CVD, which, in turn, is driven by demographic, risk factor, and medical care trends.

[a] For purposes of discussion, cerebrovascular disease and stroke will be used interchangeably. Technically stroke is a subcategory, but it accounts for 86 percent of cerebrovascular disease deaths in Connecticut.

Health Burden

The number of deaths in Connecticut from all causes is approximately 30,000 per year, of which 12,000 (42 %) are due to CVD. In comparison, cancer, the second leading cause of death, accounts for 24 percent of all deaths. Seventy-eight percent of all deaths occur in people aged 65 and over, whereas 87 percent of CVD deaths occur in this age group. CVD not only affects the elderly; it is also the second leading cause of premature death under age 75. Although CVD is assumed to be a disease primarily of men, over half (55%) of all Connecticut deaths caused by CVD are among women.[b] According to the most recent National Center's for Health Statistics calculations, the probability at birth of eventually dying from cardiovascular disease is more than twice that of dying from cancer (47% vs. 22%).[1]

A consideration of deaths alone underestimates the burden of CVD. CVD is also the leading cause of hospitalization for the state's residents (excluding childbirth) and a leading cause of disability among working adults.[2] Approximately 61,500 resident hospitalizations annually are due to CVD, or approximately 23 percent of all hospitalizations, excluding newborns and pregnancy-related conditions.

Mortality

When considered separately among cardiovascular diseases, coronary heart disease ranks slightly below cancer as the leading cause of death in Connecticut (7,000 annual deaths), and cerebrovascular disease ranks as the third leading cause of death (2,000 annual deaths).

Age and sex differences in CVD mortality are well established. Mortality rates increase with age and males experience greater overall death rates and age-specific death rates than females (Table 1). These relationships also hold for coronary heart disease-specific death

[b] Although mortality rates are greater for males, the total number of CVD deaths is actually higher in females than in males, due to the average older age of death in women and the high mortality rates in the older age groups. This reinforces the fact that CVD is not just a problem for men.

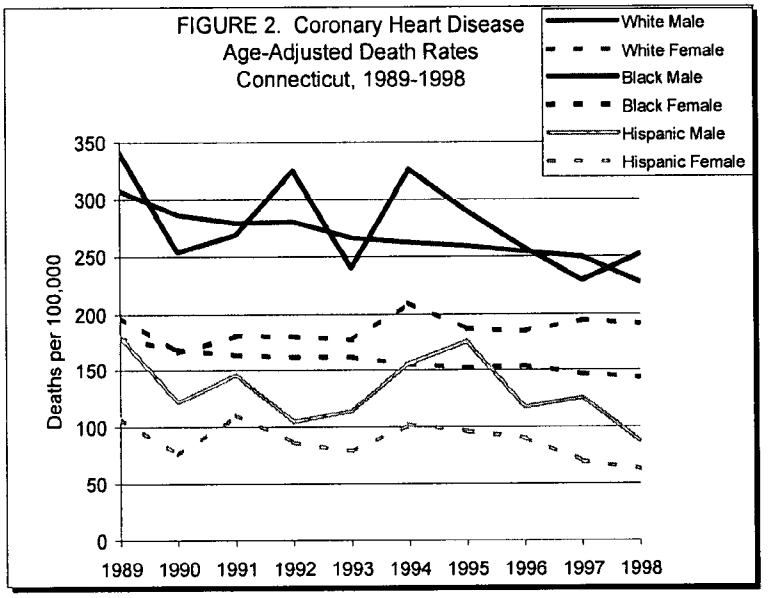
rates. The risk of death due to CHD in females is roughly that of males ten years younger. It has been assumed that normal estrogen levels in pre-menopausal women provide a protective benefit against heart disease and possibly stroke, but recent research questions that reasoning.[3, 4] Sex-specific death rates due to cerebrovascular disease are not as disparate and are highest for females 85 years and older.

TABLE 1. MORTALITY RATES
Connecticut, 1996-1998

	Cardiovascular Disease Mortality Rates		Coronary Heart Disease Mortality Rates		Cerebrovascular Disease Mortality Rates	
Age Groups	Male	Female	Male	Female	Male	Female
< 45	16.3	8.3	7.9	2.4	2.0	1.7
45-54	149.7	60.9	103.0	28.5	9.4	11.1
55-64	455.4	201.2	297.3	114.7	44.2	23.9
65-74	1,130.6	622.5	711.4	334.8	120.7	97.6
75-84	2,995.7	2,058.2	1,768.9	1,076.9	428.7	396.1
85+	8,083.0	7,940.7	4,564.0	4,202.6	1,233.9	1,408.9
AAMR*	406.6	285.7	243.0	150.0	53.0	50.3
Total Deaths	16,747	20,586	10,077	10,826	2,132	3,654

* AAMR refers to age-adjusted mortality rate.

FIGURE 2. Coronary Heart Disease
Age-Adjusted Death Rates
Connecticut, 1989-1998



Cardiovascular disease death rates, particularly coronary heart disease rates, have been steadily declining over the past decade. Significant declines have occurred overall in both sexes, but primarily in those whose race is white (Fig. 2). The sex differences in mortality and time trends are likely due to differing lifestyle factors, such as smoking and diet. Improved medical and surgical care has also contributed to the changes.[5]

Although CHD mortality rates have decreased significantly for those whose race is white, rates among blacks and Hispanics have not statistically significantly changed since 1989; rather they have fluctuated with a large degree of variability. Because they have not changed over time, black female mortality rates are significantly greater than white female rates, which have declined (Fig. 2).[6] Black women are more likely to have certain CHD risk factors, such as being overweight or having hypertension or diabetes, and are less likely to receive particular treatments like bypass surgery.[7]

Low Hispanic mortality has been consistently seen in national studies and is still largely unexplained.[8] However, Hispanics tend to have fewer classic CHD risk factors when compared to white populations.[9] In Connecticut, significantly smaller percentages of Hispanics have reported having been told they have high blood pressure or high cholesterol levels than have white, non-Hispanics.[10]

Although stroke mortality rates have not significantly changed during the last decade in Connecticut, relative differences exist similar to CHD mortality rates between sexes and among race and ethnic groups (data not shown).

Unlike stroke, age-adjusted death rates for congestive heart failure have increased significantly from 1989 to 1998 (data not shown). Increasingly people are surviving heart attacks and preventing strokes, thereby increasing their risk for CHF.

Morbidity

During 1999 there were approximately 61,500 discharges from Connecticut hospitals with some type of CVD as the first-listed diagnosis. They accounted for 23 percent of all discharges, excluding newborns and conditions relating to pregnancy and childbirth, making CVD the leading cause of hospitalization. Of these discharges, 23,300 (38%) were for patients with CHD, 9,400 (15%) were for patients with cerebrovascular disease, and 9,600 (16%) discharges had congestive heart failure (Table 2).

Sixty-two percent of CHD discharges were for people aged 65 years and over, whereas 78 percent of strokes and 82 percent of CHF discharges were in this age group. One third of CHD discharges occurred in patients aged 45-64, indicating that heart disease is not just a disease of the elderly. The median lengths of stay for patients with CHD, stroke, and CHF in 1999 were 3 days, 4 days, and 4 days, respectively, each of which was two days shorter than comparable hospital stays in 1993. These declines are most likely due to medical advances and managed care's efforts to control costs.

From 1993 to 1999, CHD hospitalization rates for males and females have decreased, particularly since 1996, but rates have remained relatively stable for cerebrovascular disease and congestive heart failure hospitalizations (Fig. 3). Although male hospitalization rates are significantly greater than female rates, actual numbers of hospitalizations are higher for females with cerebrovascular disease and congestive heart failure (Table 2).

Compared to other race and ethnic groups, black, non-Hispanics have significantly higher hospitalization rates for cerebrovascular disease and congestive heart failure, whereas white non-Hispanics have higher rates for CHD (Fig. 4). The latter is true for males only (data not shown). Hispanics tend to have lower CVD hospitalization rates. This correlates with their lower mortality rates.

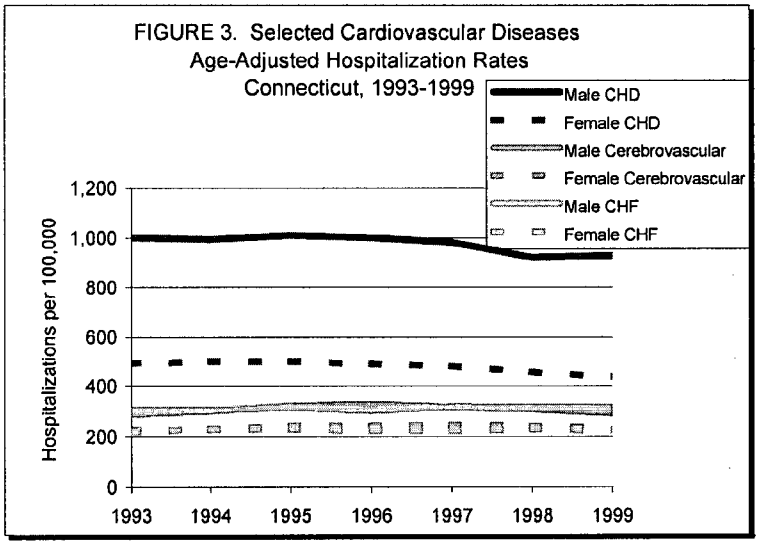
Risk Factors

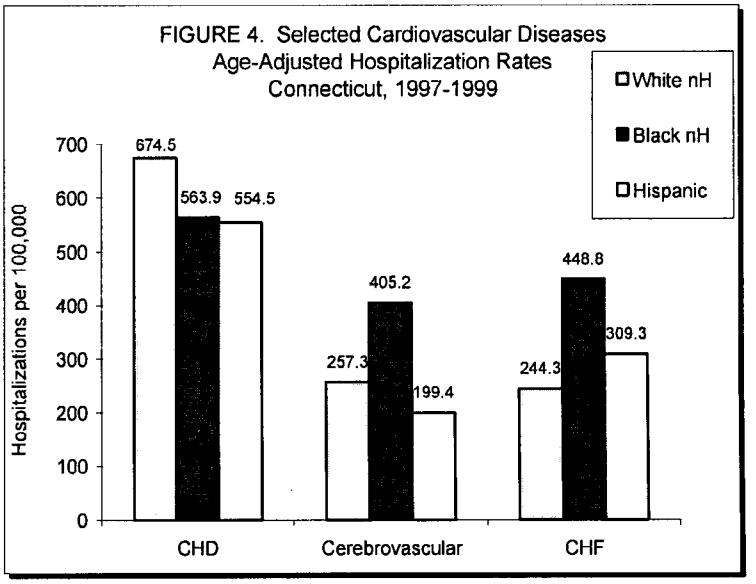
Besides the many people who already have one or more types of CVD, many more are at risk for developing the disease. Inherent and modifiable factors have been identified that are associated with an increased risk of developing CVD. CVD-associated risk factors that cannot be changed include positive family history, increasing age, male gender, and black race. Although these factors cannot be modified, their presence helps identify those at greatest risk. Major risk factors that can be modified, either by lifestyle changes or through medication, include cigarette smoking, high blood cholesterol levels, high blood pressure, diabetes, physical inactivity, and being overweight or obese. CVD risk factors tend to cluster, and the more risk factors that a person has, the greater the likelihood of developing CVD.

TABLE 2. CARDIOVASCULAR DISEASE HOSPITALIZATIONS
Connecticut, 1999

	Coronary Heart Disease Hospitalizations		Cerebrovascular Disease Hospitalizations		Congestive Heart Failure Hospitalizations	
	Number	AAHR*	Number	AAHR*	Number	AAHR*
Males	14,238	928.4	4,351	292.1	4,594	312.6
Females	9,049	435.5	5,031	230.4	5,011	222.1
All	23,287	657.9	9,382	256.1	9,605	258.9

* AAHR refers to age-adjusted hospitalization rates.





Note: nH refers to non-Hispanic.

A positive family history of CVD is often considered a risk correlate.[11] Its independent effect is difficult to ascertain because familial influences on CVD risk status tend to be mediated in part through blood pressure and blood cholesterol and indirectly through diet.

Similarly race and ethnicity are risk markers, rather than risk factors. Race and ethnicity are constructs used by health researchers to reflect socially distinct groups who share certain cultural, linguistic, socioeconomic, and/or other characteristics. They are used to identify high-risk populations who may also be affected by racism, segregation, and discrimination.[12]

Obesity and physical inactivity exert much of their adverse influence on the development of CVD through the other major risk factors. Nevertheless, they are important modifiable, contributory factors. The remaining modifiable risk factors have been shown to have independent effects on CVD.

Smoking increases the incidence of all major forms of heart disease and stroke. In 1998-1999 more than 1 in 5 Connecticut adults indicated that they smoked cigarettes (Table 3). The rates are highest (35%) in the youngest adult age group (18-24 years old), decreasing to 11 percent in the 65-and-older age group.[13] The unfavorable smoking patterns among the younger age groups may contribute substantially to the future burden of CVD.

Elevated low density lipoproteins (LDL) and low levels of high density lipoproteins (HDL) are risk factors for the development of CVD. Total cholesterol level is a less informative measure because it includes both LDL and HDL, which have opposite effects. Nevertheless, a high total cholesterol level is a major risk factor. During 1998-1999, 80 percent of Behavioral Risk Factor Surveillance System respondents in Connecticut reported ever having their cholesterol levels tested. Of those tested, 27 percent indicated that they had been told that their cholesterol was high (Table 3).

TABLE 3. CVD RISK FACTORS

Risk Factor	Percent Reporting Presence of Risk Factor*	CHD Relative Risk for Males⏏ (95% CI)	CHD Relative Risk for Females⏏ (95% CI)
Cigarette/tobacco smoking	22%	1.6 (1.4, 1.8)	1.8 (1.5, 2.1)
High blood cholesterol	27%	1.4 (1.2, 1.6)	1.1 (0.9, 1.2)
High blood pressure	22%	1.5 (1.3, 1.7)	1.5 (1.3, 1.8)
Diabetes	4%	1.9 (1.5, 2.5)	2.4 (1.9, 3.0)
Being over-weight or obese	51%	1.3 (1.1, 1.5)	1.4 (1.2, 1.6)
Physical inactivity	80%	N/A	N/A

* Source: Connecticut BRFSS, 1998-1999.
⏏ Source: Bittner, 1994.[14]
CI = Confidence interval.
N/A = Not available.

High blood pressure is also a major risk factor for heart disease and stroke. It is associated with a 50 percent increase in CHD risk over those without the condition. It is also the most important treatable risk factor for stroke. Most estimates for hypertension indicate a relative risk of stroke of approximately 3-4.[15] In 1998-1999, 22 percent of Connecticut adults reported that they had high blood pressure diagnosed by a health professional (Table 3). Development of high blood pressure is more likely to occur in people who are overweight and physically inactive, use alcohol heavily, or have excessive salt intake. The prevalence of being overweight or obese has increased significantly in Connecticut in the past decade. Diets high in saturated fat combined with sedentary lifestyles lead to excess weight. Nearly 63 percent of Connecticut males are considered overweight versus 40 percent of females. More than 70 percent of blacks are deemed to be overweight.[16] Being overweight affects the development of high blood pressure and diabetes, which, in turn, are important risk factors for heart disease and stroke.

Physical activity is beneficial in reducing CVD risk by helping to reduce body weight and by improving cholesterol levels, blood pressure, and blood sugar levels. Yet, nearly 80 percent of Connecticut adults have no regular physical activity (Table 3).

Diabetes is a significant risk factor for the development of high blood pressure, stroke, and heart disease, particularly in women. Of the modifiable risk factors, diabetes has the highest relative risk (Table 3). Diabetes not only increases the incidence of CVD but adversely influences outcomes as well - individuals with diabetes have a higher mortality rate from heart disease.

The high prevalence of major risk factors continues to contribute to the high rates of heart disease and stroke in Connecticut. Among Connecticut adults aged 18 and older, 93 percent reported having at least one of the six modifiable CVD risk factors and 28 percent reported having at least three.[17] This does not bode well for the future when the latent effects of the risk factors will manifest themselves in the form of CVD or other preventable disorders.

Prevention

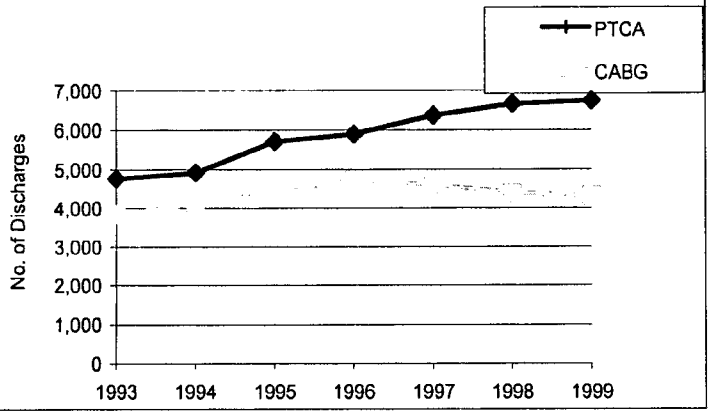
Preventive measures for heart disease and stroke include screening for existing risk factors, lifestyle modifications, or pharmacologic interventions. Early intervention will lessen the severity of risk factors that are the result of the non-modifiable factors of aging and genetics. Recommended modifications include smoking cessation, weight management, increasing physical activity, incorporating a diet low in salt and saturated fat and rich in fruits and vegetables, and treating high blood pressure and high cholesterol levels.

For women with no known CHD, the preventive role of hormone replacement therapy (HRT) is not well established. In secondary prevention, HRT has not been shown to reduce death or morbidity among women with established CHD, and therefore is not recommended for this purpose.[18] Although several clinical trials have shown cholesterol-reduction therapy to be effective for primary prevention of CHD in patients at high absolute risk, the use of such therapy in patients at low-to-moderate risk is still under investigation.[19] However, cholesterol-lowering agents, such as statins, have proven to be efficacious in secondary prevention of CHD, which, in turn, may also result in stroke prevention. Other accepted secondary preventive measures for CHD include the use of aspirin, beta blockers, angiotensin-converting enzyme (ACE) inhibitors, and revascularization procedures.

CHD Treatment: Revascularization Procedures

Revascularization procedures are surgical procedures, such as coronary artery bypass grafting (CABG) and percutaneous transluminal coronary angioplasty (PTCA), that provide for a new, additional, or augmented blood supply to the heart. They are effective, but invasive and costly, treatments for coronary heart disease. In Connecticut, the number of PTCAs continues to grow while the number of bypass procedures has started to decline (Fig. 5). Cost is one likely explanation for this divergence. Average hospitalization charges for CABG procedures are approximately $44,000 compared to $21,000 for PTCAs; and patients' hospital stays are on average 10 days versus 3 days, respectively. Another explanation for the increase is that patients, who initially received angioplasties, are being readmitted for repeat procedures due to restenosis of their arteries. Implantation of a drug-coated stent into the blocked artery may help to alleviate this problem.[20]

FIGURE 5
No. of Discharges Receiving Revascularization Procedures
Connecticut, 1993-1999



Studies have used hospitalizations for acute myocardial infarctions (AMI) as a proxy for the incidence of heart disease because those with the condition will seek care, and there is consensus regarding the necessity for admission.[21] For patients presenting with acute myocardial infarctions in Connecticut, women received fewer revascularization procedures than men. During the period 1997-1999, 20 percent of female AMI discharges received PTCA and 9 percent had CABG surgery whereas 28 percent of male AMI discharges had PTCA and 12 percent CABG. Women were older than men (73 vs. 66 years of age on average, respectively) and tended to have more comorbidities. Even after controlling for age, women received fewer procedures. It is unknown whether women with AMI are being less aggressively treated or whether they have fewer clinical manifestations warranting revascularization.

Economic Burden

Not only is CVD a considerable health burden, it is also a significant economic burden, which will continue to grow as the population ages. In the United States, the estimated annual cost of CVD is nearly $300 billion or $1,100 per person. This figure includes direct costs of health expenditures (60%) and indirect costs of lost productivity resulting from illness and death (40%). Assuming that disease rates and per person expenditures in Connecticut are the same as those nationwide, the estimated annual cost of CVD in Connecticut is $3.6 billion. The estimated annual costs of CHD, stroke, and CHF in Connecticut are $1.2 billion, $500 million, and $500 million, respectively. The use of expensive treatment, while often effective in delaying death from CVD, is likely to continue to increase the financial impact of this disease.

The majority of the cost for CVD is for inpatient hospitalizations. Total charges associated with 1999 CVD hospitalizations in Connecticut were close to $1.1 billion. The median charge was approximately $11,000. Sixty-six percent of the hospitalizations had Medicare as their expected payer. This percentage has remained relatively constant from 1993 through 1999. In 1993 only 7 percent of the CVD hospitalizations were covered by managed care organizations. By 1999 the percentage had more than doubled to 16 percent.

Conclusion

The considerable health and economic burdens of cardiovascular disease demonstrate the need to reduce its incidence, improve the treatment of its manifestations, and reduce its long-term disability and mortality. Although great advances have been made in treating CVD, changing one's habits remains the most effective way to stop the progression of the disease. Benefits arise from a low-fat diet rich in fruits and vegetables, increasing physical activity, and not smoking. Individual efforts, however, need to be promoted and supported by health programs and policies. For instance, heart healthy foods should be more readily available in school and workplace cafeterias; smoking prevention and cessation programs need to be supported by policies that address the social, economic, and commercial aspects of tobacco use; and more places need to be provided where children and adults can safely engage in physical activity. These endeavors will help individuals to lower cholesterol and blood pressure and to lose weight. Screening for risk of CVD, altering lifestyles, and receiving appropriate medical interventions provide opportunities to prevent CVD and to reduce related health expenditures.

Data Notes

Age-adjusted rates were computed by the direct method using the 2000 U.S. standard million population.

Charges associated with hospitalizations represent billed amounts and do not include physician fees. They do not necessarily reflect the actual costs of the services on the part of the providers nor do they represent the payments received.

References

[1] Anderson RN. U.S. decennial life tables for 1989-91, vol.1 no. 4, United States life tables eliminating certain causes of death. National Center for Health Statistics. Hyattsville, Maryland. 1999.

[2] Stoddard S., Jans L., Ripple J. and Kraus L. *Chartbook on Work and Disability in the United States, 1998.* An InfoUse Report. Washington, D.C.: U.S. National Institute on Disability and Rehabilitation Research.

[3] Mosca L., Collins P., Herrington D., et al. Hormone replacement therapy and cardiovascular disease: a statement for healthcare professionals from the American Heart Association. *Circulation* 2001; 104:499-503.

[4] Viscoli C.M., Brass L., Kernan W., et al. A clinical trial of estrogen-replacement therapy after ischemic stroke. *NEJM* 2001; 345:1243-1249.

[5] Hunink MG, Goldman L, Tosteson AN, et al. The recent decline in mortality from coronary heart disease, 1980-1990. The effect of secular trends in risk factors and treatment. *JAMA*. 1997;277:535-542.

[6] Hofmann M. and M.A. Hooper, eds. *Connecticut Women's Health.* Hartford, CT: Connecticut Department of Public Health, 2001.

[7] Hynes M, Mueller L, Bower C, Hofmann M. *Multicultural Health: The Health Status of Minority Groups in Connecticut.* Hartford, CT: Connecticut Department of Public Health, 1999.

[8] Abraido-Lanza AF, Dohrenwend BP, Ng-Mak DS, Turner JB. The Latino mortality paradox: a test of the "salmon bias" and healthy migrant hypotheses. *AJPH* 1999;89(10):1543-1548.

[9] Magana R, Bretsky P, Henderson S. Cardiovascular disease risk factors in African American and Latino acute MI patients. *Acad Emerg Med* 2001;8(5):507-508.

[10] Adams M. *Connecticut Behavioral Health Risks: High Risk Populations for Cardiovascular Disease.* Hartford, CT: Connecticut Department of Public Health, 2002.

[11] Grundy SM, Balady GJ, Criqui MH, et al. Primary prevention of coronary heart disease: guidance from Framingham. AHA Medical/Scientific Statement. 1998.

[12] Williams DR, Collins C. U.S. socioeconomic and racial differences in health: Patterns and explanations. *Annual Review of Sociology* 1995;21:349-386.

[13] Adams M. *op. cit.*

[14] Bittner V. Cardiovascular disease in women. *J Womens Health.* 1994;3:369-376.

[15] Sacco RL, Benjamin EF, Broderick JP, et al. Risk factors. *Stroke* 1997;28:1507-1517.

[16] Adams M. *op. cit.*

[17] Adams M. *op. cit.*

[18] Mosca L, Collins,P, Herrington D, et al. Hormone replacement therapy and cardiovascular disease: a statement of healthcare professionals from the American Heart Association. *Circulation.* 2001;104:499-503.

[19] Lloyd-Jones DM, O'Donnell CJ, D'Agostino RB, et al. Applicability of cholesterol-lowering primary prevention trials to a general population. *Arch Intern Med.* 2001;161:949-954.

[20] Hong MK, Kornowski R, Bramwell O, et al. Paclitaxel-coated Gianturco-Roubin II stents reduce neointimal hyperplasia in a porcine coronary in-stent restenosis model. *Coron Artery Dis* 2001;12(6):513-515.

[21] Wennberg JE, Freeman JL Culp WJ. Are hospital services rationed in New Haven or over-utilized in Boston? *Lancet* 1987 (8543):1185-1189.



This is the fourth in a series of briefs issued by the Connecticut Department Public Health on key health issues that affect Connecticut residents.

For more information, contact the Office of Policy, Planning, and Evaluation, Connecticut Department of Public Health, P.O. Box 340308, Hartford, CT 06134-0308, or visit our web site at **http://www.dph.state.ct.us.**

SPECIAL ARTICLE

Strategies for Reducing the Door-to-Balloon Time in Acute Myocardial Infarction

Elizabeth H. Bradley, Ph.D., Jeph Herrin, Ph.D., Yongfei Wang, M.S., Barbara A. Barton, R.N., Tashonna R. Webster, M.P.H., Jennifer A. Mattera, M.P.H., Sarah A. Roumanis, R.N., Jeptha P. Curtis, M.D., Brahmajee K. Nallamothu, M.D., David J. Magid, M.D., M.P.H., Robert L. McNamara, M.D., M.H.S., Janet Parkosewich, R.N., M.S.N., Jerod M. Loeb, Ph.D., and Harlan M. Krumholz, M.D.

ABSTRACT

BACKGROUND

Prompt reperfusion treatment is essential for patients who have myocardial infarction with ST-segment elevation. Guidelines recommend that the interval between arrival at the hospital and intracoronary balloon inflation (door-to-balloon time) during primary percutaneous coronary intervention should be 90 minutes or less. However, few hospitals meet this objective. We sought to identify hospital strategies that were significantly associated with a faster door-to-balloon time.

METHODS

We surveyed 365 hospitals to determine whether each of 28 specific strategies was in use. We used hierarchical generalized linear models and data on patients from the Centers for Medicare and Medicaid Services to determine the association between hospital strategies and the door-to-balloon time.

RESULTS

In multivariate analysis, six strategies were significantly associated with a faster door-to-balloon time. These strategies included having emergency medicine physicians activate the catheterization laboratory (mean reduction in door-to-balloon time, 8.2 minutes), having a single call to a central page operator activate the laboratory (13.8 minutes), having the emergency department activate the catheterization laboratory while the patient is en route to the hospital (15.4 minutes), expecting staff to arrive in the catheterization laboratory within 20 minutes after being paged (vs. >30 minutes) (19.3 minutes), having an attending cardiologist always on site (14.6 minutes), and having staff in the emergency department and the catheterization laboratory use real-time data feedback (8.6 minutes). Despite the effectiveness of these strategies, only a minority of hospitals surveyed were using them.

CONCLUSIONS

Several specific hospital strategies are associated with a significant reduction in the door-to-balloon time in the management of myocardial infarction with ST-segment elevation.

From the Departments of Epidemiology and Public Health (E.H.B., T.R.W., H.M.K.) and Medicine (J.H., Y.W., J.P.C., R.L.M., H.M.K.), Yale University School of Medicine; Yale–New Haven Hospital (B.A.B., J.A.M., S.A.R., J.P., H.M.K.); and Yale University School of Nursing (J.P.) — all in New Haven, CT; the University of Michigan Medical Center and the Ann Arbor Veterans Affairs Medical Center, Ann Arbor (B.K.N.); Kaiser Permanente and the University of Colorado Health Sciences Center, Denver (D.J.M.); and the Joint Commission on Accreditation of Healthcare Organizations, Oakbrook Terrace, IL (J.M.L.).

This article was published at www.nejm.org on November 13, 2006.

N Engl J Med 2006;355:2308-20.

Copyright © 2006 Massachusetts Medical Society.

Downloaded from www.nejm.org at SAINT MARYS HOSPITAL LIBRARY on August 5, 2008 .
Copyright © 2006 Massachusetts Medical Society. All rights reserved.

0443
09/15/08

Prompt treatment increases the likelihood of survival for patients who have myocardial infarction with ST-segment elevation.[1-3] Hospitals can therefore influence the outcomes for such patients by developing and implementing systems and processes that minimize the interval between arrival at the hospital and the administration of reperfusion therapy. Since percutaneous coronary intervention (PCI) has become the preferred approach for treating myocardial infarction with ST-segment elevation,[4] hospitals are seeking ways to reduce the door-to-balloon time, defined as the time between arrival at the hospital and the first balloon inflation during PCI.

The importance of the door-to-balloon time is highlighted by its inclusion as one of the core quality measures collected and reported by the Centers for Medicare and Medicaid Services (CMS) and the Joint Commission on Accreditation of Healthcare Organizations. Concomitant with national efforts to improve the care of patients with acute myocardial infarction have been substantial improvements in performance on many core measures (such as the use of aspirin and beta-blockers). However, performance with respect to the door-to-balloon time continues to lag behind national standards,[4-6] which recommend an interval of 90 minutes or less. A minority of hospitals treat patients who present with myocardial infarction with ST-segment elevation within 90 minutes after their arrival,[7-10] and hospital performance has not improved substantially in recent years.[7]

Previous qualitative work has identified some common approaches among hospitals that have achieved a rapid door-to-balloon time.[11,12] However, it is not clear which strategies are most effective or how great their effect might be. We sought to identify operational and clinical processes for treating patients who have myocardial infarction with ST-segment elevation and to quantify the association of these measures with hospital door-to-balloon times.

METHODS

STUDY DESIGN

We conducted a cross-sectional study of acute care hospitals in the United States with the use of a Web-based survey to determine the internal processes for identifying and treating patients with myocardial infarction with ST-segment elevation who undergo PCI. Eligible hospitals were those that reported the door-to-balloon time as a CMS performance measure and had reported an annualized volume of at least 25 PCI cases during 2004. From the 818 eligible hospitals, we randomly selected 500 hospitals and contacted the chief executive officer, first by letter and then by e-mail, to explain the goals and procedures of the study and to request the hospital's participation. The chief executive officer provided the contact information for the person in the organization whom they deemed to be the most appropriate respondent for the Web-based survey. This protocol was approved by the institutional review board at the Yale School of Medicine.

MEASURES AND DATA COLLECTION

From the hospital contact person, we obtained information about specific hospital strategies relevant to the door-to-balloon time, using a survey developed from our previous qualitative study[11] (see the Supplementary Appendix, available with the full text of this article at www.nejm.org). We developed closed-ended, multiple-choice questions for each hospital strategy and field-tested the instrument for clarity and comprehensiveness before implementation. The questionnaire asked about strategies in place at the time of the survey (April through October 2005). The final instrument included 32 items concerning 28 key hospital strategies. Response categories included "no standard approach" for cases of partial adoption of certain practices.

The outcome was the door-to-balloon time for patients with myocardial infarction with ST-segment elevation who underwent PCI between April and September 2005. Data on individual patients were obtained from CMS. On the basis of CMS specifications,[13] we included all patients with myocardial infarction with ST-segment elevation who were treated with PCI, except those who were transferred from other hospitals. CMS validates these hospital quality data reports with the use of quarterly validation samples that are abstracted and compared with the reported data.

STATISTICAL ANALYSIS

For each of the 28 hospital strategies, we determined the number and percentage of hospitals in each response category, as well as the average of the median door-to-balloon times of those hospitals. To evaluate the association between specific

Downloaded from www.nejm.org at SAINT MARYS HOSPITAL LIBRARY on August 5, 2008 .
Copyright © 2006 Massachusetts Medical Society. All rights reserved.

0444
09/15/08

Table 1. **Characteristics of the Hospitals.***

Characteristic	Completed Survey (N=365)	Did Not Complete Survey (N=135)†	P Value
	number (percent)		
Location			0.02
Urban	342 (93.7)	117 (86.7)	
Rural	23 (6.3)	18 (13.3)	
Teaching status			0.79
Nonteaching	281 (77.0)	105 (77.8)	
Teaching	84 (23.0)	30 (22.2)	
Staffed beds			0.27
<200	48 (13.4)	26 (19.3)	
201–500	226 (63.3)	86 (63.7)	
>500	83 (23.2)	23 (17.0)	
Missing data	8	NA	
Ownership type			0.01
Governmental	43 (11.8)	20 (14.8)	
Nonprofit	279 (76.4)	86 (63.7)	
For profit	43 (11.8)	29 (21.5)	
Geographic census region			0.05
New England	12 (3.3)	4 (3.0)	
Middle Atlantic	44 (12.1)	15 (11.1)	
South Atlantic	56 (15.3)	30 (22.2)	
East North Central	72 (19.7)	15 (11.1)	
East South Central	19 (5.2)	11 (8.1)	
West North Central	32 (8.8)	12 (8.9)	
West South Central	45 (12.3)	18 (12.6)	
Mountain	29 (7.9)	13 (9.6)	
West	56 (15.3)	17 (13.3)	
Annualized number of PCIs performed			0.22
25–40	123 (33.7)	45 (33.3)	
41–60	106 (29.0)	49 (36.3)	
>60	136 (37.3)	41 (30.4)	
CABG capability			
No	32 (8.8)	Unknown	
Yes	333 (91.2)	Unknown	
Part of a multihospital system			
No	128 (35.4)	Unknown	
Yes	234 (64.6)	Unknown	
Missing data	3	NA	
Median door-to-balloon time — min			0.83
≤90	127 (35.1)	47 (34.8)	
91–120	173 (47.8)	64 (47.4)	
121–150	47 (13.0)	20 (14.8)	
>150	15 (4.1)	4 (3.0)	
Missing data	3	NA	
Mean door-to-balloon time — min	100.4±23.5	104.8±24.1	0.08

* Plus–minus values are means ±SD. Percentages may not total 100 because of rounding. NA denotes not applicable, PCI percutaneous coronary intervention, and CABG coronary-artery bypass grafting.
† Data for hospitals that did not respond to the survey were obtained from the CMS.

Downloaded from www.nejm.org at SAINT MARYS HOSPITAL LIBRARY on August 5, 2008 .
Copyright © 2006 Massachusetts Medical Society. All rights reserved.

0445
09/15/08

hospital strategies and the door-to-balloon time, we used hierarchical generalized linear models,[14] which account for the clustering of patients within hospitals. We used the logarithm of the door-to-balloon time in our analysis to reduce skewness. For bivariate comparisons, we constructed a separate model for each hospital strategy.

We constructed a multivariate model, including independent variables that added significantly to the fit of the overall model ($P<0.10$ with the use of the likelihood ratio test for nested models), and sequentially excluded the variables that contributed the least to the fit of the model. Although the correlations among variables were modest (Cramer phi coefficient, <0.20 for 92% of the correlations), two variables were particularly strongly correlated (Cramer phi coefficient, 0.87). These variables were the specialty of the physician who was responsible for activating the catheterization laboratory on day shifts and the specialty of the physician who had that responsibility for night-and-weekend shifts. Therefore, we created a separate dummy variable for the multivariate analysis, which indicated whether emergency medicine physicians were responsible for activating the catheterization laboratory on day shifts as well as on night-and-weekend shifts. We also examined the effects of several hospital characteristics (location, teaching status, number of staffed beds, type of ownership, geographic region, capability of performing coronary-artery bypass grafting [CABG], and participation or nonparticipation in a multihospital system). However, none of these variables materially changed the effects of hospital strategies on the door-to-balloon time, and each was removed from the multivariate model. In reporting the data, we used an alpha level of 0.05 as the criterion for the statistical significance of the estimated effects of individual hospital strategies on the door-to-balloon time.

To facilitate the interpretation of the estimated effects, we centered all independent variables on their means, so that the intercept represented the mean of all independent variables.[15,16] Hence, the effect of individual strategies on the door-to-balloon time was calculated as the difference between the door-to-balloon time of hospitals implementing the selected strategy and hospitals not implementing the selected strategy, assuming the average response on all other strategies. We used simulation techniques[17-19] to transform estimated effects and confidence intervals in log units back into their natural units (i.e., minutes). All analyses were performed with the use of SAS software, version 9.1 (SAS Institute) and Stata 9 (Stata).

RESULTS

HOSPITAL SURVEY

We received responses from representatives of 365 of the 500 hospitals contacted (73%) (Table 1). The responding persons for each hospital were typically quality management directors, although cardiovascular nurse managers and medical directors were also involved at many hospitals. Nonrespondent hospitals did not differ significantly from respondent hospitals in terms of the annualized number of PCIs performed, the number of staffed beds, teaching status, geographic region, or median door-to-balloon time; however, rural hospitals were significantly less likely than urban hospitals to respond ($P=0.02$), and for-profit hospitals were significantly less likely than government or nonprofit hospitals to respond ($P=0.01$). Among the 365 respondents, 3 hospitals did not report data with regard to door-to-balloon times to CMS during the study period and were excluded from bivariate and multivariate analyses; 2 additional hospitals were missing one or more responses to survey items and were excluded from the multivariate analysis.

HOSPITAL STRATEGIES

Figure 1 shows the frequency distribution of median door-to-balloon times for the hospitals studied. The range of median values was wide, with many institutions having median times that ex-

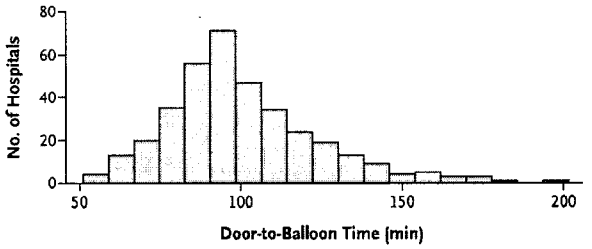


Figure 1. Frequency Distribution for Median Door-to-Balloon Times among Study Hospitals.

The median door-to-balloon time was calculated for each hospital in the study. The mean (±SD) of these median times was 100.4±23.5 minutes, which is considerably longer than the 90-minute interval recommended in the 2004 guidelines of the American Heart Association and the American College of Cardiology.[4]

Downloaded from www.nejm.org at SAINT MARYS HOSPITAL LIBRARY on August 5, 2008 .
Copyright © 2006 Massachusetts Medical Society. All rights reserved.

0446
09/15/08

Table 2. **Unadjusted Associations between Hospital Strategies and Door-to-Balloon Time.***

Strategy	Hospitals	Average Median Door-to-Balloon Time	P Value	Wald P Value†
	no. (%)	*minutes*		
Written criteria for immediate ECG in emergency department				
No	42 (11.5)	105.1		
Yes	323 (88.5)	99.8	0.34	
Formal training of triage staff for assessing acute coronary syndrome				
No	150 (41.1)	100.8		
Yes	215 (58.9)	100.2	0.75	
Dedicated ECG technicians in emergency department				0.20
No	90 (24.7)	102.6		
Yes, only some shifts	31 (8.5)	100.4	0.36	
Yes, always	244 (66.8)	99.7	0.07	
Dedicated space in triage area for immediate ECG				
No	121 (33.2)	103.2		
Yes	244 (66.8)	100	0.70	
Activation of catheterization laboratory on weekdays				<0.001
Emergency medicine physician with cardiologist	218 (59.7)	102.6		
Cardiologist alone	65 (17.8)	105.8	0.44	
Emergency medicine physician alone	82 (22.5)	90.5	<0.001	
Activation of catheterization laboratory at night and on weekends‡				<0.001
Emergency medicine physician with cardiologist	200 (54.9)	104.3		
Cardiologist alone	65 (17.9)	104.8	0.99	
Emergency medicine physician alone	99 (27.2)	90.2	<0.001	
Process for activating catheterization team‡				<0.001
After communicating with the emergency department, interventional cardiologist activates catheterization laboratory by calling staff or a central page operator	147 (40.4)	108.1		
Emergency department makes at least two calls: one to the interventional cardiologist and another to a central page operator, who pages catheterization laboratory staff	135 (37.1)	96	<0.001	
Emergency department makes a single call to a central page operator, who then pages interventional cardiologist and catheterization laboratory staff	50 (13.7)	89.2	<0.001	
No standard approach	1 (0.3)	119.5	0.37	
Other	31 (8.5)	99	0.04	
Activation of on-call staff for catheterization laboratory‡				0.23
Page operator is not used	90 (24.7)	97.5		
Page operator is used; confirmation of page receipt is required	205 (56.3)	102.2	0.47	
Page operator is used; no confirmation of page receipt is required	23 (6.3)	90.4	0.19	
No standard approach	46 (12.6)	102.1	0.34	

Downloaded from www.nejm.org at SAINT MARYS HOSPITAL LIBRARY on August 5, 2008 .
Copyright © 2006 Massachusetts Medical Society. All rights reserved.

0447
09/15/08

Table 2. (Continued.)

Strategy	Hospitals	Average Median Door-to-Balloon Time	P Value	Wald P Value†
	no. (%)	*minutes*		
First physician notified after STEMI diagnosis in emergency department				0.01
Cardiologist	239 (65.5)	101.0		
Interventional cardiologist	93 (25.5)	97.3	0.04	
Patient's primary care physician	7 (1.9)	117.9	0.01	
Other or variable	26 (7.1)	101.9	0.87	
Laboratory and radiographic results are needed to activate catheterization laboratory				0.003
Yes	11 (3.0)	116.7		
No	340 (93.2)	99.1	0.04	
No standard approach	14 (3.8)	119.6	0.81	
Patients with acute coronary syndrome who undergo ECG en route to hospital‡				0.67
0%	91 (25.0)	101.9		
1–10%	39 (10.7)	98.5	0.58	
11–50%	44 (12.1)	99.2	0.63	
51–99%	64 (17.6)	95.5	0.10	
100%	49 (13.5)	101	0.52	
Don't know	77 (21.2)	103.6	0.86	
Emergency medical service routinely calls in or transmits results of ECG				0.03
No	143 (39.2)	102.8		
Yes	144 (39.5)	96.0	0.01	
Not applicable	78 (21.4)	104.3	0.71	
Process after emergency medical service transmits ECG results				<0.001
Emergency department waits for patient to arrive at hospital to determine whether catheterization laboratory should be activated	61 (16.7)	103.6		
Emergency department contacts cardiologist while the patient is en route to determine whether catheterization laboratory should be activated	39 (10.7)	95.7	0.09	
Emergency department activates catheterization laboratory while the patient is still en route to the hospital	33 (9.0)	85.4	<0.001	
No standard approach or variable approach	11 (3.0)	87.8	0.01	
Not applicable because ECG data not transmitted en route	52 (14.2)	104.4	0.97	
Not applicable because ECG never performed en route	91 (24.9)	101.9	0.45	
Unknown or no response	78 (21.4)	104.3	0.43	
Expected interval between page and arrival of staff in catheterization laboratory‡				0.003
≤20 min	39 (10.7)	91.0		
21–30 min	280 (76.9)	99.9	0.16	
>30 min	39 (10.7)	111.1	<0.001	
No expected time	6 (1.6)	110.8	0.20	

Downloaded from www.nejm.org at SAINT MARYS HOSPITAL LIBRARY on August 5, 2008 .
Copyright © 2006 Massachusetts Medical Society. All rights reserved.

0448
09/15/08

Table 2. (Continued.)

Strategy	Hospitals	Average Median Door-to-Balloon Time	P Value	Wald P Value†
	no. (%)	*minutes*		
Expected interval between page and arrival of interventional cardiologist‡				<0.001
≤20 min	47 (12.9)	94.6		
21–30 min	205 (56.3)	97.9	0.69	
>30 min	31 (8.5)	112.1	0.005	
No expected time	81 (22.3)	105.3	0.11	
Someone is always available to transport patients from emergency department to catheterization laboratory‡				0.93
No	39 (10.7)	103.4		
Yes	325 (89.3)	99.9	0.93	
Initiation of patient transport from emergency department to catheterization laboratory‡				0.012
After catheterization laboratory notifies emergency department it is ready	339 (93.1)	100.6		
A set interval after the decision is made regarding PCI	16 (4.4)	84.9	0.01	
No standard approach	7 (1.9)	117.9	0.04	
Other approach	2 (0.5)	110.5	0.72	
Minimum number of nurses and technicians required in catheterization laboratory before patient is transported from emergency department§				0.66
Interventional cardiologist must be present	88 (24.2)	100.7		
Interventional cardiologist may not be present but need presence of				
1 staff person	8 (2.2)	94.8	0.56	
2–4 staff people	228 (62.8)	101	0.70	
No set number	39 (10.7)	97	0.48	
Elective catheterization cases rescheduled for emergency PCI§				0.65
Yes	353 (97.2)	100.3		
No	5 (1.4)	94.6	0.54	
It depends	5 (1.4)	100.4	0.49	
If interventionalist is present, number of staff required to begin PCI‡				0.64
1	22 (6.0)	109.4		
2	93 (25.5)	99.1	0.25	
3	221 (60.7)	100.0	0.30	
4	28 (7.7)	99.2	0.22	
Catheterization laboratory is left so that next PCI can begin promptly‡				0.76
Yes	321 (88.2)	100.4		
No	30 (8.2)	100.6	0.56	
No standard policy	13 (3.6)	97.5	0.68	
Cardiology fellows participate in performing PCI‡				
No	306 (84.1)	99.2		
Yes	58 (15.9)	106.2	0.31	

Downloaded from www.nejm.org at SAINT MARYS HOSPITAL LIBRARY on August 5, 2008 .
Copyright © 2006 Massachusetts Medical Society. All rights reserved.

0449
09/15/08

Table 2. (Continued.)

Strategy	Hospitals	Average Median Door-to-Balloon Time	P Value	Wald P Value†
	no. (%)	*minutes*		
Staff in critical care area are routinely cross-trained to cover catheterization laboratory‡				
No	345 (94.8)	100.4		
Yes	19 (5.2)	97.9	0.22	
Location of catheterization laboratory‡				0.94
Elevator required to travel from emergency department	204 (56.0)	101.6		
Same floor as emergency department	160 (44.0)	98.7	0.94	
An attending cardiologist is always at the hospital				
No	351 (96.2)	100.8		
Yes	14 (3.8)	92.6	0.01	
Emergency department routinely gives data feedback to emergency medical service‡				
No	289 (79.4)	102.8		
Yes	75 (20.6)	90.7	<0.001	
Hospital gives real-time feedback to staff in emergency department and catheterization laboratory‡				
No	213 (58.5)	104.7		
Yes	151 (41.5)	94.0	<0.001	
Hospital uses root-cause analysis or similar approach for delays‡				
No	99 (27.2)	103.8		
Yes	265 (72.8)	99.0	0.04	

* P values were calculated with the use of a hierarchical generalized linear model of the logarithm of door-to-balloon time with hospital strategy as an independent variable. ECG denotes electrocardiography, PCI percutaneous coronary intervention, and STEMI myocardial infarction with ST-segment elevation. P values are for the comparison between each survey response and the first listed response to each question.
† P values were calculated with the use of the Wald chi-square test.
‡ Data were missing from one survey respondent for this question.
§ Data were missing from two survey respondents for this question.

ceeded the 90-minute interval recommended in the 2004 guidelines of the American Heart Association and the American College of Cardiology.[4] The mean [±SD] of the median door-to-balloon times of all the hospitals was 100.4±23.5 minutes. There was also substantial variation in the prevalence of specific hospital strategies to expedite the door-to-balloon time. A number of strategies had significant unadjusted (bivariate) associations with the door-to-balloon time (Table 2).

The multivariate model identified six hospital strategies that added significantly to the fit of the model ($P<0.10$ for nested models) and were associated with a significantly lower door-to-balloon time. Some associations were particularly strong, indicating an estimated savings in the door-to-balloon time of 10 to 15 minutes (Table 3). These strategies were generally implemented in a minority of hospitals. Hospitals that implemented a greater number of effective strategies tended to have a shorter door-to-balloon time (Table 4).

Hospital practices regarding activation of the catheterization laboratory had a significant effect on the door-to-balloon time. The intervals were shorter for hospitals in which emergency medicine physicians activated the catheterization laboratory without consulting a cardiologist; those in which the catheterization laboratory was activated with a single call from the emergency department to a central page operator, who then paged both the interventional cardiologist and the catheterization laboratory staff; and those in which staff were expected to arrive in the catheterization laboratory either within 20 minutes or

Downloaded from www.nejm.org at SAINT MARYS HOSPITAL LIBRARY on August 5, 2008 .
Copyright © 2006 Massachusetts Medical Society. All rights reserved.

0450
09/15/08

Table 3. **Adjusted Associations between Hospital Strategies and Door-to-Balloon Times.***

Strategy	Door-to-Balloon Time (95% CI)	P Value†	Wald P Value‡
	minutes		
Catheterization laboratory is activated by emergency medicine physician			0.01
No			
Yes	−8.2 (−14.3 to −2.0)	0.01	
Process for activating catheterization team			0.01
After communicating with the emergency department, interventional cardiologist activates catheterization laboratory by calling staff or a central page operator			
Emergency department makes at least two calls: one to the interventional cardiologist and another to a central page operator, who pages catheterization laboratory staff	−6.8 (−12.5 to −1.0)	0.03	
Emergency department makes a single call to a central page operator, who then pages interventional cardiologist and catheterization laboratory staff	−13.8 (−21.2 to −6.4)	0.001	
No standard approach	13.2 (−37.8 to 64.2)	0.66	
Other	−5.0 (−14.1 to 4.0)	0.28	
Process after emergency medical service transmits ECG results			0.004
Emergency department waits for patient to arrive at the hospital to determine whether catheterization laboratory should be activated			
Emergency department contacts cardiologist while the patient is en route to determine whether catheterization laboratory should be activated	−8.9 (−17.8 to 0)	0.06	
Emergency department activates catheterization laboratory while the patient is still en route to the hospital	−15.4 (−24.2 to −6.6)§	0.001	
No set protocol or variable protocol	−23.2 (−35.3 to −11.1)¶	0.001	
Not applicable because ECG data not transmitted to emergency department	−6.6 (−15.2 to 2.1)	0.14	
Not applicable because ECG never performed en route	−4.3 (−12.0 to 3.3)	0.27	
Unknown or no response	−5.6 (−13.3 to 2.2)	0.17	
Expected interval between page and arrival of staff in catheterization laboratory			0.01
≤20 min			
21–30 min	3.5 (−4.6 to 11.6)‖	0.40	
>30 min	19.3 (6.0 to 32.7)	0.002	
No expected time	8.8 (−0.7 to 18.3)	0.06	
An attending cardiologist is always at the hospital			0.01
No			
Yes	−14.6 (−25.7 to −3.6)	0.01	
Hospital gives real-time feedback to staff in emergency department and catheterization laboratory			0.001
No			
Yes	−8.6 (−13.6 to −3.6)	0.001	

* All variables are centered at their mean value; therefore, the changes in minutes are relative to those of hospitals with an "average" score on all other items. CI denotes confidence interval, and ECG electrocardiography.

† The reference category is the first listed response to each question.

‡ P values were calculated with the use of the Wald chi-square test.

§ P=0.01 for the comparison with the door-to-balloon time at hospitals reporting that electrocardiography was never performed en route by emergency medical services.

¶ P=0.01 for the comparison with the door-to-balloon time at hospitals reporting that emergency medical services never called in or transmitted electrocardiographic data. Hospitals that reported having no set protocol or a variable protocol could have used a variety of strategies, including activation of the catheterization laboratory before the patient arrived, for expediting the door-to-balloon time.

‖ P=0.003 for the comparison with the door-to-balloon time at hospitals with an expected interval of more than 30 minutes.

Downloaded from www.nejm.org at SAINT MARYS HOSPITAL LIBRARY on August 5, 2008 .
Copyright © 2006 Massachusetts Medical Society. All rights reserved.

0451
09/15/08

21 to 30 minutes after being paged (P=0.002 for the comparison with an interval of 20 minutes or less and P=0.003 for the comparison with an interval of more than 30 minutes). In addition, hospitals that always had an attending cardiologist at the hospital had a faster door-to-balloon time than did hospitals without an attending cardiologist always on site.

Hospitals that used the results of electrocardiography that were called in or transmitted by emergency medical services to activate the catheterization laboratory while the patient was still en route to the hospital had significantly faster door-to-balloon times than did hospitals that waited for the patient to arrive before activating the catheterization laboratory (P=0.001). The hospitals that activated the laboratory while the patient was still en route also had significantly faster door-to-balloon times than did hospitals reporting that emergency medical services never performed electrocardiography (P=0.01). In addition, hospitals reporting that emergency medical services called in or transmitted the results of electrocardiography but also reporting various methods of handling such information had faster door-to-ballooon times than did hospitals that never received such information (P=0.01). Methods of handling the information may have included activating the catheterization laboratory while the patient was en route to the hospital, but with no set protocol for this procedure at the hospital. Finally, hospitals that provided real-time data feedback on the door-to-balloon time to staff members in the emergency department and catheterization laboratory had faster door-to-balloon times than those that did not (P=0.001).

One item in our survey requested an estimate of how frequently in the previous 6 months the catheterization laboratory had been activated for PCI but then had not been needed. This question was used to evaluate the effect of specific hospital policies on the frequency of such false alarms. The median number of false alarms that was reported among hospitals in which emergency medicine physicians activated the catheterization laboratory was 2 (interquartile range, 1 to 4), as compared with 1 false alarm (interquartile range, 0 to 3) for all other hospitals. Among hospitals using electrocardiographic data obtained en route to activate the catheterization laboratory, the median number of false alarms was 2 (interquartile range, 1 to 4) in the previous 6 months.

Table 4. Door-to-Balloon Time According to the Number of Key Strategies Used.*

Number of Key Strategies	Hospitals with the Number of Key Strategies (N=362)	Average of Median Door-to-Balloon Times†
	no. (%)	*minutes*
0	137 (37.8)	110
1	130 (35.9)	100
2	56 (15.5)	88
3	31 (8.6)	88
4	8 (2.2)	79

* Since the number of hospitals using three or four strategies was small, the precision of the estimates may be limited.
† P<0.001.

Hospital policies regarding the performance and assessment of electrocardiography in the emergency department did not have a significant effect on the door-to-balloon time, in either bivariate or multivariate analyses. These policies included the use of written criteria for deciding which patients should undergo immediate electrocardiography, provision of formal training in the assessment of acute coronary syndromes for triage staff members in the emergency department, inclusion of dedicated electrocardiographic technicians in the emergency department, and provision of dedicated space for performing electrocardiography in the triage area. In addition, policies and practices related to transporting patients from the emergency department to the catheterization laboratory (e.g., timing and staff required) were not significantly related to the door-to-balloon time in multivariate analysis. Practices in the catheterization laboratory that were surveyed were also not significantly associated with the door-to-balloon time in either bivariate or multivariate analyses. These practices included rescheduling elective PCI cases as emergency PCI cases, leaving the catheterization laboratory prepared for the next PCI to begin promptly, involving cardiology fellows in performing PCI, and locating the catheterization laboratory on the same floor as the emergency department.

Downloaded from www.nejm.org at SAINT MARYS HOSPITAL LIBRARY on August 5, 2008 .
Copyright © 2006 Massachusetts Medical Society. All rights reserved.

0452
09/15/08

DISCUSSION

In a cross-sectional study of 365 acute care hospitals in the United States, we identified several hospital strategies that were strongly associated with the door-to-balloon time in the performance of PCI for patients with acute myocardial infarction with ST-segment elevation. In some cases, specific practices were associated with time savings of 10 to 15 minutes, a clinically important advantage in a group of institutions with a mean value of 100 minutes for median door-to-balloon times. Many of the strategies are not commonly used in hospitals in the United States, which may account in part for the relatively poor performance of such hospitals in meeting guidelines for the door-to-balloon time.

Although implementation of some of the advantageous strategies would require investment in new resources, other strategies that are currently used by only a minority of hospitals could be implemented with existing resources. For instance, having emergency medicine physicians determine whether a myocardial infarction with ST-segment elevation is present and activate the catheterization team without involvement of a cardiologist was strongly associated with a reduced door-to-balloon time but was used in only about 23% of hospitals during weekdays and in 27% of hospitals at night or on weekends. Furthermore, having the catheterization laboratory activated by a single call from the emergency department to a central page operator, who then paged both the interventional cardiologist and the catheterization laboratory staff, was strongly associated with a faster door-to-balloon time, but the single-call process was used in only about 14% of hospitals in this study. Research on the time to fibrinolytic therapy[20] and small, single-hospital studies of the door-to-balloon time[21,22] have also indicated that treatment is more rapid if emergency medicine physicians make the treatment decision without the involvement of a cardiologist. Nonetheless, most hospitals still involve a cardiologist in the decision to activate the catheterization laboratory.

In addition to the strategies that focus on processes within the hospital, the hospital's coordination with emergency medical services was strongly associated with the door-to-balloon time. Previous studies[23-25] have shown that performing electrocardiography en route to the hospital can reduce the door-to-balloon time, and the National Heart Attack Alert Program Coordinating Committee[26] has recommended increased use of such electrocardiographic services. In our study, the percentage of patients with acute coronary syndrome who underwent electrocardiography en route was not associated with the door-to-balloon time. Instead, it was the way that such electrocardiograms were used by hospitals that was important. Hospitals that activated the catheterization laboratory on the basis of electrocardiography performed while the patient was en route and those that had varied strategies to respond to electrocardiographic data transmitted from emergency medical services had an advantage. Determining the optimal approach for incorporating such electrocardiographic data into hospital processes to expedite the door-to-balloon time is an important area for future research.

False alarms were reported to be infrequent in our study, even at hospitals where emergency medicine physicians were responsible for activation of the catheterization laboratory on the basis of electrocardiography performed en route to the hospital. We were not able to obtain independent confirmation of the accuracy of the hospitals' estimates of false alarms. However, we have no evidence to suggest that these data are inaccurate, and we believe that perceptions about the number of false alarms are probably as important as is the true number of false alarms in determining whether noncardiologists are permitted to activate the catheterization laboratory. This issue may be clarified by further study.

Implementation of other strategies that were associated with faster door-to-balloon time may be more complex. The presence of an attending cardiologist at the hospital at all times was associated with a significantly faster door-to-balloon time. These strategies may be impractical or prohibitively expensive to implement in many hospitals.

Several considerations are important in interpreting our results. First, the survey data were reported by a single respondent at the hospital, and the reported policies and practices were not independently confirmed. However, respondents were selected by the chief executive officer of each hospital as the person who was most familiar with activities in this area, and the questions were field-tested before their use to ensure their clarity and completeness.

Downloaded from www.nejm.org at SAINT MARYS HOSPITAL LIBRARY on August 5, 2008 .
Copyright © 2006 Massachusetts Medical Society. All rights reserved.

0453
09/15/08

Second, the hospitals were restricted to those that reported the door-to-balloon time as one of their CMS performance measures. These hospitals may have been more aggressive than others in their efforts to reduce the door-to-balloon time. Therefore, the prevalence of some strategies may be overestimated, but even for this group, the overall rates were low for most of the strategies. In addition, it may not have been possible to detect the influence of some practices because of a high prevalence of the preferred practice (e.g., 97% of surveyed hospitals do not wait for laboratory and radiographic results to activate the catheterization laboratory). Nevertheless, the respondent hospitals did reflect a spectrum of performance in the door-to-balloon time.

Third, with the observational study design, we could not determine whether some of the strategies identified were surrogates for unmeasured care processes that might have been important contributors to a reduced door-to-balloon time. The processes tested, however, emerged from qualitative studies[11,12] and have strong face validity for a causal relationship. In addition, some strategies may be important in particular institutions but not across the full sample, and our results should not inhibit innovations that may be effective in particular settings.

Finally, we were unable to examine efforts that may reduce the time from the onset of symptoms to admission or the time after arrival at the first hospital to balloon inflation for patients who were transferred to a hospital in which PCI is performed. These are important topics for future study, because delays in reperfusion therapy are commonplace for transferred patients.[27]

In conclusion, this study used survey information from 365 acute care hospitals to determine which specific policies and practices were in use for facilitating rapid PCI in patients with acute myocardial infarction with ST-segment elevation. These policies and practices, as reported, were correlated with data on individual patients with regard to the door-to-balloon time, permitting the identification of hospital strategies associated with the most prompt performance of this critical intervention.

Supported by a grant (R01HL072575) from the National Heart, Lung, and Blood Institute in Bethesda, MD, and by a grant (02-102, to Dr. Bradley) from the Patrick and Catherine Weldon Donaghue Medical Research Foundation in Hartford, CT. The analyses on which this article is based were performed under contract HHSM-500-2005-CO001C, entitled "Utilization and Quality Control Quality Improvement Organization for the State of Colorado," sponsored by the CMS.

No potential conflict of interest relevant to this article was reported.

The views expressed in this article are those of the authors and do not necessarily reflect the views of the Department of Health and Human Services, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. government.

We thank Steven Jencks, M.D., for his suggestions regarding the manuscript.

REFERENCES

1. Berger PB, Ellis SG, Holmes DR Jr, et al. Relationship between delay in performing direct coronary angioplasty and early clinical outcome in patients with acute myocardial infarction: results from the Global Use of Strategies to Open Occluded Arteries in Acute Coronary Syndromes (GUSTO-IIb) trial. Circulation 1999;100:14-20.

2. Cannon CP, Gibson CM, Lambrew CT, et al. Relationship of symptom-onset-to-balloon time and door-to-balloon time with mortality in patients undergoing angioplasty for acute myocardial infarction. JAMA 2000;283:2941-7.

3. McNamara RL, Wang Y, Herrin J, et al. Effect of door-to-balloon time on mortality in patients with ST-segment elevation myocardial infarction. J Am Coll Cardiol 2006;47:2180-6.

4. Antman EM, Anbe DT, Armstrong PW, et al. ACC/AHA guidelines for the management of patients with ST-elevation myocardial infarction — executive summary: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Revise the 1999 Guidelines on the Management of Patients with Acute Myocardial Infarction). Circulation 2004;110:588-636.

5. Jacobs AK, Antman EM, Ellrodt G, et al. Recommendation to develop strategies to increase the number of ST-segment-elevation myocardial infarction patients with timely access to primary percutaneous coronary intervention. Circulation 2006;113:2152-63.

6. Williams SC, Schmaltz SP, Morton DJ, Koss RG, Loeb JM. Quality of care in U.S. hospitals as reflected by standardized measures, 2002–2004. N Engl J Med 2005;353:255-64.

7. McNamara RL, Herrin J, Bradley EH, et al. Hospital improvement in time to reperfusion in patients with acute myocardial infarction, 1999 to 2002. J Am Coll Cardiol 2006;47:45-51.

8. Burwen DR, Galusha DH, Lewis JM, et al. National and state trends in quality of care for acute myocardial infarction between 1994-1995 and 1998-1999: the Medicare health care quality improvement program. Arch Intern Med 2003;163:1430-9.

9. Rogers WJ, Canto JG, Barron HV, Boscarino JA, Shoultz DA, Every NR. Treatment and outcome of myocardial infarction in hospitals with and without invasive capability. J Am Coll Cardiol 2000;35:371-9.

10. Jencks SF, Huff ED, Cuerdon T. Change in the quality of care delivered to Medicare beneficiaries, 1998-1999 to 2000-2001. JAMA 2003;289:305-12. [Erratum, 2003;289:2649.]

11. Bradley EH, Roumanis SA, Radford MJ, et al. Achieving door-to-balloon times that meet quality guidelines: how do successful hospitals do it? J Am Coll Cardiol 2005;46:1236-41.

12. Bradley EH, Curry LA, Webster TR, et al. Achieving rapid door-to-balloon times:

Downloaded from www.nejm.org at SAINT MARYS HOSPITAL LIBRARY on August 5, 2008 .
Copyright © 2006 Massachusetts Medical Society. All rights reserved.

0454
09/15/08

how top hospitals improve complex clinical systems. Circulation 2006;113:1079-85.
13. Joint Commission on Accreditation of Healthcare Organizations. A comprehensive review of development and testing for national implementation of hospital core measures. (Accessed November 2, 2006, at http://www.jointcommission.org/NR/rdonlyres/48DFC95A-9C05-4A44-AB05-1769D5253014/0/AComprehensiveReviewofDevelopmentforCoreMeasures.pdf.)
14. Snijders T, Bosker R. Multilevel analysis: an introduction to basic and advanced multilevel modeling. London: Sage, 1999.
15. Aiken LS, West SG. Multiple regression: testing and interpreting interactions. Newbury Park, CA: Sage, 1991.
16. Kreft I, de Leeuw J. Introducing multilevel modeling. London: Sage, 1998.
17. King G, Tomz M, Wittenberg J. Making the most of statistical analyses: improving interpretation and presentation. Am J Pol Sci 2000;44:341-55.
18. Stern S. Simulation-based estimation. J Econ Lit 1997;35:2006-39.
19. Tanner MA. Tools for statistical inference: methods for the exploration of posterior distributions and likelihood functions. 3rd ed. New York: Springer-Verlag, 1996.
20. Lambrew CT, Bowlby LJ, Rogers WJ, Chandra NC, Weaver WD. Factors influencing the time to thrombolysis in acute myocardial infarction: Time to Thrombolysis Substudy of the National Registry of Myocardial Infarction-1. Arch Intern Med 1997;157:2577-82.
21. Thatcher JL, Gilseth TA, Adlis S. Improved efficiency in acute myocardial infarction care through commitment to emergency department-initiated primary PCI. J Invasive Cardiol 2003;15:693-8.
22. Jacoby J, Axelband J, Patterson J, Belletti D, Heller M. Cardiac cath lab activation by the emergency physician without prior consultation decreases door-to-balloon time. J Invasive Cardiol 2005;17:154-5.
23. Canto JG, Zalenski RJ, Ornato JP, et al. Use of emergency medical services in acute myocardial infarction and subsequent quality of care: observations from the National Registry of Myocardial Infarction 2. Circulation 2002;106:3018-23.
24. Canto JG, Rogers WJ, Bowlby LJ, French WJ, Pearce DJ, Weaver WD. The prehospital electrocardiogram in acute myocardial infarction: is its full potential being realized? J Am Coll Cardiol 1997;29:498-505.
25. Curtis JP, Portnay EL, Wang Y, et al. The pre-hospital electrocardiogram and time to reperfusion in patients with acute myocardial infarction, 2000-2002: findings from the National Registry of Myocardial Infarction-4. J Am Coll Cardiol 2006;47:1544-52.
26. Garvey JL, MacLeod BA, Sopko G, Hand MM. Pre-hospital 12-lead electrocardiography programs: a call for implementation by emergency medical services systems providing advanced life support. J Am Coll Cardiol 2006;47:485-91.
27. Nallamothu BK, Bates ER, Herrin J, Wang Y, Bradley EH, Krumholz HM. Times to treatment in transfer patients undergoing primary percutaneous coronary intervention in the United States: National Registry of Myocardial Infarction (NRMI)-3/4 analysis. Circulation 2005;111:761-7.

Copyright © 2006 Massachusetts Medical Society.

Downloaded from www.nejm.org at SAINT MARYS HOSPITAL LIBRARY on August 5, 2008 .
Copyright © 2006 Massachusetts Medical Society. All rights reserved.

0455
09/15/08

Reducing the Door-to-Balloon Time for Myocardial Infarction with ST-Segment Elevation

Mauro Moscucci, M.D., and Kim A. Eagle, M.D.

It has been 27 years since the initial report of successful reperfusion of occluded coronary arteries with thrombolytic therapy in patients with acute myocardial infarction,[1] and 20 years since the initial report of the feasibility and safety of primary percutaneous coronary intervention (PCI) in the same setting.[2] During the past decade, primary PCI has gradually emerged as the preferred treatment strategy for acute myocardial infarction with ST-segment elevation.[3,4] However, for both primary PCI and thrombolytic therapy, analyses have consistently shown that timely reperfusion remains a key component in improving the survival of patients.[5-7]

For primary PCI, the standard approach to assessing the promptness of intervention is to measure the "door-to-balloon time," defined as the interval between the time a patient arrives in the emergency department and the first inflation of an angioplasty balloon in the occluded coronary artery. On the basis of data from clinical trials and registry analyses, a door-to-balloon time of less than 90 minutes recently was established as the benchmark for primary PCI.[8]

All that said, the shift from thrombolytic therapy to primary PCI has added new challenges in the already complex emergency management of acute myocardial infarction. These challenges go beyond the prompt recognition of myocardial infarction and the initiation of therapy in the emergency department. Essential steps include "activation" of the cardiac catheterization laboratory (a term that incorporates notification of interventional cardiologists and other personnel and preparation of the laboratory for the procedure), as well as transportation of the patient from the emergency department to the laboratory, preparation of the patient, and initiation and performance of the procedure itself. Recent surveys have shown that only about 20% of hospitals across the United States have been able to reach the 90-minute benchmark. Although a recent study suggested that a particular professional "culture" is needed within hospital systems to achieve optimal performance in reperfusion therapy with primary PCI,[9] relatively few objective data have been published regarding the potential benefit of specific strategies for reducing the door-to-balloon time.

In this issue of the *Journal*, Bradley and colleagues provide the results of a qualitative–quantitative analysis aimed at identifying hospital strategies that are associated with shorter door-to-balloon times for patients undergoing primary PCI.[10] The authors surveyed 365 hospitals with a questionnaire that included 32 closed-ended items identifying 28 key hospital strategies that influence the care of patients with acute myocardial infarction with primary PCI. The relationship between hospital responses and the door-to-balloon time of individual patients was then evaluated with the use of hierarchical modeling, with hospital strategies as explanatory (or independent) variables and door-to-balloon times as the dependent variable.

Several simple strategies emerged as important correlates of shorter door-to-balloon times. These strategies included activating the cardiac catheterization laboratory on the basis of electrocardiography performed while the patient is en route to the hospital, having emergency department physicians activate the catheterization laboratory rather than waiting for a cardiology consultation, activating the catheterization laboratory with a single call to a central page operator, expecting staff to arrive in the catheterization laboratory within 20 minutes (as compared with more than 30 minutes), having an attending cardiologist always on site, and providing real-time (within 1 week) data feedback with staff in the emergency department and catheterization laboratory on door-to-balloon times for patients who were recently treated. The amount of time saved with each strategy ranged from 8.2 minutes to 19.3 minutes.

It should be noted that short of having staff on call in the hospital or having the appropriate cross-training of personnel from different areas, the expectations that staff will arrive in the catheterization laboratory within 20 minutes after notification and that an attending cardiologist will always be on site may be difficult to achieve on a wide scale. Such practices would probably involve a trade-off between the optimal response time on one side and higher costs and possible personnel dissatisfaction on the other. However, all the other strategies that worked in this study

Downloaded from www.nejm.org at SAINT MARYS HOSPITAL LIBRARY on August 5, 2008 .
Copyright © 2006 Massachusetts Medical Society. All rights reserved.

0456
09/15/08

should be achievable by most hospital systems. In particular, activation of the catheterization laboratory on the basis of electrocardiographic data obtained before admission, the use of a single page for activation of the catheterization laboratory, and allowing physicians in the emergency department to activate the catheterization laboratory (thus bypassing the not-uncommon sequence of contacting the primary care physician, the cardiologist, and then the interventional cardiologist) are simple and safe steps that seem to have an important effect on reducing the door-to-balloon time. The price to pay is the occasional false alarm or inappropriate activation, which was quite rare in the study by Bradley et al., with a median of two false alarms over a 6-month period.

The data supporting the effect of the 90-minute benchmark on survival, its inclusion as a quality indicator in the practice guidelines, and the emergence of pay for performance for achieving this goal are creating important incentives for hospital systems to reach this standard. In addition, a recent ruling by a coroner's jury in Illinois provides an additional sobering reminder of the potential legal implications of treatment delays.[11] In that ruling, the jury found that the death of a patient who had spent nearly 2 hours in an emergency department waiting room before proper diagnosis and treatment of a heart attack constituted a potential homicide.

It is now time to act. The Centers for Medicare and Medicaid Services, the American College of Cardiology, the American Heart Association, the National Quality Forum, and many other public and private groups are aligned to move forward with efforts to improve the time to reperfusion for patients with acute myocardial infarction with ST-segment elevation. Ultimately, these efforts will lead to improved survival for our patients.

Dr. Moscucci reports receiving consulting fees from Pfizer and Boston Scientific, lecture fees from Pfizer, and grant support from Cordis and Blue Cross–Blue Shield of Michigan. No other potential conflict of interest relevant to this article was reported.

This article was published at www.nejm.org on November 13, 2006.

From the Department of Internal Medicine, Division of Cardiovascular Medicine, University of Michigan Cardiovascular Center, Ann Arbor.

1. Rentrop KP, Blanke H, Karsch KR, et al. Acute myocardial infarction: intracoronary application of nitroglycerin and streptokinase. Clin Cardiol 1979;2:354-63.
2. O'Neill W, Timmis GC, Bourdillon PD, et al. A prospective randomized clinical trial of intracoronary streptokinase versus coronary angioplasty for acute myocardial infarction. N Engl J Med 1986;314:812-8.
3. Weaver WD, Simes RJ, Betriu A, et al. Comparison of primary coronary angioplasty and intravenous thrombolytic therapy for acute myocardial infarction: a quantitative review. JAMA 1997;278:2093-8. [Erratum, JAMA 1998;279:1876.]
4. Keeley EC, Boura JA, Grines CL. Primary angioplasty versus intravenous thrombolytic therapy for acute myocardial infarction: a quantitative review of 23 randomised trials. Lancet 2003;361:13-20.
5. Cannon CP, Gibson CM, Lambrew CT, et al. Relationship of symptom-onset-to-balloon time and door-to-balloon time with mortality in patients undergoing angioplasty for acute myocardial infarction. JAMA 2000;283:2941-7.
6. Berger PB, Ellis SG, Holmes DR Jr, et al. Relationship between delay in performing direct coronary angioplasty and early clinical outcome in patients with acute myocardial infarction: results from the Global Use of Strategies to Open Occluded Arteries in Acute Coronary Syndromes (GUSTO-IIb) trial. Circulation 1999;100:14-20.
7. McNamara RL, Wang Y, Herrin J, et al. Effect of door-to-balloon time on mortality in patients with ST-segment elevation myocardial infarction. J Am Coll Cardiol 2006;47:2180-6.
8. Krumholz HM, Anderson JL, Brooks NH, et al. ACC/AHA clinical performance measures for adults with ST-elevation and non-ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Performance Measures (Writing Committee to Develop Performance Measures on ST-Elevation and Non-ST-Elevation Myocardial Infarction). Circulation 2006;113:732-61.
9. Bradley EH, Curry LA, Webster TR, et al. Achieving rapid door-to-balloon times: how top hospitals improve complex clinical systems. Circulation 2006;113:1079-85.
10. Bradley EH, Herrin J, Wang Y, et al. Strategies for reducing the door-to-balloon time in acute myocardial infarction. N Engl J Med 2006;355:2308-20.
11. Coroner says patient's death is a homicide: woman sought care in ER for 2 hours. Chicago Tribune. September 15, 2006:8.
Copyright © 2006 Massachusetts Medical Society.

Conflict of Interest — or Conflict of Priorities?

Elizabeth G. Nabel, M.D.

Whenever conflict of interest is mentioned in the context of clinical research, we tend to think of financial interests that may influence the ability of a person — particularly, a member of an institutional review board (IRB) — to make impartial decisions about the risks and benefits of a protocol. However, other interests are equally important elements of the clinical research enterprise. Research volunteers are vitally interested in their personal health, industry is strongly motivated to develop new diagnostics and therapeutics, and government entities are pledged to ensure proper oversight and conduct of research involving human subjects. Above all, maintaining

Downloaded from www.nejm.org at SAINT MARYS HOSPITAL LIBRARY on August 5, 2008 .
Copyright © 2006 Massachusetts Medical Society. All rights reserved.

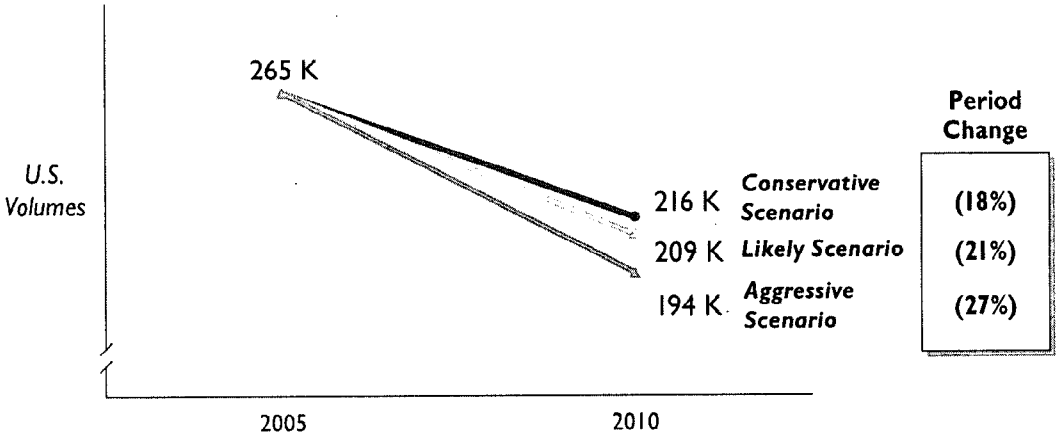
0457
09/15/08

CABGs to Steadily Decline Through 2010

Long the bastion of cardiac program prosperity, CABG volumes have experienced massive declines since the launch of drug-eluting stents. Unfortunately, with past serving as prologue, the Roundtable anticipates that these decreases will continue through the end of the decade. While an aging population and a shift toward concomitant CABG/valve surgery will help to boost volumes, these factors will not overpower the continued migration of CABG cases to drug-eluting stents. More specifically, the line graph below outlines three potential scenarios for future CABG volumes, with the middle line representing the most likely scenario of a volume decrease of 21 percent between 2005 and 2010.

Future Forecast—CABG

All Cases, 2005–2010



Utilization Drivers

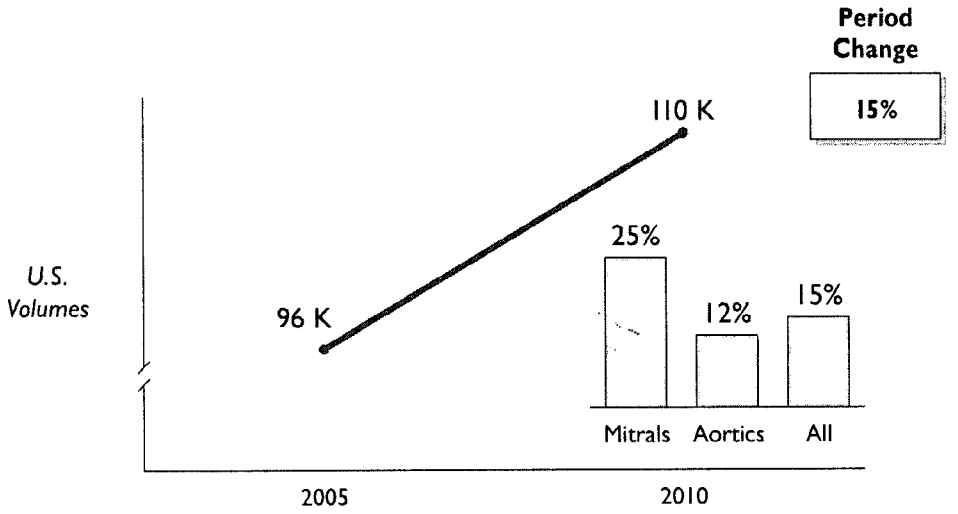
Barriers	Inducements
• Continued shift of "traditional" CABG cases (e.g., diabetics, bifurcated lesions, etc.) to DES • Decrease in saphenous vein re do cases • Reduction in in-stent restenosis cases referred to CABG • Little progress toward minimally invasive CABG adoption and penetration	• Population growth • Increase in valve cases with concomitant CABG • "Failed" restenosis cases treated with DES

Source: Innovations Center Futures Database; Cardiovascular Roundtable research and analysis.

Valves Continue to Be

Future Forecast— Valve Surgeries

All Cases, 2005–2010[1]



Utilization Drivers

Barriers	Inducements
• Technical challenge of mitral repairs • Lack of training opportunities to learn new skills • Failure of all surgeons to intervene at earlier stage in disease process	• Proliferation of valve surgery programs • Update to ACC/AHA valvular disease treatment guidelines expected to encourage earlier interventions in mitral regurgitation, aortic stenosis • Aging of population • Growth in heart failure population • Profitability of procedures • Continued growth in concomitant procedures

[1] Includes isolated valve and combined valve-CABG cases. Isolated mitral surgeries and isolated aortic surgeries 53% and 49% of total 2003 surgeries, respectively.

Source: Cardiovascular Roundtable research and analysis.

© 2005 The Advisory Board Company

0459
09/15/08

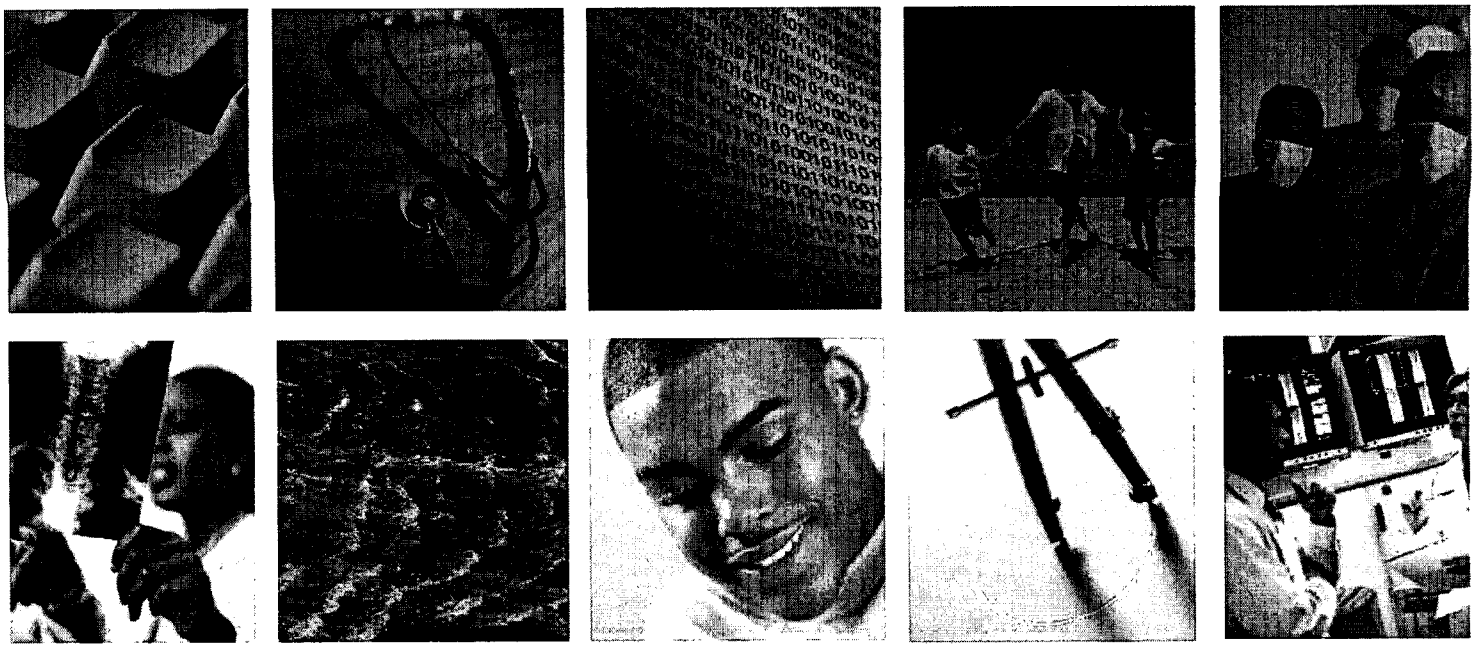
APPENDIX 5.iii.b.

Community Health Data Scan for Connecticut (exerpted)

Census 2000

The Burden of Cardiovascular Disease in Connecticut: 2006 Surveillance Report- DPH

Connecticut Diabetes Prevention and Control Plan 2007-2012- DPH

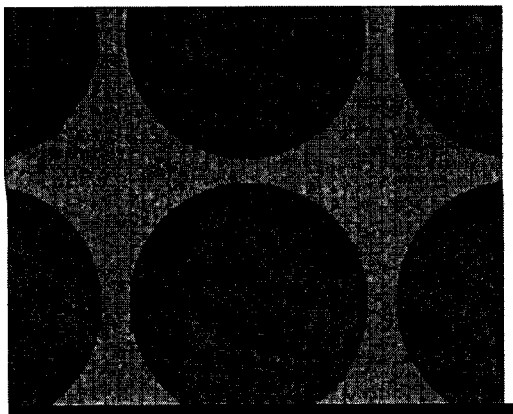


COMMUNITY HEALTH DATA SCAN FOR CONNECTICUT

A Report Commissioned by the Connecticut Health Foundation

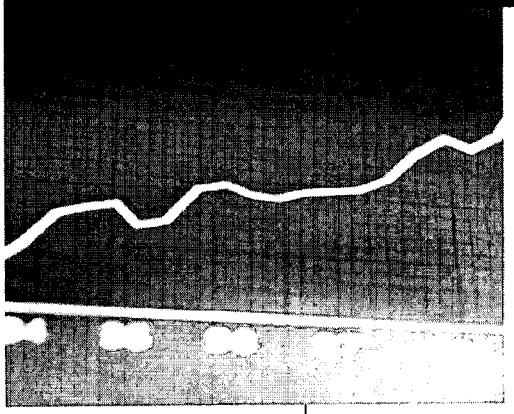
March 2007

0461
09/15/08



EXECUTIVE SUMMARY

INTRODUCTION



The *Community Health Data Scan for Connecticut* was developed by the Connecticut Health Foundation (CHF) for several purposes: to help the foundation set priorities for funding programs and policy studies; to help citizens better understand a range of key health risk, health care and health outcome issues; and to provide state policy-makers and community leaders with information that can be used in developing sound public policy. The *Data Scan* reports quantitative data on the social characteristics, health and well-being of Connecticut's residents gathered from a variety of sources at the federal, state and town levels, as well as from non governmental sources. Some data presented in the analyses will be superseded in the near future, indeed, by the time of publication. Indicators were selected that typically change only slowly over time, such that the major study conclusions are unlikely to be affected. This document is not intended to be an exhaustive report on all possible health indicators for Connecticut.

Racial and ethnic disparities are one of the main concerns investigated in the *Data Scan*. This issue provided a consistent theme for the analysis, along with a report of data on different kinds of communities arrayed in Health Reference Groups (HRGs). The *Data Scan* provides an analysis of the data, prioritizes areas for health promotion effort and includes six recommended focus areas. This report does not focus on children's mental and oral health since CHF is already addressing these problems and other reports focus on these topics.

0462
09/15/08

ADVISORY COMMITTEE ROLE

The CHF Advisory Committee provided suggestions and possible measures to be investigated, emphasizing the need to track health disparities among racial and ethnic groups.

ORGANIZATION OF THE EXECUTIVE SUMMARY

The Executive Summary is organized to present the basic methods used in the study, including an innovation called Health Reference Groups (HRGs), and findings and recommendations in six priority areas.

MEASUREMENT SCAN METHODOLOGY

The *Data Scan* investigated six sources of data:

1. Relevant Connecticut state government web sites
2. Key Connecticut state agency data available offline
3. U.S. Census Bureau datasets available online and via CD-ROM
4. Federal web sites containing state-level data
5. Data defining state and federal legislative districts
6. Data from other agencies, e.g., Boys and Girls Clubs, Jack and Jill Clubs

THE INDICATORS

The many quantitative indicators for the report are summarized in more than 170 tables and figures.

HEALTH REFERENCE GROUPS

The *Data Scan* uses a principal methodology of HRGs to report data. These HRGs were especially useful in considering small towns where the community size and indicator counts would be too small to obtain reliable estimates, or where Connecticut agencies would suppress the data for reasons of confidentiality.

Six HRGs were formed via statistical cluster analysis. These clusters were named: 1) Urban Centers (the three largest cities: Bridgeport, Hartford and New Haven); 2) Manufacturing Centers; 3) Diverse Suburbs; 4) Wealthy Suburbs; 5) Mill Towns; and 6) Rural Towns. A map showing the towns and HRG clusters is in the Executive Summary Appendix. Additional town-level data and maps are available for some indicators at www.cthealth.org. A list of the towns in each HRG is in Appendix A, and a detailed description of the HRGs is in Appendix B.

EXECUTIVE SUMMARY TABLE 1: HEALTH REFERENCE GROUPS AND THEIR POPULATIONS

HEALTH REFERENCE GROUPS	1	2	3	4	5	6
DESCRIPTIVE	Urban Centers (UC)	Manufacturing Centers (MC)	Diverse Suburbs (DS)	Wealthy Suburbs (WS)	Mill Towns (MT)	Rural Towns (RT)
Number of Cities/Towns	3	10	15	27	39	75
Total Population	384,733	662,398	587,504	487,620	698,517	584,793
Average City/Town Population Size	128,244	66,240	39,167	18,060	17,911	7,797
Percentage of Connecticut Population	11.3%	19.5%	17.3%	14.3%	20.5%	17.2%

Source: U.S. Census 2000, SF1: Table P1.

RACE AND ETHNICITY

The author made a considerable effort to define Connecticut populations in racial and ethnic terms following, where possible, requirements of the U.S. Census Bureau and the federal Office of Management and Budget (OMB) Directive 15 (1997 Revision).[1]

POPULATION CHANGE

Any discussion of health priorities should take into account the growth pattern in the population. Connecticut's population will change markedly over the next 25 years, increasing between 2000 and 2025 and then remaining stable through 2030. The total change between 2000 and 2030 is projected at 8.3 percent.

The population will also change in composition. Projections show that there will be virtually no growth in the "white race" population through 2025 (+2.5 percent). The "black race" population is expected to increase by more than 50 percent, the "Hispanic ethnicity" population by 99 percent, and the "Asian race" population by 113 percent.

The Hispanic population is currently the youngest group (74 percent are under 35), followed by the black race population (59 percent), the Asian race population (55 percent), and the white race population (41 percent).

KEY RISK FACTORS FOR MORBIDITY AND MORTALITY

Another context for examining the health data is research-based knowledge of the major risk factors for leading causes of morbidity and mortality, such as smoking, diet and exercise, alcohol abuse, microbial agents, toxic agents, firearms, sexual behavior, and motor vehicle crashes. Many of these issues are analyzed in the report. The report also considers problems of health care access, health care quality and environmental health.

A SYSTEMS VIEW

Health-related behaviors can be understood only in their relevant contexts — including health care and health promotion access, utilization and quality; peer group and cultural norms; the physical environment — and by examining both assets and barriers to good health.

0464
09/15/08

Six Priority Areas and Recommendations

The *Data Scan* suggests six priority areas. The detailed findings and rationale are provided in the *Data Scan*, and they are summarized in Chapter 11, Summary and Recommendations.

1. FOCUS ON THE HEALTH REFERENCE GROUPS AND RACIAL/ETHNIC GROUPS IN GREATEST NEED

The three Urban and 10 Manufacturing centers in Connecticut need the greatest health-promoting investments. Within these communities, black/African American and Hispanic residents are in greatest need.

2. FOCUS ON DIABETES AND OTHER CONDITIONS IN THE METABOLIC SYNDROME

Risk factors for diabetes and related conditions — called the metabolic syndrome — are increasing nationwide and are prevalent in Connecticut in several populations, especially in the black/African American population. To address the problem effectively, public policy solutions must be developed and prevention-focused support given to organizations that serve youth and adults. It will be important to focus on health care access and quality (e.g., better primary care access and utilization) and for primary care to focus on the key metabolic syndrome issues.

3. FOCUS ON ENSURING A MEDICAL HOME FOR ALL CONNECTICUT RESIDENTS

Overuse of emergency department (ED) care and many hospital admissions could be avoided if every Connecticut resident had, and used, a primary care "medical home." Reducing avoidable ED and hospital utilization will require a whole systems approach focused on increasing access to and comfort with the language and cultural surroundings of the medical home; using the medical home to discuss issues of chronic disease and child and youth safety; and promoting adherence to medical regimens prescribed in the primary care setting.

4. FOCUS ON THE BINGE DRINKING AND SMOKING CULTURE

Smoking and binge drinking are major contributors to many health problems and to premature mortality. The youth and young adult white population is especially at risk for binge drinking and smoking, and these behaviors may spread to immigrant populations as they acculturate. Methods of changing the culture of chronic and binge drinking and smoking could include: increasing the level of information about the signs and consequences of alcohol abuse and tobacco use; supporting stronger coverage of the tobacco ban for small workplaces; and supporting changes in the law that would clarify which state level agencies are charged with enforcement of tobacco-related regulations.

5. FOCUS ON YOUTH RISKS AND OPPORTUNITIES

Major youth health risks include sexually transmitted diseases (STDs), teen pregnancy, lack of use of seat belts and bicycle helmets, and child abuse. There is a need for broad initiatives on child and youth risk taking and safety, focused especially on the Urban and Manufacturing centers, and with black and Hispanic children and youth, who are most at risk regarding a variety of safety and risk issues. Some of these problems could be addressed through support for focused initiatives by youth out-of-school programs.

6. IMPROVE THE HEALTH DATA SYSTEM

The health data system could be improved in many areas to provide data where none currently exists and make data more easily available to the public. Issues that need to be addressed include: data access, data delays, mapping information, health observations, race and ethnicity categories, health care quality indices, mental health data, out-of-school data, and documentation about the data (meta-data).



CHAPTER 4

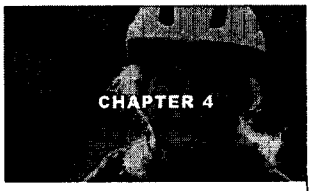
HEALTH RISK AND HEALTH-PROMOTING BEHAVIORS



This chapter considers a selection of health risk and health-promoting behaviors in Connecticut. These include:

- School performance, dropout and suspension data
- Child endangerment
- Crime data
- Travel safety
- Youth risk behavior
- Sexually transmitted diseases
- Teen births
- Obesity, diet and exercise
- Drug use and abuse — drinking and smoking

0466
09/15/08



SCHOOL PERFORMANCE

School performance has been shown to correlate with health risk.[46] The Connecticut State Department of Education (SDE) has made available data on student performance on the Connecticut Academic Performance Test (CAPT) (Table 37); on high school graduation (Table 38); and school suspension and expulsion (Table 39). These data may identify groups of students "at risk" and disparities in risk.

TABLE 37: HIGH SCHOOL MATH PERFORMANCE ON CONNECTICUT ACADEMIC PERFORMANCE TEST (CAPT), 2006, BY HOME COMMUNITY HEALTH REFERENCE GROUP

Percentage Scoring Below Basic on CAPT, 2006, by Gender and Race/Ethnicity, For Students with Valid Test Scores Only								
Gender	Race/Ethnicity	HRG 1 (UC)	HRG 2 (MC)	HRG 3 (DS)	HRG 4 (WS)	HRG 5 (MT)	HRG 6 (RT)	State
Female	Asian	5.7	6.6	0.9	1.4	0.8	0.0	2.1
Male		18.9	6.3	3.4	2.1	2.3	2.2	4.1
Female	Black	26.9	24.9	14.6	13.7	17.9	16.7	22.5
Male		30.7	27.5	19.6	19.4	15.9	9.9	25.5
Female	Hispanic	23.0	23.6	15.5	5.4	18.6	7.8	20.5
Male		25.0	23.4	16.4	2.5	13.5	8.0	20.4
Female	White	10.4	8.2	3.9	1.4	4.1	1.9	3.4
Male		13.0	6.4	5.4	1.5	4.8	3.1	4.0
Percentage Without a Valid Test Score*								
Female	Asian	2.8	2.8	3.4	0.7	3.1	0.0	2.1
Male		7.5	3.1	3.3	1.4	2.2	2.1	2.7
Female	Black	10.2	4.3	5.1	3.8	6.4	3.2	6.9
Male		17.9	7.8	10.2	1.5	6.1	6.6	12.1
Female	Hispanic	13.8	8.0	4.6	1.5	2.3	3.8	8.5
Male		20.7	12.2	8.3	3.2	6.1	5.0	13.1
Female	White	5.5	3.4	2.4	1.4	2.0	1.6	2.0
Male		11.5	4.7	3.9	2.1	4.3	2.7	3.5

Source: SDE. Data are from a file supplied by SDE for 44,652 10th-grade students. Data in the table include 44,123 students (99 percent of all students) for whom gender, district and race/ethnicity could be identified and who were white, black, Asian, or Hispanic and who were not English Language Learners who took the math test with less than 10 months in a U.S. school.

**In Math, an invalid score includes: Absent, one or more sessions of Math, Special Modifications, Blank, (no responses and "blank" bubbled by the district administrator) Grade 10 retesters who previously met certification in Math, Medical Exempt and Skills Checklist (Special Education Only). (R. Mowrey, SDE; e-mail communication; October 2006). Statewide, most invalid scores are due to absentees.*

The data in Table 37 show that the below basic rates for black and Hispanic students with valid test scores are higher than the parallel below basic rates for white and Asian students. For black and Hispanic students, the highest below basic rates are in the Urban and Manufacturing centers.

Black and Hispanic students in the Urban Centers show significantly higher rates of invalid (e.g., absent, blank and skills checklist) test scores than other groups. Their invalid test rates are lower in all other Health Reference Groups (HRGs). Black and Hispanic male students have invalid tests significantly more than black and Hispanic female students in the Urban and Manufacturing centers.

0467
09/15/08

School Graduation and Dropout Rates

A measure of attachment to school is the high school graduation rate, and conversely, the school dropout rate, shown in Table 38 as calculated by the Connecticut State Department of Education (SDE) based on submissions by each school district. High school graduation rates for each HRG are in declining order: Wealthy Suburbs > Rural Towns > Mill Towns > Diverse Suburbs > Manufacturing Centers > Urban Centers. The Connecticut vocational-technical high school system shows a high graduation rate and a low dropout rate, according to the data reported to the SDE.

TABLE 38 : ACADEMIC HIGH SCHOOL GRADUATION PERCENTAGE AND CUMULATIVE DROPOUT RATE BY HEALTH REFERENCE GROUP

AREA	Graduation Percent, 2005	Cumulative Dropout Rate, Class of 2005
HRG 1 (3)-UC	74.1	16.4
Bridgeport	74.7	18.9
Hartford	72.3	14.3
New Haven	75.0	16.6
HRG 2 (10)-MC	85.8	10.9
HRG 3 (15)-DS	91.1	7.6
HRG 4 (27)-WS	97.5	1.9
HRG 5 (39)-MT	92.0	7.4
HRG 6 (75)-RT	95.3	4.4
Connecticut	90.1	8.3
CT Voc-Tech HS	97.3	1.8

Source: SDE, available at: http://www.sde.state.ct.us/public/cedar/cedar/grads/2005_Grad_Rate_by_Dist.xls and http://www.sde.state.ct.us/public/cedar/cedar/dropout/resources/ cumltve_dropout_rate_district.xls. Average graduation rates are shown for HRGs and Connecticut. Regional school districts assigned to an HRG according to the majority of towns in district. Most regional districts are comprised of Rural Towns. Only districts with both graduation rates, dropout rates and assignable to an HRG are included. Vocational-technical high schools not included in Connecticut total and are listed separately. The table accounts for 99.5 percent of Connecticut high school graduating students. The cumulative dropout rate is a class rate that reflects the proportion of students within a high school class who dropped out of school across four consecutive years. For example, the Class of 2004 Cumulative Dropout Rate = (2000-01 Grade 9 dropouts + 2001-02 Grade 10 dropouts + 2002-03 Grade 11 dropouts + 2003-04 Grade 12 dropouts), Grade 9 enrollment as reported on Oct. 1, 2000.

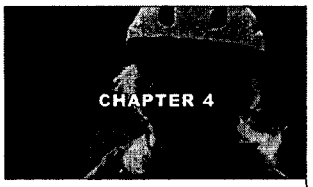
Suspension and Expulsion Rates

Another measure of school attachment is the suspension/expulsion rate, shown in Table 39, which varies significantly by HRG and by race/ethnicity.

TABLE 39: SUSPENSION AND EXPULSION (ALL TYPES) RATE PER 1,000 HIGH SCHOOL STUDENTS, FOR SCHOOL YEAR 2003-2004

AREA	White	Black	Hispanic	Asian	Total
HRG 1 (3)-UC	52	155	112	85	125
HRG 2 (10)-MC	47	150	119	32	90
HRG 3 (15)-DS	40	122	111	21	59
HRG 4 (27)-WS	30	64	39	28	32
HRG 5 (39)-MT	50	179	118	43	56
HRG 6 (75)-RT	52	113	62	15	53
Connecticut	45	143	110	31	65

Source: Analysis of file provided by the SDE, Summer 2005.



Asian students are least likely to be suspended or expelled, followed by white students, Hispanic students and black students, who are most likely to be suspended/expelled. Black and Hispanic students are least likely to be expelled in the Wealthy Suburbs. Black students are most likely to be suspended or expelled in the Mill Towns, Urban Centers and Manufacturing Centers. Asian students are most likely to be suspended/expelled in the Urban Centers.

The order of suspension/expulsion is Urban Centers > Manufacturing Centers > Diverse Suburbs > Mill Towns > Rural Towns > Wealthy Suburbs, although the rates for the Diverse Suburbs, Mill Towns and Rural Towns are virtually equal.

Three additional conclusions can be drawn from other available statewide suspension/expulsion data for all grades Pre-K – 12: Boys are much more likely to be sanctioned than girls; there are no significant race/ethnicity differences in the severity of sanction as indexed by the percent of students sanctioned who were expelled; and sanctioning rates and disparities in them are minimal in the primary years, maximal in the middle school years and decline again in the late high school years.

Table 40 indicates the relative segregation of schools in the Urban Centers — 89.3 percent of all public school students are black and Hispanic in these cities.

TABLE 40: BLACK AND HISPANIC STUDENTS AS A PERCENTAGE OF ALL STUDENTS, 2004

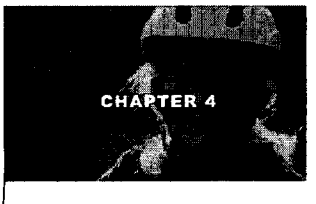
HRG 1 (UC)	HRG 2 (MC)	HRG 3 (DS)	HRG 4 (MT)	HRG 5 (MT)	HRG 6 (RT)
89.3	50.7	26.9	4.4	6.6	3.7

Source: SDE, CAPT Eligible Student File.

Summary of School-Based Indicators

To the extent that the bond between students and schools can be measured by the indicators of CAPT test-taking (valid scores), CAPT passing, suspension/expulsion, and graduation rates, there are significant disparities by race and ethnicity and by gender. These disparities are accentuated in communities characterized by a high density of black and Hispanic students in the schools, as shown in the Urban Centers, and to a lesser degree in the Manufacturing Centers.

To put it another way, the communities with the fewest black and Hispanic students — the Wealthy Suburbs and the Rural Towns — are the most "protective" of them in the sense of helping to maintain a positive school-student bond and fostering school achievement. The Mill Towns are somewhat anomalous since they have a relatively low number of black students in school yet have a high suspension/expulsion rate for black students.



CHILD ENDANGERMENT

Reports to the Connecticut Department of Children and Families

The frequency of child endangerment reported to and substantiated by the Connecticut Department of Children and Families (DCF) in various regions and the state overall is another indicator of the threats to Connecticut's children. The DCF considers an individual to be a "child" if s/he is under 18, or under 21 and a client of the DCF. It classifies "accepted reports" of child endangerment as those reports made to the child abuse/neglect hotline that contain "allegations that meet the operational definition of abuse and/or neglect."[47] "Substantiated reports" are the accepted reports in which an investigation "resulted in a finding of reasonable cause to believe that neglect and/or abuse has occurred."[48]

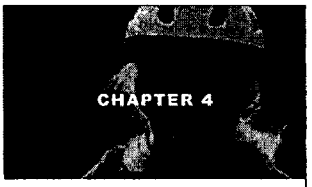
DCF's Child Protective Services Division is responsible for investigating all reports of alleged child maltreatment throughout the state and arranging follow-up services as necessary. In a 2004 needs assessment analysis, DCF reported 3,796 open investigations and 14,431 ongoing services cases within Child Protective Services, for a total of 18,227 cases.[49]

Table 41 shows the rates of accepted and substantiated cases for fiscal years 2001-2005 combined. Child abuse rates are, in decreasing order: Urban Centers > Manufacturing Centers > Diverse Suburbs > Mill Towns > Rural Towns > Wealthy Suburbs.

TABLE 41: ACCEPTED AND SUBSTANTIATED CHILD ABUSE CASES, ANNUAL AVERAGE, FISCAL YEARS 2001-2005

AREA	Accepted Cases	Population 0-17	Accepted Cases Rate per 1,000	Substantiated	Substantiated Cases Rate per 1,000	Substantiation Percentage
HRG 1 (3)-UC	7,348	107,686	68.2	2118	19.7	28.8
Bridgeport	2,312	39,672	58.3	680	17.1	29.4
Hartford	2,897	36,568	79.2	676	18.5	23.3
New Haven	2,139	31,446	68.0	762	24.2	35.6
HRG 2 (10)-MC	8,314	156,315	53.2	2477	15.8	29.8
HRG 3 (15)-DS	5,913	134,837	43.8	1550	11.5	26.2
HRG 4 (27)-WS	1,304	133,604	9.8	326	2.4	25.0
HRG 5 (39)-MT	5,103	159,571	32.0	1253	7.9	24.6
HRG 6 (75)-RT	2,964	149,675	19.8	725	4.8	24.5
Connecticut	30,945	841,688	36.8	8450	10.0	27.3

Source: DCF; U.S. Census 2000, SF1:Table PCT 12.

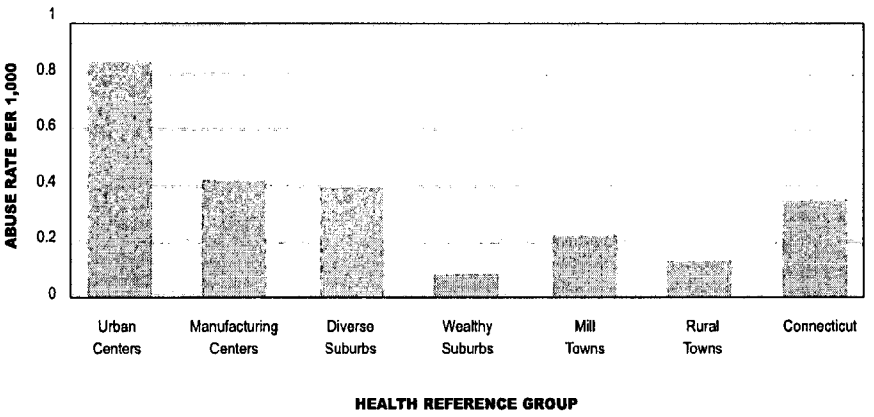


Abuse Rates Using an Emergency Department Visit Indicator

The author examined child and adult abuse rates by HRG, using 2002-2003 Connecticut Emergency Department (ED) data from the Connecticut Health Information Management and Exchange (CHIME) system. The full report is included as Appendix F. Abuse was identified using ICD-9-CM, E967 code, "perpetrator of child and adult abuse."

Adjusted for age and gender differences, the ED visit rate for abuse was highest in the Urban Centers and lowest in the Wealthy Suburbs (0.85 per 1,000 vs. 0.09 per 1,000: a ratio of 9.7 to 1) as illustrated in Figure 9. The highest rate among children was found for 10- to 14-year-old females in the Urban Centers (1.75 per 1,000) — a rate 16 times that for females the same age in the Wealthy Suburbs, as shown in Table 42.

FIGURE 9: CHILD AND ADULT ABUSE: ANNUAL RATES OF EMERGENCY DEPARTMENT VISITS PER 1,000, ADJUSTED FOR AGE AND GENDER



Source: CHIME Database, Connecticut Hospital Association (CHA); U.S. Census 2000, SF1: Table P1.

Many more cases are reported to DCF than those that appear in and are coded in emergency departments. But the HRG patterns are similar. It also appears that female children are at greater risk for abuse than male children. Clearly, children need better protection, especially those in the Urban Centers, Manufacturing Centers, Diverse Suburbs, and Mill Towns, as shown in Table 42.

TABLE 42: INDICES OF ABUSE FOR CHILDREN AND ADULTS

AREA	DCF Accepted Cases per 1,000 Children 0-17	Emergency Department "Abuse" Visits (ICD-9-CM Code E967) per 1,000		Emergency Department "Abuse" Visits for All Ages, Age-Adjusted Rate per 1,000
		Male, 10-14	Female 10-14	
Urban Centers	68.2	1.16	1.75	.85
Manufacturing Centers	53.2	0.36	0.65	.42
Diverse Suburbs	43.8	0.26	0.34	.39
Wealthy Suburbs	9.8	0.08	0.24	.09
Mill Towns	32.0	0.06	0.11	.22
Rural Towns	19.8	0.05	0.05	.13

Source: CHIME Database, CHA; U.S. Census 2000, SF1: Table PCT 12.
Data Note: The differences among the HRGs would be due to underreporting in the Wealthy Suburbs and Rural Towns. This seems an insufficient explanation for the observed differences in that: several data sources yield similar differences; the patterning of gender differences could not be explained in this way; and the reporting bias would need to be very extreme to account for the level of the differences observed.

CRIME RATES

Crime is a significant health risk in several ways. First, it is directly implicated in injury and fatality. Secondly, a high incidence of even low-level crime may send a message about anti-social behavior as suggested by Wilson, Kelling, and Coles' "broken windows" theory.[50] Crime will escalate in a community if low-level crime — broken windows or other forms of vandalism — is seen as being accepted in the community or impossible to deter.

There may also be community disinvestment as capital "flees," leading to further social disorder and increases in health-demoting behavior. Research has shown the connections of "broken windows" to health outcomes such as elevated sexually transmitted disease (STD) rates even after controlling statistically for poverty and race.[51]

Crime in Connecticut varies substantially by HRG, as shown in Table 43.

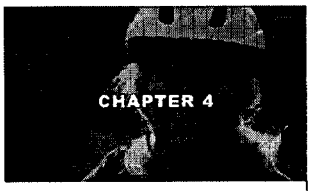


TABLE 43: ANNUALIZED CRIME REPORT RATE PER 1,000 RESIDENTS, 2002-2003

AREA	Population	Crimes Reported per 1,000 Residents
HRG 1 (3)-UC	384,733	76.1
Bridgeport	139,529	58.5
Hartford	121,578	92.6
New Haven	123,626	79.8
HRG 2 (10)-MC	662,398	39.5
HRG 3 (15)-DS	587,509	29.5
HRG 4 (27)-WS	487,620	13.0
HRG 5 (39)-MT	698,458	22.7
HRG 6 (75)-RT	584,847	12.1
Connecticut	3,405,565	30.0

Source: Crimes Analysis Unit, Connecticut State Police; U.S. Census 2000, SF1: Table P1. For some towns (e.g., New Haven) there may be several police organizations providing data, including New Haven police, Yale University police and Southern Connecticut State University police.

As with many other indicators, crime rates vary in decreasing order as follows: Urban Centers > Manufacturing Towns > Diverse Suburbs > Mill Towns. The Wealthy Suburbs and Rural Towns are lowest in overall crime rate. The HRG variation may be partly due to differences in age distribution, but this was not provable from the current data. Age-specific crime rate data are not available without considerable labor on the part of the Connecticut State Police unit responsible for the data, to bring together several databases.[52] Differences in age distribution cannot account for the vast disparity in crimes reported. The rate ratio of Urban Centers to Rural Towns is 76.1:12.1 = 6.3:1.

Related data are available on incarceration rates. According to analysis of U.S. Census 2000 data, there were 199 (white), 2,991 (black) and 1,669 (Hispanic) inmates per 100,000 residents, overall. The overall ratio of black to white confinement was 15.0:1 for Connecticut — ranking the state third in the nation — but just 6.6:1 for the United States as a whole. For Hispanic residents, the ratio was 8.4:1 for Connecticut but 2.4:1 for the United States as a whole.

For youth under 18 there were 56 (white), 334 (black) and 208 (Hispanic) residents confined per 100,000 residents. The overall ratio of black to white youth confinement was 6.0:1 for Connecticut — ranking the state eighth in the nation — but just 3.3:1 for the United States as a whole. For Hispanic youth, the ratio was 1.2:1 for Connecticut, but 1.5:1 for the U.S. as a whole.[53]

0473
09/15/08

TRAVEL SAFETY

Several aspects of travel safety were examined for the *Data Scan*, including the use of seat belts, bicycle helmets, ED visits for bicycle injury, and the incidence of auto crashes with injury. These indicators show significant variation by HRG and race/ethnicity.

Seat Belt Use

Asian respondents have the highest overall rate of always or almost always wearing seat belts, as shown in Table 44. Their rates are significantly higher, being 10.2 percent above those of black respondents, 6.1 percent above those of white respondents and 6.6 percent higher than those of Hispanic respondents.

TABLE 44: SELF-REPORTED PERCENTAGE USING SEAT BELTS (ALWAYS OR ALMOST ALWAYS)

AREA	All Race and Ethnicity, Crude Rate	All Race and Ethnicity, Age-Adjusted Rate	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	87.9	87.8	91.3	89.1	82.0	
Hartford	86.0	87.5	85.3	84.4	88.9	
New Haven	86.7	86.3	87.9	75.8	88.4	
HRG 1 (3)-UC	86.9	87.0	88.3	83.8	86.7	
HRG 2 (10)-MC	88.9	89.0	87.8	84.4	90.5	94.9
HRG 3 (15)-DS	89.1	89.0	89.0			
HRG 4 (27)-WS	92.6	92.1	92.2			
HRG 5 (39)-MT	87.3	86.8	86.7	81.3	88.1	96.1
HRG 6 (75)-RT	90.7	90.4	90.5			
Connecticut	89.3	89.1	89.2	85.1	88.7	95.3

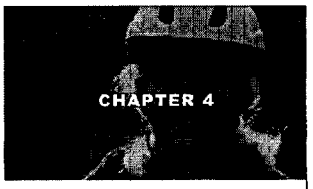
Source: Behavioral Risk Factor Surveillance System (BRFSS) Survey Data; DPH 1999-2003.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

The data for the adult population are reasonably consistent for all groups — except black New Haven residents, of whom the sample size is small — falling within plus or minus eight points of the overall Connecticut average of 89.1 percent.

TABLE 45: USED A SEAT BELT NEVER OR RARELY, HIGH SCHOOL STUDENTS, 2005

GROUP	Total	Black	Hispanic	White
Total	11.4	18.0	15.1	9.1
Male	15.0	19.5	20.3	12.9
Female	7.5	16.6	10.9	4.9

Source: DPH, Planning Branch. Connecticut High School Survey, 2005. Available at: http://www.dph.state.ct.us/PB/HISR/CSHS.htm. Accessed Feb. 7, 2007.
Note: Percentages based on self-report of students who "never or rarely wore a seat belt when riding in a car driven by someone else." Students listed as "all other races" and "multiple races" are not included.



The youth data in Table 45 show some statistically significant differences in seat belt use rate between white students (9.1 percent never or rarely use) and black (18.0 percent rarely or never use) or Hispanic students (15.1 percent rarely or never use). There is also a statistically significant difference between Hispanic female and male use rates and white female and male use rates, but not between black female and male use rates. The data are reasonably consistent with the survey results presented below on bike helmet use.

Bike Helmet Use

Bike helmet use is another indicator of youth risk. Use of a helmet may indicate greater self-care or a greater degree of health-promoting parental supervision or differences in peer group norms.

TABLE 46: ADULT REPORT OF BICYCLE HELMET USE FOR CHILDREN AGES 5-16 WHO RIDE BICYCLES

AREA	All Race and Ethnicity, Crude Rate	All Race and Ethnicity, Age-Adjusted Rate	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
HRG 1 (3)-UC	53.7	44.5	70.9	44.3	42.0	
Bridgeport	66.9	64.8				
Hartford	45.4	46.2				
New Haven	49.0	43.4				
HRG 2 (10)-MC	66.3	60.9	69.6	59.3	48.3	
HRG 3 (15)-DS	73.9	66.3	76.8			
HRG 4 (27)-WS	86.8	77.1	76.7			
HRG 5 (39)-MT	76.2	77.0	74.9			
HRG 6 (75)-RT	82.4	83.4	84.2			
Connecticut	74.7	70.5	76.0	55.2	60.2	75.9

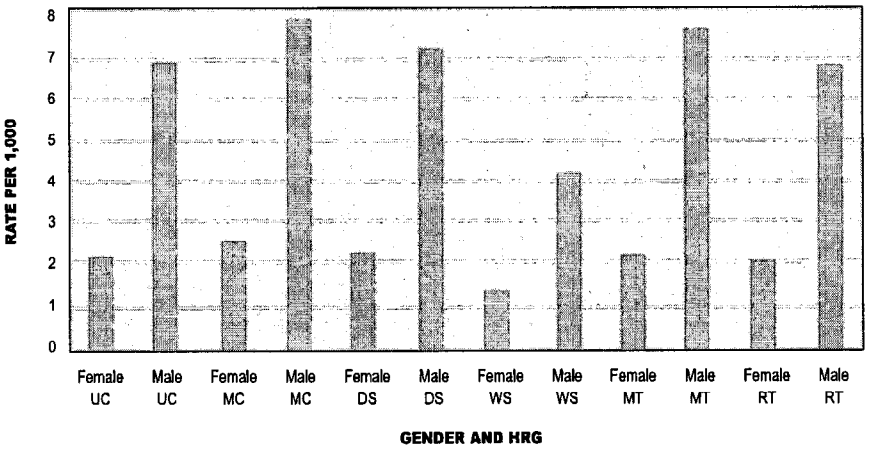
Source: BRFSS Survey Data; DPH 1999-2003.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

The results for bike helmet use reported by parents suggest relatively large and statistically significant differences in use rates by HRG and by race and ethnicity. Among children who ride bikes, black and Hispanic children show significantly lower use of bicycle helmets.

There are also bicyclist injury data for children and youth ages 5 to 19 developed from data in the CHIME emergency department database and shown in Figure 10. These data indicate highly significant gender differences for each HRG. They also indicate a significantly lower rate of ED visits for bicyclist injuries in the Wealthy Suburbs than for any other HRG. There are no significant differences among the other HRGs. These differences may be due to differences in helmet use, the "riskiness" of bicycle use, the overall level of bicycle use, and road conditions or other conditions of use.

0475
09/15/08

FIGURE 10: ANNUALIZED EMERGENCY VISIT RATES FOR 5- TO 19-YEAR-OLD CYCLIST INJURIES NOT INVOLVING AUTOMOBILES 2002-2003, BY HEALTH REFERENCE GROUP



Source: CHIME Database, CHA; U.S. Census 2000, SF1: Table P12.

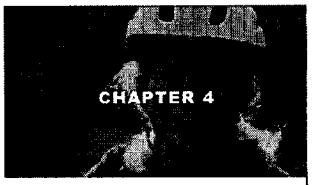
Car Crashes

Car crashes with injury can result from a number of factors, including road conditions and congestion; weather conditions; driving behavior; crash protection access and use, such as air bags and restraint devices; and insurance fraud. The Connecticut Department of Transportation (DOT) maintains a database of all crashes, but there is incomplete reporting of cases not involving injury. The following analyses are therefore, based solely on crashes involving injury. Table 47 shows annualized average results for 2003-2004.

TABLE 47: CRASHES INVOLVING FATALITY OR INJURY BY CRASH LOCATION, RATE PER 1,000 POPULATION, ANNUAL AVERAGES 2003-2004

AREA	Total Population	Average Total Crashes With Injury	Total Crash Rate per 1,000	Interstate Crash Rate per 1,000	U.S. Route Crash Rate per 1,000	State Road Crash Rate per 1,000	Local Road Crash Rate per 1,000
HRG 1 (3)-UC	384,733	5,530	14.4	2.2	1.3	2.8	8.2
HRG 2 (10)-MC	662,398	6,976	10.5	1.4	1.3	3.0	4.9
HRG 3 (15)-DS	587,509	5,056	8.6	0.7	0.7	4.1	3.1
HRG 4 (27)-WS	487,620	3,596	7.4	1.2	1.3	2.9	1.9
HRG 5 (39)-MT	698,458	5,720	8.2	1.0	1.1	4.0	2.1
HRG 6 (75)-RT	584,847	4,307	7.4	0.6	1.1	4.1	1.6
Connecticut	3,405,565	31,182	9.2	1.1	1.1	3.5	3.4

Source: DOT Accident Records Section; U.S. Census 2000, Table P1.



The data in Table 47 show that auto crash rates are significantly higher in the Urban Centers than in the other HRGs and that this difference is produced mainly by the difference in crash rates on local roads. This occurs despite that fact that Urban Center residents have far fewer vehicles per population than any other HRG and spend far less time commuting to work on nonpublic transportation (e.g., cars, vans and trucks) than residents of any other HRG. A caution in the interpretation of these crash injury statistics is that the DOT classifies crashes by the location of the crash, and the residential location of the driver is not available in electronic format.[54] This means that nonresidents of the Urban Centers, for example, may contribute to the crash rate in the Urban Centers because of a crash on an interstate highway in Hartford and that, conversely, residents of the Urban Centers may contribute to crashes in other HRGs. Whether these competing factors cancel out is unknown. The fact that the highest crash counts are on state or local roads and that national data indicates that "three out of four crashes causing death occur within 25 miles of home"[55] suggests that many accidents causing injuries are close to home and in the city or town of residence. But a statistical connection between crash site and residence cannot be absolutely demonstrated in the available data. "Miles-driven," a better denominator for crash rates than population, is also not available. Studies should be done to analyze the residential location and other characteristics of the drivers involved in injury-related crashes to ascertain whether there are significant differences among drivers residing in the various HRGs. This might lead to targeted driving safety campaigns.

Age is related to the frequency of being a driver in a car crash involving injuries or fatalities. Rates rise from the early teen years through the late teens and early 20s. For each of the years 18–22, annualized rates based on 2003–2004 are 40 per 1,000 or higher (18 = 40; 19 = 44; 20 = 42; 21 = 41; 22 = 40). Rates decline rapidly in the late 20s and are relatively low through age 95 when they begin to climb again (95 = 9; 96 = 19; 97 = 27; 98 = 29; 99 = 42; 100–104 = 75).[56] These results are consistent with a recommendation of greater attention to driving behavior and "progressive licensing" in the younger age group, and the possibility of relicensing requirements for the oldest old drivers.

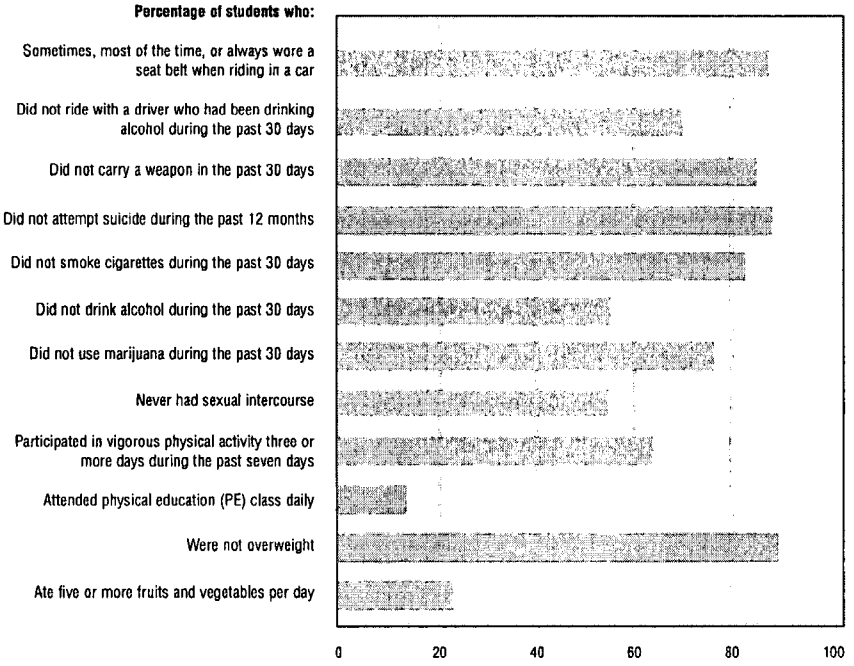
Age is also related to nonuse of seat belts among drivers in injury-present crashes. In the age group 15–24, 7.3 percent are classified as unbelted. The rate declines gradually with age to 5.5 percent for those age 40 and over.

Seat belt use varies somewhat by HRG crash site among drivers in crashes involving injury in 2003–2004. The Urban Centers (7.1 percent), Mill Towns (7.4 percent) and Rural Towns (7.5 percent) have nonuse rates significantly higher than the Manufacturing Centers (5.9 percent), Diverse Suburbs (5.5 percent) and Wealthy Suburbs (4.8 percent). To the extent that crash site and residence location are correlated, this may imply lower seat belt use rates for residents in the former three types of communities. This hypothesis can be checked only upon the possible future availability of the residential information in the DOT crash data.

YOUTH RISK BEHAVIOR SURVEY

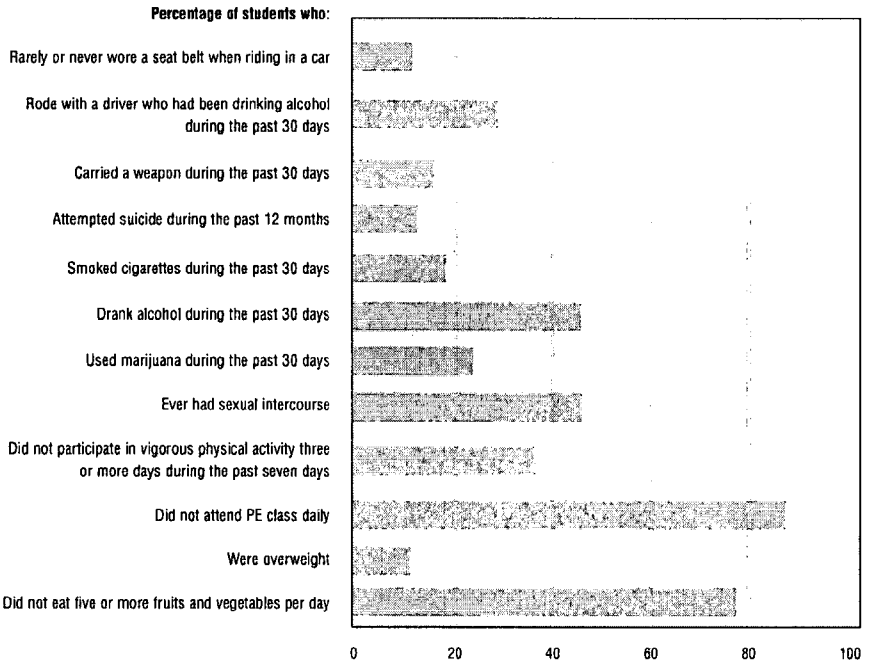
Every odd year, DPH conducts a "Youth Risk Behavior Survey" (YRBS) based on items constructed by the Centers for Disease Control and Prevention (CDC) in cooperation with the states. The survey, called the Connecticut High School Survey, is distributed to a limited number of schools on a sampling basis. Results are shown in Figures 11 and 12.

FIGURE 11: CONNECTICUT HIGH SCHOOL SURVEY, POSITIVE (HEALTH-PROMOTING) BEHAVIOR PERCENTAGES, 2005



Reproduced from DPH Connecticut High School Survey. Available at: http://www.dph.state.ct.us/PB/HISR/2005CT_Summary_Graphs.pdf. Accessed Feb. 3, 2007.

FIGURE 12: CONNECTICUT HIGH SCHOOL SURVEY, HEALTH RISK BEHAVIOR PERCENTAGES



Reproduced from DPH Connecticut High School Survey. Available at: http://www.dph.state.ct.us/PB/HISR/2005CT_Summary_Graphs.pdf. Accessed Feb. 3, 2007.

SEXUALLY TRANSMITTED DISEASES

Sexually transmitted diseases (STDs) are a good indicator of sexual risk-taking behavior (e.g., unprotected sex, having multiple sexual partners) in that they are reportable diseases and are eventually symptomatic. But sexual risk taking may have far different consequences in different contexts. Risk-taking behavior manifests itself in disease only in the context of a high incidence "pool" of disease. Thus, sexual risk taking in the Wealthy Suburbs is not as likely to manifest as disease as in the Urban Centers.

A possible reason for the STD rate differences demonstrated in Table 48 is differential reporting. This might occur if the large clinics in the Urban Centers report all cases while private physicians in the Wealthy Suburbs, for example, do not. Differential reporting would lead to differential rates and not recognize the underlying equality of disease rates. Although there are no data with which to test such a claim, it seems unlikely that this differential reporting could explain the observed rate differences. First, while persons from other communities may use the clinics in the Urban Centers, their cases are referred back to their towns of residence for rate calculation purposes. Reports also come in from STD testing labs as well as private physicians, meaning that unless the patient is treated without testing, and the physician does not report, a case will eventually be reported to DPH.

There would have to be a huge reporting differential to account for the large differences observed in Table 48, and for the race and ethnicity disparities noted within the HRGs. For example, such reporting differences could not account for the Asian/black difference in STD rates within the Urban Centers as shown in Table 49. Finally, these results are comparable to results in other states and nationally.[57]

TABLE 48: ANNUALIZED CRUDE CASE RATE OF SEXUALLY TRANSMITTED DISEASES PER 1,000 RESIDENTS, 2000-2004 AND CASES, 2005

AREA	Population	Annual Average Count, 2000-2004 and Count, 2005	Annual Average Rate per 1,000, 2000-2004	Percentage of Cases, 2000-2004
HRG 1 (3)-UC	384,733	4,970 (5,653)	21.5	42.2%
Bridgeport	139,529	1,437 (1,728)	17.2	12.2%
Hartford	121,578	2,147 (2,145)	29.4	18.2%
New Haven	123,626	1,387 (1,780)	18.7	11.8%
HRG 2 (10)-MC	662,398	3,016 (3,492)	7.6	25.6%
HRG 3 (15)-DS	587,509	1,617 (2,051)	4.6	13.7%
HRG 4 (27)-WS	487,620	235 (318)	0.8	2.0%
HRG 5 (39)-MT	698,458	697 (1,001)	1.7	5.9%
HRG 6 (75)-RT	584,847	378 (568)	1.1	3.2%
Unknown Residence		870 (761)		7.4%
Connecticut	3,405,565	11,782 (13,846)	5.8	100.0%

Source: DPH; U.S. Census 2000, SF1: Table P1.
Data note: These data are incident cases. Over the five-year period tabulated, a single individual may have many more than one case of an STD. Thus, the data should not be interpreted as the probability that a single individual will be infected.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

Table 49 shows all cases for which race, ethnicity, HRG, and age could be ascertained in the age range 15 to 34.

TABLE 49: ANNUALIZED SEXUALLY TRANSMITTED DISEASE CASE RATE PER 1,000 FOR PERSONS 15 TO 34 YEARS OLD, 2000-2004

AREA	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
HRG 1 (3)-UC	6.3	53.5	22.7	2.7
HRG 2 (10)-MC	3.3	29.7	11.1	1.6
HRG 3 (15)-DS	2.5	28.1	10.0	1.8
HRG 4 (27)-WS	0.6	9.0	3.7	0.4
HRG 5 (39)-MT	1.3	11.4	4.4	1.2
HRG 6 (75)-RT	1.0	6.9	3.3	2.1
Connecticut	2.2	39.3	15.1	1.9

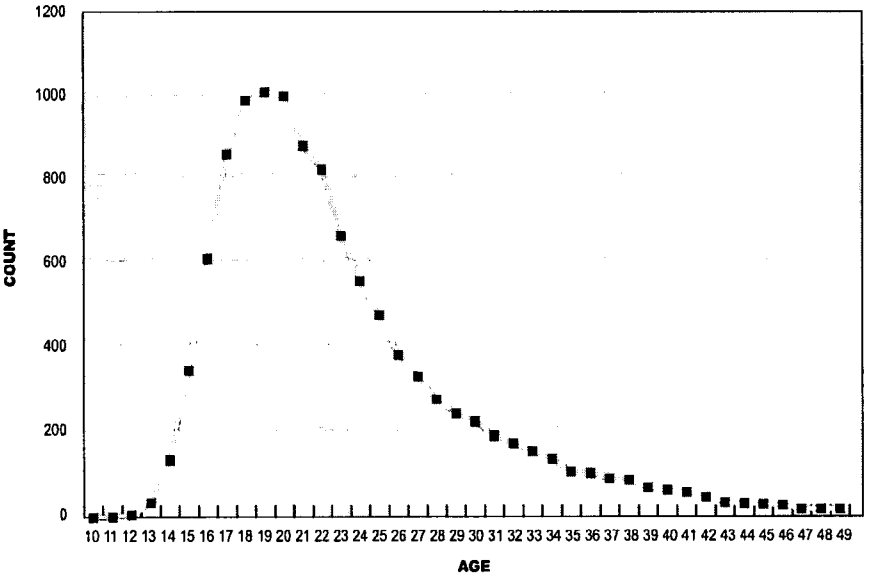
Source: DPH; U.S. Census 2000.

These results demonstrate significant effects for both race/ethnicity and for HRGs. Whites, blacks and Hispanics residing in the Urban Centers have double the STD rates as in the Manufacturing Centers. The Manufacturing Centers' and Diverse Suburbs' rates are similar, and higher than rates in Wealthy Suburbs, Mill Towns and Rural Towns. Asians have the lowest STD rate, except in the Rural Towns, but the base numbers here are very small, and the difference is of doubtful significance. Blacks consistently have a higher STD rate than Hispanics, whites or Asians, and an extremely high rate in the Urban Centers.

Recent data for 2005 indicate a modest increase from the average number of cases in 2000-2004. The increase appears in all HRGs and may not be accounted for by a reduction in the number of cases with unknown residence.

Residents between ages 15 and 34 account for 90.4 percent of all STD cases for which age could be ascertained. The modal age of incidence is 20 years old, as illustrated in Figure 13.

FIGURE 13: AVERAGE ANNUAL SEXUALLY TRANSMITTED DISEASE COUNTS, BY AGE, FOR PERSONS 10 TO 49 YEARS OLD, 2000-2004



Source: DPH.

HIV/AIDS

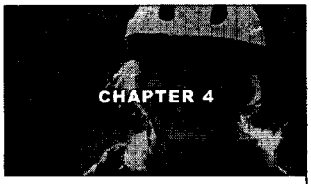
HIV/AIDS is an indicator related to STDs in some modes of transmission. Table 50 shows the number of adult AIDS cases, by gender and mode of transmission for 2006. These results indicate that men who have sex with men (MSM) predominate among white males. But for black and Hispanic males, the dominant mode of transmission is intravenous drug use (IDU). The mode of transmission for women also differs by race and ethnicity, as shown in Table 50.

The overall counts of AIDS cases declined for both men and women in 1998. For both groups AIDS counts have remained relatively constant since that time, at about 400 cases per year for adult men and about 200 cases per year for adult women, with some year-to-year variation for both genders. AIDS death rates have dropped markedly over the past decade, due in part to improved therapies. In 2006, approximately 50 percent of all AIDS cases were incident in the Urban Centers. An additional 25 percent of all AIDS cases were incident in the Manufacturing Centers.

TABLE 50: ADULT AIDS CASES IN CONNECTICUT, 2006

MODE OF TRANSMISSION	Race/Ethnicity	Adult Male	Adult Female
MSM	White	47	
	Black	16	
	Hispanic	27	
	Other	2	
IDU	White	31	19
	Black	28	12
	Hispanic	58	26
	Other	4	
MSM/IDU	White	2	
	Black	2	
	Hispanic	2	
	Other		
HETEROSEXUAL	White	3	16
	Black	12	23
	Hispanic	12	28
	Other	2	2
OTHER / UNKNOWN	White	23	10
	Black	27	19
	Hispanic	39	31
	Other	5	6

Data and Reference Note: HIV/AIDS data are continually updated, as case counts are de-duplicated, and as other new information, e.g., regarding transmission mode, becomes available, and data are reported from other states. Therefore, the counts reported here may be slightly different than those accessed from the DPH HIV/AIDS web site at another point in time. Access current data and historical series at: http://www.dph.state.ct.us/BCH/infectiousdise/2003/final%20page:/topic_index_X.htm.



TEEN BIRTHS

Teen childbearing is a serious problem with profound health, social and economic consequences. Infants of adolescent mothers are more likely to face adverse health outcomes, including low birth weight, preterm birth and infant mortality. Teen mothers are more likely to be unmarried, high school dropouts and living in poverty. Their children also are more likely to live in poverty years after birth.[58]

Table 51 illustrates that Connecticut's teen birth rate has fallen significantly between 1991 and 2002, as it has for the United States and all New England states.

TABLE 51: HISTORICAL CHANGE IN TEEN BIRTH RATE PER 1,000 TEENS AGES 15-19, 1991 TO 2002

STATE	1991	2002
CONNECTICUT	40.1	25.8
MASSACHUSETTS	37.5	23.3
RHODE ISLAND	44.7	35.6
MAINE	43.5	25.4
NEW HAMPSHIRE	33.1	20.0
VERMONT	39.2	24.2
UNITED STATES	61.8	42.9

Source: National Campaign to Prevent Teen Pregnancy, from data at CDC, National Center for Health Statistics. Web-based data accessed at: www.teenpregnancy.org, Sept. 16, 2005.

TABLE 52: ANNUALIZED TEEN (15-19) BIRTH RATE PER 1,000, BY RACE/ETHNICITY, 1999 TO 2003

RACE/ETHNICITY/ORIGIN	Teen Births	Teen Population	Rate per 1,000 Teens
All Races	12,644	105,336	24.0
White Not Hispanic	4,288	73,851	11.6
Black Not Hispanic	2,992	11,872	50.4
Asian Not Hispanic	269	2,731	19.7
Hispanic	4,969	13,918	71.4
Puerto Rican	3,946	9,303	84.8
Non-Puerto Rican Hispanic	1,023	4,615	44.3

Source: DPH; U.S. Census 2000.
Note: A small number (344) of births at ages younger than 15 were excluded from this table. Over half, 180 of these, were born to black non-Hispanic (79) and Puerto Rican Hispanic (101) teens. A small number of unknowns were also excluded from the table.

0483
09/15/08

There are clear disparities in teen birth rates in Connecticut. Analysis of the rates shown in Table 52 illustrates the dangers in the broad brush approach. While Hispanic teens have the highest birth rates, the aggregation of all Hispanics together obscures important variation. The non-Puerto Rican Hispanic teen rate (44.3 per 1,000) is only slightly more than half the Puerto Rican teen rate (84.8 per 1,000). Very young teens giving birth, under age 15, are overwhelmingly black and Puerto Rican girls. Thus, teen pregnancy prevention programs could prioritize the key populations at risk: Puerto Rican Hispanic teens, followed by black and non-Puerto Rican Hispanic teens.

There are very large HRG differences in teen births, even after controlling for race and ethnicity, as shown in Table 53. For each group, teen birth rates in the Urban and Manufacturing centers are higher than for the remaining HRGs. The Wealthy Suburbs show the lowest rate for each group, except for black non-Hispanic teens whose rates are lowest in the Rural Towns. Teen birth rates by HRG are, in decreasing order: Urban Centers > Manufacturing Centers > Diverse Suburbs > Mill Towns > Rural Towns > Wealthy Suburbs.

TABLE 53: TEEN (15-19) ANNUALIZED BIRTH RATE PER 1,000, BY RACE AND ETHNICITY, CONNECTICUT AND HRG, 1999-2003

RACE/ETHNICITY/ ORIGIN	HRG 1 (3)-UC	HRG 2 (10)-MC	HRG 3 (15)-DS	HRG 4 (27)-WS	HRG 5 (39)-MT	HRG 6 (75)-RT	State
All Races	57.3	39.9	22.2	2.9	13.0	7.3	24.0
White Not Hispanic	19.8	20.4	16.2	2.3	12.3	6.9	11.6
Black Not Hispanic	61.7	45.9	41.4	11.0	24.8	9.5	50.4
Asian Not Hispanic	31.0	32.0	27.4	5.2	8.5	7.1	19.7
Hispanic	83.5	79.7	52.3	14.6	30.4	19.0	71.4
Puerto Rican	90.8	95.5	63.1	29.3*			84.8
Non-Puerto Rican	55.9	53.8	32.1	18.8*			44.3

Source: DPH; U.S. Census 2000, SF4:Table PCT5.

**Separate HRG estimates for Puerto Rican and non-Puerto Rican Hispanic populations for HRGs 4-6 are not available due to the suppression rules of the U.S. Census Bureau. Many cities and towns in these HRGs had no denominator data for calculating rates due to small total numbers (e.g., fewer than 100) of Puerto Rican residents.*

In summary, the disparities for teens are very large — in contrast to the data for women age 25 to 49 presented in Chapter 3, Connecticut Community Profile, showing only small "broad" race and ethnicity birth rate differences. Puerto Rican teens are especially at risk for teen birth in the Urban and Manufacturing centers.

RISK FACTORS FOR METABOLIC SYNDROME AND DIABETES

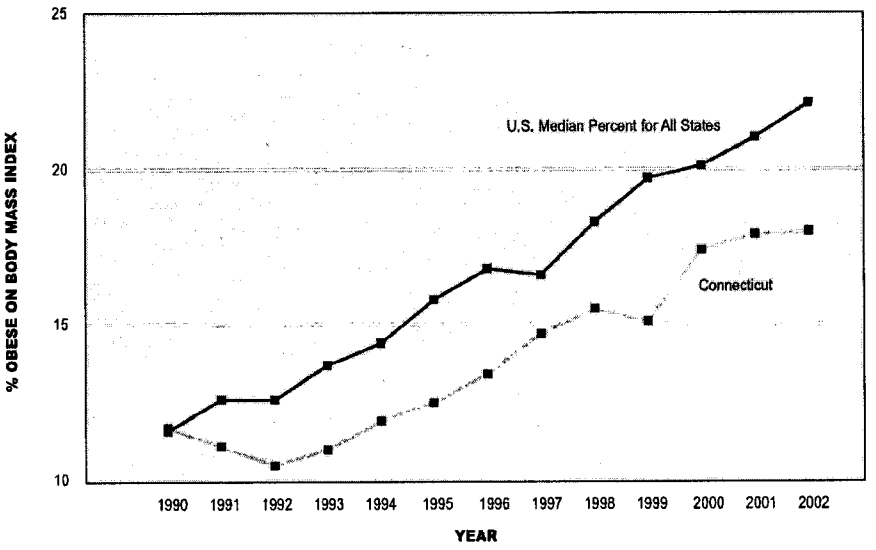
Poor diet and a lack of physical activity are responsible for a cluster of metabolic disorders — referred to as "metabolic syndrome" — including high blood pressure, high insulin levels, excess body weight, and abnormal levels of cholesterol. These disorders can cause such serious diseases as diabetes, heart disease and stroke. In combination, they dramatically boost a person's chances of premature mortality.

Overweight and Obesity

Overweight and obesity are defined by the body mass index (BMI), a ratio of body weight to height. An adult is overweight if s/he has a BMI of 25 to 29.9 (145 pounds for an adult 5'4") and obese if the BMI is 30 or higher (174 pounds for an adult 5'4").

Overweight and obesity are risk factors for a wide range of chronic diseases, including diabetes, hypertension, heart disease, gall bladder disease, and osteoarthritis.[59] The federal government's *Healthy People 2010* objective is to reduce the level of obesity among Americans to 15 percent or less.[60] But the percentage of adults who are overweight and obese has increased in recent years — making obesity a leading public health issue.

FIGURE 14: PERCENTAGE OBESE, CONNECTICUT AND UNITED STATES, 18 AND OLDER



Source: CDC BRFSS web site at: http://www.cdc.gov/brfss.

0485
09/15/08

As of 2000, more than 53 percent of Connecticut adults were overweight and more than 17 percent were obese. There were marked differences among the HRGs in the percentage of overweight and obese adults, as presented in Table 54. The Urban Centers had more than twice the percentage of obese adults as the Wealthy Suburbs. There were also differences in overweight and obesity by city. Bridgeport had a particularly high percentage of overweight and obese adults: More than two-thirds of Bridgeport adult residents were overweight and one-quarter of them obese.

In Connecticut overall, overweight and obesity were highest among black and Hispanic residents. Although there was a higher prevalence of overweight and obesity among black adults in all HRGs (when sufficient data was available), the prevalence among Hispanics in the Diverse Suburbs, Mill Towns and Rural Towns was similar to that of whites. Asian adults have by far the lowest rates of obesity, and their rates do not vary significantly by type of community.

TABLE 54: PERCENTAGE OBESE BY BODY MASS INDEX (BMI)

AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	25.3	26.2	20.7	34.2	24.4	
Hartford	24.1	25.4	17.8	29.4	36.5	
New Haven	21.2	22.6	16.6	35.1	24.1	
HRG 1 (3)-UC	23.5	24.6	18.1	33.8	29.7	
HRG 2 (10)-MC	18.2	18.6	17.2	30.0	21.0	3.2
HRG 3 (15)-DS	19.2	19.2	19.1	31.0	15.5	
HRG 4 (27)-WS	11.0	10.4	10.3		11.6	
HRG 5 (39)-MT	18.0	17.7	17.7	25.9	13.5	4.8
HRG 6 (75)-RT	15.1	14.5	14.4		14.8	
Connecticut	17.2	17.1	15.9	30.9	21.6	4.2
United States	21.0	21.0	19.8	30.2	20.3	

Source: DPH BRFSS Survey Data, 1999-2003; CDC BRFSS web site at: www.cdc.gov/brfss. BMI calculated from self-reported height and weight.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

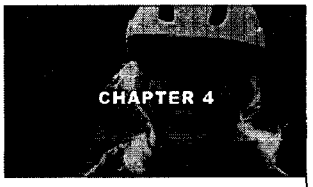
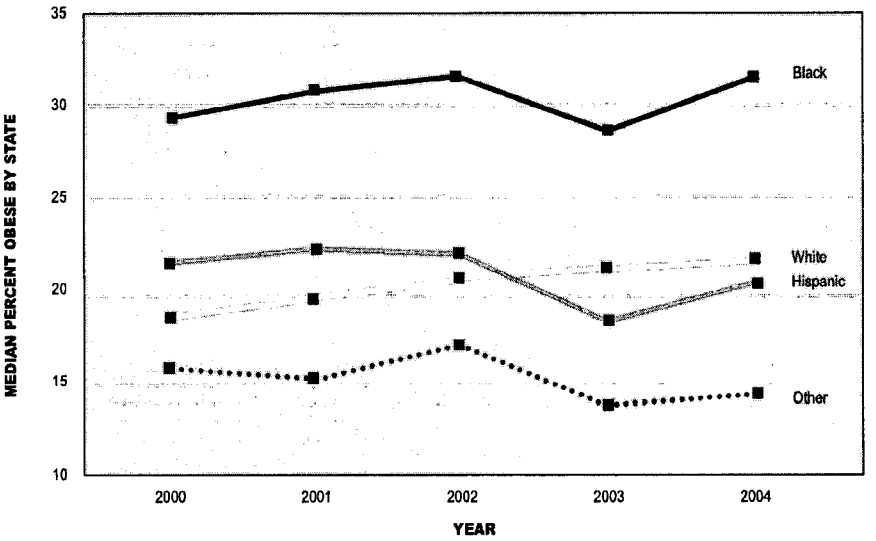


FIGURE 15: OBESITY BY RACE AND ETHNICITY: NATIONAL TRENDS



Source: CDC BRFSS web site at: http://www.cdc.gov/brfss.

There are no readily available longtime trend data on obesity by race and ethnicity. The available series of national medians' by year, shown in Figure 15, suggests that increases in obesity among whites over a period of five years have driven the increasing national levels of obesity. The lowest levels are in the "other" category, which includes Asians and all other groups, followed by whites and Hispanics.

Black residents show the highest percentage of obesity among those groups reported in the Behavioral Risk Factor Surveillance System (BRFSS) survey, 1999-2003. Within this group there are significant age and gender disparities such that black women have a higher percentage obese than black men in age group 18-29 (23.9:20.3 percent), 30-44 (36.1:27.4 percent), 45-59 (41.6:31.9 percent), and 60 and over (36.3:23.8 percent). The male-female differences are statistically significant except in the youngest age group. These results have significant implications for long-term health outcomes. No systematic data are available on environmental factors such as access to healthy foods and exercise venues. Also, there is no systematic data about cultural factors such as attitudes towards diet and exercise or ideal body type available to explain these age/gender trends and the broader race/ethnicity disparities reported here.

High Blood Pressure and High Blood Cholesterol

Both high blood pressure and high cholesterol are closely related to cardiovascular disease. The higher the blood pressure, the greater the chance of heart attack, heart failure, stroke, and kidney disease.[61] High levels of blood cholesterol, particularly low-density lipoprotein (LDL) cholesterol, increases the build up of cholesterol in the arteries and may block blood flow, leading to heart disease.[62]

0487
09/15/08

Thirty-one percent (crude rate) of Connecticut adults self-reported high blood pressure, and 29 percent reported high cholesterol. The Wealthy Suburbs had the lowest prevalence of both high blood pressure and high cholesterol. The other HRGs did not vary much in prevalence of high blood pressure and cholesterol, and there were no significant differences between the cities of the Urban Centers.

A higher percentage of Connecticut black adults than white adults reported high blood pressure, as shown in Table 55. This pattern was also seen within the Urban and Manufacturing centers and the Diverse Suburbs. Although there were no differences for the state overall in reported high cholesterol by race/ethnicity, the percentage of Hispanics in the Diverse Suburbs reporting high cholesterol was lower than that reported by whites and blacks, as seen in Table 56.

The federal government's *Healthy People 2010* objectives are to reduce the rates of American adults with high blood pressure to 16 percent and those with high cholesterol to 14 percent.[63] For each of these indicators, Connecticut residents in all HRGs are far above the national objectives.

TABLE 55: PERCENTAGE WHO HAVE BEEN TOLD THEY HAVE HIGH BLOOD PRESSURE

AREA	All Race and Ethnicity, Crude Rate	All Race and Ethnicity, Age-Adjusted Rate	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	33.5	33.1	32.0	38.2	35.7	
Hartford	23.7	25.2	21.3	27.3	28.7	
New Haven	29.3	30.0	26.6	45.1	26.7	
HRG 1 (3)-UC	28.9	29.6	26.6	36.1	30.7	
HRG 2 (10)-MC	29.1	28.6	28.3	35.2	32.3	24.7
HRG 3 (15)-DS	31.6	28.5	27.9	44.9	21.1	
HRG 4 (27)-WS	29.0	24.7	23.8			
HRG 5 (39)-MT	33.7	30.5	30.7	35.1	19.7	26.4
HRG 6 (75)-RT	29.8	27.0	27.0			
Connecticut	30.9	28.4	28.0	37.1	27.2	26.5

Source: DPH BRFSS Survey Data, 1999-2003.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

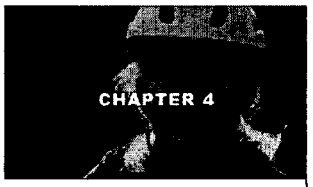


TABLE 56: PERCENTAGE WHO HAVE BEEN TOLD THEY HAVE HIGH CHOLESTEROL

AREA	All Race and Ethnicity, Crude Rate	All Race and Ethnicity, Age-Adjusted Rate	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	27.5	26.8	29.0	22.2	28.2	
Hartford	22.8	22.6	28.5	16.6	25.6	
New Haven	26.6	26.1	28.8	24.1		
HRG 1 (3)-UC	25.7	25.3	28.8	22.2	24.9	
HRG 2 (10)-MC	27.9	26.5	26.7	24.1	24.3	23.9
HRG 3 (15)-DS	31.2	28.2	28.7	28.5	18.5	
HRG 4 (27)-WS	28.0	24.8	24.6			
HRG 5 (39)-MT	30.5	27.8	27.9	22.2	29.3	24.7
HRG 6 (75)-RT	28.4	26.4	26.6			
Connecticut	28.9	26.6	27.0	24.0	25.2	26.1

Source: DPH BRFSS Survey Data, 1999-2003.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

Physical Activity and Diet

Physical activity has been shown to reduce levels of obesity and improve cardiovascular health.

Table 57 and Table 58 show significant differences in levels of physical activity by HRG and race/ethnicity. There are only limited data for Connecticut on diet, another important indicator, as shown in Table 59. Black and Hispanic adults are far more likely than white adults to report no physical activity and less likely to report regular exercise. Asian adults are least likely to report consuming "five or fewer" fruits and vegetables per day as shown in Table 59, indicating a possibly healthier diet.

TABLE 57: PERCENTAGE WITH NO PHYSICAL ACTIVITY

AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	37.4	37.8	30.8	35.6	46.1	
Hartford	37.5	36.9	23.6	38.8	48.7	
New Haven	27.5	27.7	19.8	31.8	45.3	
HRG 1 (3)-UC	34.0	34.0	24.0	36.2	46.9	
HRG 2 (10)-MC	29.6	29.8	24.1	39.0	44.6	24.6
HRG 3 (15)-DS	23.2	22.9	21.4	32.0	28.4	
HRG 4 (27)-WS	15.2	14.6	14.1		24.1	
HRG 5 (39)-MT	24.4	23.7	22.7	26.8	37.1	27.1
HRG 6 (75)-RT	19.6	19.2	18.4		36.6	
Connecticut	23.8	23.6	20.3	34.9	40.6	28.3
United States	25.6	25.6	23.1	32.2	32.3	

Source: DPH BRFSS Survey Data 1999-2003; CDC BRFSS Survey Data BRFSS at: www.cdc.gov/brfss.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

TABLE 58: PERCENTAGE WHO GET REGULAR EXERCISE

AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	41.6	41.4	42.4	40.2	32.8	
Hartford	38.2	36.7	39.5	32.7	40.5	
New Haven	44.8	42.3	49.0	37.1	25.8	
HRG 1 (3)-UC	41.7	40.0	45.8	36.1	31.9	
HRG 2 (10)-MC	47.0	46.2	51.0	35.6	32.4	28.4
HRG 3 (15)-DS	48.6	48.6	50.4	35.0	47.9	
HRG 4 (27)-WS	55.9	57.2	59.0	47.2	45.8	
HRG 5 (39)-MT	48.9	49.7	50.9	30.4	42.1	41.7
HRG 6 (75)-RT	54.1	54.5	55.5	31.3	51.3	
Connecticut	50.0	50.3	53.2	35.4	37.8	32.9
United States	44.4	44.4	46.2	36.5	42.5	

Source: DPH BRFSS Survey Data, 1999-2003; CDC BRFSS web site at: www.cdc.gov/brfss.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

TABLE 59: PERCENTAGE CONSUMING FEWER THAN FIVE FRUITS AND VEGETABLES PER DAY

AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	72.0	72.1	83.0	77.5	76.4	
Hartford	75.5	74.9	70.4	74.8	76.2	
New Haven	67.9	67.9	73.6	69.2	56.2	
HRG 1 (3)-UC	71.7	71.5	68.0	74.1	76.8	
HRG 2 (10)-MC	71.6	71.7	71.9	72.0	70.8	66.7
HRG 3 (15)-DS	71.5	71.8	71.6	78.3	75.1	
HRG 4 (27)-WS	67.4	67.9	68.3	66.5	72.1	
HRG 5 (39)-MT	72.9	73.0	73.5	70.2	70.4	64.0
HRG 6 (75)-RT	69.0	68.8	68.4	86.5	73.9	
Connecticut	70.8	70.9	70.7	74.3	73.7	66.2
United States	76.9	76.9				

Source: DPH BRFSS Survey Data, 1999-2003; CDC BRFSS web site www.cdc.gov/brfss.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

DRUG USE AND ABUSE: SMOKING AND ALCOHOL

According to a study published in the Journal of the American Medical Association (JAMA) about the causes of death in the United States, alcohol abuse has been associated with 60 percent to 90 percent of cirrhosis deaths; 40 percent to 50 percent of motor vehicle fatalities; 16 percent to 67 percent of home injuries, drowning, fire fatalities, and job injuries; and 3 percent to 5 percent of cancer deaths.[64]

Alcohol abuse is responsible for even more harm as it is implicated in child and intimate partner abuse; homicide; and loss of employment, family and community connection.

Findings and Analysis

Problem drinking, especially binge drinking (having five or more drinks on an occasion), is in many respects a "white" youth and young adult cultural problem. Among Connecticut adults 18 and over, 17.5 percent of whites report binge drinking, while this is true for only 9.0 percent of blacks, 14.5 percent of Hispanics and 8.2 percent of Asians. There are highly significant differences between whites and Hispanics on the one hand, and blacks and Asians on the other hand — and they are the same in every HRG for which comparative data are available. The problem is both statewide and nationwide.

TABLE 60: PERCENTAGE WHO ENGAGED IN CHRONIC (HEAVY) DRINKING IN PAST MONTH

AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	6.3	5.8	6.7	2.6	5.2	
Hartford	3.6	3.1	4.3	1.1	5.0	
New Haven	3.5	3.3	4.5	3.3	2.7	
HRG 1 (3)-UC	4.4	4.0	5.2	2.1	4.0	
HRG 2 (10)-MC	3.7	3.7	4.4	1.7	3.6	0.8
HRG 3 (15)-DS	4.2	4.4	4.7	1.1	3.0	
HRG 4 (27)-WS	5.4	6.1	7.1		2.3	
HRG 5 (39)-MT	4.5	4.8	4.9	2.6	3.8	2.3
HRG 6 (75)-RT	4.2	4.5	4.5		3.5	
Connecticut	4.4	4.6	5.0	1.9	3.6	1.4

Source: DPH BRFSS Survey Data, 1999-2003. Heavy or chronic drinking is defined as more than 60 drinks per month for a man and more than 30 drinks per month for a woman.

Note: All race and ethnicity specific rates are age-adjusted.

Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

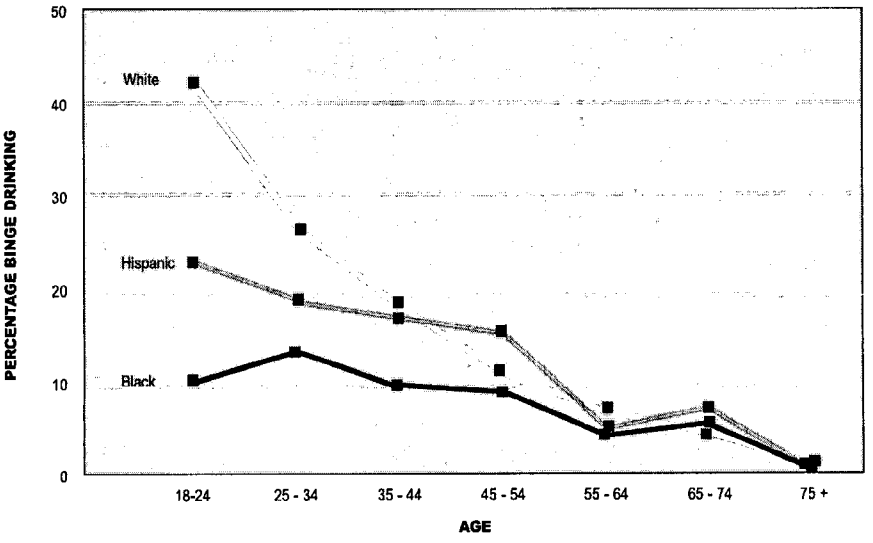
TABLE 61: PERCENTAGE WHO ENGAGED IN BINGE DRINKING IN PAST MONTH

AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	13.4	12.5	14.5	9.3	12.5	
Hartford	14.3	13.3	19.3	11.4	12.0	
New Haven	15.3	13.8	18.5	10.0	11.4	
HRG 1 (3)-UC	14.4	13.0	17.5	9.7	11.5	
HRG 2 (10)-MC	15.0	14.7	17.4	8.4	14.2	6.1
HRG 3 (15)-DS	15.5	16.4	18.1	7.2	17.0	
HRG 4 (27)-WS	15.1	18.6	18.7		17.5	
HRG 5 (39)-MT	15.8	17.3	17.5	9.9	16.6	12.6
HRG 6 (75)-RT	14.7	16.4	16.5		15.9	
Connecticut	15.2	16.0	17.5	9.0	14.5	8.2
United States	15.6	15.6				

Source: DPH BRFSS Survey Data, 1999-2003; CDC BRFSS web site at: www.cdc.gov/brfss.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

The data in Figure 16 suggest that white binge drinking is particularly prevalent among 18- to 34-year-olds. By age 44, the Hispanic binge drinking rate is equal to the white rate and by age 54, the black binge drinking rate is equal to the white rate. There are no statistically significant differences among race/ethnicity groups after age 55, as all fall to a comparatively low level.

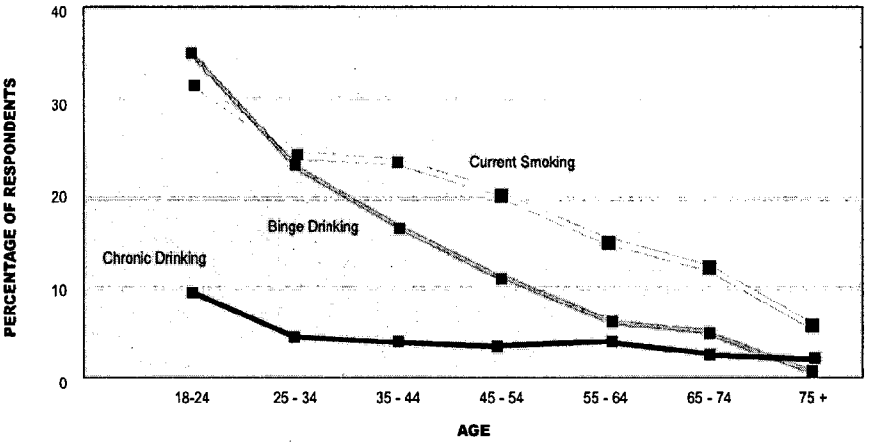
FIGURE 16: PERCENTAGE BINGE DRINKING BY AGE AND RACE/ETHNICITY, BRFSS, 1999-2003



Source: DPH BRFSS Survey Data, 1999-2003.

The disparities in rates for chronic drinking — more than two drinks on the average day for men; more than one drink per day for women — parallel the rates for binge drinking. Five percent of whites report chronic drinking, as compared with 1.9 percent of blacks, 3.6 percent of Hispanics and 1.4 percent of Asians. As illustrated in Figure 17, smoking and binge drinking are clearly related to age, while chronic drinking is not, except for a slightly higher rate in the youngest age group (18 to 24 years old).

FIGURE 17: PERCENTAGES REPORTING CURRENT SMOKING, BINGE AND HEAVY (CHRONIC) DRINKING, BRFSS,1999-2003



Source: DPH BRFSS Survey Data, 1999-2003.

Drinking and smoking "go together" in the sense that those who smoke are also more likely to abuse alcohol. As illustrated in Table 62, the "relative risk" ratio — the association between binge drinking and smoking — is significantly elevated above 1 for every category of educational attainment. This relationship is most pronounced for those at the lowest level of educational attainment.

TABLE 62: PERCENTAGE REPORTING CURRENT SMOKING AND BINGE DRINKING FOR CONNECTICUT RESIDENTS 25 AND OVER, BY EDUCATIONAL ATTAINMENT, 1999-2003

EDUCATION	Current Smoking	Binge Drinking	Both	Relative Risk*
LESS THAN HIGH SCHOOL GRADUATE	27.1	10.1	5.7	4.2
HIGH SCHOOL GRADUATE	26.5	13.6	6.1	2.7
1-3 YEARS COLLEGE	22.0	12.4	4.4	2.2
COLLEGE GRADUATE OR MORE	10.8	13.5	3.1	3.1

Source: DPH BRFSS Survey Data, 1999-2003.

**Table includes only those age 25 and older who answered all three questions: Educational Attainment, Current Smoking and Binge Drinking. Relative Risk would be 1 if there was no association between smoking and binge drinking.*

Note: All race and ethnicity specific rates are age-adjusted.

Advanced educational level (college graduate or more) is a strong independent predictor of reduced smoking but not of binge drinking (five or more drinks on one occasion in the past month). College graduates are least likely to be current smokers (10.8 percent), but they are not less likely to be binge drinkers (13.5 percent). There is a strong association for persons age 25 and over between binge drinking and smoking, regardless of educational level.

Smoking

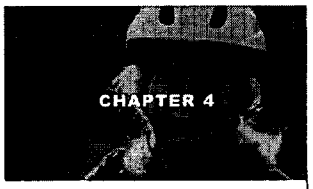
Tobacco use is the leading cause of premature death in the United States. A JAMA article about the causes of death in the United States implicated tobacco use in 19 percent of all deaths nationally. "It contributes substantially to deaths from cancer (especially cancers of the lung; esophagus; oral cavity; pancreas; kidney; and bladder; and perhaps of other organs), cardiovascular disease (coronary artery disease, stroke, and high blood pressure), lung disease (chronic obstructive pulmonary disease and pneumonia), low birth weight; and other problems of infancy and burns."[65]

As shown in Table 63, the age-adjusted rate of 20.9 percent smokers among Connecticut adults 18 years old and older is far above the *Healthy People 2010* target of 12 percent current smokers. Whites, blacks and Hispanics do not differ significantly (21.3 percent of whites, 20.9 percent of blacks and 20.6 percent of Hispanics are smokers), but they are far more likely than Asians (7.4 percent) to be smokers.

TABLE 63: PERCENTAGE CURRENTLY SMOKING

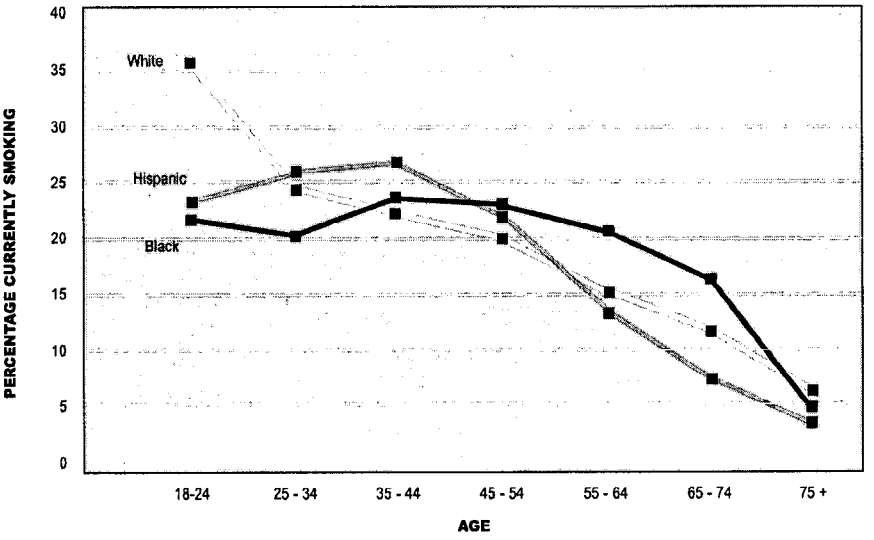
AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	25.7	25.1	30.1	26.1	19.9	
Hartford	24.6	24.1	26.8	21.5	21.7	
New Haven	19.2	19.0	19.5	25.2	15.9	
HRG 1 (3)-UC	23.0	22.5	24.4	24.0	19.1	
HRG 2 (10)-MC	23.3	23.3	25.0	20.0	22.4	7.6
HRG 3 (15)-DS	21.8	22.3	23.4	17.0	23.7	
HRG 4 (27)-WS	14.3	16.6	16.1		19.3	
HRG 5 (39)-MT	22.0	22.9	23.2	17.8	21.2	7.3
HRG 6 (75)-RT	18.0	18.9	19.1		11.3	
Connecticut	20.4	20.9	21.3	20.9	20.6	7.4
United States	22.8	22.8	22.8	23.4	22.4	

Source: DPH BRFSS Survey Data, 1999-2003; CDC BRFSS web site at: www.cdc.gov/brfss.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.



Although the overall smoking rates for whites, blacks and Hispanics are not different, the age patterns are somewhat different. Whites between 18 and 24 years old show a significantly higher rate but then trend consistently downward by age. Black and Hispanic respondents show a different pattern: lower rates of smoking in the youngest age group, but no consistent downward age trend over the middle years. Black respondents who smoke continue smoking until relatively late in life. What is not currently known is whether these different patterns are due to older age at initiation, greater degree of addiction due to type of cigarette smoked or depth of inhalation, as some researchers have suggested,[66,67] or to differential targeting or effects of smoking promotion or cessation messages in these groups.

FIGURE 18: PERCENTAGE SMOKING BY AGE AND RACE/ETHNICITY, BRFSS, 1999-2003



Source: DPH BRFSS Survey Data, 1999-2003.

Singh and Miller,[68] Diamond,[69] and others have demonstrated that formerly healthy immigrants suffer from prolonged exposure to American culture. Immigrants, particularly black and Hispanic immigrants, succumb to alcohol abuse and tobacco use with many negative consequences.[70]

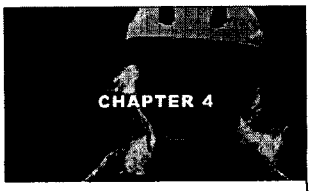
Environmental Tobacco Smoke

Many studies have shown that environmental tobacco smoke (ETS), sometimes known as "secondhand smoke," affects the health of nonsmokers. ETS can cause developmental effects such as low birth weight and Sudden Infant Death Syndrome (SIDS); respiratory effects such as bronchitis, pneumonia, new or exacerbated asthma, and chronic respiratory symptoms and middle ear infections in children; eye and nasal irritation; lung cancer; nasal sinus cancer; heart disease mortality; and acute and chronic coronary heart disease morbidity in adults.[71]

One goal of the *Healthy People 2010* initiative is the establishment of smoke-free places such as school facilities, property, vehicles, and school events; private and public workplaces; restaurants; public transportation; day care centers; and retail stores.[72]

Connecticut's smoke-free law went into effect on Oct. 1, 2003, and expanded to bars in April 2004. But some businesses (e.g., those with fewer than five employees) have weaker coverage, and they rely on employee complaint to instigate change. A weakness in the law is that no agency has been charged with enforcement. There have also been no systematic studies of compliance. Some workers, such as nurses who escort psychiatric or nursing home patients outside to smoke, are at risk — and apparently not well protected in practice. The law also does not address the effects of ETS in apartment and condominium living situations.[73]

In summary, there are no Connecticut data to assess compliance with regulations related to ETS or exposures to it.



0497
09/15/08

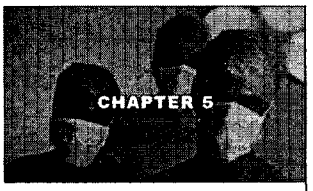


CHAPTER 5

ACCESS TO CARE

Several factors affect access to and use of health care in Connecticut, including:

- Health insurance status
- "Safety net" programs
- Availability of health care facilities and professionals
- Language compatibility between health care providers and residents
- Adequacy of prenatal care
- Access to community water fluoridation



HEALTH INSURANCE STATUS

Persons with no health insurance are less likely to have a regular source of health care or to receive preventive care, and experience worse health outcomes as compared to those with health insurance.[74] Having a regular health care provider is an important indicator as it increases use of ambulatory visits, prompt care when sick, and receipt of preventive health care.[75] The *Healthy People 2010* initiative aims for a goal of no adults under age 65 without health insurance, and 96 percent with a source of ongoing health care.[76]

The most current statistics on health insurance coverage are generated by the Current Population Survey of the U.S. Census Bureau. This survey documents a small but statistically significant annual increase in the percentage of U.S. residents who lack health insurance — defined as any type of insurance, public or private — 14.6 percent uninsured in 2001, 15.2 in 2002, 15.6 percent in 2003 and 2004, and 15.9 percent in 2005.

Connecticut remained essentially constant at 10.4 percent and 10.5 percent for the time periods 2001-2002 and 2002-2003, but increased in 2003-2004 to 11.0 percent uninsured. For the three-year average 2003-2005 Connecticut as a state ranks 11th in coverage, behind all other New England states. The uninsured rate nationally, in 2005, was 11.3 percent for white-alone non-Hispanic; 19.6 percent for black-alone non-Hispanic; 17.9 percent for Asian; and 32.7 percent for Hispanic (any race) residents.[77]

According to self-reports in the Behavioral Risk Factor Surveillance System (BRFSS) surveys, conducted between 1999 and 2003, almost 12 percent of Connecticut residents between the ages of 18 and 64 claimed that they did not have health insurance. Eighty-six percent of Connecticut residents age 18 and over reported having a regular source of medical care — a "medical home" — and 76 percent received a checkup in the past year during the time period 1999-2003. There were marked differences in access to care by HRG. Residents in the Urban and Manufacturing centers were less likely to have health insurance and less likely to have a regular source of care. However, they were not less likely to have had a checkup in the past year as compared with residents in other HRGs. Among the Urban Centers, a higher proportion of Hartford and Bridgeport residents reported having no health insurance than residents of New Haven, as shown in Table 64.

Hispanic and black adults were more likely than white adults to have no health insurance and less likely to have a regular source of medical care than white adults, as shown in Table 65. But the data indicate, paradoxically, that black adults were more likely to have had a checkup in the past year, as shown in Table 66.[1] These latter disparities were present within all HRGs. While Asians were no less likely than whites to have health insurance, they were less likely to report a regular source of medical care.

0499
09/15/08

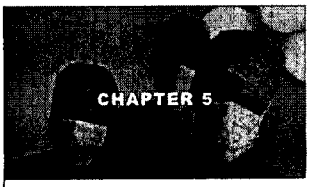


TABLE 64: PERCENTAGE WITH NO HEALTH INSURANCE

AREA	All Race and Ethnicity, Crude Rate	All Race and Ethnicity, Age-Adjusted Rate	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	27.0	26.0	17.6	28.9	33.6	
Hartford	23.3	21.8	13.2	20.9	28.5	
New Haven	14.7	13.5	8.5	11.5	25.7	
HRG 1 (3)-UC	21.4	20.2	12.0	20.1	29.9	
HRG 2 (10)-MC	16.8	16.4	10.7	22.8	33.1	11.3
HRG 3 (15)-DS	10.7	10.8	10.1	14.2	18.4	
HRG 4 (27)-WS	6.0	6.6	5.3		22.8	
HRG 5 (39)-MT	10.0	10.3	9.5	9.0	26.5	12.0
HRG 6 (75)-RT	8.2	9.0	8.2		22.6	
Connecticut	11.7	12.0	9.0	18.4	29.1	11.5

Source: DPH BRFSS Survey Data, 1999-2003.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

TABLE 65: PERCENTAGE WITH A REGULAR SOURCE OF MEDICAL CARE

AREA	All Race and Ethnicity, Crude Rate	All Race and Ethnicity, Age-Adjusted Rate	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	73.0	74.3	80.4	75.5	71.9	
Hartford	73.5	75.4	81.7	79.8	68.2	
New Haven	71.3	74.6	80.6	76.4	58.5	
HRG 1 (3)-UC	72.5	74.7	81.0	77.9	66.8	
HRG 2 (10)-MC	80.7	80.9	85.4	75.4	67.2	82.6
HRG 3 (15)-DS	87.8	87.3	87.9	88.8	80.7	
HRG 4 (27)-WS	89.4	88.1	89.4			
HRG 5 (39)-MT	87.8	86.6	87.3	90.2	75.7	79.3
HRG 6 (75)-RT	89.7	88.8	89.1			
Connecticut	85.6	84.8	87.5	80.7	69.7	79.6

Source: DPH BRFSS Survey Data, 1999-2003.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

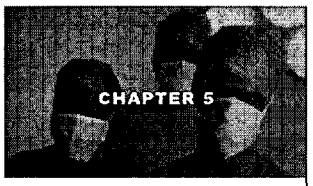


TABLE 66: PERCENTAGE WHO HAD A CHECKUP IN PAST YEAR

AREA	All Race and Ethnicity, Crude Rate	All Race and Ethnicity, Age-Adjusted Rate	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	77.5	78.7	75.5	83.8	80.6	
Hartford	75.7	77.1	71.7	84.8	75.5	
New Haven	79.0	79.3	75.3	83.7		
HRG 1 (3)-UC	77.4	78.2	74.1	83.2	79.0	
HRG 2 (10)-MC	77.4	77.5	74.9	86.5	82.8	78.0
HRG 3 (15)-DS	76.4	75.6	74.7	80.1	77.8	
HRG 4 (27)-WS	75.0	74.0	73.3			
HRG 5 (39)-MT	76.1	75.8	76.1	88.0	78.3	74.2
HRG 6 (75)-RT	73.9	73.1	73.1			
Connecticut	76.1	75.6	74.4	84.3	79.2	76.8

Source: DPH BRFSS Survey Data, 1999-2003.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

DENTAL VISITS

Oral health is an essential component of overall health status. Poor oral health and untreated oral diseases, such as dental caries and periodontal diseases, can negatively affect quality of life and lead to more serious infections. Regular dental care is an important component of oral health. Many persons do not receive preventive dental services because of lack of insurance or fear of dental visits.[78]

Overall, 79 percent of Connecticut adults reported visiting a dentist in the past year. The Wealthy Suburbs and Rural Towns had the highest percentages of residents reporting a recent dental visit, and the Urban and Manufacturing centers had the lowest percentages, as seen in Table 67.

In all HRGs where there were sufficient sample sizes to make a determination, Hispanic and black adults were less likely than white adults to have had a recent dental visit.

TABLE 67: PERCENTAGE WITH DENTAL VISIT IN PAST YEAR

AREA	All Race and Ethnicity, Crude Rate	All Race and Ethnicity, Age-Adjusted Rate	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	63.3	64.7	65.3			
Hartford	71.2	70.8	82.5	70.0	62.6	
New Haven	79.5	78.0	84.8	70.0		
HRG 1 (3)-UC	71.8	71.8	78.6	68.3	62.6	
HRG 2 (10)-MC	73.8	73.8	77.6	61.7	66.5	74.3
HRG 3 (15)-DS	77.3	77.3	78.7	61.8		
HRG 4 (27)-WS	85.7	85.8	87.3			
HRG 5 (39)-MT	80.7	80.5	81.8		71.8	
HRG 6 (75)-RT	83.7	83.6	84.0			
Connecticut	79.2	79.2	81.7	66.5	65.8	72.2

Source: DPH BRFSS Survey Data, 1999-2003.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

SAFETY NET: NEEDY INDIVIDUALS AND FAMILIES IN CONNECTICUT

Connecticut Department of Social Services

The Connecticut Department of Social Services (DSS) provides assistance to needy families and individuals to facilitate their access to needed medical care and help maximize their overall health. DSS tracks utilization of five major assistance programs by monthly caseload units and recipients. These DSS-tracked assistance programs are represented in Table 68 and Table 69. Appendix E includes a brief description of each of the five programs.

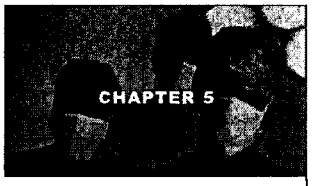


TABLE 68: AVERAGE MONTHLY CASES AND PERSONS ON FOOD STAMPS, TEMPORARY FAMILY ASSISTANCE AND STATE SUPPLEMENT (STATE FISCAL YEAR 2005)

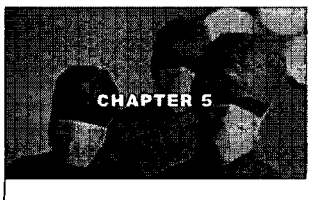
AREA	Food Stamps		Temporary Family Assistance - Totals		State Supplement			
	Cases	Persons	Cases	Persons	Aged	Blind	Disabled	Total
HRG 1 (3)-UC	39,788	76,960	9,048	19,977	1,347	14	2,967	4,330
Bridgeport	9,837	19,630	2,274	4,787	383	4	787	1,174
Hartford	17,562	33,591	3,773	8,544	558	5	1,295	1,859
New Haven	12,389	23,739	3,001	6,646	406	5	885	1,297
HRG 2 (10)-MC	29,642	58,622	6,719	14,869	1,383	10	2,986	4,388
HRG 3 (15)-DS	14,429	26,978	3,351	7,230	1,005	16	1,928	2,959
HRG 4 (27)-WS	1,576	2,444	273	557	192	1	435	637
HRG 5 (39)-MT	9,947	17,418	1,916	4,090	598	12	1,806	2,436
HRG 6 (75)-RT	3,699	6,085	630	1,317	440	26	1,176	1,666
Unclassified			2					
Connecticut	99,160	188,591	22,073	48,174	5,028	93	11,370	16,492

Source: DSS, Central Office, Information Technology Services, Electronic file. E-mail communication from S. Colangelo. Sept. 25, 2006.
Note: The following program categories are not shown in the DSS tables: Refugee, Refugee Medical, State Funded Medical, and Connecticut AIDS Drug Assistance Program (CADAP). Statewide totals may not equal sums due to rounding. Due to rounding some towns may not display a case but will display recipients. This is due to most cases having more than one recipient and therefore when averaged, the recipient count will be .5 or higher, and be counted as 1. State Supplement is a state-financed cash assistance program to supplement the income of the aged, blind and disabled that have another source of income such as disability benefits or Supplemental Security Income (SSI).

TABLE 69: CASES AND PERSONS ON MEDICAID AND STATE-ADMINISTERED GENERAL ASSISTANCE, 2005

AREA	Total Medicaid (TFA & S. Supp & Medicaid Only (Excluding QMB/SLMB*) (December 2005 only)		State-Administered General Assistance (Average Monthly, SFY 2005)			
			Cash		Medical	
	Cases	Persons	Cases	Persons	Cases	Persons
HRG 1 (3)-UC	64,097	115,564	1,440	1,441	12,223	12,227
Bridgeport	20,007	35,986	365	365	2,865	2,866
Hartford	24,387	44,838	656	657	5,363	5,366
New Haven	19,703	34,740	419	419	3,995	3,995
HRG 2 (10)-MC	65,930	116,352	1,135	1,135	8,152	8,155
HRG 3 (15)-DS	38,536	65,733	631	637	4,035	4,044
HRG 4 (27)-WS	9,213	13,885	75	75	638	638
HRG 5 (39)-MT	34,644	57,617	525	525	3,213	3,214
HRG 6 (75)-RT	17,773	29,256	194	194	1,486	1,486
Unclassified	415	418	1	1	11	11
Connecticut	230,608	398,825	4,069	4,076	29,825	29,840

Source: DSS Central Office, Information Technology Services, Electronic file. E-mail communication from S. Colangelo. Oct. 1, 2006.
** Total Medicaid counts exclude Qualified Medicare Beneficiary (QMB) and Specified Low Income Medicare Beneficiary (SLMB) cases due to program overlap.*
The following program categories are not shown in the DSS tables: Refugee, Refugee Medical, State Funded Medical, and CADAP. State totals may not equal sums of HRGs due to rounding.



PROGRAMS FOR CHILDREN AND ADOLESCENTS

The state departments of Social Services (DSS) and Children and Families (DCF) provide health-promoting services to needy Connecticut youth, including:

- Health care services
- Child protective services (including telephone hotline) to process reports of child abuse and neglect
- Youth emergency assessment and respite services (YEARS), including emergency youth shelters
- Substance abuse and mental health services
- Youth safe homes
- Foster and adoption services
- Health care and residential treatment facilities

Below are brief descriptions of selected services and data on availability and utilization.

Healthcare for UninSured Kids and Youth (HUSKY)

The HUSKY program provides health care services for Connecticut's younger residents via coverage for preventive care, outpatient and in-hospital care, prescription drug coverage, and mental health/substance abuse services. The HUSKY A program, for children in households at or below 100 percent of the federal poverty level (FPL), had an enrollment of 304,633 during fiscal year 2004. The HUSKY-B program, for youth under age 19 in certain households with higher incomes enrolled 14,533 youth in fiscal 2004.[79]

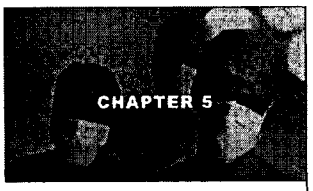
Youth Emergency Assessment and Respite Services (YEARS)

The YEARS program makes available 101 beds in eight affiliated shelters to 11- to 17-year-old children who are in crisis due to abuse, neglect or abandonment. The eight YEARS-affiliated youth shelters are listed by HRG in Appendix G. Other youth emergency shelters operate within the state of Connecticut but are not officially affiliated with the YEARS program.

TABLE 70: CHILDREN SERVED BY YEARS PROGRAM: SNAPSHOT, JULY-SEPTEMBER 2004

AGE	PERCENTAGE	GENDER	PERCENTAGE	RACE/ETHNICITY	PERCENTAGE
< 5	2.2	Male	44.2	African American/Black	35.0
5-7	1.8	Female	55.8	Caucasian/White	31.4
8-12	11.9			Puerto Rican	25.2
13-17	84.1			Biracial	2.2
				Central American	1.8
				Other Spanish Speaking	1.8
				West Indies/Islander	1.3
				Other	0.9
				South American	0.4

Source: DCF YEARS: Statistical Report, Performance-Based Contracting state fiscal year 2005 (Date Range: July 1, 2004 to Sept. 30, 2004).



During an assessment period between July and September 2004, the YEARS program served 226 youth. Of these, 57.6 percent stayed in the YEARS shelter for 45 days or less, while 42.4 percent stayed longer than 45 days. The demographic data in Table 70 reflects the 226 children served by the YEARS program in the 2004 assessment period.[80]

Other Youth Placement Services

DCF offers other treatment and placement services to needy children and adolescents besides the shelters affiliated with the YEARS program. DCF's Child Protective Services Division investigates reports of child maltreatment and arranges necessary follow-up. This can include in-home services to children and families or placement of children in temporary or permanent locations outside the home.

Child Protective Services' 2004 caseload included 18,227 cases. A needs assessment was conducted based upon a random, representative sample of 375 cases. DCF found an over-representation of black and Hispanic families in the Child Protective Services caseload. Black children also were removed from their homes as a result of Child Protective Services investigation at a higher rate than children from other race and ethnicity groups.

TABLE 71: SAMPLE CASELOAD FROM CONNECTICUT CHILD PROTECTIVE SERVICES BY RACE/ETHNICITY AND SERVICE PROVIDED, 2004

RACE/ETHNICITY	In-Home Services	Removal From Home
WHITE	26%	22%
HISPANIC	22%	24%
BLACK/AFRICAN AMERICAN	26%	34.5%
UNABLE TO DETERMINE/UNKNOWN	22%	14%
MULTI	3%	5%
OTHER (ASIAN, AMERICAN INDIAN, ALASKAN NATIVE, NATIVE HAWAIIAN, OTHER PACIFIC ISLANDER)	<1 %	.5%

Source: DCF Needs Assessment, 2004. Oct. 24, 2004. See reference note.
Source: DCF Overview of Programs and Services: Child Welfare Services. See reference note.
Cases are children under 18 or under 21 and clients of DCF

Preventive Oral Health Care for Children in HUSKY A

Oral health data are available from DSS for children ages 3 to 19 who were continuously enrolled during fiscal years 2000-2002 and during calendar years 2003-2005. In 2003, 140,728 children were continuously enrolled in HUSKY A; in 2004 there were 146,598, and in 2005 there were 146,046. There were virtually no changes in either oral preventive care (40 percent for 2003 and 2004, and 41 percent for 2005) or treatment (21 percent in 2003 and 2004, and 22 percent in 2005).

The preventive oral health care rate was highest for Hispanic children ages 3 to 19 (43 percent in 2004 and 45 percent in 2005), next for white (39 percent in both years) and black (38 percent in 2004 and 39 percent in 2005) children and youth. The percentage was highest in Hartford (47 percent in 2004, 48 percent in 2005) followed by Bridgeport (40 percent in both years). There was a statistically significant increase in New Haven (35 percent in 2004 and 43 percent in 2005).[81]

Connecticut Pharmaceutical Assistance Contract to the Elderly and Disabled (ConnPACE)

DSS provides multiple health-promoting programs to needy elders in the state. ConnPACE helps elderly and disabled residents finance the cost of prescription medications. Monthly enrollment in ConnPACE averaged 51,000 in fiscal year 2004, 10.8 percent of the state population over age 65 (470,183 according to U.S. Census 2000). The DSS's Older Americans Act Program served 57,830 elders and their caregivers in fiscal year 2004 via home-delivered and group-setting meals, transportation, homemaker services, and adult day care.[82]

Nursing Home Care

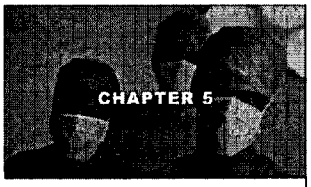
Connecticut has 246 Medicare/Medicaid-certified nursing homes, accounting for 29,927 beds. These are distributed as in Table 72.

TABLE 72: MEDICARE/MEDICAID-CERTIFIED LICENSED NURSING HOMES, 2005

AREA	Number of Licensed Nursing Home Facilities	Number of Available Beds	Beds Per 1,000 Residents Age 80 and Over
HRG 1 (3)-UC	18	2,793	231.8
Bridgeport	5	910	
Hartford	5	832	
New Haven	8	1,051	
HRG 2 (10)-MC	50	5,939	220.6
HRG 3 (15)-DS	48	6,279	214.6
HRG 4 (27)-WS	30	3,861	207.4
HRG 5 (39)-MT	64	7,690	250.7
HRG 6 (75)-RT	36	3,365	168.2
Connecticut	246	29,927	217.6

Source: Centers for Medicare and Medicaid Services (CMS): Nursing Home Compare. Available at: http://www.medicare.gov/NHCompare.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

The number and rate of nursing home beds is relatively large in the Mill Towns but much smaller in the Rural Towns. It seems likely that the Mill Towns, which are situated in relatively rural areas, provide a "catchment" to which elders from surrounding Rural Towns move for nursing home care.



INDIVIDUAL HEALTH CARE PROVIDERS

DPH tracks the status of service providers statewide via its Office of Licensure and Renewal. Table 73 shows the health-related service providers licensed at the end of calendar year 2004.

TABLE 73: CONNECTICUT LICENSED HEALTH CARE PROVIDERS, YEAR END, 2004

PROVIDER	COUNT
Physician/Surgeon	14,721
Physician Assistant	1,233
Licensed Practical Nurse	11,526
Advanced Practice Registered Nurse	2,580
Dentist	3,107
Dental Hygienist	3,230
Dietitian/Nutritionist	548
Licensed Alcohol and Drug Counselor	585
Licensed Clinical Social Worker	4,408
Licensed Midwife	1
Licensed Nurse Midwife	200

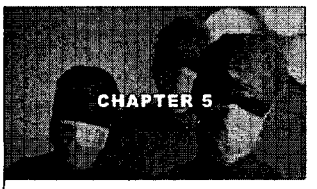
Source: DPH, Licensure and Renewal. Licensing Statistics: Numbers of Currently Licensed Practitioners, Calendar Year-End, 2004. Available at: http://www.dph.state.ct.us/Licensure/apps/apps/2004_Year_End_ActiveLicenses.pdf.

TABLE 74: CONNECTICUT LICENSED DOCTORS AND DENTISTS, AUGUST, 2005

	Doctors and Dentists: Number and Rate per 1000*				
AREA	Total Population	Doctors	Doctors per 1000	Dentists	Dentists per 1000
HRG 1 (3)-UC	384,733	1,842	4.8	177	0.5
Bridgeport	139,529	225	1.6	56	0.4
Hartford	121,578	587	4.8	46	0.4
New Haven	123,626	1,030	8.3	75	0.6
HRG 2 (10)-MC	662,398	1,700	2.6	483	0.7
HRG 3 (15)-DS	587,509	2,074	3.5	518	0.9
HRG 4 (27)-WS	487,620	2,831	5.8	596	1.2
HRG 5 (39)-MT	698,458	1,242	1.8	486	0.7
HRG 6 (75)-RT	584,847	1,713	2.9	484	0.8
Connecticut	3,405,565	11,402	3.3	2,744	0.8

Source: DPH, Licensure File, generated Aug. 16, 2005, and U.S. Census 2000, Table P1.

**Includes addresses as given in licensure file. No claims are made as to whether these are home or business addresses. All out-of-state addresses are deleted from the file, although some may practice in Connecticut. Some residents may go out of state for care.*



Doctors and dentists are not evenly distributed among the different types of communities, as shown in Table 74. While it is unclear whether licensees use their home or office addresses — there is likely a mixture of practice in this regard — it appears that the Urban Centers and the Wealthy Suburbs are relatively advantaged. Yet, the high rate for the Urban Centers is due to Hartford and, especially, New Haven, home of a large medical teaching hospital. Bridgeport, on the other hand, is very much disadvantaged, with only 1.6 physicians per 1,000 residents. The Mill Towns also have a low rate: 1.8 doctors per 1,000 residents.

With the exception of the Wealthy Suburbs, the distribution of dental practitioners is much more even across the HRGs, with a rate of 1.2 dentists per 1,000 residents. The Urban Centers have only 0.5 dentists per 1,000 residents.

LINGUISTIC ISOLATION

Language mismatches between patients and health care professionals can impede effective care. Language is indexed in the U.S. Census Bureau by household "linguistic isolation" — defined as households in which all members 14 and over have at least some difficulty with English. Linguistic isolation is shown in Table 23. The figure for Spanish-language household linguistic isolation is 7.8 percent of all households in the Urban Centers and 4.2 percent in the Manufacturing Centers. For all other HRGs, Spanish-language linguistic isolation is negligible. In the Urban Centers 3.3 percent of "Other Indo-European language" households are linguistically isolated, while in the Manufacturing Centers 3.4 percent of "Other Indo-European language" households experience linguistic isolation. In general, Asian-language linguistic isolation is negligible. There is no readily available means to track the availability of medical professionals who share language with those persons living in linguistically isolated households, since medical licensing bodies do not track language proficiency.

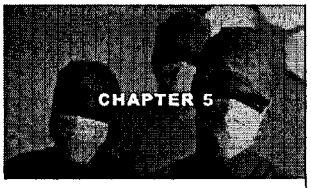
PRENATAL CARE

Prenatal care is another indicator of access to the "preventive" health care system. While the causal connections are complex, it appears that adequate prenatal care may assist in improving the health status and future reproductive health of mothers. There appears to be significant variation in access to and the timing of this care, as indicated in Table 75.

TABLE 75: PERCENTAGE OF BIRTHS WITH INADEQUATE, LATE OR NO PRENATAL CARE, 1999-2003

AREA	Total Population	White, Not Hispanic	Black, Not Hispanic	Hispanic	Puerto Rican	Hispanic, Non Puerto Rican	Asian
HRG 1 (3)-UC	37.0	29.0	34.1	43.5	39.8	54.4	
HRG 2 (10)-MC	31.1	21.4	39.0	44.5	43.7	45.5	
HRG 3 (15)-DS	22.5	19.5	29.1	32.6	32.3	32.9	
HRG 4 (27)-WS	11.8	11.4	22.7	24.9			
HRG 5 (39)-MT	19.9	18.6	29.8	33.7	24.6	31.9	
HRG 6 (75)-RT	17.5	16.8	31.8	25.4			
Connecticut	24.0	18.0	34.3	41.4	39.6	44.2	

Source: DPH, Vital Statistics.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.



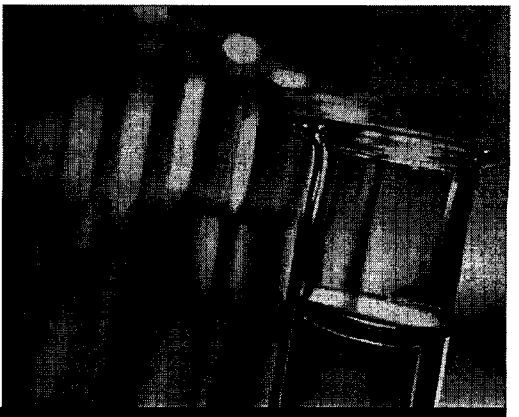
In general, non-Puerto Rican Hispanics have the highest rates of inadequate, late or no care. It may be that these are immigrants who are not well attached to the health care system, or they are very recent immigrants without early prenatal care in their home countries. Next are Puerto Rican Hispanics, followed by black non-Hispanics and white non-Hispanics. No data were available for Asians.

ACCESS TO COMMUNITY WATER FLUORIDATION

DPH has promoted and documented the benefits of water fluoridation as reducing tooth decay by 20 percent to 40 percent.[83]

Connecticut's Public Water Supplies (PWS) provide optimally fluoridated drinking water to an estimated 70 percent of the total population or 2.39 million state residents. The state requires those serving at least 20,000 people to fluoridate their water to a level of 0.8 mg/1 and 1.2 mg/1, with a level of 1.0 mg/1 considered to be most beneficial to oral health. Twenty-five PWSs serving a total of 2.18 million residents are required to fluoridate their water. Eight PWS's serving 90,364 voluntarily fluoridate their water to benefit their customers. Thirty-five PWSs serving 110,715 residents purchase fluoridated drinking water from other utilities. Thirty PWSs provide naturally fluoridated water to approximately 5,300 residents.[84]

The extent of community water fluoridation in Connecticut is mapped in Appendix H.



CHAPTER 6

SCREENING AND PREVENTION



Screening and prevention are closely related to health care access. They are critical aspects of a high quality health system, since they may prevent disease or alter the course of disease and prevent early mortality.

SCREENING TESTS

Breast Cancer Screening

Breast cancer is the most common form of cancer among women, and the second leading cause of cancer-related death among women. Regular screening increases the likelihood of early detection, treatment initiation and positive outcome. The American Cancer Society recommends annual mammograms for women 40 and over.[85] The federal *Healthy People 2010* initiative aims for at least 70 percent of women age 40 and older to have received a mammogram within the preceding two years.[86]

TABLE 76: PERCENTAGE WITH A MAMMOGRAM IN PAST TWO YEARS, WOMEN 40 AND OVER

AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
HRG 1 (3)-UC	81.7	82.1	83.0	77.0	81.9	
Bridgeport	82.5	83.1	85.4			
Hartford	82.6	83.2	82.6			
New Haven	79.9	79.7	81.7			
HRG 2 (10)-MC	80.6	81.9	81.3	80.8		
HRG 3 (15)-DS	81.2	82.1	81.9			
HRG 4 (27)-WS	84.2	84.9	85.2			
HRG 5 (39)-MT	80.9	80.8	81.5			
HRG 6 (75)-RT	84.4	84.5	84.1			
Connecticut	82.3	82.8	83.0	78.5	81.4	
United States	71.1	71.1	74.7	76.2	72.3	

Source: Behavioral Risk Factor Surveillance System (BRFSS) Survey Data, 1999-2003; Connecticut Department of Public Health (DPH); Centers for Disease Control and Prevention (CDC) BRFSS web site at: www.cdc.gov/brfss.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

Nearly 83 percent of Connecticut women age 40 and older received a mammogram within the past two years, a higher rate than the U.S. population overall and the *Healthy People 2010* objectives. Recent mammogram testing was fairly consistent across HRGs and the large Connecticut cities, as shown in Table 76.

Although the percentage of black women in Connecticut who received a recent mammogram appears lower than that of white women, the sample size was too small to detect statistically significant differences or to examine race/ethnicity differences in mammogram tests among the HRGs or the Urban Centers' cities.

Cervical Cancer Screening

The American Cancer Society estimates that more than 10,000 women in the United States will be diagnosed with cervical cancer annually. Cervical cancer is curable if detected early. The Papanicolaou (Pap) smear test is a simple, routine screening that can detect early-stage disease and precancerous cells. It can be performed in a doctor's office as part of a routine gynecological exam. The American Cancer Society guidelines prescribe regular Pap smear tests for adult women.[87] The *Healthy People 2010* target is for at least 90 percent of adult women to have received a Pap smear within the past three years.[88]

Almost 88 percent of women in Connecticut received a Pap smear within the past three years, as shown in Table 77. The percentage varied somewhat by HRG, highest in the Wealthy Suburbs and the Rural Towns, lowest in the Urban Centers. Of the three Connecticut cities examined, the Pap smear test rate was lowest in Hartford and highest in New Haven.

TABLE 77: PERCENTAGE OF WOMEN WHO HAVE HAD A PAP SMEAR IN PAST THREE YEARS

AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	85.5	85.3	87.9			
Hartford	77.0	79.6	84.4	81.1	71.3	
New Haven	89.0	89.9	90.8	91.5		
HRG 1 (3)-UC	83.8	84.7	88.1	86.6	77.6	
HRG 2 (10)-MC	86.5	85.6	86.9	83.8	88.1	76.6
HRG 3 (15)-DS	87.2	87.2	88.6			
HRG 4 (27)-WS	90.6	88.9	88.3			
HRG 5 (39)-MT	86.5	85.7	86.7		73.4	
HRG 6 (75)-RT	90.6	89.0	89.5			
Connecticut	87.8	87.3	88.5	85.6	80.1	76.9
United States	85.9	85.9	86.3	89.8	85.2	

Source: DPH BRFSS Survey Data, 1999-2003; CDC BRFSS web site. Available at: www.cdc.gov/brfss. Accessed Sept. 8, 2005. Includes all women 18 and over, excluding women who have had a hysterectomy.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

Asian and Hispanic women are least likely to have had a recent Pap smear test. Hartford has a particularly low rate for Hispanic women, even on an age-adjusted basis, and has the lowest rate for black women as well.

Sigmoidoscopy/Colonoscopy/Blood Stool Tests

The sigmoidoscopy and colonoscopy (Table 78) and blood stool (fecal occult blood) tests (Table 79) are recommended for detecting colorectal cancer beginning at age 50 for both men and women of average risk.

TABLE 78: SIGMOIDOSCOPY/COLONOSCOPY TEST AGE 50 AND OVER

AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
HRG 1 (3)-UC	43.2	43.0	42.2	44.0		
Bridgeport	40.3	40.3	30.7			
Hartford	38.9	39.5	44.3			
New Haven	49.7	50.1	48.5			
HRG 2 (10)-MC	43.0	42.7	46.2			
HRG 3 (15)-DS	44.0	43.9	43.0			
HRG 4 (27)-WS	51.3	51.3	52.5			
HRG 5 (39)-MT	42.3	42.4	42.7			
HRG 6 (75)-RT	45.1	45.3	46.5			
Connecticut	44.9	45.6	45.9	46.1	41.1	
United States	35.7	35.7	37.0	36.4	29.9	

Source: DPH BRFSS Survey Data, 1999-2003; CDC BRFSS web site. Available at: www.cdc.gov/brfss.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

Connecticut has a significantly higher sigmoidoscopy/colonoscopy rate (45.6 percent) than the United States (35.7 percent). There appears to be little difference in the rates for white, non-Hispanics, and the overall rate suggesting little disparity on this measure. Similarly, for blood stool tests (Table 79) there are virtually no differences between the U.S. rates, and black and white rates. The rate for Hispanics appears to be slightly lower than for blacks or whites.

TABLE 79: BLOOD STOOL TEST IN PAST YEAR, AGE 50 AND OVER

AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
HRG 1 (3)-UC	25.7	25.6	24.2	27.3		
Bridgeport	23.0	23.6	19.0			
Hartford	19.2	20.5	18.1			
New Haven	33.9	34.3	32.2			
HRG 2 (10)-MC	26.4	26.2	26.8			
HRG 3 (15)-DS	26.2	26.1	26.3			
HRG 4 (27)-WS	32.5	32.5	33.8			
HRG 5 (39)-MT	28.7	28.8	29.1			
HRG 6 (75)-RT	28.3	28.4	29.3			
Connecticut	28.2	28.5	28.9	26.6	23.8	
United States	29.2	28.5	30.3	28.0	21.7	

Source: DPH BRFSS Survey Data, 1999-2003; CDC BRFSS web site. Available at: www.cdc.gov/brfss.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

Prostate Screening

An annual prostate-specific antigen (PSA) blood test to detect possible prostate cancer is recommended for men beginning at age 50 and with at least a 10-year life expectancy. Men at heightened risk — black men and men with a family history of prostate cancer — are advised to start testing at 45 or even 40 years old.[89]

TABLE 80: PSA TEST IN PAST YEAR, MEN AGE 50 AND OVER

AREA	All Race and Ethnicity, Crude Rate	All Race and Ethnicity, Age-Adjusted Rate	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
HRG 1 (3)-UC	57.4	58.5	59.7			
HRG 2 (10)-MC	55.3	57.9	60.6			
HRG 3 (15)-DS	57.5	58.8	62.8			
HRG 4 (27)-WS	58.3	59.7	59.9			
HRG 5 (39)-MT	56.2	57.6	57.8			
HRG 6 (75)-RT	58.2	60.2	60.6			
Connecticut	57.2	58.9	60.2			
United States	56.3	56.3				

Source: DPH BRFSS Survey Data, 1999-2003; CDC BRFSS web site. Available at: www.cdc.gov/brfss.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

As shown in Table 80, close to 60 percent of Connecticut men age 50 and over report that they have had a PSA test in the past year.

HIV Tests

The number of people living with human immunodeficienty virus (HIV) infection in the United States continues to increase. Early detection is essential to reduce morbidity and mortality associated with HIV/AIDS. Some experts advocate routine HIV testing, although the Centers for Disease Control and Prevention (CDC) recommends testing based on risk assessment.[90]

HIV testing could be thought of as an indicator of physician practice in ordering tests for patients that they consider at high risk. It also could serve as protective behavior on the part of individuals who want the tests to protect themselves or others.

Overall, 45 percent of Connecticut adults age 18 to 64 reported ever being tested for HIV; 15 percent reported being tested in the past year. The Urban Centers had the highest percentage of reported HIV testing. There were no differences in HIV testing by city.

Black and Hispanic adults were more likely than white or Asian adults to have ever had an HIV test and to have had a test within the past year. There were higher HIV testing rates among blacks compared to whites in all HRGs with sufficient sample size to produce a reliable estimate. HIV testing among Hispanics as compared to whites was higher only in the Urban Centers and Diverse Suburbs. Asian adults were less likely than white adults to report ever being tested.

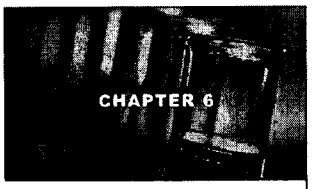


TABLE 81: EVER HIV-TESTED, AGES 18-64

AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	55.3	53.7	46.4	64.1	53.4	
Hartford	57.0	55.8	42.9	65.0	58.5	
New Haven	52.5	52.1	50.6	64.0	53.4	
HRG 1 (3)-UC	54.9	53.9	47.8	63.9	55.2	
HRG 2 (10)-MC	48.5	47.4	44.9	60.5	48.9	34.9
HRG 3 (15)-DS	45.8	46.2	45.2	57.1	57.4	
HRG 4 (27)-WS	44.1	44.0	44.1		49.0	
HRG 5 (39)-MT	40.4	40.6	40.6	61.3	35.8	32.5
HRG 6 (75)-RT	41.9	42.5	41.7		57.9	
Connecticut	45.3	45.4	43.5	61.3	51.6	33.6
United States	45.4	45.4				

Source: DPH BRFSS Survey Data, 1999-2003; CDC BRFSS web site. Available at: www.cdc.gov/brfss.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

TABLE 82: HIV TEST IN PAST YEAR, AGES 18-64

AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	23.5	22.0	14.9	29.2	22.8	
Hartford	24.4	23.7	13.7	22.7	33.1	
New Haven	21.7	20.5	17.2	31.9	25.0	
HRG 1 (3)-UC	23.1	22.0	15.8	27.1	27.2	
HRG 2 (10)-MC	17.5	16.8	14.0	23.5	21.7	11.8
HRG 3 (15)-DS	15.4	15.6	14.3	30.2	18.6	
HRG 4 (27)-WS	11.9	12.4	12.6		11.3	
HRG 5 (39)-MT	12.2	12.5	11.9	27.2	14.0	11.9
HRG 6 (75)-RT	10.7	11.4	10.9		15.9	
Connecticut	14.6	14.8	13.0	26.4	22.1	12.1
United States	12.4	12.4				

Source: DPH BRFSS Survey Data, 1999-2003; CDC BRFSS web site. Available online at: www.cdc.gov/brfss.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

Cholesterol Tests

Cholesterol checks are particularly important in preventing cardiovascular disease. A finding of high cholesterol may lead to medication and recommendations for changes in diet and physical activity levels. The Behavioral Risk Factor Surveillance System (BRFSS) survey asks whether the respondent has received a cholesterol check in the past five years. Results are shown in Table 83.

TABLE 83: CHOLESTEROL CHECK IN PAST FIVE YEARS

AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	75.6	76.6	77.8	79.5	76.2	
Hartford	68.8	70.9	73.5	75.1	64.7	
New Haven	68.7	72.7	79.1			
HRG 1 (3)-UC	71.0	73.4	76.7	75.3	67.2	
HRG 2 (10)-MC	74.6	75.1	79.3	66.6	65.1	60.1
HRG 3 (15)-DS	77.2	75.8	77.1	73.7	71.2	
HRG 4 (27)-WS	81.7	78.6	79.1			
HRG 5 (39)-MT	78.2	76.5	76.7	81.7	68.6	79.6
HRG 6 (75)-RT	79.1	77.3	77.5			
Connecticut	77.4	76.3	77.8	73.7	67.5	69.8
United States	71.5	71.5				

Source: DPH BRFSS Survey Data, 1999-2003; CDC BRFSS web site. Available at: www.cdc.gov/brfss.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

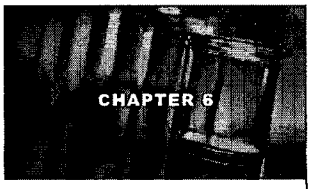
These results indicate a lower level of cholesterol checks for black, Hispanic and Asian adults statewide than for white adults, but there are no statistically significant differences among HRGs.

CLINICAL PREVENTIVE MEASURES

Flu Vaccine

More than 36,000 people nationally die from influenza each year. Elderly adults, young children and people with certain health conditions are at high risk for complications. The CDC recommends that all adults 50 and older receive a yearly flu vaccine. Adults over age 65 are considered one of the groups at highest risk and are given priority status for influenza vaccine administration.[91] The *Healthy People 2010* initiative aims for 90 percent of adults age 65 and older to have received a flu vaccine within the past year.[92]

Overall, 70 percent of Connecticut adults age 65 and older reported receiving a flu shot in the past year as did 40 percent of adults aged 50-64. Receipt of flu shots in both age groups varied somewhat by HRG, though sample sizes were too small to detect significant differences. Sample sizes were also insufficient to detect city differences in flu shot receipt.



Hispanic adults in the 50-64 year age group were more likely to receive a flu shot than black and white adults. Among adults age 65 and older, blacks are significantly less likely than whites to have received a flu shot.

TABLE 84: FLU SHOT IN PAST YEAR AGES 50-64

AREA	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
HRG 1 (3)-UC	39.7	39.6	32.3		
Bridgeport	35.5				
Hartford	46.0	49.2			
New Haven	38.7	36.9			
HRG 2 (10)-MC	34.9	32.1			
HRG 3 (15)-DS	38.1	37.5			
HRG 4 (27)-WS	43.0	41.9			
HRG 5 (39)-MT	43.3	43.1			
HRG 6 (75)-RT	38.9	39.1			
Connecticut	40.0	39.5	34.2	51.4	

Source: DPH BRFSS Survey Data, 1999-2003.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

TABLE 85: FLU SHOT IN PAST YEAR, AGE 65 AND OVER

AREA	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
HRG 1 (3)-UC	64.7	67.1			
Bridgeport	61.7	61.4			
Hartford	65.9				
New Haven	67.2	70.5			
HRG 2 (10)-MC	69.5	69.7			
HRG 3 (15)-DS	69.7	70.5			
HRG 4 (27)-WS	72.0	72.0			
HRG 5 (39)-MT	68.9	69.0			
HRG 6 (75)-RT	71.7	71.5			
Connecticut	70.0	70.5	58.5	66.5	

Source: DPH BRFSS Survey Data, 1999-2003.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

Pneumonia Vaccine

The CDC estimates that 500,000 people nationwide contract, and 40,000 die from, pneumococcal pneumonia each year. The elderly are at greater risk than younger adults for serious illness and death from the disease. Pneumonia vaccine is recommended for all adults age 65 and older, as well as for younger adults with serious long-term health problems.[93] The *Healthy People 2010* initiative aims for 90 percent of adults age 65 and older to receive a pneumonia vaccine.[94]

TABLE 86: PNEUMONIA SHOT EVER, AGE 65 AND OVER, 1999-2003

AREA	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
HRG 1 (3)-UC	54.3	61.4			
Bridgeport	53.4	56.5			
Hartford	49.2				
New Haven	60.8				
HRG 2 (10)-MC	58.0	59.4			
HRG 3 (15)-DS	61.4	62.0			
HRG 4 (27)-WS	60.2	60.8			
HRG 5 (39)-MT	63.2	63.4			
HRG 6 (75)-RT	60.6	61.1			
Connecticut	60.4	61.6	37.9	46.4	

Source: DPH BRFSS Survey Data, 1999-2003.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

Overall, over 60 percent of Connecticut's adults age 65 and older report ever having had pneumonia vaccine, as presented in Table 86. The percentage varied slightly by HRG, from 54 percent receiving the vaccine in the Urban Centers to 63 percent in the Mill Towns. There were no statistically significant differences in pneumonia vaccine by city.

White Connecticut residents age 65 and older were more likely than their black and Hispanic counterparts to report ever receiving a pneumonia vaccine. In contrast, white residents ages 50 to 64 were less likely than their black and Hispanic counterparts to have received pneumonia shots, as shown in Table 87.

TABLE 87: PNEUMONIA SHOT EVER, AGES 50-64, 1999-2003

AREA	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
HRG 1 (3)-UC	21.6	16.8	22.3		
Bridgeport	21.4				
Hartford	22.5				
New Haven	20.9	19.6			
HRG 2 (10)-MC	15.6	15.1			
HRG 3 (15)-DS	18.3	18.6			
HRG 4 (27)-WS	15.3	15.1			
HRG 5 (39)-MT	19.2	18.4			
HRG 6 (75)-RT	15.5	15.2			
Connecticut	17.3	16.6	22.5	24.2	

Source: DPH BRFSS Survey Data, 1999-2003; CDC BRFSS web site. Available at: www.cdc.gov/brfss.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.



CHAPTER 9
HEALTH OUTCOMES: HEALTH STATUS, DISEASE INCIDENCE, HOSPITALIZATION, AND MORTALITY



Of the many possible indicators of health outcome, the following are included in this report:

- Health status
- Disease incidence
- Hospitalization
- Emergency department utilization (ED)
- Mortality

SELF-REPORTED HEALTH STATUS

Self-reported health status is a strong predictor of future illness, death, and use of health care.[187] Physical and mental health are both important components of health status.

Twelve percent of state residents reported their health to be fair or poor, according to the Behavioral Risk Factor Surveillance System (BRFSS) surveys of adults 18 years old and older that were conducted between 1999 and 2003, reported in Table 97. Eight percent reported having 15 or more days of poor physical health in the past month, and 8 percent reported 15 or more days of poor mental health in the past month.

There were differences in self-reported health status by Health Reference Groups (HRGs), adjusted for age differences. Although more than one-fifth of residents in the Urban Centers reported that their overall health was fair or poor, only 8 percent of residents in the Wealthy Suburbs and 9 percent of residents in the Rural Towns reported fair or poor overall health.

Residents in the Urban Centers were also much more likely to report poor physical health (Table 98) and poor mental health (Table 99) than residents in the Manufacturing Centers and Wealthy Suburbs. Self-report of poor physical health was also high in the Manufacturing Centers, while poor mental health was relatively high in the Diverse Suburbs.

Hispanic respondents were more likely than white or black respondents to report fair or poor health. This difference was most evident for residents in the Urban and Manufacturing centers. Asian respondents were the least likely to report fair or poor overall health. They were also least likely to report 15 or more days of poor physical health or poor mental health.

TABLE 97: PERCENTAGE REPORTING FAIR OR POOR OVERALL HEALTH

AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	22.6	23.8	18.9	18.4	35.2	
Hartford	18.8	20.3	14.0	16.2	35.8	
New Haven	17.6	19.3	13.4	21.7	33.2	
HRG 1 (3)-UC	19.6	21.0	14.9	19.0	35.0	
HRG 2 (10)-MC	15.1	15.3	12.0	19.0	30.4	7.0
HRG 3 (15)-DS	13.1	12.5	11.8	18.1	16.9	
HRG 4 (27)-WS	7.1	6.6	5.7		22.8	
HRG 5 (39)-MT	11.9	11.3	11.1	12.8	17.6	5.0
HRG 6 (75)-RT	8.9	8.7	8.4		15.6	
Connecticut	12.3	12.0	10.1	18.0	28.3	6.2
United States	14.0	14.0				

Source: Connecticut Department of Public Health BRFSS Survey Data, 1999-2003; Centers for Disease Control and Prevention BRFSS web site. Available at: www.cdc.gov/brfss. Average of medians of states — 1999-2003.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

TABLE 98: PERCENTAGE REPORTING POOR PHYSICAL HEALTH 15 OR MORE DAYS IN PAST MONTH

AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	9.6	10.2	9.7	9.5	9.7	
Hartford	8.8	9.5	8.5	11.2	8.1	
New Haven	7.6	8.6	7.3	8.2	12.8	
HRG 1 (3)-UC	8.6	9.4	8.2	10.0	9.4	
HRG 2 (10)-MC	9.7	9.9	8.9	8.5	17.2	4.3
HRG 3 (15)-DS	8.4	8.1	8.0	9.8	8.2	
HRG 4 (27)-WS	5.3	5.0	4.9		7.4	
HRG 5 (39)-MT	8.4	8.0	7.9	10.5	12.9	4.7
HRG 6 (75)-RT	7.1	6.8	6.5		10.1	
Connecticut	8.0	7.8	7.3	9.6	12.0	5.1
United States	8.8	8.8				

Source: DPH BRFSS Survey Data, 1999-2003; CDC BRFSS web site. Available at: www.cdc.gov/brfss.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

TABLE 99: PERCENTAGE REPORTING POOR MENTAL HEALTH 15 OR MORE DAYS IN PAST MONTH

AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	12.1	12.1	9.8	12.8	13.4	
Hartford	8.8	8.5	8.6	5.4	8.9	
New Haven	9.2	9.5	9.7	9.8	15.3	
HRG 1 (3)-UC	10.0	10.0	9.4	10.0	11.3	
HRG 2 (10)-MC	8.6	8.6	9.6	6.9	10.2	2.7
HRG 3 (15)-DS	9.2	9.2	9.1	13.9	10.0	
HRG 4 (27)-WS	6.1	6.1	6.1		8.4	
HRG 5 (39)-MT	8.5	8.6	8.6	6.2	9.5	5.5
HRG 6 (75)-RT	6.8	7.0	6.8		9.3	
Connecticut	8.1	8.2	8.1	9.2	10.3	4.6
United States	9.1	9.1				

Source: DPH BRFSS Survey Data, 1999-2003; CDC BRFSS web site. Available at: www.cdc.gov/brfss.
Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

Self-Reported Health Summary

Self-reported overall health and physical health is lowest in the Urban Centers, as summarized in Table 100. Poor mental health shows a more variable pattern. The communities in the Wealthy Suburbs group have the most favorable self-reported health on all three indicators.

TABLE 100: AGE-ADJUSTED PERCENTAGES OF PERSONS 18 AND OVER WITH SELECTED SELF-REPORTED HEALTH LEVELS, BY HRG, BRFSS SURVEYS 1999-2003

AREA	Fair or Poor Overall Health	Poor Physical Health 15 or More Days in Past Month	Poor Mental Health 15 or More Days in Past Month
Urban Centers (3)	21.0	9.4	10.0
Manufacturing Centers (10)	15.3	9.9	8.6
Diverse Suburbs (15)	12.5	8.1	9.2
Wealthy Suburbs (27)	6.6	5.0	6.1
Mill Towns (39)	11.3	8.0	8.6
Rural Towns (75)	8.7	6.8	7.0
Connecticut (169)	12.0	7.8	8.2

Source: DPH BRFSS Survey Data, 1999-2003.

DISEASE INCIDENCE

ASTHMA

Asthma is the seventh-ranked chronic health condition in the United States, causing almost 500,000 hospitalizations and 5,000 deaths per year. Asthma-related health care costs are estimated at $14.5 billion a year. The incidence of asthma, asthma-related health care costs, and deaths due to asthma increases each year.[188]

Overall, 12.4 percent of Connecticut adults report ever being diagnosed with asthma (Table 101), and 8.3 percent report currently having asthma, as shown in Table 102. Prevalence of both lifetime and current asthma was highest in the Urban Centers and lowest in the Wealthy Suburbs. Sample sizes were insufficient to detect differences in asthma prevalence by city.

Prevalence of lifetime and current asthma was similar among white, black and Hispanic respondents, but it was somewhat lower among Asian respondents. While the asthma prevalence among Hispanics was similar to that of whites and blacks in the Urban and Manufacturing centers and Diverse Suburbs, the prevalence of lifetime and current asthma was lower among Hispanics in the Wealthy Suburbs than among whites.

TABLE 101: PERCENTAGE EVER TOLD THEY HAD ASTHMA

AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	14.9	14.4	18.9	7.5	16.2	
Hartford	15.5	15.3	14.8	16.6	17.7	
New Haven	14.9	15.2	16.1	21.1	8.1	
HRG 1 (3)-UC	15.1	14.8	16.3	14.4	15.2	
HRG 2 (10)-MC	12.6	12.7	12.3	14.0	14.8	6.1
HRG 3 (15)-DS	13.2	13.5	13.6	13.4	13.8	
HRG 4 (27)-WS	10.1	11.1	11.8		4.3	
HRG 5 (39)-MT	11.5	11.8	11.7	12.6	18.6	9.3
HRG 6 (75)-RT	11.6	12.2	11.9		15.9	
Connecticut	12.1	12.4	12.4	13.9	14.1	8.1
United States	11.3	11.3				

Source: DPH BRFSS Survey Data, 1999-2003; CDC BRFSS web site. Available at: www.cdc.gov/brfss. Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

TABLE 102: PERCENTAGE WHO CURRENTLY HAVE ASTHMA

AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	8.5	8.2	11.2	5.3	7.9	
Hartford	10.5	10.6	10.2	11.7	12.1	
New Haven	9.3	9.4	10.7	13.4	5.5	
HRG 1 (3)-UC	9.4	9.3	10.6	9.6	9.2	
HRG 2 (10)-MC	8.9	9.0	8.7	11.5	9.9	2.9
HRG 3 (15)-DS	9.1	9.3	8.9	11.4	12.0	
HRG 4 (27)-WS	5.9	6.2	6.6		1.8	
HRG 5 (39)-MT	8.3	8.6	8.9	6.3	10.2	5.3
HRG 6 (75)-RT	7.6	7.7	7.9		12.7	
Connecticut	8.1	8.3	8.3	10.1	9.0	4.7
United States	7.5	7.5				

Source: DPH BRFSS Survey Data, 1999-2003; CDC BRFSS web site. Available at: www.cdc.gov/brfss. Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

ARTHRITIS

Arthritis refers to a variety of disorders, the most common of which is osteoarthritis, or degenerative joint disease. Osteoarthritis, affecting mostly older people, results from the wearing away of the cartilage that covers the ends of bones in a joint, causing pain, swelling and loss of motion. Osteoarthritis affects more than 20 million people in the U.S., and is one of the most frequent causes of physical disability among adults.[189]

TABLE 103: SELF-REPORTED DIAGNOSIS OF ARTHRITIS, AGE 50 AND OVER

AREA	All Race and Ethnicity, Crude Rate	All Race and Ethnicity, Age-Adjusted Rate	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
HRG 1 (3)-UC	41.4	41.8	41.1	34.5		
Bridgeport	43.6	45.2				
Hartford	39.0	40.6				
New Haven	41.0	42.0	39.8			
HRG 2 (10)-MC	43.3	43.0	43.8			
HRG 3 (15)-DS	41.2	40.8	40.3			
HRG 4 (27)-WS	37.3	37.4	39.1			
HRG 5 (39)-MT	42.1	41.7	43.1			
HRG 6 (75)-RT	37.9	38.6	39.5			
Connecticut	40.4	41.1	40.9	41.2	43.6	41.9

Source: DPH BRFSS Survey Data, 1999-2003. Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

Overall, 40 percent of Connecticut adults age 50 and older reported being diagnosed with arthritis (Table 103). There were no statistically significant differences in the prevalence of arthritis by HRG or city. A similar percentage of white, black, Hispanic, and Asian respondents age 50 and older reported being diagnosed with arthritis.

OSTEOPOROSIS

Osteoporosis involves deterioration of bone tissue, leading to bone weakness and increased risk of fractures of the hip, spine and wrist. Although the disease affects both sexes, 68 percent of those with osteoporosis are women. This difference may be due in part to the older age distribution of women. Risk of osteoporosis is reduced among individuals with a lifetime diet high in calcium and vitamin D. Other risk factors for the disease include cigarette smoking and lack of exercise.[190]

Overall, almost 9 percent of women age 40 and older reported being told by a doctor that they had osteoporosis (Table 104). Although the prevalence of osteoporosis in this group appeared to vary by HRG, sample sizes were too small to detect statistically significant differences. Sample sizes were also insufficient to examine racial and ethnic differences in the prevalence of osteoporosis.

TABLE 104: SELF-REPORTED OSTEOPOROSIS, WOMEN 40 AND OVER

AREA	All Race and Ethnicity, Crude Rate	All Race and Ethnicity, Age-Adjusted Rate	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
HRG 1 (3)-UC	7.2	7.9				
Bridgeport						
Hartford						
New Haven						
HRG 2 (10)-MC	8.7	8.6	9.4			
HRG 3 (15)-DS	6.7	6.5	6.1			
HRG 4 (27)-WS	9.3	9.7	10.0			
HRG 5 (39)-MT	13.4	12.4	12.7			
HRG 6 (75)-RT	5.9	6.0	6.1			
Connecticut	8.6	8.6	8.9		7.7	

Source: DPH BRFSS Survey Data, 1999-2003. Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

DIABETES

Diabetes is a disease in which the body does not produce or properly use insulin. Type 2 diabetes, the most common type, may result in serious complications including heart disease, blindness, nerve damage, and kidney damage.[191] The *Healthy People 2010* initiative sets a target level of no more than 2.5 percent diabetic in the adult population.[192]

Over 5 percent of Connecticut residents reported having diabetes (Table 105). Diabetes prevalence varied by HRG. Residents in the Urban Centers had the highest prevalence of diabetes, more than twice that of residents living in the Wealthy Suburbs.

In the Urban and Manufacturing centers, the prevalence of diabetes was higher among black and Hispanic adults than among white adults. Sample sizes were insufficient to detect statically significant race and ethnicity differences in diabetes between the other HRGs and between the cities of the Urban Centers.

TABLE 105: PERCENTAGE TOLD THEY HAVE DIABETES

AREA	All Race and Ethnicity, Crude Percentage	All Race and Ethnicity, Age-Adjusted Percentage	White, Not Hispanic	Black, Not Hispanic	Hispanic	Asian, Not Hispanic
Bridgeport	8.7	9.9	10.1	8.8	9.8	
Hartford	7.6	8.7	7.6	10.4	8.4	
New Haven	7.2	8.5	4.8	16.3	10.5	
HRG 1 (3)-UC	7.8	9.0	7.2	12.2	9.1	
HRG 2 (10)-MC	5.8	6.0	5.3	10.3	9.5	6.4
HRG 3 (15)-DS	5.8	5.5	5.5	4.6	4.9	
HRG 4 (27)-WS	3.3	2.8	2.7		2.4	
HRG 5 (39)-MT	5.8	5.4	5.4	8.1	4.9	4.7
HRG 6 (75)-RT	4.6	4.4	4.2		11.5	
Connecticut	5.4	5.2	4.7	9.8	7.5	5.3
United States	6.3	6.3				

Source: DPH BRFSS Survey Data, 1999-2003; CDC BRFSS web site. Available at: www.cdc.gov/brfss. Note: All race and ethnicity specific rates are age-adjusted.
Blank cells indicate that data were not available due to small survey numbers or otherwise not calculated or available.

0527
09/15/08

BIRTH WEIGHT

Birth weight is an important predictor of neonatal mortality and future health problems. Low birth weight (LBW) is less than 5 pounds, 8 ounces (2,500 grams) at birth. Very low birth weight (VLBW) is less than 3 pounds, 5 ounces (1,500 grams). There are two different forms of low birth weight: "preterm births" and "small-for-date babies." The latter are full-term babies who are below the weight guidelines.

Low birth weight affects about one in every 13 babies born each year in the United States, and it is a factor in 65 percent of infant deaths. Low birth weight babies may face serious health problems as newborns and are at increased risk of long-term disabilities.

The factors influencing low birth weight are only partly understood, and they include genetic or environmental conditions that limit normal development, as well as mothers' medical problems. Mothers' substance use and abuse has also been correlated with low birth weight.[193]

TABLE 106: PERCENTAGE LOW OR VERY LOW BIRTH WEIGHT, 1999-2003

AREA	All Race and Ethnicity	White, Not Hispanic	Black, Not Hispanic	Hispanic	Puerto Rican	Non-Puerto Rican Hispanic
HRG 1 (3)-UC	13.2	9.0	17.0	11.7	13.2	7.2
HRG 2 (10)-MC	9.8	8.0	16.7	9.7	12.6	6.3
HRG 3 (15)-DS	8.9	7.8	14.4	9.9	11.5	7.4
HRG 4 (27)-WS	6.6	6.8	14.8	5.4		
HRG 5 (39)-MT	8.2	8.1	15.0	9.3	12.5	5.5
HRG 6 (75)-RT	7.3	7.1	8.9	9.2		
Connecticut	9.1	7.6	16.3	10.3	12.8	6.5

Source: DPH.

Black non-Hispanics have the highest rate of low or very low birth weight, followed by Puerto Rican Hispanics, whites, and non-Puerto Rican Hispanics, whose rates for LBW or VLBW are slightly lower than those for whites in every HRG.

MORTALITY

Any health planning effort requires an examination of mortality patterns, but since mortality often reflects behavioral risks and chronic diseases developed over many years, mortality should be examined along with the risk behaviors and environmental conditions presented in other chapters of the *Data Scan*.

Since the populations being compared in the *Data Scan* are very different in age distribution (Hispanic and Asian populations are younger than the black population, which in turn is younger than the white population), crude mortality rates make for "unfair" comparisons. Age adjusting allows for fair comparisons among Connecticut mortality rates, as shown in Tables 107-111.

TABLE 107: ANNUALIZED CRUDE AND AGE-ADJUSTED MORTALITY PER 100,000 FROM ALL CAUSES, 2000-2004

AREA	Average Deaths Each Year	Crude Rate	Age-Adjusted Rate*
HRG 1 (3)-UC	3,250.4	844.8	945.9
Bridgeport	1,227.6	879.8	923.8
Hartford	987.0	811.8	971.7
New Haven	1,035.8	837.8	945.9
HRG 2 (10)-MC	5,913.0	892.7	792.0
HRG 3 (15)-DS	5,774.8	982.9	755.4
HRG 4 (27)-WS	3,653.4	749.2	655.7
HRG 5 (39)-MT	6,696.2	958.6	779.5
HRG 6 (75)-RT	4,418.6	755.6	727.7
Connecticut	29,733.0	873.1	763.7

Source: DPH Supplementary Table 9, U.S. Census 2000, SF1: Table P12.
**Standardized to the U.S. Population, 2000.*

TABLE 108: ANNUALIZED WHITE-ALONE, NOT HISPANIC ALL-CAUSE MORTALITY RATE PER 100,000, 2000-2004 — CRUDE RATE, AND AGE-ADJUSTED RATE

AREA	Average Deaths Each Year	Crude Rate	Age-Adjusted Rate
HRG 1 (3)-UC	1,792.0	1,646.8	912.0
Bridgeport	769.4	1,782.8	925.2
Hartford	410.2	1,892.3	944.6
New Haven	612.4	1,392.5	885.0
HRG 2 (10)-MC	5,026.6	1,206.7	789.0
HRG 3 (15)-DS	5,343.0	1,133.4	755.6
HRG 4 (27)-WS	3,551.6	785.0	658.0
HRG 5 (39)-MT	6,529.6	1,018.6	785.4
HRG 6 (75)-RT	4,330.6	789.4	732.9
Connecticut	26,573.6	1,007.0	750.3

Source: DPH Supplementary Table 9; U.S. Census 2000, SF1: Tables PCT0121. Standardized to the U.S. Population, 2000.
Note: White crude mortality rate is much higher than the age-adjusted rate because the white population is much older. Age adjusting makes comparisons "fairer."

0529
09/15/08

TABLE 109: ANNUALIZED BLACK-ALONE, NOT HISPANIC ALL-CAUSE MORTALITY RATE, PER 100,000, 2000-2004

AREA	Average Deaths Each Year	Crude Rate	Age-Adjusted Rate
HRG 1 (3)-UC	988.8	764.5	1,135.2
Bridgeport	282.8	690.2	1,108.8
Hartford	366.4	837.0	1,139.5
New Haven	339.6	761.5	1,162.2
HRG 2 (10)-MC	519.0	620.6	973.7
HRG 3 (15)-DS	319.8	566.7	874.4
HRG 4 (27)-WS	33.6	655.5	788.8
HRG 5 (39)-MT	74.4	591.8	968.6
HRG 6 (75)-RT	40.2	474.4	876.6
Connecticut	1,975.8	668.5	1,017.1

Source: DPH Supplementary Table 9; U.S. Census 2000, SF1: Tables PCT012J. Standardized to the U.S. Population, 2000.
Note: The black crude mortality rate is much lower than the age-adjusted rate because the black population is much younger. Age adjusting makes comparisons "fairer."

TABLE 110: ANNUALIZED ASIAN-ALONE NOT HISPANIC ALL-CAUSE MORTALITY RATE PER 100,000, 2000-2004

AREA	Average Deaths Each Year	Crude Rate	Age-Adjusted Rate
HRG 1 (3)-UC	18.6	167.1	635.0
HRG 2 (10)-MC	36.4	174.4	445.1
HRG 3 (15)-DS	26.6	178.2	481.3
HRG 4 (27)-WS	17.2	138.0	361.9
HRG 5 (39)-MT	22.0	160.4	425.7
HRG 6 (75)-RT	17.4	205.9	552.4
Connecticut	138.2	169.4	463.3

Source: DPH Supplementary Table 9; U.S. Census 2000, SF1: Tables PCT012L. Standardized to the U.S. Population, 2000. City specific rates are excluded due to small denominator numbers and wide margins of error.

TABLE 111: ANNUALIZED HISPANIC ALL-CAUSE MORTALITY RATE PER 100,000, 2000-2004

AREA	Average Deaths Each Year	Crude Rate	Age-Adjusted Rate
HRG 1 (3)-UC	431.0	358.6	790.6
Bridgeport	158.2	355.7	780.5
Hartford	200.0	406.0	817.2
New Haven	72.8	275.3	765.5
HRG 2 (10)-MC	291.4	237.5	626.1
HRG 3 (15)-DS	68.0	215.3	608.6
HRG 4 (27)-WS	24.2	191.6	419.8
HRG 5 (39)-MT	53.6	251.1	617.4
HRG 6 (75)-RT	21.4	180.0	452.5
Connecticut	889.6	277.7	668.6

Source: DPH Supplementary Table 9; U.S. Census 2000, SF1: Table PCT012H. Standardized to the U.S. Population, 2000.

Data note on mortality counts and rates

An average of about 150 deaths per year are from Other Races, American Indian or Unknown and are excluded from the race-specific tables. The race-specific tables include a small number of persons of mixed race in the numerators who may be listed as black, white or Asian. U.S. Census Bureau denominator data excludes these persons, producing slightly smaller denominators and a slight elevation in crude and age-adjusted race-specific rates. In 2000, of 30,140 deaths, 1,249 or 4.1 percent were missing the Hispanic identifier. Persons for whom the Hispanic identifier was missing were assigned by DPH to non-Hispanic race specific categories in data made available for this study. The overall white non-Hispanic, black non-Hispanic and Asian non-Hispanic rates may be slightly elevated due to the assignment of "Hispanic missing" cases to these non-Hispanic groups. In the test year of 2000, the white non-Hispanic crude death rate was 984.0 per 100,000 population without the white missing Hispanic ethnicity and 1023.7 when white missing Hispanic ethnicity cases were reassigned to white non-Hispanic ethnicity. Similarly, black non-Hispanic crude rates were 649.3 and 681.4 and Asian non-Hispanic crude rates were 134.9 and 144.7 per 100,000 population.

The mortality rates produced for the *Data Scan* differ slightly from the rates available from some state and federal government sources. The federal rates are for whole states. Detailed estimates of state populations for age by sex by race and ethnicity groups are updated each year to provide denominators to calculate age-adjusted rates. In the *Data Scan*, age by sex by race and ethnicity data at the town level were required to produce mortality rates for HRGs. These required population estimates were not available for the years 2001-2004. While the numerator mortality count data were from the period 2000-2004, denominator population data from the 2000 U.S. Census only were used in the mortality rate calculations. Since the Connecticut population increased slightly from 2000-2004, the overall mortality rates reported here may be slightly higher than mortality rates reported elsewhere, because the *Data Scan* rates are based on slightly smaller denominators than those used elsewhere.

The Asian mortality rates are extremely low, consistent with those in other areas of the United States. The relative youth of this population does not account for the crude mortality differences. For example, the percentages under 35 years old for the black and Asian populations are relatively similar — 57.7 percent and 59.3 percent, respectively — yet the crude mortality rates are vastly different — 657.8 and 160.2 per 100,000 population.

The black population has a large discrepancy between crude and age-adjusted mortality. On the basis of crude rates, for example, black mortality is markedly lower than white mortality for each HRG and for Connecticut as a whole. But this occurs because of the large difference in age distribution. Taking age structure into account, the age-adjusted mortality rates for blacks are much higher than for whites as shown in Table 112.

There is also a large discrepancy between the crude and age-adjusted rates for Hispanics because the Hispanic population is much younger than the U.S. population used for age adjustment. Correcting for differences in the age distribution, the Hispanic death rate remains higher in the Urban Centers than in any of the other HRGs. It is lowest in the Wealthy Suburbs. Thus, there is a marked discrepancy among Hispanics depending on their HRG of residence.

Since residential locations differ for various Hispanic subgroups, e.g., Puerto Rican versus non-Puerto Rican Hispanics, this mortality difference may be related to Hispanic subgroup differences between HRGs. But this suggests more fundamental questions about differences in life circumstances and lifestyles *within* broad race and ethnicity categories that cannot be answered with the available data.

TABLE 112: RATIO OF RACE/ETHNICITY SPECIFIC ALL-CAUSE MORTALITY RATE TO WHITE NOT HISPANIC AGE-ADJUSTED MORTALITY RATE, 2000-2004

AREA	Asian Not Hispanic Rate to White Not Hispanic Rate	Black Not Hispanic Rate to White Not Hispanic	Hispanic Rate to White Not Hispanic
HRG 1 (3)-UC	69.6%	124.5%	86.7%
HRG 2 (10)-MC	56.4%	123.4%	79.3%
HRG 3 (15)-DS	63.7%	115.7%	80.5%
HRG 4 (27)-WS	55.0%	119.9%	63.8%
HRG 5 (39)-MT	54.2%	123.3%	78.6%
HRG 6 (75)-RT	75.4%	119.6%	61.7%

Source: Data Scan Tables 108-111. All rates are age-adjusted.

Conclusions from All-Cause Mortality Data

After the data is age-adjusted, Asian and Hispanic death rates are lower than white and black death rates (Table 112). This major finding also may be due in part to the so-called "Healthy Immigrant Effect" or, for Latinos/Hispanics, the "Latino Paradox."[194] The basic finding is that recent black and Latino/Hispanic immigrants are healthier despite having lower incomes and less health insurance. But their health worsens as they acculturate to U.S. lifestyles. Some of this affect, for Hispanics, may be due to the recently discovered "born Hispanic, died white" effect, where some Hispanics may be identified on death certificates by funeral directors as white, without information about their Hispanic status.[k] Thus, Hispanic deaths may be slightly underreported relative to their numbers in the population.

Overall, black death rates are significantly higher than white death rates after age adjustment. This pattern exists in each HRG.

Specific Causes of Mortality

Table 113 provides major cause rates for all ages; Table 114 provides them for persons dying before age 75; and Table 115 provides Years of Potential Life Lost (YPLL). Appendix K provides a complete list of deaths by cause.

TABLE 113: STATEWIDE SELECTED CAUSE OF MORTALITY BY MAJOR CAUSE, AGE-ADJUSTED RATES PER 100,000, 2000-2004

CAUSE AND ICD-10 CODE	All Groups	White-alone, Not Hispanic	Black-alone, Not Hispanic	Asian-alone, Not Hispanic	Hispanic
All Causes	763.7	750.3	1017.1	463.3	668.6
All Cancers	186.4	187.6	237.5	106.8	134.6
Lung	49.7	50.9	57.7	22.3	26.6
Colorectal	19.0	18.8	27.2	10.1	13.5
Breast*	28.3	28.6	33.7	17.0	18.6
Prostate**	20.8	20.0	47.2	2.9	20.1
Cardiovascular I00-I78	278.3	275.7	366.6	187.9	222.9
Diabetes E10-E14	18.3	16.6	46.4	11.8	29.9
HIV B20-B24	5.3	1.0	30.9	0.6	20.4
Pneumonia J12-J18	20.9	21.0	20.9	16.7	19.8
Accidental Injury Deaths	31.8	32.0	35.2	14.1	32.1
Motor Vehicle Deaths	5.0	5.3	4.6	3.2	4.5
Suicide X60-X84	8.0	8.8	4.8	2.8	6.2
Homicide X85-Y09, Y87, 1	3.2	1.3	14.1	1.5	6.0

Source: DPH Supplementary Table 9; U.S. Census 2000, SF1: Tables P12, PCT012H,I,J,L. Standardized to the U.S. Population, 2000.

**Female only, rate denominator is the female population.*

***Male only, rate denominator is the male population.*

TABLE 114: STATEWIDE SELECTED CAUSE AGE-ADJUSTED MORTALITY PER 100,000 FOR DEATHS BEFORE AGE 75, 2000-2004

CAUSE AND ICD-10 CODE	All Groups	White-alone, Not Hispanic	Black-alone, Not Hispanic	Asian-alone, Not Hispanic	Hispanic
All Causes	329.7	311.6	553.9	167.1	352.7
All Cancers	105.9	106.5	142.3	54.3	80.5
Lung	31.0	32.1	37.2	8.4	14.2
Colorectal	9.6	9.4	15.2	4.9	9.0
Breast*	18.6	18.8	24.7	12.7	12.1
Prostate**	6.1	5.7	15.5	1.3	4.3
Cardiovascular I00-I78	86.9	82.3	161.5	52.4	90.8
Diabetes E10-E14	8.6	7.4	23.0	2.7	14.3
HIV B20-B24	5.6	2.0	32.9	0.6	20.8
Pneumonia J12-J18	3.8	3.6	6.7	2.0	5.4
Accidental Injury Deaths	24.2	24.3	30.1	8.0	27.3
Motor Vehicle Deaths	4.8	5.0	4.7	2.5	4.1
Suicide X60-X84	7.9	8.8	4.8	2.9	5.7
Homicide X85-Y09, Y87, 1	3.2	1.3	14.4	1.6	6.1

Source: DPH Supplementary Table 9; U.S. Census 2000, SF1: Tables P12, PCT012H,I,J,L. Standardized to the U.S. Population, 2000.

**Female only, rate denominator is the female population.*

***Male only, rate denominator is the male population.*

TABLE 115: STATEWIDE SELECTED CAUSE MORTALITY:
ANNUAL YEARS OF POTENTIAL LIFE LOST BEFORE AGE 75, 2000-2004

CAUSE AND ICD-10 CODE	All Groups	White-alone, Not Hispanic	Black-alone, Not Hispanic	Asian-alone, Not Hispanic	Hispanic
All Causes	202,933	147,617	31,055	2,170	18,874
All Cancers	49,679	41,691	5,104	539	2,230
Lung	12,744	11,232	1,168	59	264
Colorectal	4,232	3,450	467	41	259
Breast	5,436	4,495	613	96	216
Prostate	889	734	134	1	19
Cardiovascular I00-I78	41,522	32,162	6,373	418	2,434
Diabetes E10-E14	4,027	2,844	786	16	355
HIV B20-B24	5,638	1,629	2,381	24	1,581
Pneumonia J12-J18	1,981	1,451	317	16	191
Accidental Injury Deaths	27,178	20,209	3,225	236	3,394
Motor Vehicle Deaths	5,731	4,386	540	74	711
Suicide X60-X84	8,167	6,882	529	64	639
Homicide X85-Y09, Y87, 1	4,280	1,162	2,038	50	989

Source: See Table 114.

Conclusions from the Mortality Cause Data — All Ages

As the data show, the black population has the highest age-adjusted mortality rate — except for suicide, pneumonia and motor vehicle deaths — whether one considers all mortality or mortality before age 75.

The rate ratios for blacks compared with the overall population rate are especially elevated for HIV/AIDS (30.9:5.3 = 5.8:1), homicide (14.1:3.2 = 4.1:1), diabetes (46.4:18.3 = 2.5:1), and cardiovascular disease (366.6:278.3 = 1.3:1). Their rate for suicide is lower than the overall population rate (4.8:8.0 = 0.6:1). Black males show a significantly elevated death rate before age 75 from prostate cancer (15.5:6.1 = 2.5:1).

The Asian population shows a lower rate on all indicators and on many indicators their rate is less than half the all-group rate.

The Hispanic population shows a mixed pattern. There are higher mortality rates for HIV/AIDS (20.8:5.6 = 3.7:1), homicide (6.1:3.2 = 1.9:1) and diabetes (14.3:8.6 = 1.7:1). They have lower rates for suicide (5.7:7.9 = 0.7:1).

Years of potential life lost are greatest for cancer, particularly lung cancer. The next greatest YPLL is for cardiovascular disease, and then accidental injury. These causes have relevant community-level interventions.

The complex pattern of differential causes of death for different race and ethnicity groups requires explanation. At least four explanations have been advanced:

- Differential access to and use of quality health care
- Cultural differences in behaviors that have health consequences
- Biohistorical differences that affect susceptibility to specific diseases in the modern U.S. culture
- The "healthy immigrant" theory

These competing hypotheses cannot be resolved with the information available in the *Data Scan*.

CHILD MORTALITY

The state Connecticut Department of Children and Families (DCF) reports that Connecticut has the third-lowest overall rate of child fatalities in the United States. The state was the fourth lowest in the nation in 2002 fatalities due to accident, suicide, or homicide in youth ages 15–19, at a rate of 34 per 100,000.[195] The 2002 report was DCF's last comprehensive annual report on child fatalities. According to the National Center for Health Statistics, the 2000 mortality rate for children 0–19 years old in Connecticut was 52.2 deaths per 100,000 population. The infant mortality rate (ages 0 to 1 year) was 6.6 per 1,000 live births.[196] The state Department of Public Health reports that the leading cause of death among children ages 1 to 19 in 2003 was unintentional injury, and among these motor vehicle incidents were the greatest number. Table 116 provides the leading causes of child mortality.

TABLE 116: 10 LEADING CAUSES OF DEATH IN CHILDREN (AGES 0-19) IN CONNECTICUT, 2003

AGE GROUP	Cause	Count
< 1	Short Gestation and Low Birth Weight	40
	Congenital Anomalies	34
1 - 4	Accidents (unintentional injury)	9
	Motor Vehicle	4
	Heart Disease	3
5 - 9	Accidents (unintentional injury)	6
	Motor Vehicle	5
	Malignant Neoplasms	4
10 - 14	Malignant Neoplasms	8
	Accidents (unintentional injury)	7
	Motor Vehicle	2
15 - 19	Accidents (unintentional injury)	48
	Motor Vehicle	29
	Poisoning	11
	Homicide	11
	By Firearm	8

Source: DPH Connecticut Resident Deaths, 2003: Top Five Leading Causes of Death by Age and Sex. Available at: http://www.dph.state.ct.us/OPPE/RR2003/RR2003_T10.xls. Accessed Feb. 3, 2007.

In cases of child mortality in which abuse may have been a possible cause of death, DCF conducts an investigation independent of medical examiner findings. DCF also notes that some deaths are ruled as homicides by the police, although medical and judicial findings may differ. According to DCF, 3 percent of child deaths reported in 2002 were the result of abuse — including skull fractures, intentional suffocation, and shaken baby syndrome.[197]

EMERGENCY DEPARTMENT UTILIZATION (ED)

Several types of emergency department (ED) utilization fall within the general heading of health outcomes. Two of these are assaults and suicide attempts. The data for these two indicators show very different patterns, by HRG.

TABLE 117: EMERGENCY DEPARTMENT UTILIZATION PER 100,000, 2002-2003

AREA	Assaults	Suicide Attempts
HRG 1 (3)-UC	10.1	1.8
HRG 2 (10)-MC	5.6	1.5
HRG 3 (15)-DS	3.9	1.6
HRG 4 (27)-WS	1.3	0.9
HRG 5 (39)-MT	2.7	1.5
HRG 6 (75)-RT	2.0	1.3
Connecticut	3.9	1.3

Source: Connecticut Health Information Management and Exchange (CHIME) Database, Connecticut Hospital Association (CHA).

The HRG rates for ED visits for assaults shown in Table 117 follow a familiar pattern from highest to lowest: Urban Centers > Manufacturing Centers > Diverse Suburbs > Mill Towns > Rural Towns > Wealthy Suburbs. Suicide shows a less clear pattern, except that the Urban Centers have twice the rate of suicide-related ED visits as the Wealthy Suburbs (1.8:0.9 = 2:1). The assault rate ratio between the Urban Centers and the Wealthy Suburbs is 10.1:1.3 = 7.8:1, a rate ratio for assault-related visits that is more than triple that of suicide-related visits.

These data do not suggest a clear reason for this difference in pattern for violent impulses turned outward (assault) versus inward (suicide), but the topic is worth further investigation.

CANCER INCIDENCE

Cancer incidence is reportable to the Connecticut Tumor Registry, within DPH. Cancer incidence data for this study have been aggregated into HRGs and reported by race and ethnicity. The cancer incidence rate data may, therefore, be analyzed by HRG to develop hypotheses about potential environmental and lifestyle risk factors and then design interventions.

TABLE 118: AVERAGE ANNUAL AGE-ADJUSTED CANCER INCIDENCE RATES PER 100,000 FOR CONNECTICUT, 1998-2002

RACE AND ETHNICITY	HRG 1 (UC)	HRG 2 (MC)	HRG 3 (DS)	HRG 4 (WS)	HRG 5 (MT)	HRG 6 (RT)	State
Colorectal Cancer							
White-alone, Not Hispanic	70	65	65	57	64	61	63
Black-alone, Not Hispanic	64	59	53	38L	72	58	60
Hispanic	38L	43	37L	37L	80	74	44
All race/ethnicity	61	61	63	57	63	61	61
Lung Cancer							
White-alone, Not Hispanic	91	77	79	56	77	64	72
Black-alone, Not Hispanic	75	68	63	55	60	80	70
Hispanic	38L	33L	38L	54	52	61	39L
All race/ethnicity	72	69	74	55	75	63	68
Prostate Cancer (Male)							
White-alone, Not Hispanic	162	150	155	193	148	161	160
Black-alone, Not Hispanic	216H	218H	243H	364H	219H	191	224H
Hispanic	102L	113L	117L	277H	177	138	122L
All race/ethnicity	155	148	159	197	150	162	161
Breast Cancer (Female)							
White-alone, Not Hispanic	161	162	166	190	161	174	169
Black-alone, Not Hispanic	122L	115L	131	206H	140	131L	124L
Hispanic	73L	77L	115L	120L	120L	181	87L
All race/ethnicity	118	140	157	188	158	172	157

Source: Counts of cancers were obtained from the Connecticut Tumor Registry (CTR), DPH; Rates were calculated by the author using cancer counts as numerators and U.S. Census 2000, SF1:Tables PCT12, PCT12H,I,J as denominators.

Notes: (1) Invasive cancers only are included in the table. (2) Since Connecticut populations of interest have very different age distributions, all incidence rates are age-adjusted. Cancer incidence counts for three broad age categories (60; 60-79; 80+ years) were available from the CTR without the need to seek approval from the DPH Human Investigations Committee. Therefore, the age-adjusted rates reported here are slightly different than those computed using five-year age groups. (3) According to the CTR, some errors in coding of "Hispanic" occur because hospitals do not ascertain Hispanic ethnicity for all cancer patients. The CTR, along with many other U.S. cancer registries performs Spanish-surname matching in an attempt to improve identification of patients who might identify themselves as Hispanic/Latino. These results were included in the numerator data used in the table. (4) Race and ethnicity specific rates significantly below the total rate for the state are labeled "L" and those significantly above the state rate are labeled "H." (5) Certain data used in this study were obtained from the CTR, located in DPH. The author assumes full responsibility for analyses and interpretation of these data.

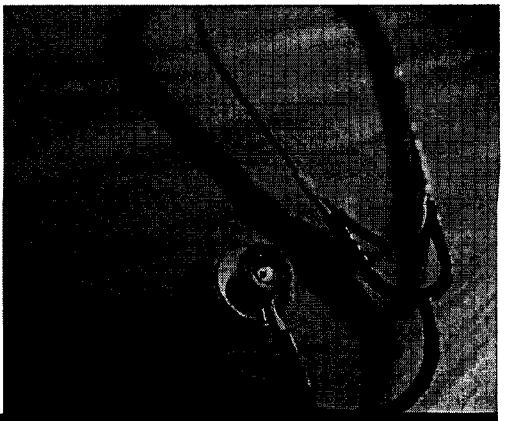
The most significant findings in Table 118 are that black males are significantly high in prostate cancer incidence in every HRG but the Rural Towns, where the difference is not large enough to be statistically significant given the small underlying population. Blacks have a lower rate for colorectal cancer in the Wealthy suburbs; and a lower rate for breast cancer in the Urban and Manufacturing centers and Mill Towns.

Hispanics are below the overall Connecticut rates on several cancer indices, including: colorectal cancer in the Urban Centers and Diverse and Wealthy suburbs; lung cancer in the Urban and Manufacturing centers and Diverse Suburbs; and breast cancer in all but the Rural Towns.

Some of the differences for Hispanics are possibly due to difficulties in age adjustment. The age categories used for the data provided for this study by the Tumor Registry were "under 60," "60-79," and "80 and over." These broad categories were used so as to preserve confidentiality. Since the Hispanic population is very young, these age categories may not have yielded a sensitive enough age adjustment. Another factor producing lower Hispanic rates may be the potential undercounts suggested in the Table 118 notes.

Some persons may be included in the rate numerators (e.g., multiracial black non-Hispanic residents) but excluded from rate denominators (black-alone non-Hispanic residents). Therefore, the rates reported here, as all rates, should be treated as estimates only, with some potential for bias.

Asian cancer incidence rates are not available due to small counts and preservation of confidentiality.



CHAPTER 11

SUMMARY AND RECOMMENDATIONS



Six focus areas are suggested to improve the health of the people of Connecticut by: increasing access to high quality care; promoting disease prevention, wellness, and active management of chronic health problems; and securing improvement of health outcomes and wise use of resources. Additional factors considered in selecting these areas were that they: show a significant amount of racial/ethnic disparity; involve risk factors that are likely to produce significant future health problems; or be health risks and conditions that are elevated above the *Healthy People 2010* national targets.

The focus areas are:

- Health Reference Groups (HRGs), and race and ethnicity groups in greatest need
- Diabetes and other conditions in the metabolic syndrome
- The medical home
- The binge drinking and smoking culture
- Youth risks and opportunities
- The health data system

The following sections explore each of these focus areas in detail.

FOCUS AREA 1 — FOCUS ON THE HEALTH REFERENCE GROUPS (HRGs) AND RACE AND ETHNICITY GROUPS IN GREATEST NEED

Many methods could be used in setting priorities and determining focus areas for future effort. These are discussed in Appendix L.

Findings and Analysis

Most of the data in the *Data Scan* are organized according to the HRGs previously described. On almost all measures of health risk and outcome, the ordering of HRGs is, from most to least risk and from poorest to best health outcomes: Urban Centers > Manufacturing Centers > Diverse Suburbs > Mill Towns > Rural Towns > Wealthy Suburbs.

The rates for black residents show significantly greater risk or poorer outcomes on more indicators than other race/ethnicity groups, even after controlling for HRG of residence. The rates for Asian residents, where available, show the lowest rates of risk and the best outcomes. Rates for Hispanic residents are mixed. On some indicators they show higher health risks and poorer health outcomes than other groups, but on other indicators they show better outcomes, if not better risk status. This pattern may be due to significant variation within the Hispanic ethnicity group, particularly between Puerto Rican and non-Puerto Rican Hispanics.

Quantitative Data on Health: Selected Measures

The full *Data Scan* includes more than 170 tables and figures showing health and related indicators for individual cities and towns, HRGs and Connecticut as a whole. Table 119 illustrates the rates for a selection of these measures, which were used to estimate needs in each of the HRGs. The indicators were selected to represent a wide variety of aspects of health. This was done so that no one area would be overrepresented in the needs analysis.

The rates shown in Table 119 follow a pattern similar to self-reported overall poor health: Urban Centers > Manufacturing Centers > Diverse Suburbs > Mill Towns > Rural Towns > Wealthy Suburbs.

TABLE 119: SELECTED INDICATORS OF HEALTH, BY HEALTH REFERENCE GROUP

INDICATOR	Connecticut	3 Urban Centers	10 Manufacturing Centers	15 Diverse Suburbs	27 Wealthy Suburbs	39 Mill Towns	75 Rural Towns
Population, 2000	3,405,565	384,733	662,398	587,504	487,620	698,517	584,793
Accepted Child Abuse Cases per 1,000, 2001-2005	36.8	68.2	53.2	43.8	9.8	32.0	19.8
Crimes Reported per 1,000, 2002-2003	30.0	76.1	39.5	29.5	13.0	22.7	12.1
Car Crashes with Injury per 1,000, 2002	9.4	15.8	10.7	8.5	7.8	8.3	7.2
STD Rate per 1,000, 2000-2004	5.8	21.5	7.6	4.6	0.8	1.7	1.1
Teen Births 15-19 per 1,000, 1999-2003	24.0	57.3	39.9	22.2	2.9	13.0	7.3
Percentage Self-Reported Employment Related Disability for Persons 21-64, 2000	11.3	17.7	14.4	12.5	6.4	10.0	8.4
Percentage Obese: Calculated from Self-Reported Height and Weight, 18 and Older, 1999-2003	17.2	23.5	18.2	19.2	11.0	18.0	15.1
Emergency Department (ED) Visits per 1,000, 2002-2003	387.4	607.6	498.3	404.6	214.6	343.6	295.9
Deaths Before Age 75 per 100,000, 2000-2002	350.3	444.0	381.1	366.4	244.2	372.3	300.0

Source: See "Data Scan" text tables.

There is a large difference in the size of the differentials for the various indicators. For example, the rate ratio of sexually transmitted disease (STD) case rates for the Urban Centers to the Wealthy Suburbs is 21.5:0.8 = 26.9:1. The rate ratio between Urban Centers and Wealthy Suburbs for overall mortality before age 75 is only 444.0:244.2 = 1.8:1. Thus, HRG of residence makes a much greater difference for STD rates than for mortality rates. The differences cannot be accounted for by age distribution differences between the HRGs.

Community Need Calculations

One approach to estimating comparative need in each of the HRGs is to estimate the percentage of the total need in the state attributable to each HRG.

Table 120 converts the rates from Table 119 into percentages for each HRG, based on relevant population size, and then summarizes the need in each HRG by averaging all of the selected indicators.

A summary of the results in Table 120 indicates that half (49.1 percent) of the total need in the state is attributable to the 13 communities in the Urban and Manufacturing centers, compared with their 31.8 percent of the total population for the state. Conversely, 50.9 percent of the need exists in the remaining 156 communities with 68.2 percent of the total population.

Recommendations

Resources could be allocated among HRGs, approximating the percentage distribution of need, over the broad set of indicators: 24.0 percent to the three Urban Centers; 25.1 percent to the 10 Manufacturing Centers; 17.3 percent to the 15 Diverse Suburbs; 6.8 percent to the 27 Wealthy Suburbs; 16.4 percent to the 39 Mill Towns; and 10.4 percent to the 75 Rural Towns, as shown in Figure 28.

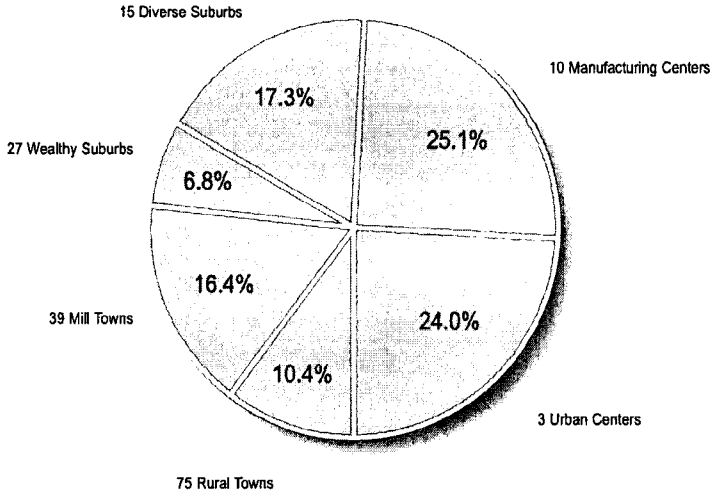
TABLE 120: PERCENTAGES OF TOTAL CONNECTICUT ESTIMATED NEED, FOR SELECTED INDICATORS, BY HEALTH REFERENCE GROUP

INDICATOR	3 Urban Centers	10 Manufacturing Centers	15 Diverse Suburbs	27 Wealthy Suburbs	39 Mill Towns	75 Rural Towns
Accepted Child Abuse Cases	23.7	26.9	19.1	4.2	16.5	9.6
Crimes	28.7	25.6	17.0	6.2	15.5	6.9
Car Crashes with Injury	19.0	22.2	15.6	12.0	18.1	13.2
Sexually Transmitted Disease/Known Residence	45.5	27.6	14.8	2.2	6.4	3.5
Teen Births 15-19	35.5	31.6	15.5	1.6	10.9	4.9
Self-Reported Employment Related Disability for Persons 21-64	16.9	25.2	18.4	8.0	18.6	12.9
Obesity: Calculated Self-Reported Height and Weight, 18 and Older	14.6	20.7	19.5	8.7	21.8	14.7
ED Visits	17.7	25.0	18.0	7.9	18.2	13.1
Average Deaths < 75	14.6	21.1	17.8	10.0	21.6	14.9
Average, All Measures	24.0	25.1	17.3	6.8	16.4	10.4
Population (Percentage)	11.3	19.5	17.3	14.3	20.5	17.2

Source: See "Data Scan" text tables.

Somewhat greater weight beyond the crude percentages could be given to health risks in the Urban and Manufacturing centers since their populations are generally younger, and these risks represent significant future problems. Key populations at risk are the black and Puerto Rican Hispanic residents in the three Urban Centers and in the 10 Manufacturing Centers, as they have the largest health risks beyond those that would be predicted based on their HRG residence alone. The concentration of black and Hispanic residents in these areas is discussed in Chapter 3, Connecticut Community Profile, and in Appendix C.

FIGURE 28: PERCENTAGE DISTRIBUTION OF ESTIMATED NEED BY HRG



FOCUS AREA 2 — FOCUS ON DIABETES AND OTHER CONDITIONS IN THE METABOLIC SYNDROME

Findings and Analysis

Type 2 diabetes may lead to serious complications, including heart disease, blindness, nerve damage, and kidney damage.[201] There are clear racial and ethnicity disparities in risk factors, incidence, hospitalization, and mortality due to diabetes.

Diabetes Incidence

Age-adjusted rates of Connecticut residents "ever told they have diabetes" are 4.7 percent for the white population age 18 and over, 8.8 percent for the black population, 7.5 percent for the Hispanic population, and 5.3 percent for the Asian population.

In contrast, the *Healthy People 2010* objective is for no more than 2.5 percent of the adult population with a diagnosis of diabetes.[202] Thus, diabetes is a problem for all racial and ethnic groups, but it is particularly for black and Hispanic residents.

Diabetes Mortality Disparities

The age-adjusted diabetes mortality rate before age 75 for Connecticut overall (2000-2004) is 8.6 per 100,000. For whites, the age-adjusted rate is 7.4 per 100,000 residents, while it is 23.0 per 100,000 for black residents, 14.3 for Hispanics, and 2.7 for Asians. Thus, blacks have almost triple the "premature" diabetes mortality of whites.

Diabetes is not only a prevalent condition, but it is also a good "index" for examining chronic disease disparities, since there are data at each level in the causal chain. Diabetes can also be understood as part of a larger concept of the "metabolic syndrome" — a group of related conditions including diabetes, heart disease and stroke.

Diabetes and Ambulatory Care Sensitive Conditions

Diabetes and metabolic syndrome care are particularly important markers for understanding health disparities.

Of the 16 conditions tracked by the Office of Healthcare Access (OHCA), the hospitalization ratio of rates for blacks to rates for all races is highest for hypertension (rate ratio of 89.1:24.7 = 3.6:1); next highest for uncontrolled diabetes (rate ratio of 26.1:7.4 = 3.5:1); followed by diabetes short-term complications (rate ratio of 143.5:42.5 = 3.4:1); and diabetes long-term complications (rate ratio of 263.2:105.8 = 2.5:1). One additional condition potentially related to diabetes, lower extremity amputation, ranks seventh in this rate-ratio comparison at 83.2:38.0 = 2.2:1.

Ambulatory care sensitive conditions (ACSCs) are conditions for which hospitalization could be avoided through appropriate ambulatory care. ACSC conditions are good markers for how well the health care system provides, and residents utilize preventive services and care in appropriate settings. The ACSCs are discussed more broadly in the section of this chapter on the "Medical Home," as well as in Chapter 7: Health Care Quality.

The high rate ratios for these metabolic syndromes and ACSC conditions for the black population, even utilizing crude rates that underestimate the age-adjusted rates, are cause for serious concern about this health disparity.

Risk Factors: Obesity and Lack of Physical Exercise

Obesity and lack of physical exercise are key modifiable risk factors for diabetes and metabolic syndrome diseases. There has been a significant increase in obesity in the past decade, both nationally and in Connecticut. There are also significant disparities that could worsen if they are not addressed. The black population is especially at risk.

Behavioral Risk Factor Surveillance System (BRFSS) data for Connecticut demonstrate that 15.9 percent of the age-adjusted 18 and over white population is considered obese under national guidelines; 30.9 percent of the black population; 21.6 percent of the Hispanic population; and 4.2 percent of the Asian population. Within the black population females are more likely obese than males in all age groups 30 and over.

High blood pressure is another aspect of metabolic syndrome. According to self-report, this condition affects 28.0 percent of the white population 18 and over; 37.1 percent of the black population; 27.2 percent of the Hispanic population; and 26.5 percent of the Asian population.

Self-reported rates of "no physical activity" are 20.3 percent of the white population; 34.9 percent of the black population; 40.6 percent of the Hispanic population; and 28.3 percent of the Asian population.

These rates suggest a looming future problem of metabolic syndrome diseases among all populations, but particularly among blacks and Hispanics.

Obesity: The Special Case of Immigrants

Although immigrants are less obese than native-born residents of the United States, this comparative advantage disappears the longer they are in the country. In one survey, immigrant respondents "were less likely to be overweight or obese" than the U.S.-born respondents (16 percent vs. 22 percent). Eight percent of those who had lived in the United States for less than one year were obese. But 19 percent of those who had lived in the country for at least 15 years were obese. This relationship between body mass index (BMI) and years of residence held true for all racial/ethnicity groups except foreign-born blacks.[203]

This research has led to several studies aimed at finding the roots of the apparent tendency for immigrants to adopt less healthy lifestyles the longer they reside — and presumably the more they acculturate — in the United States. Women in one focus group study suggested that limited time for family, cooking, and food shopping, as well as such obstacles as lack of transportation and child care, influenced the diets of long-term immigrant residents — rather than scarcity of food or physical access to grocery stores.[204]

Metabolic Syndrome Disparities Develop Early

The Youth Risk Behavior Survey (YRBS) at the state and national levels, as well as the National Health and Nutrition Surveys (NHANES), contain data on key indicators for youth adopting lifestyles that may lead to metabolic syndrome conditions later in life. Both surveys show that high school students are at increasing risk due to increased rates of overweight and decreased rates of physical activity.

The risks are especially acute among black and Hispanic teens.[205] According to the Connecticut School Health Survey (available at: http://www.dph.state.ct.us/PB/HISR/CSHS.htm), 9.2 percent of white high schoolers in Connecticut were overweight (at or above the 95th percentile for body mass index) in 2005. By comparison, 15.4 percent of black and 17.9 percent of Hispanic high schoolers were overweight. The difference between white and Hispanic students is statistically significant.

The survey also found that white students (67.2 percent) were more likely to have engaged in vigorous physical activity than black (53.6 percent) or Hispanic (52.1 percent) students. The white-Hispanic differences are statistically significant.

These differences were consistent with the rates of those who "watch TV three or more hours per day." The self-reported percentages were significantly lower for white students (27.9 percent) than for black students (59.1 percent), and Hispanic students (42.6 percent).

The race/ethnicity differences for Connecticut are consistent with data from national surveys and similar states (e.g., Massachusetts and Rhode Island). Further detailed data are available in Chapter 4, Health Risk and Health-Promoting Behaviors.

Prevention Is the Key

The Mayo Clinic's "Tools for Healthier Living" suggest that the primary goal for metabolic syndrome is to *prevent* the development of type 2 diabetes, heart attack and stroke. This can usually be accomplished with an aggressive regimen of self-care strategies focusing on diet and exercise.

Mayo recommends: eating a healthy diet with fruits, vegetables, beans and other fiber foods, white meat or fish; avoiding processed or deep fried dinners, eliminating table salt; participating in at least 30 minutes of moderately strenuous activity most days of the week; undergoing regular screenings for blood pressure; and stopping smoking.[206]

The Connecticut Medicaid Managed Care Council's Quality Assurance Subcommittee has developed recommendations regarding childhood obesity. Rather than the traditional view that obesity reflects a lack of discipline in choosing an appropriate diet and adequate physical activity, this "ecological model" assumes a complex interaction of individual physiology, family, social environment in communities, cultural influences, and larger social influences on the development of obesity. Interventions based on this model emphasize systematic changes of the factors that promote obesity, including the influence of family, community, and social circumstances (worksite, school, and health care), cultural factors, and the larger social policy environment.[207]

Recommendations

Diabetes and its complications are a significant problem for the black/African American population in Connecticut and nationwide. The causal factors for diabetes, such as obesity, are becoming more prevalent in all age groups and in the whole population. This is a "ticking time bomb" for the current and future adult population.

Addressing metabolic syndrome and its causes will require significant additional prevention-focused support for organizations, that serve youth and adults, such as better primary care access, utilization and focus on the key metabolic syndrome issues in the primary care encounter.

It will also require further public policy development regarding diets available, opportunities for exercise and information about both. These efforts could be focused especially to benefit the black population, which suffers the most from metabolic syndrome diseases and premature death from them.

FOCUS AREA 3 — THE "MEDICAL HOME" CONCEPT: AVOIDABLE EMERGENCY DEPARTMENT (ED) AND HOSPITAL UTILIZATION AND UNDER-USE OF PRIMARY CARE

Findings and Analysis

Health services researchers and policy-makers increasingly realize the importance of a "medical home" — where people can regularly obtain care. Unfortunately for many people, this medical home is often a costly and inappropriate one — the hospital emergency department (ED).

This section examines the self-report data on having a regular source of care, hospitalization for ACSCs, emergency department utilization, linguistic isolation, and preventive care and screening.

Age-adjusted BRFSS survey data for Connecticut reveals that Urban Center adult residents (age 18 and over) are least likely to report a regular source of medical care: only 74.7 percent report such a "medical home." This compares with 80.9 percent in the Manufacturing Centers and values above 87 percent in all of the other HRGs.

These differences are partly due to the low rates for Hispanic residents (66.8 percent in the Urban Centers and 67.2 percent in the Manufacturing Centers) and black residents (77.9 percent in the Urban Centers and 75.4 percent in the Manufacturing Centers). Statewide, white residents are more likely to report having a regular source of medical care (87.5 percent age-adjusted), compared with black and Asian residents (80.7 percent and 79.6 percent, respectively) and Hispanic residents (only 69.7 percent).

These rates to some extent parallel the results for the BRFSS item on who has health insurance: 91 percent of white residents (age-adjusted rate for residents over 18) and 88.5 percent of Asian residents versus 81.6 percent of black residents and 70.9 percent of Hispanic residents. As Table 121 demonstrates, white, black and Hispanic residents having medical homes parallel their having medical insurance, but Asian respondents have a significantly higher rate of health insurance than they have a regular source of care.

TABLE 121: PERCENTAGES OF CONNECTICUT RESIDENTS 18 AND OVER CLAIMING A REGULAR SOURCE OF CARE AND HEALTH INSURANCE, BRFSS SURVEY, 1999-2003

RACE/ETHNICITY GROUP	Percentage with a Medical Home	Percentage with Health Insurance
White, Not Hispanic	87.5	91.0
Black, Not Hispanic	80.7	81.6
Hispanic	69.7	70.9
Asian, Not Hispanic	79.6	88.5

Source: DPH; BRFSS 1999-2003. Note: All race and ethnicity specific rates are age-adjusted.

Hospitalization for Ambulatory Care Sensitive Conditions

OHCA has identified several ambulatory care sensitive conditions for which hospitalization can be avoided through adequate primary care. A high rate of ACSCs is an indicator that disease is not being handled well or at all in the primary care setting, the medical home. This situation could occur for several reasons:

- Patients have inadequate access to primary care or do not use primary care, even when available, until late in the disease process, and then require emergency care and/or hospitalization;
- Poor communication between providers and patients;
- Patients use primary care, but do not follow prescribed medication;
- Inadequate follow-up systems; or
- The underlying condition may be frequent in the population, and even with equal access to and utilization of primary care, the ACSC rate might still be higher (e.g., rates of diabetes for blacks).

Thus, ACSC rates are a "flag" for further investigation, not a conclusion about principal causes. Table 92 in Chapter 7, Health Care Quality, indicates that ACSC rates are highest in the Urban Centers, followed by the Manufacturing Centers, Diverse Suburbs, Mill Towns, Rural Towns, and Wealthy Suburbs, in that order.

ACSC rates are highest for blacks — double the rate for whites — followed by Hispanics and then by whites.

Emergency Department (ED) Utilization

Variation in the rates of ED use can be an indicator of problems with access to primary care or lack of utilization of primary care or poor continuity of care. Although the ED's primary role is immediate treatment and/or stabilization of seriously ill and injured patients, the ED is often used for unscheduled care because of inadequate capacity or underutilization in other parts of the health care system. A study was conducted for the *Data Scan*, based on hospital ED record data from the Connecticut Health Information Management and Exchange (CHIME) database for fiscal years 2002 and 2003 combined. Chapter 7, Health Care Quality, discusses this study — results reproduced in Table 122 — suggesting that Connecticut's urban area populations are most likely to use the hospital ED for treatment of conditions that can be treated more appropriately in a practitioner's office or clinic.

TABLE 122: ANNUALIZED AGE- AND SEX-ADJUSTED EMERGENCY DEPARTMENT VISITS PER 1,000 BY HRG AND RACE/ETHNICITY, FISCAL YEARS 2002-2003

AREA	All	White	Black	Hispanic	Asian
HRG 1 (3)-UC	608.1	423.9	745.4	743.3	117.8
HRG 2 (10)-MC	492.7	394.3	720.8	724.1	76.8
HRG 3 (15)-DS	398.3	379.1	564.3	498.7	126.7
HRG 4 (27)-WS	222.0	217.3	392.4	264.0	95.1
HRG 5 (39)-MT	341.2	340.9	554.6	319.1	99.3
HRG 6 (75)-RT	306.6	308.0	412.0	203.4	114.8
Connecticut	388.0	329.4	674.1	640.5	100.0

Detailed data and sources are included in Chapter 7, Health Care Quality, and online at www.cthealth.org.

Summary of ACSC and ED Visit Data

There is a significant problem of hospitalization for ACSC and ED utilization for conditions that could be seen in other less expensive, usually more effective settings. This problem is particularly prevalent in the more urbanized settings, and among black and Hispanic residents within these settings, and may be due partly to differential rates of health insurance coverage. However, the differences in insurance rates do not account for the extreme differences in ED utilization. Therefore, fully understanding disparities in the existence or utilization of the medical home is a task still to be accomplished.

Linguistic Isolation

The areas of high ED utilization overlap somewhat with areas of household "linguistic isolation." Among all households, 7.8 percent in the Urban Centers and 4.2 percent in the Manufacturing Centers are Spanish-language linguistically isolated. For all other HRGs, Spanish-language linguistic isolation is negligible. Among households in the Urban Centers, 3.3 percent are linguistically isolated for "other Indo-European language"; among households in Manufacturing Centers, 3.4 percent. In general, Asian-language linguistic isolation is negligible.

The Hispanic population is of particular concern because of higher rates without health insurance, lower rates with a regular source of medical care, and significantly higher rates of linguistic isolation.

Prevention and Screening

Rate disparities are mixed for preventive care and screening, suggesting that although such care is received, it may be in settings other than a "private" medical home. For example, despite differences in health insurance, the BRFSS survey shows negligible differences in self-reported mammogram rates "in the past two years": 74.7 percent for white women over 40, 76.2 percent for black women and 72.3 percent for Hispanic women; the rate for Asian women is not available. Age-adjusted Pap smear rates are 88.5 percent for white women, 85.6 percent for black women, 80.1 percent for Hispanic women, and 76.9 percent for Asian women. Health programs such as the Connecticut State Breast and Cervical Cancer Early Detection program may act to reduce disparities. Chapter 6, Screening and Prevention, includes detailed data for additional screening tests.

What Is the Value of a Medical Home?

A primary care "medical home" is a place where prevention, screening and guidance regarding causes of metabolic syndrome diseases, problems of alcohol use and abuse, child and youth safety, and other health-related issues can be addressed. Follow-up testing and care can be managed through discussion between practitioners, patients and their families.

But there are cultural and systems constraints to developing a medical home, where time can be taken for these discussions and true patient-provider continuity established. For example, practitioners and patients may have very limited time for dialogue. Language barriers may impede communication. Finally, the meaning of the term "medical home" may be problematic for some immigrants who travel frequently to their "home" countries and who may have multiple medical homes.

Recommendations

Unnecessary ED and hospital utilization are both stressors for the health care system and may result in less effective care. Policies could focus on encouraging greater and earlier use of primary care.

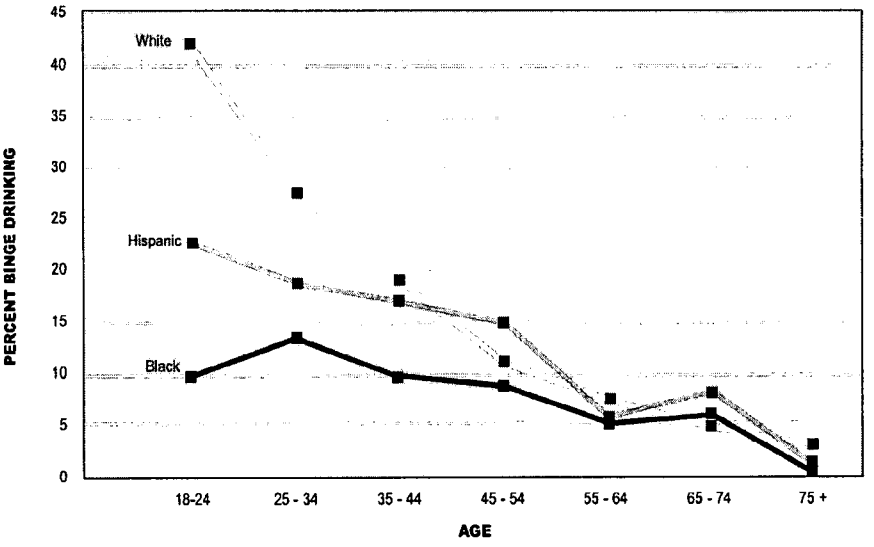
A whole systems approach will be required to reduce avoidable ED and hospital utilization, especially in the Urban and Manufacturing centers. Such an approach would focus on increasing access and comfort with the language and cultural surroundings of the medical home; utilizing the medical home to discuss issues of health risk, chronic disease, and issues of child and youth safety; and promoting adherence to medical regimens prescribed in the primary care setting. In short, a systems approach will need to support and enhance the role of community health centers.

FOCUS AREA 4 — FOCUS ON THE BINGE DRINKING AND SMOKING CULTURE

Findings

Data from the BRFSS surveys demonstrate significant age, race/ethnicity and educational level differences for smoking; considerable race/ethnicity differences were also noted for youth and youth adult binge drinking. These differences are particularly pronounced for the population ages 18-24. Reproduced below is a key figure from Chapter 4, Health Risk and Health-Promoting Behaviors, to illustrate the patterns noted in the data.

FIGURE 29: PERCENTAGE BINGE DRINKING BY AGE AND RACE/ETHNICITY, BRFSS, 1999-2003



Source: Connecticut Department of Public Health (DPH); BRFSS Survey, 1999-2003.

The high school youth population demonstrates significant race/ethnicity differences in smoking and drinking. As in other similar states and nationally, the young white population is more "at-risk" for alcohol abuse and smoking than the black or Hispanic population. One possibility is that this is a cultural phenomenon, buttressed by tobacco and alcohol industry marketing.

Recommendations

Changing binge drinking and smoking will require a broad effort to change both the level of information about the signs and consequences of alcohol abuse and tobacco use, changing cultural norms regarding alcohol and tobacco use, and the penalties for alcohol abuse, e.g., drunken driving and teen access to tobacco.

Additional programming in this area could be partly funded by greater disbursements from tobacco settlement money. Connecticut is currently far below the Centers for Disease Control and Prevention (CDC) minimum recommendation for tobacco prevention funding. In FY 2007, Connecticut was at 9.4 percent of the CDC recommendation, 36th of 45 states reporting.[208]

FOCUS AREA 5 — YOUTH RISKS AND OPPORTUNITIES

Findings and Analysis — Selected Indictors

Numerous investigations have examined youth risk behavior from the sociological, behavioral and even brain development perspectives. While the assumption had been that adolescent brain development was, like adolescence itself, a transitional stage between childhood and adulthood, research now indicates that changes in different areas of the brain play critical roles in memory, voluntary motor behavior, impulse control, decision making, planning, and other higher cognitive functions.[209]

Several measurable aspects of youth- and young-adult safety and behavior were selected as "indicator variables," including: child abuse; Connecticut Academic Performance Test (CAPT) participation and passing rates; high school graduation; school suspension and expulsion; sexually transmitted diseases; teen births; seat belt use; and bicycle helmet use, all presented in Chapter 4, Health Risk and Health-Promoting Behaviors. Also, implications of the statistics on membership in adult-sponsored, youth-promoting out-of-school organizations were presented in Chapter 3, Connecticut Community Profile.

Sexually Transmitted Disease and Teen Births

There are marked disparities in sexual risk-taking behavior among youth and young adults, as indicated in the sexually transmitted disease (STD) incidence rates and teen birth statistics.

Overall, the rate of STDs for black, non-Hispanic persons age 15 to 34 is 39.3 per 1,000; for Hispanics, 15.1 per 1,000; for white non-Hispanic 2.2 per 1,000; and for Asian non-Hispanic, 1.9 per 1,000. The rates are highest for black non-Hispanic persons in the Urban Centers — 53.5 per 1,000. In general, STD incidence rates peak in the late teens and decline after age 20. Further details are available in Chapter 4, Health Risk and Health-Promoting Behaviors.

Teen birth rates also show a marked disparity. Although the overall rate for Connecticut is 24.0 per 1,000, the rate climbs to 50.4 for black teens statewide, and 71.4 per 1,000 for Hispanic teens statewide. Within this group, Puerto Rican teens have an 84.8 per 1,000 rate, while non-Puerto Rican Hispanic teens have a rate of 44.3 per 1,000. Teen birth rates are generally elevated for all race and ethnicity groups in the Urban and Manufacturing centers. The highest rate is that of Puerto Rican Hispanic teens in the Urban Centers: 90.8 per 1,000.

Youth Seat Belt and Bicycle Helmet Use

Another indicator of risk taking is vehicle use without adequate protection. There are also marked disparities in these indicators. According to the 2005 Connecticut High School Survey (available at: http://www.dph.state.ct.us/PB/HISR/CSHS.htm) 73.1 percent of white male students statewide used a seat belt "all or most of the time," but only 46.1 percent of black male students and 56.0 percent of Hispanic male students did so. Rates for female students were higher for each group: 77.3 percent for white female students, 67.9 percent of black female students and 59.0 percent of Hispanic female students.

Self-reported bicycle helmet use, for students riding a bike during the past 12 months, was significantly lower for black (92.3 percent reporting never or rarely used) and Hispanic (89.9 percent) than for white students (70.6 percent). Similar race and ethnicity differences are noted on adult reports of their children's use of bicycle helmets as shown in Table 46. The rate of helmet use for all race and ethnicity groups is markedly too low.

Child Abuse

Abuse is a health risk for a significant number of Connecticut children. Reports of cases to Connecticut Department of Children and Families (DCF) and ED visits offer two types of data on the problem of child abuse. There is a large discrepancy between reports to DSS and ED visits because many more cases are reported to DCF than are coded in emergency departments. But the HRG patterns are similar, as they are for all age-adjusted ED-reported abuse rates.

Female children appear to be more at risk than male children. All children need better protection, especially those in the Urban Centers, Manufacturing Centers, Diverse Suburbs, and Mill Towns, as shown in Table 41 and Table 42 in Chapter 4, Health Risk and Health-Promoting Behaviors. The highest rates of DSS-reported abuse are for black and Hispanic youth.

Youth-Serving Organizations

Many community resources are available to help prevent health risks and poor health outcomes. These can include active out-of-school programs, such as Scouts and youth soccer and other sports.

Data on soccer and scouting participation by both boys and girls show a markedly lower rate of participation in the Urban and Manufacturing centers than in the state as a whole. This becomes problematic when data also show that other types of adult-sponsored activities for youth do not have high enough participation rates to make up the difference. For example, Boys and Girls Clubs serve primarily urban youth, yet they are estimated to serve fewer than one in 10 (8.8 percent) of all youth in the Urban Centers.

The Jack and Jill Clubs, an important mothers' volunteer program geared toward black and multiracial children and youth, have a membership estimated at 456 children in Connecticut, but only half of these members may reside in the Urban or Manufacturing centers. Thus, the vast majority of black and Hispanic children and youth appear not to be adequately involved in adult-sponsored, non-church-related organizations. The number involved in church-sponsored organizations is not known.

Recommendation

Broad initiatives on child and youth risk taking and safety could be focused especially on the Urban and Manufacturing centers, and on black and Hispanic children and youth, who are most at risk regarding a variety of safety and risk issues. These initiatives could include making available well-focused, out-of-school health promoting activities to youth in the neighborhoods in the Urban and Manufacturing centers, where such activities currently neither enroll many school-age children and youth nor attract sufficient adult volunteers. In addition, better data on youth out-of-school participation is a vital need.

FOCUS AREA 6 — IMPROVE THE HEALTH DATA SYSTEM

In preparing the *Data Scan*, the author had an opportunity to evaluate some aspects of the Connecticut "data system." It is actually not a system, but a series of separate "pots" of data in varied formats, each with its own strengths and weaknesses. This section is organized as a series of findings and recommendations.

Data Access

Finding

There are problems with the data access and coordination "infrastructure" in Connecticut that have been previously studied. Each request for other-than-standard web-based reports must be fulfilled separately by Connecticut state agency personnel — a time-consuming and costly process. Web-based reports are frequently presented only in portable document format (PDF) format, which makes secondary analyses and display of data more difficult.

Recommendation

A query-driven system would make the data more widely and easily available. A hypothesized pattern of health disparities would be less conjecture and more clearly demonstrated or refuted. More fine-tuned analyses below the state level — such as by HRG — would be possible and would not require state personnel to fulfill individual data requests.

Departmental Web Sites

Finding

Connecticut does not have a "one-stop shopping place" for broad community health data, in contrast to other states such as Florida, Utah, Missouri, and Massachusetts. At best, each Connecticut state department operates a separate "silo" for data. Each department's data is in a different format, with different and often inadequate access and search procedures. This produces great difficulty in searching for data and developing a broad picture of community health.

Recommendation

Provide a single community health web "portal" through which data and information about that data can be shared with the public. This will ease access problems, encourage standardization of procedures and data formats, and assist in more fruitful data search strategies. Encourage state agencies to take part in this "one-stop" effort.

Mapping

Finding

There is no accessible mapping capability for community health data in Connecticut. By comparison, in Massachusetts' Mass-CHIP system and in several other state systems data can be queried, graphed and mapped. This allows for great flexibility in analysis and presentation. It makes data available quickly to concerned citizens and policy-makers, as they need to analyze and display the information.

Recommendation

Encourage the inclusion of a mapping option in a query-based data system.

Data Delays

Finding

A previous analysis of the state of community health data in Connecticut indicated a number of structural weaknesses, culminating in delays in the release of data.[210]

State agencies and the public may not have a shared sense of what is reasonable. Frustration borne out of unshared expectations may occur because of time lags between when central authorities receive data and perform the necessary quality control on the data before publication. In addition, resource and infrastructure issues may lead to delay.

Recommendation

Interested organizations could work with state policy-makers to establish clear policies and standards based on reasonable expectations regarding the collection and release of data. Since timetables will be specific to different types of data, the public data consumer would further be helped by having lists of data items and realistic expectations of the time required to release data. For example, three years may be reasonable for Cancer Registry data to be issued in report format, but it may be unreasonably long for the reporting of infectious disease data. In addition, as practiced at the federal level, "preliminary data" could be released early and "final data" later in time.

Meta Data — Documentation about Data

Finding

There is a serious lack of "meta-data"— documentation about the data themselves — on the datasets accessed from many Connecticut agencies. For example, a particular dataset might use race and ethnicity as a variable to "group" health observations. Meta-data would be information about how race and ethnicity are defined for that particular dataset. For many indicators, the author had to piece together meta-data in preparing this report.

Recommendation

Support the establishment of a standard for meta-data with the clear expectation that all state agency reports will follow it. This would be easy to do when creating new datasets because much less labor is required to create meta-data as new datasets are being created — rather than to find the information at a much later date.

Youth Data

Finding

Despite the recognized importance of out-of-school program participation, there is neither a comprehensive dataset on this key indicator nor a way to systematically estimate it. There has also been a serious weakness in the collection of YRBS data in the recent past. For several iterations of the YRBS, data were not collected or the CDC has not "weighted" the Connecticut data, due apparently to a lower than acceptable response rate. Data collection for the 2005 YRBS was sufficient for CDC weighting — allowing for statistical inferences from the data.

Recommendation

The Connecticut departments of Public Health and Education could investigate and help strengthen the capacity to collect youth data. One method used in Massachusetts is to add items to that state's equivalent of the Connecticut Academic Performance Test (CAPT), asking about the type and frequency of out-of-school program participation by each child.

The departments could choose noncontroversial items about students' after-school activities, including homework, clubs, sports, and TV watching and make them an addendum to the CAPT testing, so that universal coverage for the relevant grades could be obtained. Doing so will allow for population-based estimates by school district, by HRG, and/or by race and ethnicity group. The data would also be useful to individuals districts in diagnosing student performance.

Health Observations

Finding

Observation-based health data are lacking in many areas — such as youth safety that includes seat belt use; bicycle helmet use; the prevalence of violence promoting graffiti in a neighborhood; the availability, conditions, use of public spaces for exercise; and the amount of smoking on school property and at school-sponsored events. Observation would be useful, but expensive, if done in the traditional manner — hiring observers. There appears to be no current capability to collect such data on a systematic basis.

Recommendation

Support community-based research partnerships such as those pioneered by the Youth Action Research Institute of Hartford's Institute for Community Research[211] to work with public school students and other youth to collect community-oriented data as part of a larger statewide project.

This kind of data collection and analysis falls completely within the requirements of the Connecticut Mathematics Curriculum Frameworks Content Standards and Expected Performances. For example, one framework requires collecting, organizing, and displaying data help to analyze information and make reasonable predictions and informed decisions.[212]

With its connection to required school work, this innovative strategy offers the advantages of:

- Collecting needed health data;
- Encouraging student interest in learning about their communities in a prosocial way and taking action based on their findings;
- Raising students' interest in their own health; and
- Fulfilling school curriculum requirements.

Partnerships among community agencies, universities, and schools would "improve teachers' and students' understanding of sampling, surveys, and observational strategies,"[213] as well as obtain vital data for health assessments.

Race and Ethnicity Categories

Finding

The broad-brush approach to race and ethnicity identification misses significant variation. For example, in this report the Puerto Rican Hispanic teen birth rate appears to be more than double the non-Puerto Rican Hispanic teen birth rate. Yet most datasets do not include this subgroup code. There may be similar disparities within broad race and ethnicity groups, such as between Chinese, Vietnamese and Cambodian Asians. Given most current practices in subgroup data collection and reporting, there is no way to verify whether these subgroups are at particular risk. Finally, most datasets do not include biracial reporting categories. Yet, biracial individuals on many indicators have different health profiles than either of their "monoracial" components.[o, 214] Biracial individuals are becoming numerically more important as residents increasingly insist on reflecting all parts of their heritages and as the rate of biracial marriages increases.

Recommendation

Encourage agencies, wherever possible, to obtain more specific race and ethnicity identification, including biracial identification, consistent with federal Office of Management and Budget (OMB) Directive 15 (1997 Revision) and U.S. Census Bureau practice, and make the results available in more fine-tuned analyses. Doing so will permit better targeting of interventions.

Health Care Quality

Finding

There are significant problems in conceptualizing and operationalizing health care quality data in Connecticut. The current method of obtaining hospital adverse event data leads to what appear to be significant underestimates. There also are no broad and agreed-upon standards for "adjusting" data for patient acuity.

Recommendation

Support development of an agreed-upon overall quality "index" that would help the public to know whether or not health care quality is getting better. Subsections of the index could indicate which sectors are leading and which are lagging in improvement. The index also could be constructed to reveal disparities in the quality of care, with adequate controls for appropriateness of care, patient choice and co-morbidities. Given anticipated difficulties, this could be a long-term project.

0559
09/15/08

Mental Health Data

Finding

The mental health data system remains problematic despite efforts to improve it and to implement the Center for Mental Health Services (CMHS) Uniform Reporting System (URS) dataset and standards. Some data in the federal submissions under URS seem contradictory or beg further explanation. But the format of the reporting tables does not contain enough helpful explanatory documentation (meta-data).

There is a fragmentation of data reporting, lack of online data capability, and a lack of readily accessible information about the agencies' data definitions and the connection of particular datasets to specific programs. Information exists in the historical memories of individual staff but is not documented adequately to guide outside researchers.

Recommendation

Support the development of better organized mental health data — and make the data and information documentation about it available online to promote an educated citizenry about this important area.

A NOTE ABOUT ADDITIONAL ISSUES

Many important issues are not a focus of this report's recommendations. This is generally because, although there may be disparities, there are not clear science-based interventions of proven efficacy for reducing these rates or disparities.

This report did not focus specifically on investigating oral health and mental health due to Connecticut Health Foundation's (CHF) current investments in these areas. Some data were obtained that are pertinent to these issues and are reported here.

Mental Health

The BRFSS indicates that 8.2 percent of Connecticut residents 18 and over self-report poor mental health 15 or more days in the past month. There is little variation by HRG on this indicator: 10.0 percent (age-adjusted) for the Urban Centers; 8.6 percent for the Manufacturing Centers; 9.2 percent for the Diverse Suburbs; 6.1 percent for the Wealthy Suburbs; 8.6 percent for the Mill Towns; and 7.0 percent for the Rural Towns. There do not appear to be significant race- and ethnicity-specific differences in mental health status, except for Asians, whose statewide rate — 4.6 percent — is significantly lower on the poor mental health indicator.

The federal government publishes estimates of adults' and youths' need for mental health treatment. The 2004 Connecticut estimate for "serious mental illness" was 143,493.

Recent national data indicate that, on interview, 6.3 percent of parents thought that a son in the age range, 4 to 17 years old had "definite or severe difficulties with emotions, concentration, behavior, or being able to get along with others." This was true for only 3.3 percent of girls in the same age range.

The data show statistically significant race and ethnicity differences: 8.3 percent of black boys were assessed by a parent to have such difficulties, as compared with 6.6 percent of white boys, and 4.7 percent of Hispanic or Latino boys.

The comparable — but not statistically different — rates for girls the same age were: 3.8 percent of white girls, 2.7 percent of black girls, and 2.6 percent of Hispanic or Latino girls.

The family structure "mother present, no father in the household" was also associated with higher rates of perceived difficulties.[215]

See Appendix M for further discussion of mental health in Connecticut and www.cthealth.org for selected data.

Oral Health

Overall, 79.2 percent of Connecticut residents reported a "past year" dental visit in the previous year. This rate varies by HRG in that only 71.8 percent of the Urban Center residents 18 and over reported a visit, 73.9 percent of Manufacturing Center residents, 77.3 percent of Diverse Suburbs residents, 85.8 percent of Wealthy Suburb residents, 80.5 percent of Mill Town residents, and 83.6 percent of Rural Town residents.

Dental visits varied significantly by race and ethnicity: 81.7 percent of white residents, 72.2 percent of Asian residents, 66.5 percent of black residents, and 65.8 percent of Hispanic residents.

There are no overall data about oral health for children in Connecticut. Recent 2005 data prepared by Connecticut Voices for Children regarding children 3 to 19 continuously enrolled in HUSKY A, Connecticut's Medicaid managed care program, indicate that approximately 41 percent of the children involved in that program received preventive oral health care, and 22 percent received treatment. Both of these rates were virtually unchanged from 2004.

The child's age was the chief variable in preventive care and treatment, from a low of 38 percent in the 3- to 5-year-old age group to 51 percent in the 6- to 8-year-old group, 49 percent between 9 and 11 years old, 42 percent age 12-14, and 28 percent age 15-19. These percentages were virtually unchanged from 2004.

Hispanic children in HUSKY A had the highest rate of preventive care (44 percent), while black and white children each had a 39 percent rate. "Other" children had a 44 percent rate. These rates were unchanged from 2004. Treatment rates showed a slightly different pattern: 26 percent of "other" children were treated, followed by 23 percent of Hispanic children, 21 percent of white children, and 20 percent of black children.[216]

Additional data obtained from Connecticut Voices for Children have demonstrated expected differences by HRG in the percentage of children enrolled in HUSKY A, but only slight differences among HRGs in the percentages of participation of HUSKY A enrollees in dental care.[217]

TABLE 123: CHILDREN AGE 3-19 CONTINUOUSLY ENROLLED IN HUSKY A, 2004

AREA	Population		Percentage Enrollment	Any Dental Care		Preventive Dental Care		Treatment Dental Care	
	Enrolled, 2004	Population 3-19, 2000		N	%	N	%	N	%
HRG 1 (3)-UC	45,966	104,469	44.0	23,594	51.3	19,002	41.3	10,094	22.0
HRG 2 (10)-MC	43,263	146,266	29.6	19,829	45.8	17,108	39.5	8,649	20.0
HRG 3 (15)-DS	23,440	127,728	18.4	10,621	45.3	9,090	38.8	4,788	20.4
HRG 4 (27)-WS	4,141	122,050	3.4	1,795	43.3	1,553	37.5	886	21.4
HRG 5 (39)-MT	18,776	153,571	12.2	8,731	46.5	7,651	40.7	3,998	21.3
HRG 6 (75)-RT	10,333	140,805	7.3	4,523	43.8	3,984	38.6	2,098	20.3
Unknown	679	-	-	326	48.0	296	43.6	163	24.0
Total	146,598	794,889	18.4	69,419	47.4	58,684	40.0	30,676	20.9

Source: Connecticut Voices for Children; U.S. Census 2000, SF1: Table P12.

OVERALL COMMENT ON THE FINDINGS AND RECOMMENDATIONS

Some of the findings and recommendations in this report may be more difficult than others to embrace and implement. This is partly because they locate the problem at all levels of the "system": state, health provider, corporate, community, family, peer group and individual. Each level may require work for the health outcome to change. Changing cultural norms will be important as well.

Focusing on diabetes, for example, and more generally on the metabolic syndrome, will require changes in how primary care providers counsel patients about issues of obesity, diet and exercise. It will require changes in how parents understand and implement their responsibilities regarding their children's diet, exercise and TV-watching.

Focusing on metabolic syndrome diseases will also require changing community-specific cultural norms about food and exercise, as well as limiting the "selling" of residents and their children on unhealthy diets. The state will need to expand its capacity to collect population-based data on children and youth to make better estimates of the extent of their out-of-school activities and risk behaviors.

The effort will require policy changes — such as school bus and school lunch policies — and providing more opportunities and support for safe walking, rollerblading and biking to school, to work and for recreation. Transportation policy has a significant role to play.

In summary, a systems view will require supporting investigations and action in each part of the causal chain to improve health outcomes for current and future residents of Connecticut.

U.S. Census Bureau
American FactFinder

FACT SHEET

Waterbury city, Connecticut

2006 American Community Survey
Data Profile Highlights:

NOTE. Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.

Social Characteristics - show more >>	Estimate	Percent	U.S.	Margin of Error
Average household size	2.42	(X)	2.61	+/-0.11
Average family size	3.14	(X)	3.20	+/-0.13
Population 25 years and over	67,550			+/-4,389
High school graduate or higher	(X)	79.6	84.1%	(X)
Bachelor's degree or higher	(X)	13.5	27.0%	(X)
Civilian veterans (civilian population 18 years and over)	N	N	10.4%	N
Disability status (population 5 years and over)	15,788	16.7	15.1%	+/-2,178
Foreign born	10,681	10.2	12.5%	+/-2,215
Male, Now married, except separated (population 15 years and over)	14,728	37.7	52.4%	+/-1,652
Female, Now married, except separated (population 15 years and over)	14,096	32.7	48.4%	+/-1,641
Speak a language other than English at home (population 5 years and over)	N	N	19.7%	N
Household population	102,488			+/-7,700
Group quarters population	(X)	(X)	(X)	(X)

Economic Characteristics - show more >>	Estimate	Percent	U.S.	Margin of Error
In labor force (population 16 years and over)	53,094	65.6	65.0%	+/-4,320
Mean travel time to work in minutes (workers 16 years and over)	22.6	(X)	25.0	+/-1.2
Median household income (in 2006 inflation-adjusted dollars)	37,673	(X)	48,451	+/-2,342
Median family income (in 2006 inflation-adjusted dollars)	42,246	(X)	58,526	+/-3,740
Per capita income (in 2006 inflation-adjusted dollars)	20,288	(X)	25,267	+/-1,235
Families below poverty level	(X)	18.1	9.8%	(X)
Individuals below poverty level	(X)	19.7	13.3%	(X)

Housing Characteristics - show more >>	Estimate	Percent	U.S.	Margin of Error
Total housing units	48,427			+/-2,398
Occupied housing units	42,270	87.3	88.4%	+/-2,377
Owner-occupied housing units	21,332	50.5	67.3%	+/-1,821
Renter-occupied housing units	20,938	49.5	32.7%	+/-2,228
Vacant housing units	6,157	12.7	11.6%	+/-1,519
Owner-occupied homes	21,332			+/-1,821
Median value (dollars)	156,800	(X)	185,200	+/-6,965
Median of selected monthly owner costs				
With a mortgage (dollars)	1,384	(X)	1,402	+/-50
Not mortgaged (dollars)	592	(X)	399	+/-32

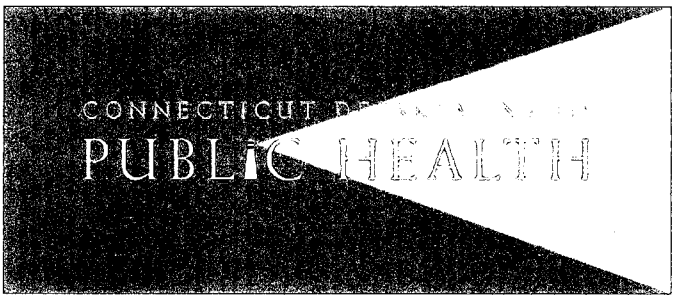
ACS Demographic Estimates - show more >>	Estimate	Percent	U.S.	Margin of Error
Total population	104,341			+/-7,698
Male	50,560	48.5	49.2%	+/-4,340
Female	53,781	51.5	50.8%	+/-4,180

Median age (years)	35.0	(X)	36.4	+/-1.9
Under 5 years	8,033	7.7	6.8%	+/-1,714
18 years and over	78,425	75.2	75.4%	+/-4,920
65 years and over	13,913	13.3	12.4%	+/-1,579
One race	97,679	93.6	98.0%	+/-6,840
White	65,829	63.1	73.9%	+/-5,916
Black or African American	20,013	19.2	12.4%	+/-4,148
American Indian and Alaska Native	267	0.3	0.8%	+/-304
Asian	1,186	1.1	4.4%	+/-1,388
Native Hawaiian and Other Pacific Islander	0	0.0	0.1%	+/-269
Some other race	10,384	10.0	6.3%	+/-2,829
Two or more races	6,662	6.4	2.0%	+/-2,442
Hispanic or Latino (of any race)	28,642	27.5	14.8%	+/-4,099

Source: U.S. Census Bureau, 2006 American Community Survey

Explanation of Symbols:
'****' - The median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
'*****' - The estimate is controlled. A statistical test for sampling variability is not appropriate.
'N' - Data for this geographic area cannot be displayed because the number of sample cases is too small.
'(X)' - The value is not applicable or not available.

The letters PDF or symbol indicate a document is in the Portable Document Format (PDF). To view the file you will need the Adobe® Acrobat® Reader, which is available for free from the Adobe web site.



Keeping Connecticut Healthy

THE BURDEN OF CARDIOVASCULAR DISEASE IN CONNECTICUT

2006 Surveillance Report

DECEMBER 2006



State of Connecticut
Department of Public Health
410 Capitol Avenue
P.O. Box 340308
Hartford, CT 06134-0308

0566
09/15/08

Prepared by

Margaret M. Hynes, Ph.D., M.P.H. and Betty C. Jung, R.N., M.P.H., C.H.E.S.
Connecticut Department of Public Health
Health Information Systems and Reporting Section
Surveillance and Reporting Unit

Acknowledgments

We gratefully acknowledge the Connecticut Department of Public Health staff who reviewed this report:

Chris Andresen
Lauren Backman, RN, MS
Marcie Cavacas, MS
Joan Foland, MHS, MPhil
Donna Heins, RN, MPH, CHES
Pamela Hodge
Gene Nichols
Barbara Pickett, MPH, MS
Gary St. Amand
Thomas St. Louis, MsPH
Anil Shah, DVM
Charlie Slaughter, MS, RD
Dawn Sorosiak, MBA
Carol Stone, PhD
Bill Teel, PhD

INTRODUCTION

Cardiovascular diseases involve the body's vascular system, which is responsible for supplying oxygen and nutrients to the body's organs and cells. The most common forms of cardiovascular disease are coronary heart disease and cerebrovascular disease. Essential hypertension, congestive heart failure, and atherosclerosis are other common cardiovascular diseases. Cardiovascular diseases (CVD) are of great public health concern because more than one-third of all deaths in the United States and Connecticut are due to CVD and because prevention efforts have shown such great potential in reducing CVD morbidity, mortality, and disability.[1]

Coronary heart disease and cerebrovascular disease deaths have shown decreasing trends over time in the United States and Connecticut.[2] Despite advances in treatment, however, the number of congestive heart failure deaths has increased steadily in Connecticut and the United States most likely because people are surviving heart attacks experienced earlier in life.[3] Approximately 59% of all congestive heart failure deaths in Connecticut occur to persons aged 85 or older. In contrast, only 39% of all coronary heart disease deaths and 46% of all cerebrovascular disease deaths occur in persons 85 and older.[4]

THE BURDEN OF CARDIOVASCULAR DISEASE IN CONNECTICUT

Mortality

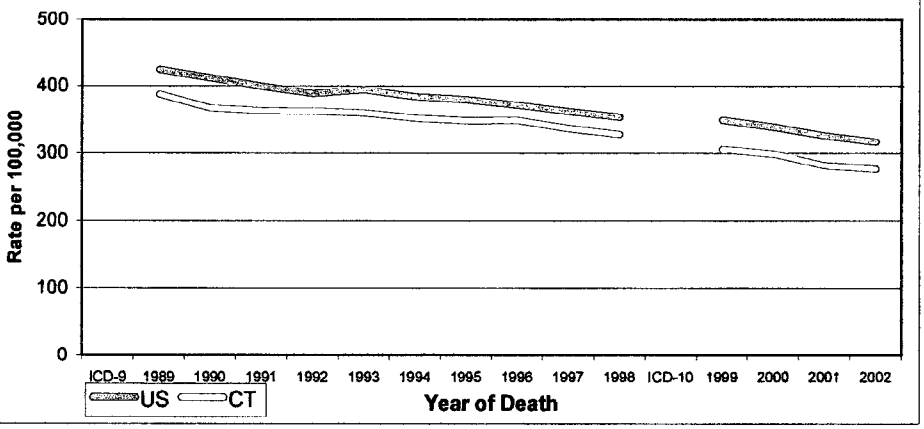
Cardiovascular diseases accounted for 11,365 Connecticut resident deaths in 2002, or about 38% of all deaths for the period.[5] In contrast, cancer deaths comprised 24%, chronic lower respiratory disease comprised 5%, unintentional injuries comprised 4%, and diabetes comprised 2% of all Connecticut resident deaths in 2002 (Table 1).

Table 1. CONNECTICUT RESIDENT DEATHS – 2002

- 30,055 Deaths from All Causes
- 11,365 Cardiovascular Disease Deaths
- 7,130 Cancer Deaths
- 1,452 Chronic Lower Respiratory Disease Deaths
- 1,155 Unintentional Injury Deaths
- 674 Diabetes Deaths

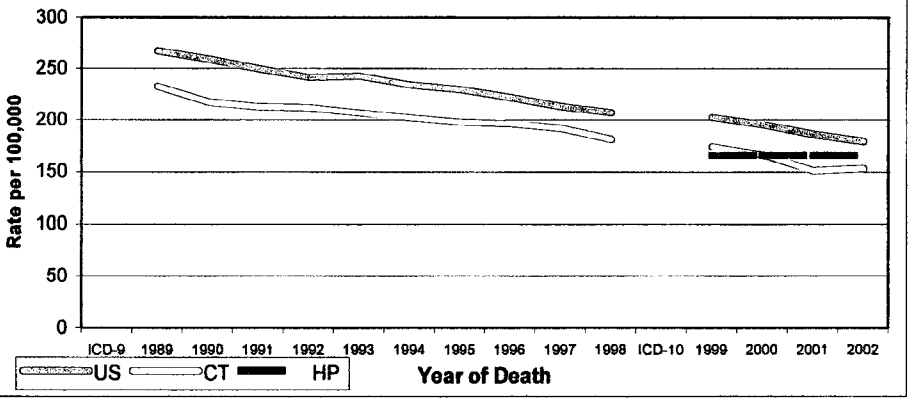
Source: Connecticut Department of Public Health, Vital Records Mortality Files, 2005.

Figure 2. Cardiovascular Age-adjusted Mortality Rates, Connecticut & the United States



Sources: Centers for Disease Control and Prevention, 2005; Connecticut Department of Public Health, 2005. Note: Rates are adjusted to the 2000 US standard million population. Classification includes deaths with ICD-9 codes: 390-459.9 (1989 to 1998); ICD-10 codes: I00, I78.9 (1999 to 2002).

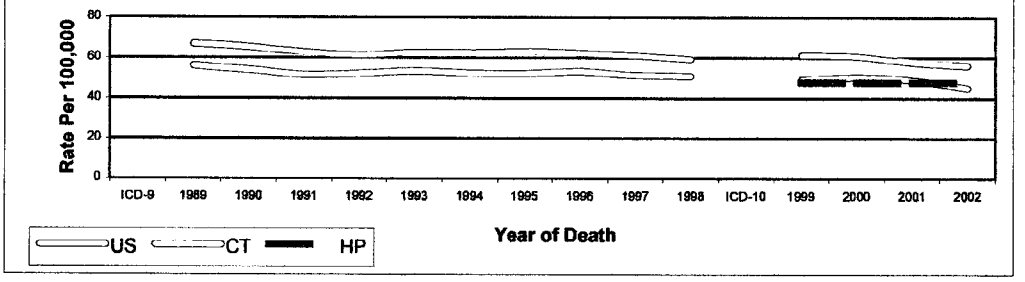
Figure 3. Coronary Heart Disease Age-adjusted Mortality Rates, Connecticut, United States & Healthy People 2010 Target



Sources: Centers for Disease Control and Prevention, 2005; Connecticut Department of Public Health, 2005. Note: Rates are adjusted to the 2000 US standard million population. Classification includes deaths with ICD-9 codes: 402,410-414, 429.2 (1989 to 1998); ICD-10 codes: I11, I20-25 (1999 to 2002).

Between 1989 and 1998 age-adjusted stroke mortality rates did not change significantly for the Connecticut population as a whole. Connecticut death rates from stroke have been consistently lower than those of the U.S., and very close to the *Healthy People 2010* target of 48 per 100,000 population (Figure 4).[10,11]

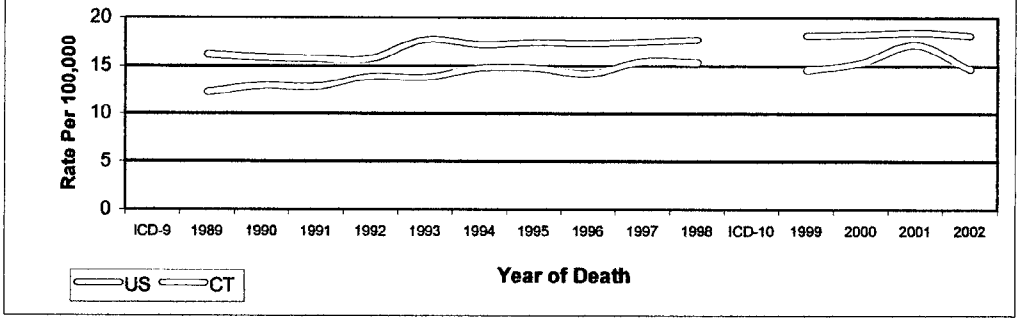
Figure 4. Stroke Age-adjusted Mortality Rates, Connecticut, United States & Healthy People 2010 Target



Sources: Centers for Disease Control and Prevention, 2005; Connecticut Department of Public Health, 2005.
Note: Rates are adjusted to the 2000 US standard million population. Classification includes deaths with ICD-9 codes: 430-438 (1989 to 1998); ICD-10 codes: I60-69 (1999 to 2002).

Between 1989 and 1998 congestive heart failure (CHF) age-adjusted mortality rates increased significantly for the Connecticut population as a whole ($p < .01$). There is no *Healthy People 2010* target for congestive heart failure (Figure 5).

Figure 5. Congestive Heart Failure Age-adjusted Mortality Rates, Connecticut and the United States



Sources: Centers for Disease Control and Prevention, 2005; Connecticut Department of Public Health, 2005.
Note: Rates are adjusted to the 2000 US standard million population. Classification includes deaths with ICD-9 code: 428.0 (1989 to 1998); ICD-10 codes: I50.0 (1999 to 2002).

Mortality by Gender

Approximately 55% of all Connecticut resident CVD deaths in 2002 were female. While more females than males die from CVD in Connecticut, males have higher age-adjusted mortality rates (Table 2).[12] In 2002, Connecticut males had a 45% higher death rate due to CVD compared with females and a 60% higher death rate due to CHD ($p < .001$ for both comparisons). Connecticut males and females had equivalent rates of death due to stroke and congestive heart failure in 2002.

Table 2. Cardiovascular Diseases Deaths and Age-adjusted Mortality Rates (AAMR) per 100,000 population - Connecticut Residents, 2002

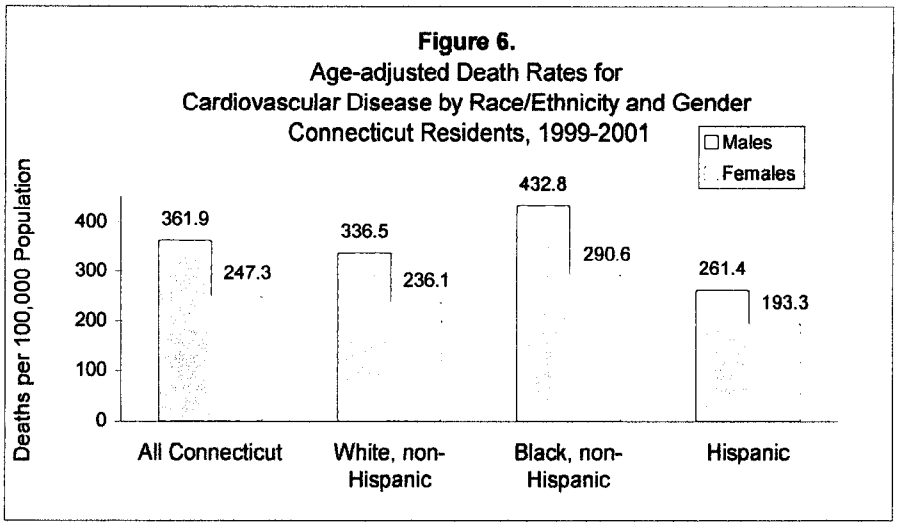
Cause of Death	All		Male		Female	
	Deaths	AAMR	Deaths	AAMR	Deaths	AAMR
All Cardiovascular Diseases	11,365	277.8	5,139	337.0	6,226	231.7
Coronary Heart Disease	6,246	153.3	2,998	195.3	3,248	120.2
Stroke	1,867	45.2	684	45.2	1,183	44.3
Congestive Heart Failure	629	14.7	240	16.6	389	13.4

Source: Connecticut Department of Public Health, Vital Records Mortality Files, 2005.

Mortality by Race/Ethnicity and Gender

Cardiovascular Disease

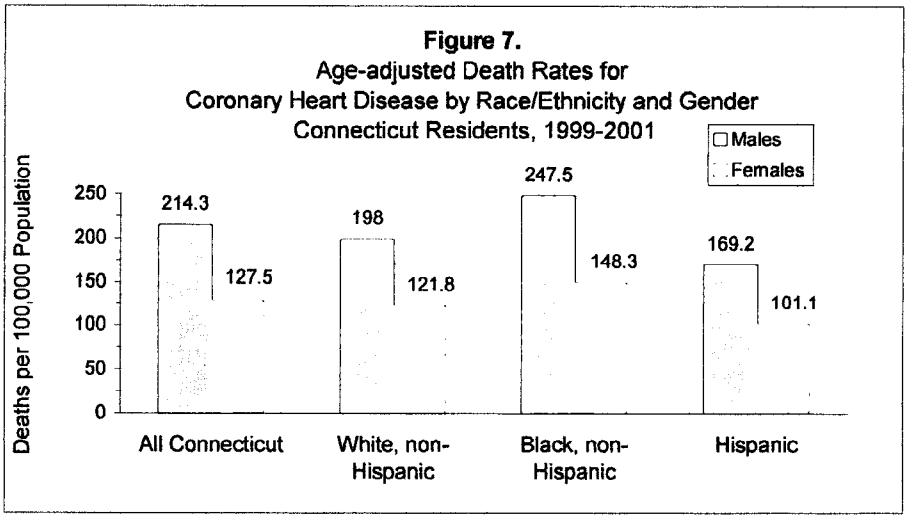
Age-adjusted CVD death rates differ by race, ethnicity and gender with Black (non-Hispanic) males and females having significantly higher CVD death rates compared with White (non-Hispanic) males and females, respectively ($p < .001$ for both comparisons). Hispanic males and females have significantly lower death rates due to CVD than do White males and females ($p<.01$ for both comparisons) [Figure 6].[13] CVD death rates declined significantly for White and Black males and White females between 1989-91 and 1996-98 ($p < .01$ for all comparisons). CVD death rates did not change significantly for other subpopulation groups during this time period.[14]



Source: Connecticut Department of Public Health, Vital Records Mortality Files, 2005.

Coronary Heart Disease

Coronary heart disease death rates differ by race, ethnicity, and gender with Black (non-Hispanic) males and females having significantly higher CHD death rates compared with White (non-Hispanic) males and females, respectively ($p < .01$ for both comparisons). White and Hispanic males do not have significantly different death rates due to CHD. White females have significantly higher CHD death rates compared with Hispanic females ($p < .05$) [Figure 7].[15] CHD death rates declined significantly among White males and females between 1989-91 and 1996-98 ($p < .001$), while CHD death rates did not change significantly for other subpopulation groups during this time period.[16]



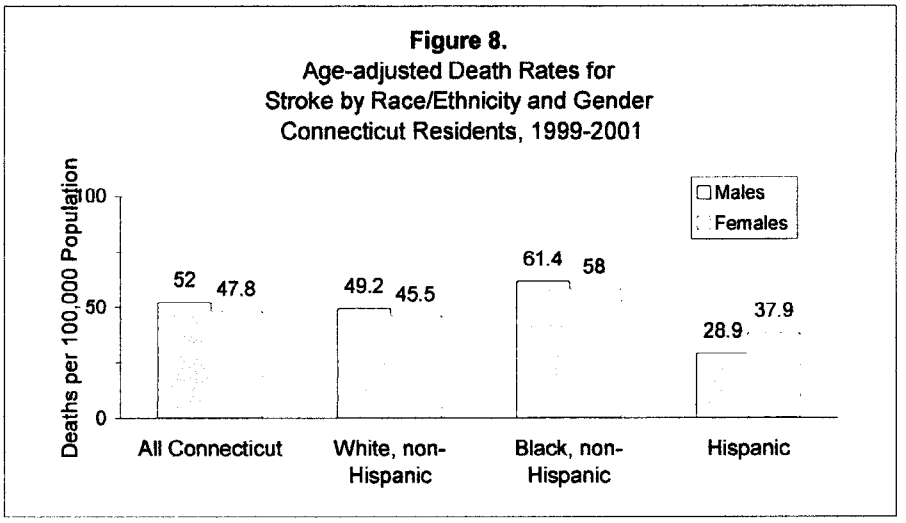
Source: Connecticut Department of Public Health, Vital Records Mortality Files, 2005.

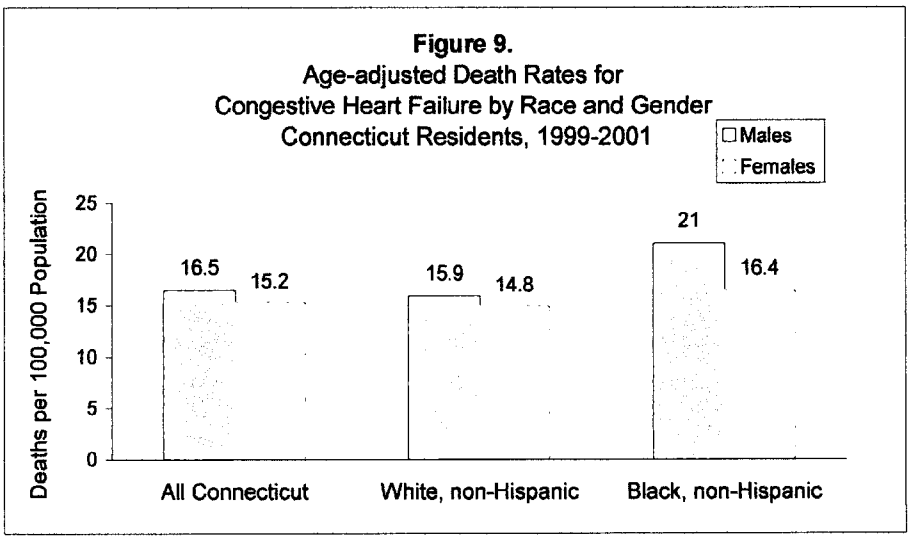
Stroke

Age-adjusted stroke death rates differ somewhat by race, ethnicity and gender. Stroke death rates (1999-2001) of Black and White males are not significantly different; however, they are significantly higher than Hispanic male stroke death rates ($p < .01$ for both comparisons). Black females have significantly higher age-adjusted stroke death rates compared with White and Hispanic females ($p < .05$ for both comparisons). Age-adjusted stroke death rates of White and Hispanic females are not significantly different (Figure 8).[17] Age-adjusted stroke death rates declined significantly for Black males between 1989-91 and 1996-98 ($p < .05$), but did not change significantly for other subpopulation groups during this time period.[18]

Congestive Heart Failure

Age-adjusted congestive heart failure (CHF) death rates do not differ significantly by race and gender (Figure 9). There were too few deaths among Connecticut Hispanic residents (N=30) in the period 1999-2001 to calculate stable mortality rate estimates. Age-adjusted CHF death rates increased significantly for all Connecticut residents between 1989-91 and 1996-98 ($p<.01$); the increase was significant for Black and White females but not for other subpopulation groups during this time period.[19]





Source for Figures 8 and 9: Connecticut Department of Public Health, Vital Records Mortality Files, 2005.

0573
09/15/08

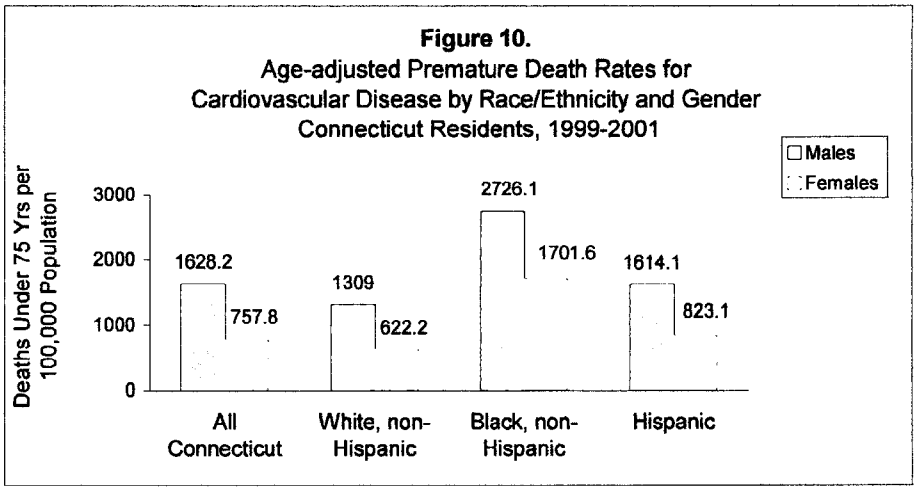
Premature Mortality by Race/Ethnicity and Gender

Premature mortality, defined as the "years of potential life lost before age 75," emphasizes deaths that occur at younger ages. For example, a person who dies at age 45 is considered to have lost 30 years of life, and a person who dies at 70 is considered to have lost 5 years of life.[20]

Cardiovascular Disease

Black (non-Hispanic) residents have significantly higher age-adjusted premature CVD mortality rates (under 75 years) compared with White (non-Hispanic) and Hispanic residents ($p < .001$) [1999-2001 data](Figure 10).[21] CVD time-trend analyses show that age-adjusted premature CVD death rates declined significantly for the entire population ($p < .001$) between 1989-91 and 1996-98. CVD death rates declined significantly for White and Black males and White females ($p < .01$ for all comparisons), but did not change significantly for other subpopulation groups during this time period.[22]

Figure 10.
Age-adjusted Premature Death Rates for
Cardiovascular Disease by Race/Ethnicity and Gender
Connecticut Residents, 1999-2001

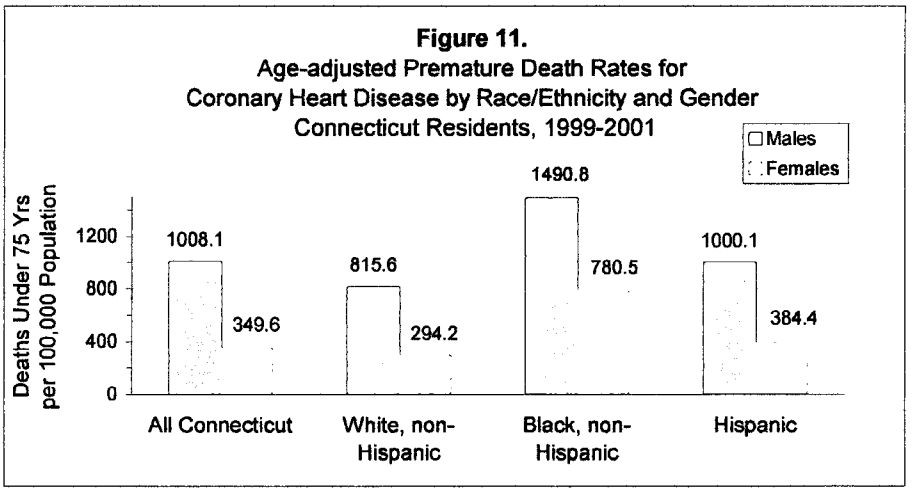


Source: Connecticut Department of Public Health, Vital Records Mortality Files, 2005.

Coronary Heart Disease

Black (non-Hispanic) residents have significantly higher age-adjusted premature coronary heart disease (CHD) mortality rates (under 75 years) compared with White (non-Hispanic) and Hispanic residents (1999-2001 data). Age-adjusted premature CHD mortality rates of White and Hispanic residents are not significantly different (Figure 11).[23] CHD time-trend analyses show that age-adjusted premature CHD death rates declined significantly for White males and females between 1989-91 and 1996-98, but did not change significantly for other subpopulation groups during this time period.[24]

0574
09/15/08



Source: Connecticut Department of Public Health, Vital Records Mortality Files, 2005.

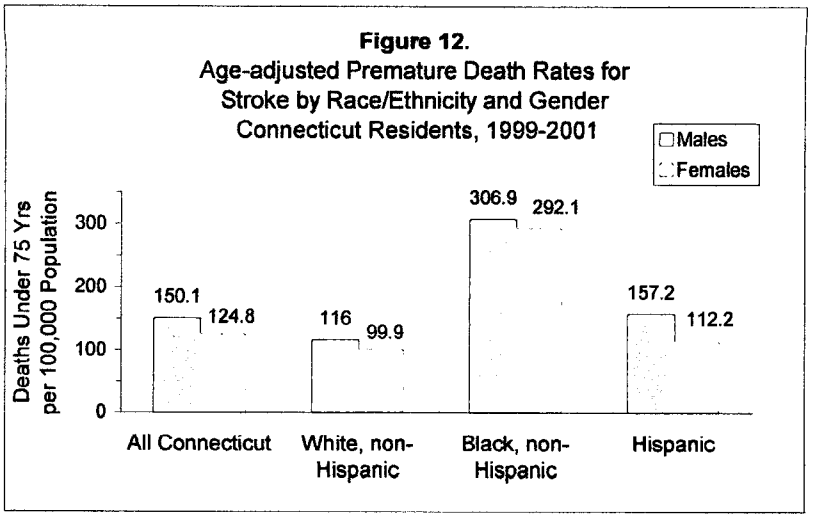
Stroke

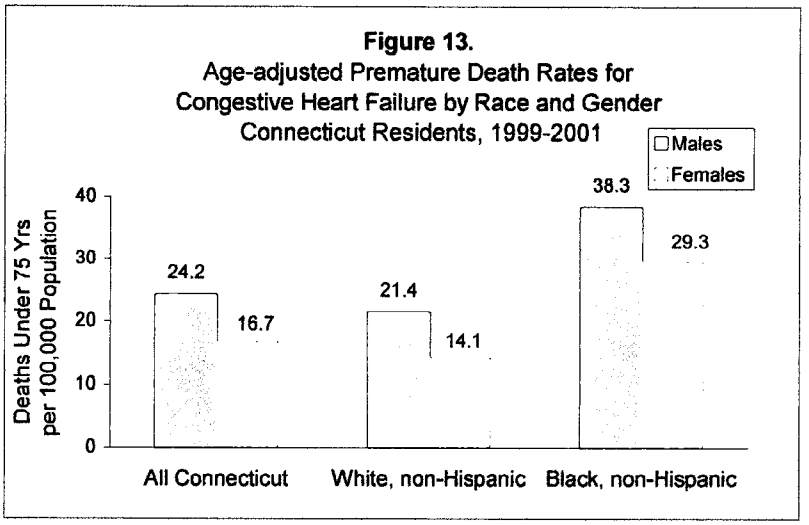
Age-adjusted premature stroke death rates differ somewhat by race, ethnicity and gender. Black males have significantly higher premature stroke death rates (1999-2001 data) than do White and Hispanic males ($p < .01$ for both comparisons). Age-adjusted premature stroke death rates of White and Hispanic males are not significantly different. Black females have significantly higher premature stroke death rates compared with White and Hispanic females ($p < .01$ for both comparisons). Age-adjusted premature stroke death rates of White and Hispanic females are not significantly different (Figure 12).[25] Time trend analyses show that age-adjusted premature stroke death rates declined significantly among Black males between 1989-91 and 1996-98, but did not change significantly for other subpopulation groups during this time period.[26]

Congestive Heart Failure

Age-adjusted premature CHF mortality rates (under 75 years) of White and Black residents are not significantly different (1999-2001 data).[27] There were insufficient numbers of CHF deaths among Hispanics to calculate reliable premature mortality rates (Figure 13).

Age-adjusted premature CHF death rates increased significantly for the entire population ($p < .01$) between 1989-91 and 1996-98. This increase was significant for White females ($p < .001$) and Black females ($p<.05$), but not for other subpopulation groups during this time period.[28]





Source for Figures 12 and 13: Connecticut Department of Public Health, Vital Records Mortality Files, 2005.

0576
09/15/08

Morbidity

During 2002, there were 62,174 discharges from Connecticut hospitals for all cardiovascular diseases. This represents 20% of all hospital discharges (excluding pregnancy and childbirth related discharges) and 23% of all hospital billing charges in the state. Approximately 34% of all cardiovascular disease discharges were due to coronary heart disease (CHD), 12% were for stroke discharges, and 16% were for discharges with congestive heart failure. The median length of stay for CHD, stroke, and congestive heart failure was three, four, and four days, respectively. The median length of stay for all hospital discharges in Connecticut during the same period was three days. [29]

Hospitalization Rates by Gender

Connecticut males have significantly higher rates of hospitalizations for all cardiovascular diseases, coronary heart disease, stroke, and congestive heart failure compared with Connecticut females ($p < .05$). More females than males, however, are hospitalized for stroke and congestive heart failure [Table 3].[30]

Table 3. Cardiovascular Diseases Hospitalizations and Age-adjusted Hospitalization Rates (AAHR) per 100,000 population - Connecticut Residents by Gender, 2002

Cause of Death	All		Male		Female	
	Number	AAHR	Number	AAHR	Number	AAHR
All Cardiovascular Diseases	62,174	1,630.2	33,097	2,059.3	29,077	1,289.1
Coronary Heart Disease	21,178	561.2	12,954	791.4	8,224	372.7
Stroke	7,618	198.3	3,618	227.7	4,000	174.5
Congestive Heart Failure	10,076	255.9	4,656	299.9	5,420	224.8

Source: Connecticut Department of Public Health, Connecticut Hospital Discharge Abstract and Billing Data Base, 2005.

Hospitalization Rates by Race and Ethnicity

Black (non-Hispanic) Connecticut residents have significantly higher rates of hospitalizations than both White (non-Hispanic) and Hispanic residents for all cardiovascular diseases, coronary heart disease, stroke, and congestive heart failure ($p < .05$ for all comparisons). Hispanic residents have significantly higher rates of hospitalizations than Whites for all cardiovascular diseases and for congestive heart failure; however, Hispanic-White differences in hospitalizations for CHD and stroke are not significantly different (Table 4).[31]

0577
09/15/08

Table 4. Cardiovascular Diseases Hospitalizations and Age-adjusted Hospitalization Rates (AAHR) per 100,000 population - Connecticut Residents by Race/Ethnicity, 2002

Cause of Death	All Residents		White, Non-Hisp		Black, Non-Hisp		Hispanic	
	Number	AAHR	Number	AAHR	Number	AAHR	Number	AAHR
All Cardiovascular Diseases	62,174	1,630.2	52,631	1,54.9	4,783	2,081.8	2,639	1,718.9
Coronary Heart Disease	21,178	561.2	18,032	538.7	1,153	495.2	912	597.4
Stroke	7,618	198.3	6,479	187.0	642	287.4	267	173.4
Congestive Heart Failure	10,076	255.9	8,459	233.4	921	415.6	522	398.2

Source: Connecticut Department of Public Health, Connecticut Hospital Discharge Abstract and Billing Data Base, 2005.

Coronary Heart Disease Treatment: Revascularization Procedures

Surgical interventions—coronary artery bypass graft surgery (bypass surgery or CABG), valvular surgery, and percutaneous transluminal coronary angioplasty (angioplasty or PTCA)—are commonly used to treat coronary artery disease. These revascularization procedures provide a new, additional, or augmented blood supply to the heart. Use of these procedures nationally and in Connecticut has increased with the development of this technology.[32] In 2002, there were 5,812 hospital discharges receiving PTCA, 3,000 receiving CABG, and 1,178 receiving valvular surgery in Connecticut. Revascularization procedures can be effective, but costly. In 2002, median charges for PTCA, CABG, and valvular surgery were $22,200, $40,776, and $53,869 for Connecticut residents.[33]

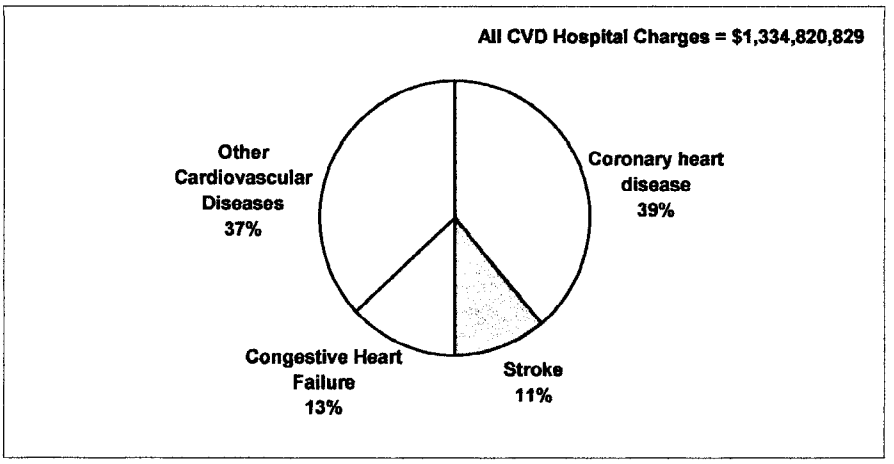
Economic Costs

The estimated national annual cost for the medical management of cardiovascular disease is $403.1 billion in 2006, or $1,352 per person.[34] This estimate includes direct medical costs and indirect costs associated with lost productivity from illness and death. Both heart disease and stroke can accrue enormous indirect costs. They are major causes of disability and the ability to live independently, and they can severely impact the quality of life for individuals and families. Assuming that per person costs are the same in Connecticut as they are nationwide, the estimated economic burden of CVD in our state is about $4.7 billion. A large portion of these costs is attributable to inpatient hospitalizations.

Total Connecticut CVD hospital charges in 2002 were about $1.3 billion, with a median charge of $13,500 (Figure 14). About 39% of total CVD hospitalization charges were for CHD, 11% were for stroke, and 13% were for congestive heart failure hospitalizations. Median hospital charges were $17,662 for coronary heart disease, $12,013 for stroke, and $11,248 for congestive heart failure. In contrast, the median charge for all hospital discharges in Connecticut was $8,451.[35]

0578
09/15/08

Figure 14. Cardiovascular Disease Hospital Charges, Connecticut Residents - 2002



Source: Connecticut Department of Public Health, Connecticut Hospital Discharge Abstract and Billing Data Base, 2005.

Risk Factors for Cardiovascular Diseases

Risk factors for cardiovascular diseases include non-modifiable (increasing age, family history) and modifiable (high blood pressure, high cholesterol, smoking, diabetes, obesity, physical inactivity) factors (Table 5). Increasing age is a key risk factor for heart disease, stroke, and congestive heart failure. About 86% of all heart disease deaths in Connecticut occur among those aged 65 and older (1999-2001 data). For men, major increases in heart disease mortality rates begin in the 35-to-39-year-old age group; for women, major increases in mortality begin at ages 55 to 59. About 92% of all stroke deaths and 96% of all congestive heart failure deaths in Connecticut occur among persons aged 65 and older (1999-2001 data).[36] A family history of heart disease and stroke increases one's risk of developing these diseases. A combination of inherited characteristics and behavioral patterns (similar dietary, smoking, and activity habits, for example) are thought to explain increased risk within families.[37, 38]

Lower socioeconomic position (SEP) is an important risk marker for cardiovascular disease (CVD). SEP is commonly measured by personal income, household income, or educational attainment level. Persons of lower SEP have higher CVD morbidity and mortality than do middle- or upper-income persons. Behavioral risk factors such as smoking, hypertension, and obesity are more prevalent in lower SEP persons and may explain some of the observed disparity;[39,40] however, other factors, like neighborhood socioeconomic environment, appear to have effects on individuals' risk for CVD.[41,42] Low-income neighborhood environments may contribute to increased CVD risk and poorer health outcomes because of such factors like poorer air quality, fewer food choices, and lower quality and/or lack of public services.[43] Lower-income persons tend to have less access to, and/or less effectively use, preventive health services that are important to the early detection and treatment of hypertension.[44] While low-socioeconomic

0579
09/15/08

position may be considered "modifiable" in the sense that people can move in and out of poverty during a lifetime or over generations, it is not usually within a given individual's control to change his or her social position or neighborhood environment.

Table 5. RISK FACTORS FOR CARDIOVASCULAR DISEASE

Modifiable Factors	Non-Modifiable Factors
• high blood pressure	• increasing age
• high cholesterol	• family history
• smoking	
• diabetes	
• obesity	
• physical inactivity	

Modifiable Risk Factors

Current Connecticut Behavioral Risk Factor Surveillance (BRFSS) data show that about one out of three Connecticut adults report having one or more modifiable risk factors for cardiovascular disease. Following are summaries of the five main risk factors (high blood pressure, high blood cholesterol, tobacco use, diabetes, and obesity) for coronary heart disease and stroke. Dyslipidemias had been traditionally regarded as a risk factor for CHD but not for cerebrovascular disease; however, several recent studies have established a direct relationship between increased serum lipids and stroke risk.[45]

High Blood Pressure

High blood pressure (HBP) is a major risk factor for heart attack and the most important modifiable risk factor for stroke. People with elevated blood pressure ($\geq$ 140mm Hg systolic / 90 mmHg diastolic) are 2 to 4 times more likely to develop CHD as are people with normal blood pressure.[46] About 26% of all stroke mortality is attributable to high blood pressure.[47] New federal guidelines classify normal blood pressure as below 120/80 mm Hg and readings from 120/80 Hg up to 140/90 mmHg as prehypertensive.[48]

Approximately 24% of Connecticut adults report that they have high blood pressure compared with about 25% of adults nationwide (Figure 15).[49] The risks for hypertension-related cardiovascular disease increase markedly with age, as does the prevalence of hypertension, and drug treatment for high blood pressure.[50] Black Connecticut adults experience high blood pressure more than White and Hispanic adults. About 36% of Black Connecticut adults report

0580
09/15/08

that they were told they had hypertension compared with 24% of White, and 14% of Hispanic adults in Connecticut (Figure 16).[51]

Figure 15.
Estimated Percentage of Adults with Modifiable Risk Factors for Cardiovascular Diseases
U.S. vs. Connecticut, Various Years

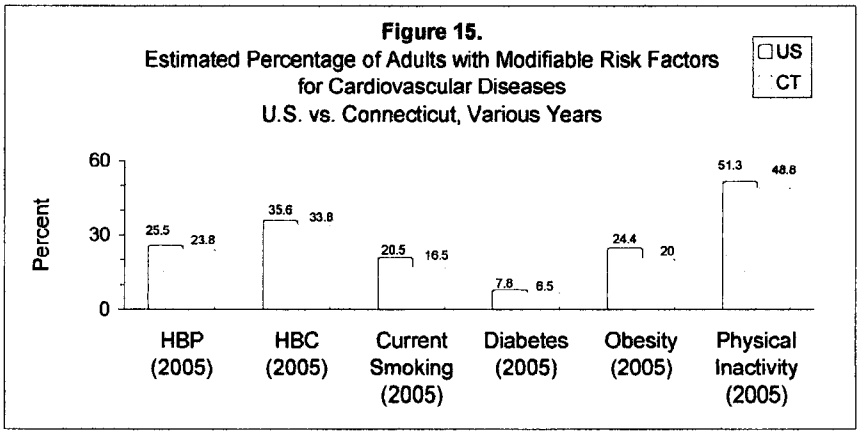
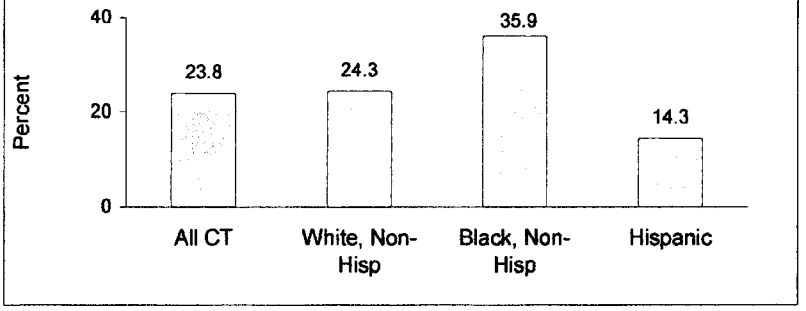


Figure 16.
High Blood Pressure Prevalence Among Connecticut Adults by Race and Ethnicity, 2005



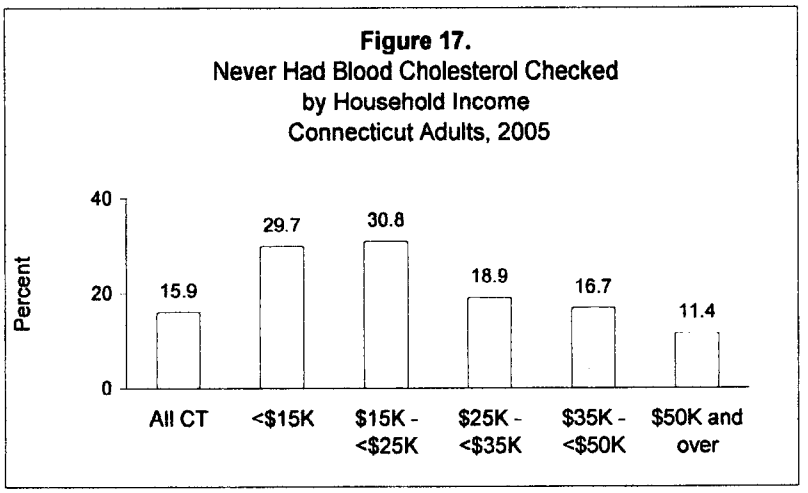
Source for Figures 15 and 16: Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System, 2005.

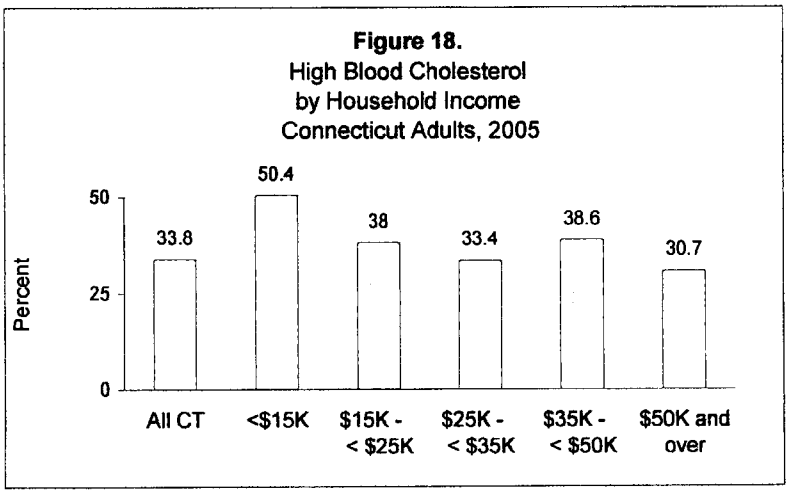
High Blood Cholesterol

High blood cholesterol (HBC) is considered a major risk factor for heart disease and a moderate risk factor for stroke. The Centers for Disease Control and Prevention estimates that more than 80% of people with high blood cholesterol do not have it under control. A 10% decrease in total blood cholesterol levels may reduce the incidence of coronary heart disease by as much as 30%. [52] Studies have found that stroke risk can be reduced with cholesterol-lowering medication among persons with higher cholesterol levels and persons with coronary artery disease.[53]

0581
09/15/08

Connecticut adults compare favorably to adults nationwide in terms of cholesterol screening and blood cholesterol levels. In 2005, 80% of Connecticut adults reported having had their blood cholesterol screened within the last five years compared with 73% of adults in the U.S.[54] About 34% of Connecticut adults were told they had high blood cholesterol (HBC) compared with about 36% of adults nationwide (Figure 15).[55] Lower-income Connecticut adults are more likely to report that they have never had their blood cholesterol checked compared with higher income adults (Figure 17). Among Connecticut adults who have had their cholesterol checked, lower-income residents are also more likely to report high blood cholesterol compared with higher-income adults in Connecticut (Figure 18).





Source for Figures 17 and 18: Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System, 2005.

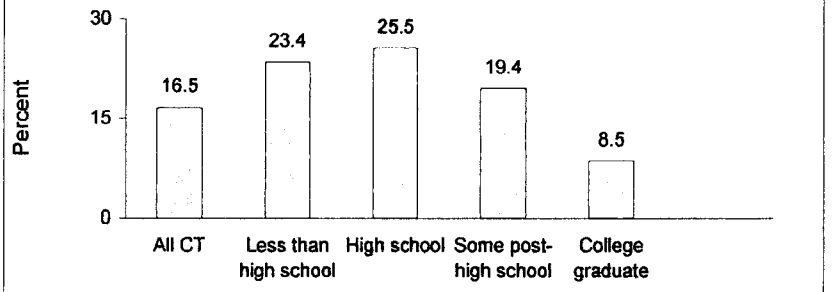
0582
09/15/08

Smoking

Cigarette smoking is a major modifiable risk factor for cardiovascular diseases. Smoking causes reduced blood vessel elasticity by increasing arterial wall stiffness. Smoking increases the risk of heart attack two-fold. Smokers have higher CHD mortality rates than non-smokers and their risk of death increases with greater number of cigarettes smoked. Current smokers have more than twice the risk of stroke compared with those who have never smoked.[56] Approximately 18% of strokes are attributable to current cigarette smoking.[57] People who stop smoking decrease their stroke risk and their risk of CHD mortality.[58]

In 2005, about 16% of Connecticut adults reported being current smokers compared with about 20% of adults nationwide (Figure 15). Connecticut adult smokers are more likely to be younger, with lower incomes, and less educated. For example, 31% of Connecticut adults 18 to 24 years old smoke compared with only 20% of those aged 45 to 54, and 7% of those aged 65 and older. About 30% of adults with household incomes under $15,000 smoke, compared with 14% of adults with household incomes of $50,000 or more. About 23% of adults with less than a high school education smoke compared with only about 8% of adults who graduated from college (Figure 19).[59]

Figure 19.
Current Smoking by Educational Attainment
Connecticut Adults, 2005



Source: Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System, 2005.

0583
09/15/08

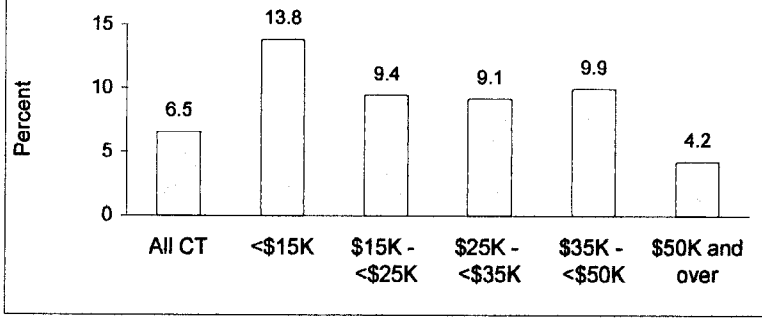
Diabetes

In recent years, diabetes has been recognized as a major risk factor for cardiovascular disease. Cardiovascular disease (CVD) is the primary cause of death for persons with diabetes, accounting for about 65% of mortality. Increased cardiovascular risk precedes the formal diagnosis of type 2 diabetes by many years. [60] Diabetic persons are 2 to 4 times more likely to develop coronary heart disease than the rest of the population and are at much greater risk of having a stroke.[61, 62] People with diabetes often have high blood pressure and high cholesterol and are overweight, increasing their risk for CVD even more. [63]

About 6.5% of Connecticut adults have been diagnosed with diabetes compared with almost 8% of adults nationwide (Figure 15).[64] Lower-income people are at higher risk of diabetes than are higher-income people. For example, approximately 14% of Connecticut adults with household incomes under $15,000 report having diabetes, compared with 4% of Connecticut adults with household incomes over $50,000 (Figure 20).[65]

Diabetes self-management education is essential because improperly controlled diabetes can result in cardiovascular disease, kidney disease, blindness and loss of limb. It is, therefore, a particular concern that 52% of Connecticut adults with diabetes reported that they had never taken a course to manage the disease.[66]

Figure 20.
Diabetes Prevalence by Household Income
Connecticut Adults, 2005



Source: Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System, 2005.

Obesity

Body mass index (BMI), or weight adjusted for height, is a widely used screening method for obesity. Medical guidelines identify normal/desirable weight as a BMI under 25, overweight as a BMI of 25 to 29.9, and obese as a BMI of 30 or more.[67] The prevalence of overweight and obesity has been increasing in the United States since the mid 1980s.[68] High calorie diets, along with less physical activity, in our society have contributed to the obesity epidemic.[69]

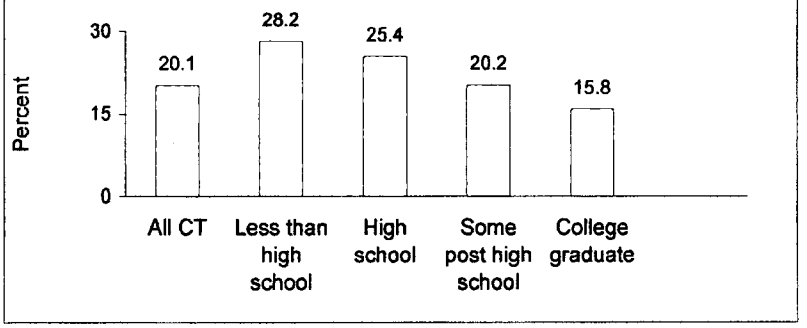
0584
09/15/08

Obesity is considered a metabolic disorder, which can be explained by a combination of hereditary and environmental factors. Obesity has been found to independently predict coronary atherosclerosis. Left ventricular hypertrophy, right heart changes and systemic hypertension are more common in those who are obese. While comorbidities relating obesity to coronary heart disease increase as BMI increases, body fat distribution is also an important factor.[70] For example, abdominal obesity places individuals at higher risk for health problems, including high blood pressure, high blood cholesterol, high triglycerides, diabetes, heart disease and stroke.[71] Obesity increases the risk of fatal and non-fatal stroke. Among females, increasing BMI is associated with increased risk of stroke. Among males, abdominal obesity, rather than BMI, is closely related to stroke risk.[72]

An estimated 20% of Connecticut adults are obese compared with about 24% of adults nationwide (Figure 15).[73] Approximately 38% of Connecticut adults are overweight, and 42% are normal or desired weight.[74] Adults with less education are more likely to be obese than adults with more education in Connecticut. For example, an estimated 28% of adults with less than a high school education are obese, compared with only 16% of college-educated Connecticut adults (Figure 21).[75] African American (non-Hispanic) females are more likely to be obese compared with White (non-Hispanic) and Hispanic females. An estimated 39% of African American adult females in Connecticut are obese, compared with 26% of Hispanic adult females, and 17% of White adult females (data not shown). There are no significant differences in obesity among Connecticut adult males by race or Hispanic ethnicity.[76]

Connecticut adults who are obese are significantly more likely to report that they are in poorer health compared with non-obese adults. Twenty percent of obese adults reported that they were in fair or poor health compared with about 10% of those who were overweight or of healthy weight (data not shown).[77]

Figure 21.
Obesity by Educational Level
Connecticut Adults, 2005



Source: Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System, 2005.

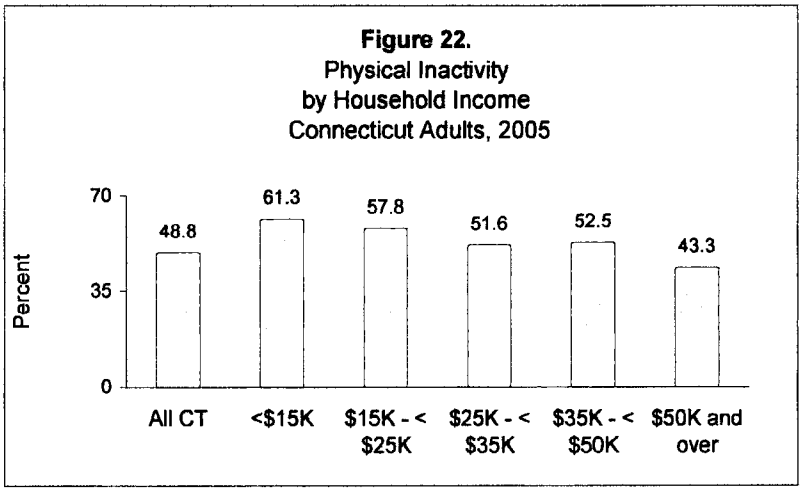
0585
09/15/08

Physical Inactivity

Physical inactivity and poor diet are associated with an increased risk of a number of chronic health conditions including cardiovascular disease, diabetes, some cancers, high blood pressure, overweight and obesity, back problems, and osteoporosis. [78, 79] Physical inactivity indirectly increases the risk of stroke because it is associated with high blood pressure.

The Centers for Disease Control and Prevention (CDC) and the American College of Sports Medicine (ACSM) recommend that all adults should engage in "at least 30 minutes of moderate-intensity physical activity on five or more days of the week." [80] Approximately 49% of Connecticut adults report having less than thirty minutes of moderate physical activity five or more days per week (Figure 22).

Physical inactivity increases with age. About 59% of Connecticut adults 65 and older do not meet the recommended CDC/ACSM activity levels compared with 34% of Connecticut adults aged 18 to 24 (data not shown). Lower-income adults are also more likely to be physically inactive compared with higher-income adults. About 61% of Connecticut adults with incomes of less than $15,000 per year are inactive compared with 43% of Connecticut adults earning $50,000 or more per year Figure 22).[81]



Source: Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System, 2005.

Co-Prevalence of Cardiovascular Risk Factors

Coronary heart disease and stroke share a common set of risk factors that are usually found among those who develop one or both of these diseases. For example, research has shown that 84% of those having both diabetes and hypertension were also found to have dyslipidemia (abnormal lipid levels),[82] and that the relative risk of ischemic heart disease, stroke, and all-cause mortality increases linearly with the number of metabolic risk factors (overweight, high blood

0586
09/15/08

pressure, high fasting glucose, and high total cholesterol).[83] Approximately 52% of Connecticut adults report having 2 or more and 25% report having 3 or more modifiable risk factors for CVD.[84] The co-prevalence of risk factors contributes to the complexity of disease management.

Recognizing the Signs and Symptoms of Heart Attack and Stroke

The *Healthy People 2010* national objectives for both heart disease and stroke include increasing the proportion of persons who are aware of the early warning symptoms and signs of heart attack and stroke and the necessity of calling 911 when persons are suffering from either of these conditions.[85] Early recognition and calling 911 increase the likelihood of immediate emergency transport to the hospital and timely medical care that can reduce disability and death.

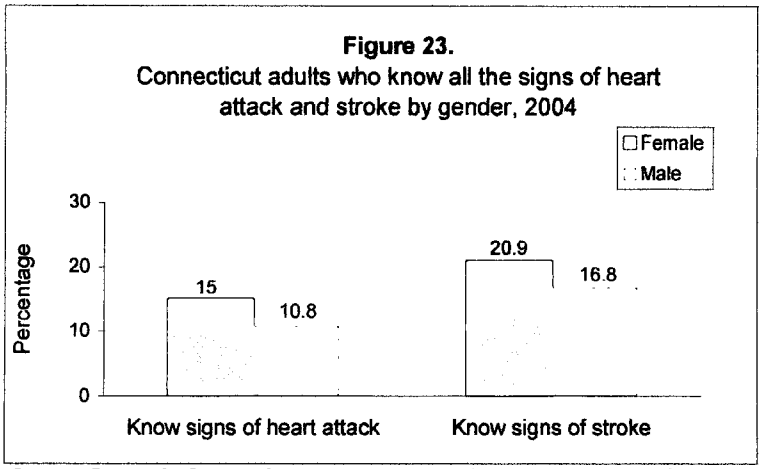
Table 6. WARNING SIGNS FOR HEART ATTACK AND STROKE

Heart Attack	Stroke
• Jaw, neck, back pain	• Severe headache with no known cause
• Lightheaded, faint	• Trouble seeing in one or both eyes
• Shortness of breath	• Trouble walking, dizziness, or loss of balance
• Arm or shoulder discomfort	• Confusion, trouble speaking
• Chest pain or discomfort	• Sudden numbness/weakness of face, arm, or leg

Source: Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System, 2004.

The percentage of Connecticut adults who know all the warning signs and symptoms for heart attack and stroke tends to be very low. About 13% of Connecticut adults know all the proper heart attack signs and 19% know all the proper stroke signs. Women tend to be more knowledgeable than men about signs and symptoms of heart attack and stroke. About 15% of Connecticut females know all heart attack signs compared with about 11% of males ($p < .05$). About 21% of Connecticut females know all stroke signs compared with about 17% of males ($p < .001$) [Figure 23].

Figure 23.
Connecticut adults who know all the signs of heart attack and stroke by gender, 2004



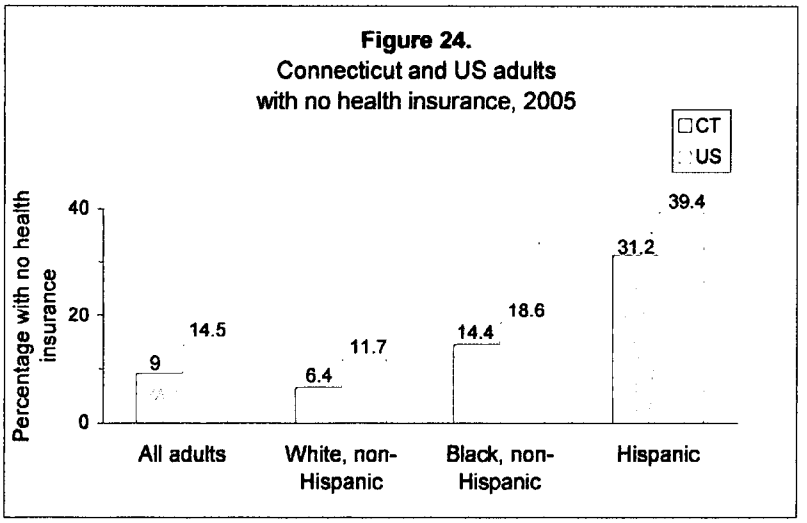
Source: Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System, 2005.

0587
09/15/08

Access to Health Care

Access to health care is key to the prevention, treatment, and management of heart disease and stroke. People without health insurance are less likely than others to have a usual source of care, to receive preventive health care services, and appropriate medical management of chronic conditions. About 9% of Connecticut adults aged 18 and over do not have health insurance compared with almost 15% of adults nationwide. Hispanic adults in Connecticut are least likely to report having health insurance (about 31%), followed by Black adults (14%), and White adults (6%). Comparable national figures show that about 39% of Hispanic adults, 19% of Black adults, and 12% of White adults nationwide reported having no health insurance (Figure 24).[86] The health status of the entire Connecticut population is compromised when large numbers of residents are uninsured, and it imposes a significant additional financial burden on our state.

Figure 24.
Connecticut and US adults
with no health insurance, 2005



Source: Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System, 2006.

Targeting High-Risk Populations

The high co-prevalence of risk factors for cardiovascular disease indicates the need to address all these risk factors rather than each factor individually in public health interventions. A special emphasis needs to be placed on adults with diabetes, whose high percentages of high blood pressure, overweight and obesity increase their risk for developing cardiovascular disease. Second, screening for high blood pressure, high cholesterol, and overweight is necessary to address the high co-prevalence of these three factors. Third, smoking cessation, cholesterol and blood pressure control would greatly benefit those with multiple risk factors, especially for those with diabetes (Table 7).

0588
09/15/08

Table 7. TARGETING HIGH-RISK POPULATIONS

- Address multiple risk factors together
- Emphasize risk factor interventions among adults with diabetes
- Screen for high blood pressure, high cholesterol, and overweight
- Emphasize smoking cessation, blood cholesterol management, and blood pressure control

Black Connecticut residents have higher coronary heart disease death and premature mortality rates compared with White and Hispanic Connecticut residents. Black females have higher stroke death rates, and Black males and females have higher premature stroke mortality rates compared with the respective White and Hispanic populations. Black Connecticut residents have significantly higher rates of some important modifiable risk factors for cardiovascular diseases, such as high blood pressure, diabetes, and overweight/obesity (females only) compared with White and Hispanic Connecticut residents. Lower-income residents are also more likely to have higher rates of high blood pressure, high cholesterol, diabetes, current smoking, obesity, and physical inactivity compared with higher-income residents. Targeted public health interventions are warranted for all Connecticut residents with multiple risk factors, and special emphasis should address risk factor reduction among Black and lower-income Connecticut residents.

Footnotes

[1] National Center for Health Statistics, 2006. *Deaths: Final Data for 2003* 54(13). Hyattsville, MD: Centers for Disease Control and Prevention, National Center for Health Statistics; Connecticut Department of Public Health, Vital Records Mortality Files, 2002. 2005. Hartford, CT: Connecticut Department of Public Health; Brownson, R.C., P.L Remington, and J.R. Davis. 1998. *Chronic Disease Epidemiology and Control.* Second edition. Washington, DC: American Public Health Association

[2] Brownson, et al. 1998; Hynes, M.M., L.M. Mueller, H. Li, and F. Amadeo. 2005. *Mortality and its Risk Factors in Connecticut, 1989-1998*, Hartford, CT: Connecticut Department of Public Health.

[3] American College of Cardiology Foundation and the American Heart Association. (August 2005). ACC/ AHA 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult. p.4. Retrieved May 1, 2007, from http://circ.ahajournals.org/cgi/content/full/112/12/e154

[4] Connecticut Department of Public Health. 2006. Age-specific mortality rates, 1999-2001. Unpublished tables.

[5] Connecticut Department of Public Health, Vital Records Mortality Files, 2002. 2005. *Connecticut Resident Deaths, 2002.* Hartford, CT: Connecticut Department of Public Health. Retrieved January 24, 2006. http://www.dph.state.ct.us/PB/HISR/CT_resident_deaths_2002.pdf

[6] World Health Organization. 1992. *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, Based on the Recommendations of the Tenth Revision Conference, 1992* Geneva: World Health Organization.

[7] Insel, P.M., & Roth, W.T. 2006. *Core Concepts in Health.* Tenth Edition. NY: McGraw-Hill. p. 290.

[8] Hynes, M.M., L.M. Mueller, H. Li, and F. Amadeo. 2005. *Mortality and its Risk Factors in Connecticut, 1989-1998*, Hartford, CT: Connecticut Department of Public Health. http://www.dph.state.ct.us/OPPE/Mortality/mortalityriskfactors.htm

0589
09/15/08

[9] Centers for Disease Control and Prevention. 2000. Healthy People 2010: Understanding and Improving Health. Second edition. Volume 1. Retrieved January 24, 2006. http://www.healthypeople.gov/Document/tableofcontents.htm#volume1
[10] Hynes, Mueller, Li and Amadeo, *op. cit.*
[11] *Ibid.*
[12] Connecticut Department of Public Health, Vital Records Mortality Files, 2002, *op. cit.*
[13] Connecticut Department of Public Health. 2006. Unpublished mortality tables.
[14] Hynes, Mueller, Li and Amadeo, *op. cit.*
[15] Hynes, M.M., F.A. Amadeo, and L.M. Mueller. 2005. *Connecticut Resident Mortality Summary Tables by Gender, Race, & Hispanic Ethnicity, 1999-2001.* Hartford, CT: Connecticut Department of Public Health. http://www.dph.state.ct.us/PB/HISR/CT_death_summary_1999-2001.pdf. Retrieved January 24, 2006.
[16] Hynes, Mueller, Li and Amadeo, *op. cit.*
[17] Hynes, Amadeo, and Mueller, *op. cit.*
[18] Hynes, Mueller, Li and Amadeo, *op. cit.*
[19] Hynes, Mueller, Li and Amadeo, *op. cit.*
[20] National Center for Health Statistics. 2004. *Health, United States with Chartbook on Trends in the Health of Americans.* Hyattsville, MD: NCHS. http://www.cdc.gov/nchs/data/hus/hus04acc.pdf. Retrieved January 5, 2006.
[21] Connecticut Department of Public Health. 2006, *op. cit.*
[22] Hynes, Mueller, Li and Amadeo, *op. cit.*
[23] Hynes, Amadeo, and Mueller, *op. cit.*
[24] Hynes, Mueller, Li and Amadeo, *op. cit.*
[25] Hynes, Amadeo, and Mueller, *op. cit.*
[26] Hynes, Mueller, Li and Amadeo, *op. cit.*
[27] Hynes, Amadeo, and Mueller, *op. cit.*
[28] Hynes, Mueller, Li and Amadeo, *op. cit.*
[29] Connecticut Department of Public Health. 2005. *Connecticut Resident Hospitalizations, 2002* (Table CDI-1). Hartford, CT: Connecticut Department of Public Health. Retrieved January 24, 2006. http://www.dph.state.ct.us/PB/HISR/CDI_Tables.pdf
[30] Connecticut Department of Public Health. 2005 a. *Connecticut Resident Hospitalizations, 2002.* Retrieved March 21, 2006 from: http://www.dph.state.ct.us/PB/HISR/CDI_Tables.pdf
[31] *Ibid.*
[32] Foland, J. 2002. *Cardiovascular Disease—Connecticut's Leading Killer.* Hartford, CT: Connecticut Department of Public Health. http://www.dph.state.ct.us/OPPE/pdfs/cvd.pdf
[33] Connecticut Department of Public Health, 2005. *op. cit.*
[34] American Heart Association Statistics Committee and Stroke Statistics Subcommittee. 2006. Heart disease and Stroke Statistics—2006 Update. *Circulation.* February 14, 2006. Retrieved 1/30/2006 from http://circ.ahajournals.org/cgi/reprint/CIRCULATIONAHA.105.171600v1
[35] Connecticut Department of Public Health, 2005. *op. cit.*
[36] Connecticut Department of Public Health. 2006. *op. cit.*
[37] Newschaffer, Brownson, and Dusenbury. 1998. Chapter 11— Cardiovascular Disease. In Brownson, Remington, and Davis *Chronic Disease Epidemiology and Control* Washington, D.C.: American Public Health Association.
[38] Goldstein, Adams, Becker, et al. 2001. Primary prevention of ischemic stroke—A statement for healthcare professionals from the Stroke Council of the American Heart Association. *Stroke* 32: 280-299.
[39] National Heart, Lung, and Blood Institute. 1995. *Report of the Conference on Socioeconomic Status and Cardiovascular Health and Disease* Washington, D.C.: Public Health Service. U.S. Department of Health and Human Services. http://www.nhlbi.nih.gov/resources/docs
[40] Hart, Hole, and Davey Smith. 2000. The contribution of risk factors to stroke differentials, by socioeconomic position in adulthood: The Renfrew/Paisley Study. *American Journal of Public Health* 90(11): 1788-1791.
[41] Diez-Roux, Nieto, Muntaner, et al. 1997. Neighborhood environments and coronary heart disease: A multilevel analysis. *American Journal of Epidemiology* 146(1): 48-63.
[42] Newschaffer, Brownson, and Dusenbury. *op. cit.*

0590
09/15/08

[43] Boden-Abala, and Sacco. 2002. Socioeconomic status and stroke mortality: Refining the relationship (editorial comment). *Stroke* 33: 274-275.
[44] Kunst, del Rios, Groenhof, et al. 1998. Socioeconomic inequalities in stroke mortality among middle-aged men—An international overview. *Stroke* 29: 2285-2291.
[45] Alevizos, A., Lentzas, J., Kokkoris, S., Mariolis, A., & Korantzopoulos, P. (2005). Physical activity and stroke risk. *International Journal of Clinical Practice* 59(8): 922-930, 2005. Retrieved November 17, 2005, from http://www.medscape.com/viewarticle/514650
[46] Newschaffer, Brownson, and Dusenbury, 1998. *op. cit.*
[47] Goldstein, Adams, and Becker, 2001. *op. cit.*
[48] Chobanian, Bakris, Black, et al. 2003. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Journal of the American Medical Association* 289: 2560-2571.
[49] Centers for Disease Control and Prevention. 2005 Connecticut and US BRFSS data. Retrieved June 13, 2006. http://apps.nccd.cdc.gov/brfss/
[50] Blood Pressure Control Poor Among Elderly Women. Reuters Health Information (*JAMA* 2005; 294:466-472.). Retrieved May 1, 2007, from: http://www.medscape.com/viewarticle/510238_2
[51] Centers for Disease Control and Prevention. 2005 Connecticut BRFSS data. Retrieved June 13, 2006. http://apps.nccd.cdc.gov/brfss/race.asp?cat=HA&yr=2005&qkey=4420&state=CT
[52] Preventing Heart Disease and Stroke Addressing the Nation's Leading Killers At A Glance 2005. Retrieved 9/7/2005, from: http://www.cdc.gov/nccdphp/aag/aag_cvd.htm
[53] Goldstein, Adams, and Becker, *op. cit.*
[54]Centers for Disease Control and Prevention. 2005 Connecticut BRFSS data. Retrieved June 13, 2006. http://apps.nccd.cdc.gov/brfss/display.asp?cat=CA&yr=2005&qkey=1487&state=CT
[55] Centers for Disease Control and Prevention. 2005 Connecticut BRFSS data. Retrieved June 13, 2006 http://apps.nccd.cdc.gov/brfss/display.asp?cat=CA&yr=2005&qkey=4392&state=CT
[56] Newschaffer, Brownson, and Dusenbury, *op. cit.*
[57] Goldstein, Adams, and Becker, *op. cit.*
[58] Newschaffer, Brownson, and Dusenbury, *op. cit.*
[59] Centers for Disease Control and Prevention. 2004 Connecticut BRFSS data. Retrieved January 23, 2006. http://apps.nccd.cdc.gov/brfss/
[60] Vinik, A.I, *Natural History of the Metabolic Syndrome and Type 2 Diabetes: The Ticking Clock.* Presentation at the 65th Scientific Session of the American Diabetes Association. Retrieved August 10, 2005, from: http://www.medscape.com/viewprogram/4324_pnt
[61] Newschaffer, Brownson, and Dusenbury, 1998. Chapter 11—Cardiovascular Disease. In Brownson, Remington, and Davis *Chronic Disease Epidemiology and Control* Washington, DC: American Public Health Association.
[62] Goldstein, Adams, and Becker, 2001. Primary prevention of ischemic stroke—A statement for healthcare professionals from the Stroke Council of the American Heart Association. *Stroke* 33: 565-571.
[63] American Heart Association. 2005. Women, Heart Disease and Stroke. Retrieved September 8, 2005, from: http://www.americanheart.org/presenter.jhtml?identifier=4786
[64] Centers for Disease Control and Prevention. 2005. 2004 Connecticut and US BRFSS data. Retrieved January 23, 2006. http://apps.nccd.cdc.gov/brfss/
[65] Connecticut Department of Public Health. 2005. *Diabetes Prevalence in Connecticut, 2002-2004.* Retrieved January 23, 2006. http://www.dph.state.ct.us/PB/HISR/BRFSS_Diabetes_prev.pdf
[66] Connecticut Department of Public Health, Behavioral Risk Factor Surveillance System (BRFSS) Program. 2005. Connecticut, 2004 (March 25, 2005) BRFSS Module Variables Reports. Unpublished tables.
[67] U.S. Preventive Services Task Force. 2005. The Guide to Clinical Preventive Services, Recommendations of the U.S. Preventive Services Task Force. Washington, DC: US Department of Health and Human Services, Agency for Healthcare, Research and Quality.
[68] Flegal, K.M. 2005. Epidemiologic aspects of overweight and obesity in the United States. *Physiology and Behavior* 86(5): 599-602.

0591
09/15/08

[69] Eckel. R.H. 1997. Obesity and Heart Disease. *Circulation* 96:3248-3250. Retrieved September 8, 2005, from: http://circ.ahajournals.org/cgi/content/full/96/9/3248
[70] *Ibid.*
[71] American Heart Association. 2005 *op. cit.* http://www.americanheart.org/presenter.jhtml?identifier=4786
[72] Goldstein, Adams, and Becker, *op. cit.*
[73] Centers for Disease Control and Prevention. 2006. *op. cit.*
[74] *Ibid.*
[75] *Ibid.*
[76] *Ibid.*
[77] *Ibid.*
[78]
[78] Effects of physical inactivity and unhealthy diets. Retrieved May 1, 2007, from: http://www.sciencedaily.com/releases/2006/06/060603091830.htm
[79] Physical inactivity and heart disease. Retrieved September 9, 2005, from: http://www.phac-aspc.gc.ca/ccdpc-cpcmc/hhk-tcs/english/pdf_e/inac_eng.pdf
[80] Physical activity for everyone: Recommendations. Retrieved June 13, 2006 from: http://www.cdc.gov/nccdphp/dnpa/physical/recommendations/older_adults.htm
[81] Centers for Disease Control and Prevention, 2005 Connecticut and US BRFSS data. Retrieved June 13, 2006. http://apps.nccd.cdc.gov/brfss/page.asp?cat=PA&yr=2005&state=CT#PA
[82] Managing the overall risk of cardiovascular disease. Retrieved July 24, 2005, from: http://www.qualityprofiles.org/leadership_series/cardiovascular_disease/cardiovascular_managingrisk.asp#
[83] Park, H.S., Choi, S.I., Song, Y.M., & Sung. J. 2005. Multiple metabolic risk factors and total and cardiovascular mortality in men with low prevalence of obesity. *Atheroslerosis* 2005 Sep 26. Retrieved November 18, 2005, from: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=16197950&query_hl=3
[84] Connecticut Department of Public Health. 2006. 2005 Behavioral Risk Factor Surveillance System (BRFSS) Survey. Unpublished tables.
[85] United States Department of Health and Human Services. 2000. *Healthy People 2010* (2nd ed.) *With Understanding and Improving Health and Objectives for Improving Health.* Volume II. Chapter 12 – Heart Disease and Stroke. Washington, DC: U.S. Government Printing Office.
[86] Centers for Disease Control and Prevention. 2005 Connecticut and US BRFSS data. Retrieved December 13, 2006. http://apps.nccd.cdc.gov/brfss/

0592
09/15/08

Appendix 1. Data Sources

Connecticut Vital Records Mortality Files

The Connecticut Vital Records Mortality Files are part of the state's vital statistics data base that contains records pertaining to deaths that occur within the state as well as deaths of Connecticut residents occurring in other states and Canada. Mortality statistics are compiled in accordance with the World Health Organization (WHO) regulations, which specify that deaths be classified by the current Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death. Deaths for the 1989-1998 period included in this report are classified by the Ninth Revision of the International Classification of Diseases [ICD-9] (World Health Organization 1977). Deaths for the 1999-2002 period are classified by the Tenth Revision of the International Classification of Diseases [ICD-10] (World Health Organization 1992).

The race-ethnicity designation is typically based on report by next of kin, a funeral director, coroner, or other official. As such, the race-ethnicity designation based on observation may be reported incorrectly. Another potential source of error is the fact that death rates are calculated using two different sources of data – the death certificate for the numerator and the Census Bureau population estimates for the denominator. Errors in under- or overcounting populations by race and ethnicity will affect the death rates reported for these groups. Mortality data are reported using racial categories that exclude persons of Hispanic origin (White, non-Hispanic and Black, non-Hispanic) and by Hispanic ethnicity (Hispanics of any race). Death Registry data follow the National Center for Health Statistics guidelines for coding race and Hispanic ethnicity.

Behavioral Risk Factor Surveillance System

The Behavioral Risk Factor Surveillance System (BRFSS) survey is a state-based system of health surveys that generate information about health risk behaviors, clinical preventive practices, and health care access and use. The BRFSS, sponsored by the Centers for Disease Control and Prevention, is the world's largest telephone survey, and is conducted in all 50 states. It is an on-going random sample telephone survey of non-institutionalized adults, 18 years and older. Information from the survey is used to improve the health of people nationwide and in Connecticut. Racial and ethnic classifications are based on self-report and include White, non-Hispanic, Black, non-Hispanic, and Hispanic (including persons of any race). Other national and state-specific risk factor data and information regarding BRFSS methodology can be accessed on the CDC's BRFSS Web site at: http://www.cdc.gov/brfss/

Connecticut Hospital Discharge Abstract and Billing Data Base

The Connecticut Hospital Discharge Abstract and Billing Data Base is the source of inpatient hospitalization data. It is maintained by the Connecticut Office of Health Care Access, and it contains patient-level demographic, clinical, and billing data for all non-federal acute care hospitals in the state. In addition to age, gender, and town of residence, the demographic data elements include race and ethnicity. Based upon observation of the patient rather than self-reporting by the patient, race is designated as White, non-Hispanic and Black, non-Hispanic. Hispanic ethnicity includes persons of any race.

It should be noted that counts reflect hospitalizations not persons. For example, a patient admitted to a hospital on two separate occasions in 2002 would be counted twice in these data. Another limitation of the data is the fact that it is an administrative data set. It contains diagnoses and procedures based on ICD-9-CM codes. The literature contains many reports on the validity and reliability of hospital discharge data with clinical conditions emphasizing discrepancies between ICD-9-CM codes and clinical data.

0594
09/15/08

Appendix 2A. ICD-10 Coding for Selected Causes of Death, 1999-2001

Cause of Death	ICD-10 Code
All Causes	A00.0 – Y89.9
All Cancers	C00 – C97
Diabetes Mellitus	E10 – E14
Cardiovascular Disease Deaths	I00-I78
Diseases of the Heart	I00 – I09, I11, I13, I20 – I51
Coronary Heart Disease	I11, I20-I25
Congestive Heart Failure	I50.0
Essential Hypertension & Hypertensive Renal Disease	I10, I12
Cerebrovascular Disease	I60 – I69
Atherosclerosis	I71
Chronic Lower Respiratory Diseases	J40 – J47
Unintentional Injuries	V01 – X59, Y85 – Y86

Source: World Health Organization. 1977. *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, based on the recommendations of the Ninth Revision Conference, 1975 (ICD-9).* Geneva: World Health Organization.

Appendix 2B. ICD-9 Coding for Selected Causes of Death, 1989-1998

Cause of Death	ICD-9 Code
All Causes	1-E999
Cardiovascular Disease Deaths	390-459
Diseases of the Heart	390-398,402,404-429
Coronary Heart Disease	402, 410-414, 429.2
Congestive Heart Failure	428.0
Hypertension without Renal Disease	401, 403
Cerebrovascular Disease	430-438
Atherosclerosis	440

Source: World Health Organization. 1992. *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, based on the recommendations of the Tenth Revision Conference, 1992 (ICD-10)* Geneva: World Health Organization.

Appendix 2C. ICD9-CM Coding for Selected Causes of Hospitalizations

Cause of Hospitalization	ICD-9 Code
Circulatory	390-459
Coronary Heart Disease	402, 410-414, 429.2
Congestive Heart Failure	428
Cerebrovascular Disease	430-4, 438-438

Source: Practice Management Information Corporation. 2004. *The International Classification of Diseases, Ninth Revision, Clinical Modification, 6th edition.* Los Angeles, CA.

0596
09/15/08

Appendix 3A. Glossary of Statistical Terms

Age-adjusted Mortality Rates (AAMR) and Age-adjusted Hospitalization Rates (AAHR) are used to compare relative mortality and hospitalization risk, respectively, across groups and over time. They are not actual measures of risk but rather an index of risk. They are weighted statistical averages of the age-specific rates, in which the weights represent the fixed population proportions by age (Murphy 2000). The age-adjusted rates in these tables were computed by the direct method. The 1940 and 2000 U.S. standard million population distributions are shown below:

Age group	1940	2000
0-4	80,057	69,136
5-9	81,151	72,533
10-14	89,209	73,032
15-19	93,665	72,169
20-24	88,002	66,477
25-29	84,280	64,529
30-34	77,787	71,044
35-39	72,501	80,762
40-44	66,744	81,851
45-49	62,696	72,118
50-54	55,116	62,716
55-59	44,559	48,454
60-64	36,129	38,793
65-69	28,519	34,264
70-74	19,519	31,773
75-79	11,423	26,999
80-84	5,878	17,842
85+	2,765	15,508
Total	1,000,000	1,000,000

Age standardization is a technique that allows for the comparison of death rates in two or more populations. The National Center for Health Statistics (NCHS) used the 1940 standard million population in reporting national mortality statistics for over 50 years. Implementation of the new year 2000 population standard began with deaths occurring in 1999. Age-adjustment based on the year 2000 standard often results in age-adjusted death rates that are larger than those based on the 1940 standard. The new standard affects trends in age-adjusted death rates for certain causes of death and decreases race and ethnicity differentials in age-adjusted death rates (Anderson and Rosenberg 1998).

Cause-of-death classification Mortality statistics for this report were compiled in accordance with the World Health Organization (WHO) regulations, which specify that member nations classify causes of death by the current Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death. Deaths for the 1989-1998 period were classified by the Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, Ninth Revision of the International Classification of Diseases [ICD-9] (World Health Organization 1977). Deaths for the 1999-2002 period

0597
09/15/08

were classified according to the Tenth Revision of the International Classification of Diseases [ICD-10] (World Health Organization 1992).

Healthy People 2000 and ***Healthy People 2010*** are part of a national strategy addressing the prevention of major chronic illnesses, injuries, and infectious diseases. They are the product of an effort, involving expert working groups, a consortium of national organizations, all state health departments, and the Institute of Medicine of the National Academy of Sciences to set health objectives for the nation. After extensive national and regional hearings were conducted with a period of public review and comment, the health objectives were published in 1990 as *Healthy People 2000—National Health Promotion and Disease Prevention Objectives.* It established national objectives and served as the basis for the development of state and community plans. *Healthy People 2010* provides a comprehensive view of the nation's health in 2000, and establishes national goals and targets to be achieved by 2010, and monitors progress over time.

Hispanic origin refers to people whose origins are from Spain, the Spanish-speaking countries of Central America, South America, and the Caribbean, or persons of Hispanic origin identifying themselves as Spanish, Spanish-American, Hispanic, Hispano, or Latino. Since 1988, the Connecticut death certificate has had a separate line item for Hispanic ethnicity. Individuals identified as "Hispanic" can be of any race, and are also counted in the race breakdown as either "white," "black," "Asian or Pacific Islander," "American Indian," or other.

International Classification of Diseases (ICD-9, ICD-10) has been the internationally accepted coding system for determining cause of death since the early 1900s. It is periodically revised. The ninth revision (ICD-9) was in use from 1975 through 1998. Beginning with 1999 deaths, the tenth revision (ICD-10) is being used.

Preliminary estimates of the comparability of ICD-9 to ICD-10 have been published and indicate that the discontinuity in trends from 1998 to 1999 for some leading causes of death (septicemia, influenza and pneumonia, Alzheimer's disease, nephritis, nephrotic syndrome, and nephrosis) is substantial (Anderson, Minino, Hoyert, et al. 2001).

International Classification of Diseases, Clinical Modification (ICD-9-CM) is a coding system recommended for use in all clinical settings to describe procedures and diagnoses. It is required for reporting diagnoses and diseases to all U.S. Public Health Service and Department of Health and Human Services programs, including Medicare and Medicaid. The foundation of the ICD-9-CM is the *International Classification of Diseases, 9th Revision* published by the World Health Organization.

Population bases for computing rates are taken from the U.S. Census Bureau *Estimates of the population of states by age, sex, race, and Hispanic origin.* These data are estimates of the population of Connecticut by 5-year age groups (age 0 to 4, 5 to 9,...85 and over), sex (male, female), modified race (white; black; Native American including Alaska Natives; Asian and Pacific Islander) and Hispanic origin (Hispanic, non-Hispanic) for each year, July 1, 1999 through July 1, 2002.

Race refers to a population of individuals identified from a common history, nationality, or geographical place. Race is widely considered a valid scientific category, but not a valid biological or genetic category (Lewontin, 1995; Gould 1981). Available scientific evidence indicates that racial and ethnic

0598
09/15/08

classifications do not capture biological distinctiveness, and that there is more genetic variation within racial groups than there is between racial groups (Williams, Lavizzo-Mourey, and Warren 1994; American Anthropological Association 1998). Contemporary race divisions result from historical events and circumstances and reflect current social realities. Thus, racial categories may be viewed more accurately as proxies for social and economic conditions that put individuals at higher risk for certain disease conditions.

Data are reported for two racial groups in Connecticut: white, non-Hispanic and black, non-Hispanic. Individuals identified as "Hispanic" can be of any race.

Socioeconomic position refers to a person's social and economic place in a society, and is operationalized or measured by characteristics such as per capita or household income, educational attainment, or occupation. Historically, lower socioeconomic position has been strongly correlated with less favorable health outcomes such as higher death and premature mortality rates from all causes; conversely, persons of higher socioeconomic position do better on most measures of health status.

Years of potential life lost (YPLL) represents the number of years of potential life lost by each death before a predetermined end point (e.g., 65 or 75 years of age). Whereas the crude and adjusted death rates are heavily influenced by the large number of deaths among the elderly, the YPLL measure provides a picture of premature mortality by weighting deaths that occur at younger ages more heavily than those occurring at older ages. It thereby emphasizes different causes of death. Age-adjusted YPLLs are calculated using the methodology of Romeder and McWhinnie (1977).

References

American Anthropological Association. 1998. *American Anthropological Association Statement on "Race."* Via website http://www.aaanet.org/stmts/racepp.htm.

Anderson, R.N., A.M.Minino, D.L. Hoyert, H.M. Rosenberg. 2001. "Comparability of cause of death between ICD-9 and ICD-10: Preliminary estimates." *National Vital Statistics Reports* 49(2): 1-32.

Anderson, R.N. and H.M. Rosenberg 1998. "Age standardization of death rates: implementation of the year 2000 standard." *National Vital Statistics Report* 47(3):1-16, 20.

Gould, S.J. 1981. *The Mismeasure of Man.* New York: W.W. Norton and Company.

Lewontin, R. 1995. *Human Diversity.* New York: Scientific Ameican Books.

Murphy, S.L. 2000. Deaths: Final data for 1998. *National Vital Statistics Reports* 48(11). Hyattsville, MD: National Center for Health Statistics. DHHS Publication No. (PHS) 2000-1120.

Romeder, J.M. and McWhinnie, J.R. 1977. Potential Years of Life Lost between ages 1 and 70: An indicator of premature mortality for health planning. *International Journal of Epidemiology* 6:143-151.

Williams, D.R., R. Lavizzo-Mourey, and R.C. Warren. 1994. The concept of race and health status in America. *Public Health Reports* 109: 26-41.

World Health Organization. 1977. *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, based on the recommendations of the Ninth Revision Conference, 1975*. Geneva: World Health Organization.

World Health Organization. 1992. *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, based on the recommendations of the Tenth Revision Conference, 1992*. Geneva: World Health Organization.

0600
09/15/08

Appendix 3B. Glossary of Medical Terms

Atherosclerosis: A disease that affects the arteries, particularly those supplying the heart, the brain, the aorta, and the lower extremities. Atherosclerosis underlies the occurrence of heart attacks, many strokes, peripheral arterial disease, and ruptures of the aorta. **Source:** Centers for Disease Control and Prevention. 2006. *A Public Health Action Plan to Prevent Heart Disease and Stroke, Appendix A.* Retrieved 1/2/2007: http://www.cdc.gov/dhdsp/library/action_plan/full_appendix_a.htm

Cardiovascular Diseases (CVD): Diseases of the circulatory system, which include acute myocardial infarction, ischemic heart disease, valvular heart disease, peripheral vascular disease, arrhythmias, high blood pressure and stroke. **Source:** World Health Organization Collaborating Centre on Surveillance of Cardiovascular Diseases. *The Growing Burden of Heart Disease and Stroke.* (n.d.). Retrieved 1/2/2006: http://www.cvdinfobase.ca/cvdbook/En/Glossary.htm

Coronary Heart Disease (CHD): A form of heart disease resulting from impaired circulation in one or more coronary arteries. Common clinical manifestations of CHD include chest pain (angina pectoris) or heart attack." **Source:** Centers for Disease Control and Prevention. 2006. Retrieved 1/2/2007: http://www.cdc.gov/dhdsp/library/action_plan/full_appendix_a.htm

Cerebrovascular Disease: A disease of one or more blood vessels in the brain, which often results in the sudden development of a focal neurologic deficit, or stroke. Stroke, or a "brain attack" is the most severe clinical manifestation of cerebrovascular disease. **Source:** World Health Organization Collaborating Centre on Surveillance of Cardiovascular Diseases. *The Growing Burden of Heart Disease and Stroke.* Retrieved 1/2/2006: http://www.cvdinfobase.ca/cvdbook/En/Glossary.htm

Congestive Heart Failure: The inability of the heart to maintain adequate pumping function, which can be caused by a number of factors, such as untreated hypertension, heart attacks, or infections. Heart failure increases the risk for other cardiovascular disease events and often results in physical disability. Congestive Heart Failure is commonly referred to as "heart failure." **Sources:** World Health Organization Collaborating Centre on Surveillance of Cardiovascular Diseases. *The Growing Burden of Heart Disease and Stroke.* Retrieved 1/2/2006: http://www.cvdinfobase.ca/cvdbook/En/Glossary.htm;
The Cleveland Clinic Information Center. 2004. *Hypertension Glossary.* Retrieved 1/3/2007: http://www.clevelandclinic.org/health/health-info/docs/3800/3846.asp?index=12273;
Centers for Disease Control and Prevention. 2006. *A Public Health Action Plan to Prevent Heart Disease and Stroke, Appendix A.* Retrieved 1/2/2007: http://www.cdc.gov/dhdsp/library/action_plan/full_appendix_a.htm.

Coronary Artery Bypass Graft: Commonly referred to as "CABG" (pronounced "cabbage"). CABG is the most commonly performed "open heart" operation in the United States, and is a procedure to bypass blockages or obstructions of the coronary arteries, which cause chest pain or "angina." The majority of people report relief of their symptoms of angina after surgery. Symptoms may recur, and a small percentage of people will require repeat surgery, typically 10 or more years after the original operation. **Source:** The Society of Thoracic Surgeons. 2006. *What is Coronary Artery Bypass Grafting (CABG)?* Retrieved 1/3/2007: http://www.sts.org/sections/patientinformation/adultcardiacsurgery/cabg/

Diabetes (or diabetes mellitus): A metabolic disorder that results from the body's insufficient production or utilization of insulin. The most common types of diabetes includes "Type 1 diabetes," formerly known as "juvenile diabetes," and "Type 2 diabetes," formerly known as "adult-onset diabetes." Long-term effects of diabetes include cardiovascular complications. **Source:** Centers for Disease Control and Prevention. 2006. *A Public Health Action Plan to Prevent Heart Disease and Stroke, Appendix A.* Retrieved 1/2/2007: http://www.cdc.gov/dhdsp/library/action_plan/full_appendix_a.htm

Dyslipidemia: A disorder of lipoprotein metabolism, such as an overproduction or deficiency of lipoprotein. Dyslipidemia is often manifested by elevated levels of total cholesterol, the "bad" or low-density lipoprotein (LDL) cholesterol, and the triglyceride concentrations, as well as decreased levels of the "good" or high-density lipoprotein (HDL) cholesterol concentration in the blood. **Source:** MedicineNet.com. *Definition of Dyslipidemia.* Retrieved 1/3/2007: http://www.medterms.com/script/main/art.asp?articlekey=33979

Essential Hypertension: "high blood pressure that does not have an apparent cause — The vast majority (95 percent) of high blood pressure is essential hypertension." **Source:** The Cleveland Clinic Information Center. 2004. Hypertension Glossary. Retrieved 1/3/2007: http://www.clevelandclinic.org/health/health-info/docs/3800/3846.asp?index=12273

Heart Failure: See Congestive Heart Failure.

Hemorrhagic Stroke: Hemorrhagic stroke involves bleeding within the brain that damages nearby brain tissue. A common cause of hemorrhagic stroke is the bursting of an aneurysm (a weak spot in an artery wall). Hemorrhagic stroke is often associated with high blood pressure. About 20% of all strokes are hemorrhagic. **Source:** MedlinePlus. 2006. *Hemmorhagic Stroke.* Retrieved 1/2/2007: http://www.nlm.nih.gov/medlineplus/ency/article/000761.htm

High Blood Cholesterol: Cholesterol is a substance found in all cells of the body; it is carried in lipoproteins, made of fat (lipid) on the inside and proteins on the outside. Low-density lipoprotein (LDL) cholesterol is sometimes called "bad cholesterol" because it leads to a buildup of cholesterol in arteries. The higher the LDL level in the blood, the greater one's chance of getting heart disease. The buildup of cholesterol in the arteries is called plaque, which over time causes the narrowing of the arteries, or "atherosclerosis." Some plaques can burst, releasing fat and cholesterol into the bloodstream, which may cause the blood to clot and block the flow of blood. This blockage can cause angina or a heart attack. Lowering one's cholesterol level decreases the chance of having a plaque burst and a subsequent heart attack. Lowering cholesterol may also slow down, reduce, or even stop plaque from building up. **Source:** National Heart, Lung and Blood Institute. 2006. *What is Cholesterol? What is High Blood Cholesterol?* Retrieved 1/3/2007: http://www.nhlbi.nih.gov/health/dci/Diseases/Hbc/HBC_WhatIs.html

High Blood Pressure: A condition in which the pressure in the arterial circulation system is greater than clinically recommended, that is, a systolic pressure greater than or equal to 140 mm Hg or a diastolic pressure greater than or equal to 90 mm Hg. High blood pressure is associated with increased risk for heart disease, stroke, and chronic kidney disease. **Source:** Centers for Disease Control and Prevention. 2006. *A Public Health Action Plan to Prevent Heart Disease and Stroke, Appendix A.* Retrieved 1/2/2007: http://www.cdc.gov/dhdsp/library/action_plan/full_appendix_a.htm

Hypertensive Heart Disease: An abnormality in the structure and function of the heart caused by long-standing high blood pressure. A common, clinical manifestation of hypertensive heart disease is heart failure. **Source:** Centers for Disease Control and Prevention. 2006. *A Public Health Action Plan to Prevent Heart Disease and Stroke, Appendix A.* Retrieved 1/2/2007: http://www.cdc.gov/dhdsp/library/action_plan/full_appendix_a.htm

Ischemic Heart Disease: A condition in which heart muscle is damaged or works inefficiently because of an absence or deficiency of its blood supply. Ischemic heart disease is most often caused by atherosclerosis, and includes angina pectoris, acute myocardial infarction, chronic ischemic heart disease, and sudden death. **Source:** World Health Organization Collaborating Centre on Surveillance of Cardiovascular Diseases. *The Growing Burden of Heart Disease and Stroke.* Retrieved 1/2/2006: http://www.cvdinfobase.ca/cvdbook/En/Glossary.htm

0602
09/15/08

Ischemic Stroke: The most common type of stroke that occurs when too little blood reaches an area of the brain usually due to a clot that has blocked a blood vessel. An ischemic stroke can sometimes lead to a brain hemorrhage. About 80% of strokes are ischemic strokes, **Source:** MedlinePlus. 2006. *Hemmorhagic Stroke.* Retrieved 1/2/2007: http://www.nlm.nih.gov/medlineplus/ency/article/000761.htm

Obesity: Defined in terms of body mass index (BMI), and calculated as body weight in kilograms (1 kg = 2.2 lbs) divided by height in meters (1 m = 39.37 in) squared. Adults with a BMI of greater than or equal to 30.0 kg/m2 are considered "obese," and those with a BMI of 25–29.9 kg/m2 are considered "overweight." **Source:** Centers for Disease Control and Prevention. 2006. *A Public Health Action Plan to Prevent Heart Disease and Stroke, Appendix A.* Retrieved 1/2/2007: http://www.cdc.gov/dhdsp/library/action_plan/full_appendix_a.htm

Classification of Overweight and Obesity in Adults According to BMI.
Obesity is classified as BMI $\geq$ 30 kg/m^2.

Classification	BMI (kg/m^2)	Risk of Health Problems
Underweight	< 18.5	Low (but risk of other clinical problems increased)
Normal range	18.5-24.9	Average
Overweight	25.0-29.9	Mildly increased
Obese	**≥ 30.0**	
Class I	30.0-34.9	Moderate
Class II	35.0-39.9	Severe
Class III	≥ 40.0	Very severe
Note that these values are age-independent and correspond to the same degree of fatness across different populations.		

Source: World Health Organization Collaborating Centre on Surveillance of Cardiovascular Diseases. *The Growing Burden of Heart Disease and Stroke.* Retrieved 1/2/2006: http://www.cvdinfobase.ca/cvdbook/En/Glossary.htm

Percutaneous Transluminal Coronary Angioplasty: Coronary angioplasty is a medical procedure that restores blood flow through a narrowed or blocked artery in the heart (coronary artery). The coronary arteries can become narrowed and blocked due to buildup of a material called plaque on the inner walls, which reduces the flow of blood through the artery and can lead, over time, to coronary artery disease and heart attack. During an angioplasty procedure, a balloon or other device is threaded through a blood vessel in the arm or groin up to the site of a narrowing or blockage. The balloon is then inflated to push the plaque outward against the wall of the artery, which widens the artery and restores the blood flow. Coronary angioplasty is currently a common medical procedure with more than 1 million done in the United States every year. **Sources:** National Heart, Lung and Blood Institute. 2006. *What Is Coronary Angioplasty?* Retrieved 1/3/2007: http://www.nhlbi.nih.gov/health/dci/Diseases/Angioplasty/Angioplasty_WhatIs.html

Mayoclinic.com. 2006. *Coronary angioplasty and stenting: Opening clogged heart arteries.* Retrieved 1/3/2007: http://www.mayoclinic.com/health/angioplasty/HQ00485

Serum (Blood) Lipids: Cholesterol and triglycerides are two forms of lipid, or fat in the body. Patients with elevated triglyceride levels typically have other major risk factors for heart disease (obesity, diabetes, and/or high blood pressure), but no study has yet proven that high triglyceride levels are an independent risk factor for heart disease. Recent evidence strongly suggests that an elevated triglyceride level is a significant risk factor for cardiac disease - especially when it is elevated as part of the "metabolic syndrome X." **Source:** About: Heart Disease. *Cholesterol and Triglycerides*. Retrieved 1/3/2007: http://heartdisease.about.com/cs/cholesterol/a/choltri.htm

Stroke: The most common clinical manifestation of cerebrovascular disease. Stroke describes an interruption of the blood supply in the brain that results in damaged brain tissue. It can be caused by clots or by bleeding in the brain from a ruptured blood vessel or a significant injury. **Source:** The Cleveland Clinic Information Center. 2004. *Hypertension Glossary*. Retrieved 1/3/2007: http://www.clevelandclinic.org/health/health-info/docs/3800/3846.asp?index=12273

Valvular Surgery: A surgical procedure consisting of two types: 1) **Valve repair surgery**, which involves repair to a faulty heart valve, typically without the use of artificial parts, and 2) **Valve replacement surgery**, which involves complete replacement of the native valve, and is used if valve repair is not considered a good option. The replacement valve can either be mechanical or biological. Although mechanical valves are durable and can last a lifetime, persons receiving valve replacement require lifelong treatment with a blood-thinning medication, which help prevent clots from forming on the mechanical valve. Biologic (or tissue) valves are made of human or animal tissue. They traditionally needed to be replaced after about 10 years, but newer valves have been shown to last as long as 17 years. **Source:** Cleveland Clinic. 2005. *Heart Valve Surgery*. Retrieved 1/3/2007: http://www.clevelandclinic.org/heartcenter/pub/guide/disease/valve/valvetreatment.htm

0604
09/15/08

The Connecticut Diabetes Prevention and Control Plan

2007 – 2012



The Connecticut Charter Oak

Enhancing the lives of people affected by diabetes through community partnerships & a comprehensive system of prevention and care

CONNECTICUT DEPARTMENT OF PUBLIC HEALTH

0605
09/15/08

Connecticut Department of Public Health

Commissioner

J. Robert Galvin, M.D., M.P.H., M.B.A.

Public Health Initiatives Branch

Richard Edmonds, M.A., Branch Chief

AIDS and Chronic Diseases Section

Rosa M. Biaggi, M.P.H., M.P.A., Section Chief

Christian D. Andresen, Public Health Services Manager

Diabetes Prevention and Control Program

Cindy Kozak, R.D., M.P.H., C.D.E., Health Program Associate

Nancy Prevost, Secretary

Nadine Repinecz, M.P.A., Health Program Supervisor

Health Information System and Reporting Section
Surveillance and Reporting Unit

Margaret M. Hynes, Ph.D., M.P.H, Supervising Epidemiologist

Betty C. Jung, R.N., M.P.H., C.H.E.S, Epidemiologist

Funding for the Diabetes Prevention and Control Program provided by the Centers for Disease Control and Prevention

Permission to Copy Statement
CT Department of Public Health,
410 Capitol Avenue Hartford, CT 06134

0606
09/15/08

Preface

The *Connecticut Diabetes Prevention and Control Plan* is the product of the combined knowledge, commitment, and collaboration of over seventy partners. The Advisory Council and its Executive Committee serve as the primary leadership that directed the development of the recommendations set forth in this plan.

This plan strives to address the needs of people already diagnosed with diabetes in order to prevent complications. It also addresses the prevention or delay of diabetes in high-risk individuals with pre-diabetes.

Diabetes Advisory Council

Christian D. Andresen, DPH

William Behan, RN, BS, DPH

Louise Butcher*, American Diabetes Association

Nanette Char*, Char Consulting

Marian Evans, MD, Bridgeport Health and Social Services

Jennifer Granger, MPH, CT Primary Care Association

Toni Nathaniel Harp, CT State Senator

Lewis Head, Health Educator, Mashantucket Pequot Tribal Nation

Margaret M. Hynes, PhD, MPH, DPH

Betty C. Jung, RN, MPH, CHES, DPH

Molly Kirschner, RD, CDE, CD-N, Juvenile Diabetes Research Foundation

Cynthia Kozak, RD, MPH, CDE, DPH

Jeffrey Palmer, OD, CT Association of Optometrists

William A. Petit, Jr.*, MD, FACP, FACE, Joslin Diabetes Center at the Hospital of Central Connecticut

Karana M. Pierre, DPM, Optimus Healthcare

Richard Roy*, CT State Representative

Katherine Schneider, MD, MPhil., Middlesex Health System

Eleanor Seiler*, MD, Anthem

Warren Wollschlager, DPH

* *Member of the Executive Committee*

Acknowledgements: *We would like to acknowledge the contributions of the work group members for their time and expertise. Their dedication to this process has made this plan possible. The work group members are listed alphabetically on the following pages.*

NAME	ORGANIZATION	WORK GROUP
Ann Agro	Yale Prevention Research Center	Access & Policy
Daren Anderson, MD	Community Health Center, Inc.	Disease Management
Chris Andresen	DPH	Access & Policy
Joni Arvai	American Heart Association	Access & Policy
Patricia Bak, RN, CDE	Windham Community Hospital	Education & Awareness
Stephanie Belding	Community Renewal Team	Surveillance
Rosa Browne	NAACP-Health Committee	Access & Policy, Disease Management, Education & Awareness, Prevention, Surveillance
Louise Butcher	American Diabetes Association	Education & Awareness (Co-Chair), Surveillance
Nanette Char	Char Consulting	Access & Policy (Co-Chair), Prevention
Mark Chasse, OD	Connecticut Association of Optometrists	Disease Management
Jyoti Chhabra, PhD	Hartford Hospital	Disease Management, Surveillance
Sally Cooney, RN, BSN, CDE	St. Francis Hospital and Medical Center	Education & Awareness
James Cox-Chapman, MD	ProHealth Physicians	Disease Management
Diane Creed	American Diabetes Association	Education & Awareness, Prevention
Gail D'Eramo Melkus, EdD, C-ANP, FAAN	Yale School of Nursing	Surveillance
Grace Damio, MS, CD/N	Hispanic Health Council	Surveillance
Kari Davis, APRN	Generations Family Health Center	Access & Policy
Steven Delaronde , MPH, MSW	ConnectiCare	Surveillance
Brenda DelGado, MS	AHEC	Access & Policy
Patricia DeWitt	Yale-New Haven Hospital	Access & Policy, Disease Management, Education & Awareness
Anne Elwell, RN, BS, MPH, CPHQ	Qualidigm	Surveillance
Linda Ferro, APRN, CDE	Norwalk Hospital	Education & Awareness
Linda J. Ferraro, RDH	Department of Public Health	Disease Management
R. Allen Frommelt. PhD	Connecticut Hospital Association	Surveillance
Marghie Giuliano, R Ph	Connecticut Pharmacists Association	Disease Management
Ana Lourdes Gomez, PhD	University of Connecticut	Disease Management, Prevention, Surveillance
Kimberly Hathaway, CEO	National Kidney Foundation of CT	Education & Awareness
Marcia Hilditch	National Kidney Foundation of CT	Education & Awareness
Shih-Yieh Ho, MPH, PhD	Qualidigm	Surveillance
Sheryl Horowitz, PhD	Griffin Hospital	Surveillance
Margaret M. Hynes, PHD, MPH	Department of Public Health	Surveillance (Co-Chair)
Georgia Jennings, MPH	Yale Prevention Research Center	Access & Policy
Betty C. Jung, RN, MPH, CHES	Department of Public Health	Surveillance
Brenda Kelley	AARP Connecticut	Surveillance
Michelle Kelvey-Albert	Qualidigm	Education & Awareness
Molly Kirschner, MS, RD	Juvenile Diabetes Research Foundation, Hartford and Western Massachusetts	Disease Management
Cynthia Kozak, RD, MPH, CDE	Department of Public Health	Access & Policy, Disease Management, Education & Awareness, Prevention, Surveillance
Paula Leibovitz, MS, RD, CD-N	Consultant Briarwood College	Education & Awareness, Prevention
Kevin Maloy	Pfizer	Surveillance
Kristin Mattocks, MPH, PhD	Qualidigm	Access & Policy

Barbara McCabe, APRN	AmeriCares clinic	Access & Policy
Susan McKenney	Anthem Blue Cross & Blue Shield	Surveillance
Kit McKinnon	Middlesex Hospital	Access & Policy
Thomas Meehan, MD, MPH, FACP	Qualidigm	Disease Management
Carolé Mensing, RN, MA, CDE	University of Connecticut Health Center	Disease Management, Prevention, Surveillance
Phillip Montgomery	Connecticut Business & Industry Association	Prevention
Rebecca Murray, MSN, FNP, CDE	West Side School-Based Health Center	Disease Management, Prevention
Kelley Newlin, DNSc	Yale University	Disease Management
Hilary Norcia	American Heart Association	Education & Awareness
Patricia O'Connell, MS, RD, CDE	Joslin Diabetes Center	Education & Awareness, Prevention
Rafael Perez-Escamilla PhD	University of Connecticut	Surveillance
William A. Petit, Jr., MD	Joslin Diabetes Center	Disease Management (Co-Chair)
Christine Pinette, APRN	Bristol Hospital	Disease Management, Prevention
James Rawlings	NAACP Health Committee	Surveillance
Cheryl-Ann Resha, RN, EdD	State Department of Education	Access & Policy
Joseph A. Rosa, MD	St. Vincent's Hospital	Disease Management
Richard Roy	CT State House of Representatives	Education & Awareness (Co-Chair)
Katherine Schneider, MD	Middlesex Hospital	Disease Management, Surveillance
Joan Schwartz, MS, RN, CDE	Eastern Connecticut Health Network	Education & Awareness
Eleanor Seiler, MD	Anthem Blue Cross & Blue Shield	Disease Management (Co-Chair)
Diane Sell	Consultant	Prevention
Laura Shuey	American Heart Association	Disease Management
Hilary Silver	Department of Social Services	Access & Policy
Maureen Smith	Office of the Health Care Advocate	Access & Policy
Anne Somsel, RN, MS	Fair Haven Community Health Center	Education & Awareness
Gary Spinner, PA	Hill Health Center	Access & Policy
Eric Triffin, Dir. of Health	City of West Haven	Surveillance
Carmela Valentino, MPH, CHES	Healthnet	Surveillance
Julie Wagner, PhD	University of Connecticut Health Center	Access & Policy
Maredia Warren	American Heart Association	Education & Awareness
Anne Wilson	CIGNA	Disease Management, Prevention
Ardell A. Wilson, D.D.S., M.P.H.	Department of Public Health	Disease Management
Jeffrey Yale, DPM	Griffin Hospital	Access & Policy
Donald Zetterval	The Diabetes Center	Disease Management
Jean Zimkus, RN	Bridgeport Hospital	Prevention, Surveillance

Special thanks to:

- *Nancy Prevost, Connecticut Department of Public Health (DPH) for her assistance in editing and formatting this state plan.*
- *Consultants, Holt, Wexler & Farnam, LLP*

Note: Members of the work groups and the DPH recognize the need to involve as many organizations and programs across the state as possible to ensure the success of the Connecticut Diabetes Prevention and Control Plan. To assist interested individuals, programs, and organizations in locating initiatives with which to partner, the group developed a resource list which can be found in Appendix D. The list includes programs sponsored by the Department of Public Health and those sponsored by community and private organizations. While the list provides a good sample of programs in Connecticut, it does not provide information on all programs in the state. Omission of a program should not be construed as judgment on the usefulness of the program.

Table of Contents

Executive Summary ..... **p. i**

1. **Defining Diabetes** ..... **p. 1**
2. **The Connecticut Diabetes Partnership** ..... **p. 4**
3. **Connecticut, its Population and Diabetes** ..... **p. 9**
4. **The Burden of Diabetes in Connecticut** ..... **p. 12**
5. **Preventing Diabetes Before It Starts** ..... **p. 22**
6. **Disease Management** ..... **p. 26**
7. **Education and Awareness** ..... **p. 35**
8. **Access and Policy: Assuring Access to Treatment** ..... **p. 39**
9. **Surveillance: Tracking and Monitoring** ..... **p. 43**
10. **Cross-Cutting Issues** ..... **p. 45**
    - The Chronic Care Model
11. **Implementation and Funding** ..... **p. 51**
    a. Phase I 2007
    b. Phase II 2008-2011
    c. Funding
    d. Evaluation
12. **Appendices** ..... **p. 54**
13. **End Notes** ..... **p. 65**

EXECUTIVE SUMMARY

Mission: *"The Connecticut Diabetes Prevention and Control Plan is to create an environment for change in which a comprehensive system of care and prevention will reduce or delay the onset of diabetes and its complications, and enhance the quality of life for people affected by diabetes. Successful implementation of the Plan will bring about measurable improvement in the quality of life for people with diabetes and prediabetes, resulting in healthier communities."*— Diabetes Advisory Council[1]



Diabetes is a chronic metabolic disorder characterized by elevated levels of blood sugar which over time can ravage the body causing eye disease, kidney disease, nerve disease, and cardiovascular disease. An estimated 6.2% of Connecticut adults (163,000 people) have diagnosed diabetes (2003-05 data) with an additional 70,000 people with undiagnosed diabetes. According to the Centers for Disease Control and Prevention, diabetes cost Connecticut an estimated **$1.7 billion in direct and indirect costs in 2003**. In 2005, the Connecticut Department of Public Health reported that approximately $77 million was billed for hospitalizations due to diabetes as a principal diagnosis in 2002. In addition, almost $39 million was billed for hospitalizations related to diabetes with a lower extremity amputation

Healthy People 2010, the national agenda for disease prevention and health promotion, calls for efforts to reduce the diabetes prevalence rate to 2.5% by the year 2010. Currently, the Connecticut rate is 6.2%. Closing that gap will prove increasingly difficult because Connecticut's population is growing older, specific high-risk groups for diabetes are increasing, and Connecticut's population tends to be increasingly overweight and sedentary. To address this public health issue, the Connecticut Diabetes Prevention and Control Program convened experts in five major topic areas: preventing diabetes, education/awareness, access/policy, disease management, and surveillance. The program is to promote Connecticut meeting the HP2010 goal to lower the prevalence rate by at least 0.5 percent by 2010. Priorities in implementing the plan include:

1. Develop support for efforts to ensure all persons with diabetes particularly those who are Medicaid eligible are enrolled and receiving medically appropriate preventive care and treatment, including podiatric and diabetes self-management education.

2. Develop a plan to seek legislative support for programs to provide free or low cost access to education, care and treatment for uninsured of underinsured people with diabetes.

Plan Development. The Connecticut Department of Public Health established a Connecticut Diabetes Partnership to identify how care and prevention systems could combat diabetes as a growing public health issue in our state. The Advisory Council and five work groups came together to form the Connecticut Diabetes Partnership and develop this Diabetes Prevention and Control Plan. The purpose of this plan is to help residents delay or prevent the onset of diabetes, reduce diabetes-related complications, and enhance the quality of life for people affected by diabetes.

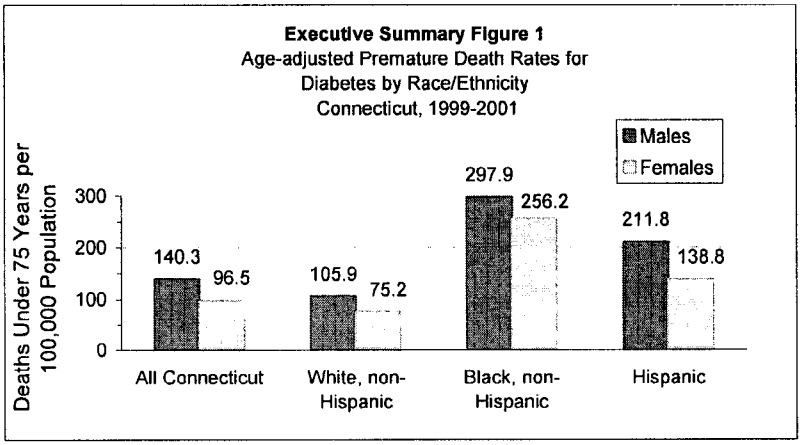
The Diabetes Advisory Council organized five work groups (Access and Policy, Education and Awareness, Disease Management, Prevention, and Surveillance) and assembled a wide range of experts and representatives from across all aspects of the disease: people with diabetes, health care providers, community health centers/clinics, hospitals, health maintenance organizations, visiting nursing associations, public health representatives, health care professionals, American Diabetes and Heart associations, managed care organizations, insurance groups, state representatives, and community and special interest groups. The five work groups analyzed policy, epidemiological data, and existing resources, and used the information as the basis to develop goals, objectives, strategies, and action steps. Work groups completed their tasks over a five-month period and submitted their recommendations to the Connecticut Diabetes Advisory Council for refinement and final approval.

Background. Diabetes occurs when the body produces no insulin at all (type 1 diabetes) or when the body produces insulin but does not use it properly (type 2 diabetes). Similar symptoms exist for both types of diabetes. High blood sugar (hyperglycemia) can cause: blurry vision, excessive thirst, frequent urination, feeling very hungry or tired, and/or unintended weight loss. Many of these symptoms can be overlooked as temporary consequences of lifestyle. In fact, many people live with symptoms for several years prior to a diagnosis of type 2 diabetes. The long term consequences of hyperglycemia include eye disease, kidney disease (nephropathy), nerve disease (neuropathy), and a significant increase for cardiovascular disease (heart attack and stroke). Diabetes can not be cured. Ultimately, untreated or poorly controlled diabetes can lead to death due to these complications. Annual medical costs for a person with diabetes average about $13,000 (five times more per year than persons without diabetes).[ii]

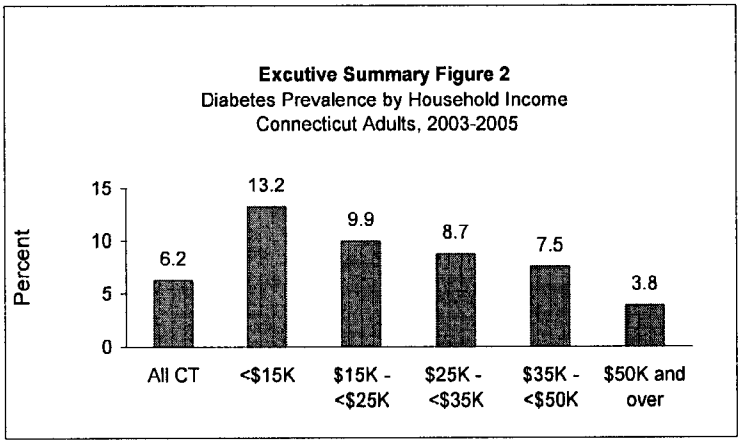
An estimated 6.2% of the Connecticut adult population or approximately 163,000 adults age 18 years and older have been diagnosed with diabetes (2003-05 data). The Centers for Disease Control and Prevention (CDC) estimates that about 30% of all diabetes cases are undiagnosed,

partly because symptoms develop gradually. An additional 70,000 Connecticut adults are estimated to have undiagnosed diabetes. Thus a total of 233,000 of Connecticut residents are estimated to have diagnosed or undiagnosed diabetes.

Diabetes disproportionately affects certain ethnic groups as well as those of lower socioeconomic status. Figures 1 and 2 below illustrate the socio demographic disparities associated with diabetes.



The cornerstones of diabetes care include rigorous monitoring and control of blood sugar, blood pressure, and cholesterol to decrease diabetes complications. Recent research has also shown with lifestyle changes, diabetes can even be prevented or delayed before it begins in high-risk individuals with a condition known as pre-diabetes.



Major Goals of the Plan. Preventing and managing diabetes are influenced by numerous factors including: lifestyle, such as food choices, exercise habits, and access to health care. To address these factors, the Connecticut Diabetes Partnership work groups developed specific recommendations and strategies for the *Connecticut Diabetes Prevention and Control Plan.* The

organization of the work groups is supported by the Chronic Care Model (See Figure 2. Connecticut's Chronic Care Model p. 50). The *Connecticut Diabetes Control and Prevention Plan* follows the Chronic Care Model, which incorporates both prevention and care elements from a variety of perspectives, including the individual, the health care provider, health care systems, and the community. All are intended to improve outcomes and reduce costs.

- The ***Prevention Work Group*** developed strategies to reverse pre-diabetes and to prevent or delay the progression of pre-diabetes to type 2 diabetes.
- The ***Disease Management Work Group*** developed strategies to: improve how health care providers diagnose and monitor diabetes; improve communication among health care providers and patients; clarify measurement of clinical outcomes; increase self-management practices among people with diabetes; increase screening for pre-diabetes and diabetes; and improve reporting of diabetes diagnoses.
- The ***Education and Awareness Work Group*** developed strategies for: people with diabetes who must manage and control diabetes; for health care providers to increase their knowledge and to increase participation in education programs; and for the general public to increase awareness about the symptoms, impact, and options related to diabetes.
- The ***Access and Policy Work Group*** developed strategies to: integrate and increase access to the various elements of successful care, including prevention, treatment, supplies, equipment, medication, diabetes self-management education, and nutrition therapy and to support the medical care system and communities in these efforts.
- The ***Surveillance Work Group*** developed strategies to capture and share relevant information about trends in diabetes statistics.

While this plan focuses on programs and policies to address diabetes we recognize the importance of stem cell research as an avenue to finding a cure for (type 1) diabetes.[iii]

The full set of recommendations and strategies is shown in Executive Summary Table 1, beginning on p. vi.

2007 Work Plan. Of the final recommendations, the Diabetes Advisory Council selected two priorities for implementation in 2007:

I. *The access and policy goal is to ensure that comprehensive diabetes care i.e., preventive care, treatment, supplies, equipment, diabetes self-management education, medical nutrition therapy, and medications are offered, available and affordable across the public and private sectors to every citizen in Connecticut in need.* Specific strategies include: 1) support efforts to ensure that all Medicaid-eligible persons with diabetes are enrolled and receiving medically appropriate preventive care and treatment, in their community when possible,

including podiatric care and diabetes education services; and 2) develop a plan to seek legislative support for a program with community clinics, hospitals, and other health care providers to provide free or low cost access to preventive education and care, and treatment for uninsured and underinsured persons with diabetes.

II. *The education and awareness goal is to ensure that all people with diabetes, those at risk for diabetes, and their health care providers all have current knowledge and can apply evidence based guidelines.* Specific strategies include: 1) make available training curricula options for patient education; 2) train non-Certified Diabetes Educators (CDEs) to augment traditional education programs; 3) partner with grocery stores, libraries, and other public places to make diabetes, nutrition, and general better health information available; and 4) to engage HMOs to standardize diabetes education programs benefit availability.

Monitoring. During each year of the plan, the Connecticut Department of Public Health (CT DPH) and the Diabetes Advisory Council will prepare a report on the previous year's activities and results. Data will be collected and tabulated each year by the Diabetes Prevention and Control Program staff, and a report will be prepared by CT DPH and the Diabetes Advisory Council to update funding agencies, partnering health care organizations, and concerned citizens on the plan's progress. Based upon information in the annual report, the CT DPH in conjunction with the Diabetes Advisory Council will create an action plan for the subsequent year. The action plan will clearly state the objectives and the recommended strategies to achieve those objectives in the next calendar year. To fully implement the recommendations of *Connecticut's Diabetes Prevention and Control Plan*, a diverse group of funding sources, from state and federal government to private foundations, must be recruited.

Conclusion: Through this five year prevention and control plan – with careful attention to results of programs, initiatives and collaborative support of various public and private entities - the Connecticut Diabetes Partnership has made a commitment to lower the Connecticut diabetes prevalence rate from 6.2% to 5.7%, and to improving the quality of life for Connecticut residents with diabetes and pre-diabetes resulting in a healthier community.

Executive Summary Table 1 **RECOMMENDED GOALS AND STRATEGIES**

Prevention

Objective 1	By 2012, reduce by .5% the prevalence of type 2 diabetes by preventing or delaying the progression of pre-diabetes to diabetes.
Strategies	1. Increase awareness of providers and people with pre-diabetes of the potential to prevent diabetes onset through lifestyle change. 2. Develop and promote pre-diabetes screening programs accessible to all at risk Connecticut residents with referrals to health care providers as appropriate. 3. Deliver cost-effective pre-diabetes interventions as efficiently as possible. 4. Change Connecticut's health system to support healthy lifestyles for residents of all ages. 5. Engage community organizations to ensure that messages about lifestyle modification are delivered in culturally relevant and positive ways. 6. Support interventions promoted by other programs, such as the CT DPH Obesity Program, that include modifications to school lunch programs to provide healthy school nutrition environments.

Disease Management

Objective 1	By 2012, increase by 50% the number of Connecticut physicians and other health care providers who use ADA and other evidence-based guidelines to diagnose and monitor pre-diabetes and diabetes as measured by the number of physicians recognized by the ADA.
Strategies	1. Promote adoption and integration of ADA and other evidence-based guidelines into clinical practice to support early diabetes diagnosis and use of ABC (A1c, blood pressure, cholesterol) values. 2. Develop a pay-for-performance system that rewards physicians and patients for adhering to guidelines. 3. Engage employers in encouraging and supporting more managed care organizations to offer incentives.
Objective 2	By 2012, improve patient care by increasing the number of health care providers using electronic medical records or disease registries by 10% to establish a statewide health data exchange, increase outreach, and improve communication among providers.
Strategies	1. Develop effective communication vehicles to demonstrate the value of reporting clinical outcomes to providers using evidenced based literature, peer-to-peer outreach and other means. Show providers how such clinical outcomes, reporting through incentive programs, or other vehicles can be valuable for their patients, their practices and others. 2. Work collaboratively with managed care organizations to identify the current communication barriers for effective disease management. With MCOs, promote a process to simplify referrals and communication linkages that will create administrative efficiencies. 3. Promote integrative processes among health plans to link diagnosis, treatment plans and education plans thus promoting communication among those who are providing services to persons with diabetes.
Objective 3	By 2012, establish a system of process and outcome measurement used by all health care providers on the patient care team.
Strategies	1. Adopt evidence-based guidelines as evaluation benchmarks for clinical outcomes (e.g., A1c control, blood pressure control, lipid level controls, and smoking cessation). Highlight and communicate recommendations in these guidelines for provider accountability in monitoring clinical care. 2. Use a quality assurance process to assess outcomes (e.g., behavioral/functional outcomes, impact of education, outreach, effects on caregivers and family members with chronic disease, end of life care and impact on mental health). 3. Encourage employers to provide meaningful financial incentives for employees and their providers to reach established benchmarks.

0616
09/15/08

Objective 4	By 2012, increase by 5% the percentage of adults age 18 and older who are conducting comprehensive self-management to control their dise
Strategies	1. Assess current disparities and create plans to remove identified disparities through culturally-focused diabetes care. 2. Involve community leaders in creating community health initiatives. 3. Train health care professionals, para-professionals and lay health workers in the community health setting on diabetes prevention, care and management. 4. Create a standard self-management education program that is simple and user friendly and that involves a program for health care literacy that is language appropriate and culturally sensitive. 5. Foster patient responsibility for diabetes care by adopting and promoting self-management education programs that engage the patient, and provide patient financial incentives and personalized nutrition guides and exercise plans. 6. Engage employers to work with managed care organizations in supporting the importance of simple, barrier-free self-management education. 7. Support interventions promoted by other programs such as the Department of Public Health's Obesity Program that include modifications to companies, restaurants, the workplace and school lunch programs to provide healthy nutrition environments.
Objective 5	By 2012, increase by 10% the proportion of at risk individuals who are screened for diabetes and pre-diabetes using evidence-based guidelin
Strategy	1. Promote new and enhanced screening programs in varied settings. 2. Promote increased use in clinical practice of ADA and other evidence-based criteria for diabetes diagnosis and pre-diabetes.
Objective 6	By 2012, increase by 10% the proportion of health care providers who adopt a uniform system of reporting, including the coding of diabetes diagnoses.
Strategy	1. Promote and support standardized coding and reporting tools and processes for providers. 2. Promote linkage of diagnosis plans with education plans.
	Education & Awareness
Objective 1	By 2012, increase by 5%, the proportion of people with diabetes participating in diabetes self-management education programs in order to learn about controlling their diabetes.
Strategies	1. Make available training curricula options for patient education. 2. Create partnerships with hospitals, CHCs, volunteer health organizations, CADH, AHA, and local health departments to ensure staff has information relevant to care through education resources added to organizational newsletters (hospitals, CT DPH, etc.) and Web sites. 3. Train non-CDEs, including school nurses, medical assistants, certified nurse aides, peer-to-peer educators, faith organization members, senior center staff, local health department educators, and lay persons as referral resources, to augment traditional education programs. 4. Engage HMOs to standardize access to education programs by taking advantage of Connecticut law that requires diabetes education for persons with diabetes. 5. Partner with grocery stores, libraries, senior centers, town halls, and other public places to make diabetes, nutrition, and general health information available. 6. Make people with pre-diabetes aware of the potential to prevent diabetes onset through lifestyle change. 7. Outreach to leaders of large group practices to encourage their members' physicians to refer to diabetes education programs.

0617
09/15/08

Objective 2	By 2012, increase by 10% the number of providers who participate in continuing education programs focused on diabetes.
Strategies	1. Expand physician participation in professional education programs by encouraging insurers and pharmaceutical companies to offer scholarships for doctors to attend the national scientific sessions or diabetes post graduate conferences and providing materials on these programs to physicians' office staff. 2. Conduct ongoing professional education with a curriculum that incorporates best practices and prevention (e.g., Grand Rounds, CMEs, etc.) for physicians involved in providing diabetes services. 3. Engage hospital and clinic administrators to foster mentoring or peer education to change physician behavior and to support the increased number of, and enrollment in, patient education programs; engage medical directors from MCOs and PHOs to encourage their members to receive regular diabetes education. 4. Make providers and people with pre-diabetes aware of the potential to prevent diabetes onset through lifestyle change. 5. Promote the use of relevant billing and reimbursement codes for screening, education and treatment
Objective 3	By 2012, improve public awareness of the impact of diabetes by increasing by 10% the number of partnerships with community organizations such as schools, libraries, the media, town halls, and other public places.
Strategies	1. Engage schools, libraries, senior centers, town halls and other public places, workplaces, faith-based and community-based organizations to share information on the risks, burden, and impact of diabetes, and on the availability of screenings. 2. Train non-CDEs to provide accurate information on signs and symptoms of diabetes, and to refer people to formal education programs; develop a proficiency measure for community and peer diabetes health educators. 3. Launch an information campaign drawing on partnerships, existing programs, and national campaigns to highlight the rapid rise in diabetes diagnoses; connect with a public figure to promote the message. 4. Engage community organizations to ensure that messages about lifestyle modification are delivered in culturally relevant and positive ways.

Access and Policy

Objective 1	By 2012, increase by 5% the proportion of people who receive comprehensive diabetes care, i.e., diabetes preventive care, treatment, supplies, equipment, medication, education and medical nutrition therapy.
Strategies: Universal	1. Demonstrate the cost-effectiveness of diabetes education programs and promote a partnership among CT DPH, private groups, and public groups to implement universal diabetes education. 2. Engage the state legislature to appropriate funds for pilot programs to spread the message about diabetes, both how to prevent it, and how to treat it. 3. Secure commitment of the health care delivery system to the Diabetes Bill of Rights, and expand the definition of those covered under the Diabetes Bill of Rights. 4. Encourage diabetes-friendly policies at employers and schools. 5. Determine how to find people at high-risk for diabetes and deliver cost-effective interventions as efficiently as possible.
Strategies: For Persons with Insurance Coverage	1. Encourage insurers to cover diabetes preventive care, treatment, supplies, education, and treatment with co-payments that do not exceed 25% of the covered item's total cost, and include diabetes education and medical nutrition therapy as a reimbursable service across insurance programs. 2. Work to change Federal ERISA provisions to require self-insured employers to cover diabetes supplies, education, and treatment, and adopt the ADA Diabetes Bill of Rights to guide insurance regulation in Connecticut.

0618
09/15/08

	3. Develop "Report Cards" for insurance plans on 1) what is covered and 2) on A1c levels including rates for flu shots, foot exams, and eye exams. (HEDIS /NCQA Measures)
Strategies: For persons covered under Medicaid	Support efforts to ensure all Medicaid eligible persons with diabetes are enrolled and receiving medically appropriate care and treatment, in their community when possible, including podiatric care and diabetes education services.
Strategies: For the Uninsured	1. Pilot a program with appropriate legislative and private foundation support to provide lab tests, supplies, medicines, and education for uninsured people with diabetes through a variety of providers and settings. 2. Develop and seek legislative support for a program with community clinics, hospitals, and other health care providers to provide free or low cost access to preventive education and care, and treatment for uninsured or underinsured persons with diabetes. 3. Expand use of Patient Access Programs sponsored by major pharmaceutical companies.
Objective 2	By 2012, increase by 5% the number of diabetes education services and disease management supports for people with diabetes.
Strategies	1. Assess diabetes public health infrastructure to determine system gaps and develop policies that encourage the development of strong, efficient networks of providers by engaging legislators and insurers to make them aware of the barriers that exist to proper care. 2. Develop improved capacity to address the behavioral causes of poor diabetes patient outcomes, including defining and addressing reimbursement issues that may inhibit access to psychologists' services. 3. Address shortages of specialists with focus on diabetes by expanding the number of nurse practitioners and physician assistants that specialize in diabetes care through educational incentives and policy development to support creation of teams of connected diabetes professionals. 4. Expand the role of licensed health care professionals to provide more diabetes care including more frequent follow-up. 5. Publish HEDIS measures related to diabetes for health plans; develop benchmarks on diabetes measures to inform policy; develop mandated reporting of specific diabetes-related measures by hospitals and other health providers.

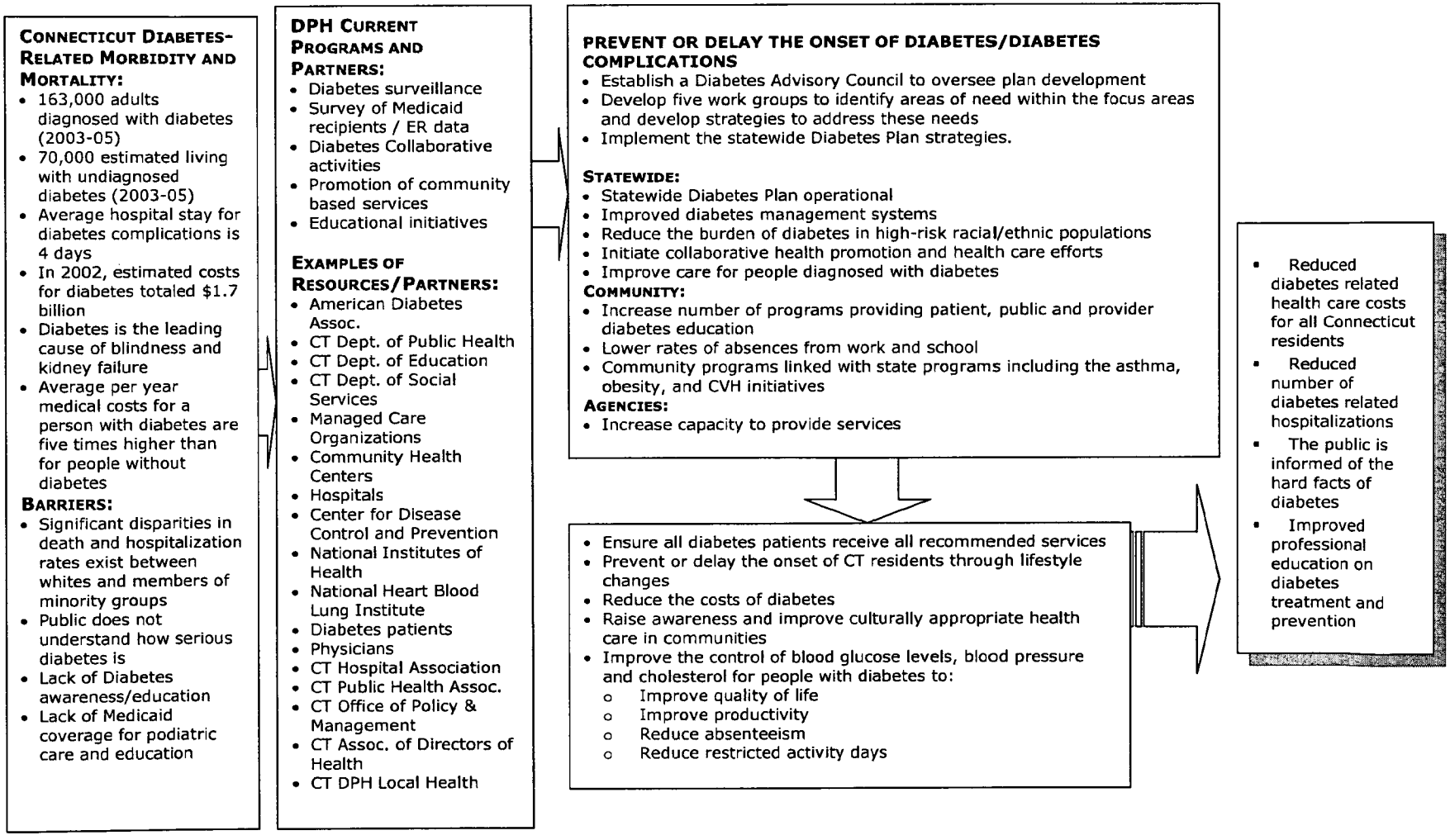
Surveillance

Objective 1	By 2012, increase by 5% the number of hits to the diabetes surveillance Web page as a means of increasing accessibility to the diabetes prevalence, morbidity and mortality data.
Strategies	1. Develop partnerships with large centers, registries, community-based organizations, CHCs, occupational health services, and use academia to assist in research and data collection projects. 2. Identify other data sources and data-collecting agencies to meet with state planning groups to determine how best to create data sharing networks. 3. Provide technical assistance on how to collect data to organizations that provide diabetes services. 4. Provide resources to community-based organizations to gather data about diabetes services. 5. Conduct surveillance of priority subpopulations, as limited resources allow, and make information resources available to non-DPH organizations as appropriate. 6. Disseminate available diabetes surveillance data to the general public through the CT DPH Web site and other appropriate venues.

0619
09/15/08

Comprehensive System of Diabetes Care and Prevention

"The mission of the *Connecticut Diabetes Prevention and Control Plan* is to create an environment for change in which a comprehensive system of diabetes care and prevention will reduce or delay the onset of diabetes and its complications, and enhance the quality of life for people affected by diabetes. Successful implementation of the plan will bring about measurable improvement in the quality of life for people with diabetes and pre-diabetes, resulting in healthier communities."—Advisory Council



0620
09/15/08

1. DEFINING DIABETES

a. Characteristics of Diabetes

What is Diabetes?

Diabetes, as defined by the American Diabetes Association (ADA), is a group of diseases characterized by high levels of blood glucose resulting from defects in insulin secretion, insulin action, or both. The consequences of these elevated blood sugars can result in serious complications which pose a severe public health concern in Connecticut.

Types 1 and 2
- Type 1 accounts for 5 to 10% of all diabetes cases
- Type 2 accounts for 90-95% of all cases of diabetes

Types of Diabetes

Type 1 diabetes is an auto-immune disease which destroys the beta cells of the pancreas which normally produce insulin. Therefore, the person with type 1 diabetes must take multiple daily insulin injections. Type 1 accounts for 5-10% of diabetes cases.

Type 2 is the most common type of diabetes accounting for 90-95% of cases. This occurs when the body fails to make enough insulin or properly use it. Aspects of type 2 diabetes include:

Risk factors for Type 2
- Overweight
- Family member with diabetes
- High blood pressure/cholesterol
- Gestational diabetes
- Being African American, Native American, Asian or Pacific Islander, Hispanic American
- Pre-diabetes

- Gradual onset often with few or no symptoms.
- Some people with type 2 diabetes can control their blood sugars through meal planning and exercise. Others will need medication, including insulin.
- The majority of people with type 2 diabetes are over age 40; however, it is becoming increasingly more common among children and young adults.
- Risk factors for type 2 diabetes include: being overweight (defined as a body mass index over 25 kg/m2), having a family member with diabetes, having high blood pressure or cholesterol, having a history of gestational diabetes or delivering a baby over 9 pounds, being African American, Hispanic, Native American, Asian or Pacific Islander, and/or having pre-diabetes as described below.

Gestational diabetes is a form of diabetes that occurs in 4-8% of pregnancies. Gestational diabetes usually requires treatment only during pregnancy but puts the mother at high-risk for later development of diabetes. Treatment involves meal planning, physical activity, and in some cases insulin. Treatment helps to normalize maternal blood sugars and prevent complications in the infant, including low blood sugar at birth and larger size (greater than 9 lbs.). Risk factors

for gestational diabetes include being overweight, being an ethnic minority, and having a family history of diabetes.

Pre-diabetes is a condition in which a person's blood sugar levels are higher than normal, but are not high enough to be considered diabetes. People with pre-diabetes do not often exhibit any symptoms. They are, however, at greater risk for developing diabetes and having a heart attack or stroke. Diagnosis of pre-diabetes is a fasting blood sugar equal to or greater than 100 mg/dL, but less than 126 mg/dL or a two-hour blood sugar of 140-199 mg/dL after a 75 gram glucose challenge. Research conducted on people with pre-diabetes in the Diabetes Prevention Program at National Institutes of Health demonstrated that 5-7% weight loss could prevent or delay diabetes.

Diabetes **can be prevented or delayed** – a 5-7% weight loss could prevent or delay diabetes

Symptoms and Diagnosis

Symptoms of high blood sugar may include frequent thirst (polydipsea) and urination (polyuria), unexplained weight loss, fatigue, cuts that are slow to heal, frequent infections, tingling or numbness in the feet, legs or fingers, and blurred vision. Frequently though, no symptoms are present, and diabetes often goes undetected. Meanwhile, the damaging effects of high blood sugar are beginning.

The diagnosis of diabetes is made when symptoms are present and there is a random blood sugar greater than or equal to 200 mg/dL, or when a fasting blood sugar is greater than or equal to 126 mg/dL. These results should be confirmed by repeat testing on a different day. Alternately, diabetes can be diagnosed with a two-hour post-load blood sugar greater than or equal to 200 mg/dL during an oral glucose tolerance test using 75 grams of glucose.

Effects of Diabetes

The chronic effects of high blood glucose are associated with long-term damage to various organs, especially the eyes, kidneys, nerves, and blood vessels. The potential long term complications of diabetes can include kidney failure, loss of vision, amputation (usually of the lower extremities), stroke, heart disease, complications of pregnancy, and gum disease. Research has also shown depression to be twice as prevalent among persons with diabetes than nondiabetic controls[iv] and is associated with poor diabetes outcomes in quality of life,[v] disability,[vi] blood sugar control,[vii] long-term complications,[viii] mortality,[ix] and healthcare costs[x]. There are also acute or


Diabetic Retinopathy

immediate concerns associated with diabetes. These include hypoglycemia, diabetic ketoacidosis, and hyperglycemic hyperosmolar states.

b. Diabetes as a Self-Managed Disease

Research has shown that good blood sugar control can help avoid many complications associated with diabetes. The *Diabetes Control and Complications Trial* conducted with individuals with type 1 diabetes, and the *United Kingdom Prospective Diabetes Study* of people with type 2 diabetes, among others, have demonstrated that achieving good blood sugar control can decrease complications.



Treatment of diabetes varies with the type of diabetes, but there are many similarities. It is very much a self-managed disease. Successful management requires knowledge, skills and a willingness to modify behaviors related to food intake and physical activity, as well as blood sugar monitoring, medication adherence, and frequent medical follow-up.

2. THE CONNECTICUT DIABETES PARTNERSHIP

The MISSION of the Connecticut Diabetes Partnership is to create an environment for change in which a comprehensive system of prevention and care will prevent or delay the onset of diabetes, reduce its complications when diabetes is diagnosed, and enhance the quality of life for people affected by diabetes. Successful implementation of the plan will bring about measurable improvement in the quality of life for people with diabetes and pre-diabetes, resulting in healthier communities.

The Connecticut Department of Public Health (CT DPH) continues to respond to the changing demographics of its residents and the accompanying health issues that confront them. Increasingly, diabetes has become a topic of concern for the Commissioner of Public Health, the public health sector, health care providers, health insurers, families, and employers. Increased incidence and costs, both financial and psychological, associated with this chronic disease have raised the awareness for the need of a better system to prevent or delay the onset of diabetes and reduce its complications.

The CT DPH recognizes that the increasing prevalence of diabetes is a serious health issue for Connecticut. To better address the epidemic and to embark upon a statewide diabetes public health plan, Commissioner J. Robert Galvin, M.D., M.P.H., asked key individuals to provide guidance and recommendations to the Connecticut Diabetes Prevention and Control Program (CT DPCP), directing them to:

- An estimated 233,000 CT adults have diabetes but 70,000 of these are undiagnosed
- The diabetes prevalence among the Black population in CT is 10%, compared to 6.2% in CT overall
- Lower income adults are more likely to have diabetes than those with higher incomes

- Provide expert advice on emerging diabetes issues affecting care, treatment, and quality of life for people with diabetes or at risk for diabetes;
- Describe the burden of diabetes in Connecticut;
- Set diabetes priorities;
- Improve policy and legislative efforts; and
- Design and implement a diabetes plan, and influence the strategic planning of the CT DPCP.

Statewide Resources

The Connecticut Department of Public Health's Diabetes Prevention and Control Program (CT DPCP) operates within the AIDS and Chronic Diseases Section of the Public Health Initiatives Branch. The CT DPCP is primarily funded by the Centers for Disease Control and Prevention (CDC), Division of Diabetes Translation. The goal of the CDC program is to reduce the burden

of diabetes in the United States. It works to achieve this goal by combining support for public health oriented diabetes prevention and control programs and translating diabetes research findings into widespread clinical and public health practice. The mission of this division is, "To eliminate the preventable burden of diabetes through leadership, research, programs and policies that translate science into practice." CDC is guided by the *Ten Essentials of Public Health Service* (see Appendix C).

The goals of the C DPCP are to improve care for people diagnosed with diabetes, initiate health promotion efforts in collaboration with other chronic disease programs, and reduce the burden of diabetes for people in high-risk racial and ethnic populations in Connecticut. The implementation of a statewide plan focuses on the Chronic Care Model and creative linkages among state initiatives (e.g., AIDS, asthma, cancer, diabetes, heart disease and stroke, obesity). To achieve a statewide Diabetes Prevention and Control Plan, CT DPH acknowledges the need to convene stakeholders, develop a common plan, and provide an ongoing forum for improvement to diabetes prevention and control.

The CT DPCP serves as a statewide resource for diabetes programs and information while providing a forum for stakeholders statewide. Significant efforts are made by the CT DPCP to reach out to providers of diabetes care and work with partners in managed care, health service delivery, and media to effect change within community-based programs, and increase health information communication. CT DPH maintains a diabetes surveillance system to continuously monitor and assess the burden of diabetes and to assist in the evaluation of programs. The CT DPCP collaborates on various projects such as quality improvement initiatives at community health centers, efforts to increase the number of bilingual certified diabetes educators, promotion of influenza and pneumoccal vaccinations, eye exams, foot exams and A1c testing (3 month average of blood sugars), and providing professional education for health care providers.[xi] The current effort undertaken by the CT DPCP was to convene stakeholders to develop and implement a statewide diabetes plan.

Connecticut Success Stories

The following are examples of successful programs in Connecticut. It is the intent of the plan to engage and build upon these programs and others like them to realize the plan goals and recommendations.

- Currently the American Diabetes Association (ADA) recognizes 26 diabetes education programs across the state. Each program meets rigorous standards to achieve this designation; all offer both group educational classes and one-to-one counseling for diabetes. Some include on-site services of endocrinology, podiatry and optometry.

- *Learning and Diabetes: A Resource Guide for Connecticut Schools and Families* was developed through cooperation with key organizations and individuals committed to improving diabetes care for school children. It has been distributed to school nurses throughout the state and is posted on the Connecticut Department of Education Web site.
- *Bridgeport Mayor's Diabetes Awareness Initiative:* This city-wide program has brought together partners from the public and private sectors. The initiative consists of series of educational sessions at various locations around the city, coaching sessions, "dancing for diabetes" programs, and various media campaigns. Data is being collected on the impact on diabetes control.
- *World Without Limits Diabetes Health Fair* at the First Cathedral in Bloomfield, Connecticut is a faith-based initiative that has attracted over 1,000 African Americans each year. The event features screenings, informational presentations, diabetes product information, and entertainment. One of the outgrowths of this program is the "Each One, Teach One" Diabetes Support Group for African Americans held at the Urban League.
- Health Resources Services Administration's *Health Disparities Diabetes Collaborative:* Seven community health centers in Connecticut participate in the diabetes collaborative, which was developed to improve the way care is delivered. It is based on the Chronic Care Model, and through system redesign, the programs have been able to achieve remarkable improvements in diabetes metabolic control.
- *Robert Wood Johnson Advancing Diabetes Self-Management Program* at Community Health Center Inc., Middletown, CT: Over 500 patients have been enrolled in a program focusing on self-management goal setting and achievement to improve their diabetes control.
- *The American Diabetes Association Expo*: This annual event held in Hartford, Connecticut has grown to attract over 2,000 attendees. The day-long program features cooking demonstrations, screenings, diabetes product information, and informational presentations.
- *Partners Reducing the Effects of Diabetes*: *Initiatives through Collaboration and Teamwork* at the Yale Griffin Prevention Research Center. This project strives to develop strategies to prevent and reduce diabetes and diabetes complications among residents in New Haven and Bridgeport. It is a faith-based project tailored toward low-income African American residents. Project strategies include training community health advisors to promote good health.
- *Amigos en Salud* is a program at Hartford Hospital in which "Promotoras" (community-based lay health educators), specifically trained in behavior change strategies and diabetes, have formed partnerships with patients and help them design and implement changes that are consistent with their cultural beliefs and lifestyle.

The Background and Process

Responding to the rise in prevalence of diabetes in Connecticut and to a request by the Centers for Disease Control and Prevention (CDC), the Connecticut Department of Public Health (CT DPH) convened a diverse group of stakeholders to form the Diabetes Advisory Council in December 2005 to oversee creation of the state diabetes plan. The Advisory Council created an executive committee to manage work groups and to report on the groups' progress. Each member of the Executive Committee was assigned as co-chair of one of the five work groups.

DPH then sent invitations to individuals representing health care delivery, health insurance, government, business, education, and community organizations to serve on the work groups that would be responsible for identifying the barriers to effective diabetes prevention and control in Connecticut, and for creating the strategies to overcome those barriers. The work groups were convened at a large meeting of the planning partners on January 31, 2006. At that meeting, the planning partners were briefed on the current state of diabetes in Connecticut, and they selected the work group(s) to which they felt they could best contribute.

During early 2006, the five work groups—Access and Policy, Disease Management, Education and Awareness, Surveillance, and Prevention—met regularly to refine problem statements, to review research, and to determine the methods that would be most effective in combating diabetes in Connecticut. By early May 2006, each work group had a comprehensive list of the problems that existed in its work area and a set of recommendations to address each problem. All five work groups were reconvened on May 10, 2006 to brief one another on their accomplishments and to make their recommendations to create the Diabetes Prevention and Control Plan. In addition, the planning partners decided on a specific set of action steps to take in the first year of plan execution to produce meaningful success soon after the plan's release. Each work group had a specific focus.

- The *Access and Policy Work Group* was assigned the task of identifying and communicating the barriers that prevent people with diabetes and those at risk for diabetes from receiving the care or education they need to manage their health. The group then devised strategies to overcome those barriers.
- The *Disease Management Work Group* had the task of determining what problems inhibited effective diabetes management and creating recommendations to solve those problems.
- The *Education and Awareness Work Group* was responsible for identifying the gaps in diabetes self-management education, professional education and in general public awareness and for determining the best ways to bridge those gaps.
- The Diabetes Data and Surveillance Work Group of the Connecticut Department of Public Health was responsible for the *Surveillance* section of the plan. The group described the

barriers that still exist to accurate data gathering and sharing, and created recommendations to reduce those barriers.

- The *Prevention Work Group* was responsible for recommending strategies for primary prevention of diabetes in people with pre-diabetes. As planning progressed, primary prevention emerged as an issue that each work group's charge touched upon but did not explicitly address. Mindful that Connecticut's Diabetes and Prevention Control Plan was intended to reduce the incidence of diabetes, as well as, to reduce complications of diabetes among those living with the disease, the combined planning group decided to convene a prevention work group with representatives from the other four work groups. The recommendations coming from this work group are included in the plan.

Achieving the Goals

The *Connecticut Diabetes Prevention and Control Plan* has goals in two broad areas: the care system and care outcomes. While systems improvement is the structural change that the plan seeks, improvement in care outcomes is the ultimate goal of that structural change. Accordingly, the intended impacts of the plan can be organized under two categories: 1) comprehensive system of care and prevention, and 2) improved quality of life. For the purposes of this plan, comprehensive diabetes care is defined as a comprehensive system of care and prevention that includes diabetes preventive care, treatment, supplies, equipment, medication, diabetes self-management education, and medical nutrition therapy, that is offered, available and affordable across the public and private sectors to every citizen of Connecticut in need.



Many of the recommendations involve community groups and local jurisdictions. The National Public Health Performance Standards Program (NPHPSP) has developed *10 Essential Public Health Services* that should be provided in all communities. Consideration was given to the *10 Essential Public Health Services* in the development of the plan. These are included in the Appendix as a reference (see Appendix C).

Healthy People 2010 objectives for diabetes (Appendix B) were used to identify ways to address problems specific to Connecticut and to develop measurable outcome statements.

3. CONNECTICUT, ITS POPULATION AND DIABETES

Introduction

Connecticut is the southernmost New England state, bordered by Massachusetts to the north, Long Island Sound to the south, Rhode Island to the east, and New York to the west. Much of Connecticut's population lives in the larger cities along the coastal plain and in the river valley of the Connecticut River, which bisects the state from north to south. Connecticut is characterized by high social and economic contrast and racial and ethnic diversity. It is the third smallest in area, but fourth most densely populated state in the U.S.; about 88% of its population lives in urban areas.[xii]

Whether in terms of health status, income, poverty, racial composition, or almost any other factor, statewide averages for Connecticut often are misleading. Striking disparities appear across town lines, among racial and ethnic groups, and among urban and rural populations. These differences have engendered the concept of "two Connecticuts,"[xiii] one for people who live in the wealthiest state in the nation, and the other for those living in some of the most severe and concentrated pockets of poverty in the U.S. Recently the notion of "five Connecticuts" based on disparate social and economic factors has been proposed.[xiv]

The overall health of Connecticut's people varies dramatically among its wealthiest and poorest communities. Connecticut's population is changing, and the demographic changes are reflected in both numbers and patterns of diabetes and evolving needs for health care and support services. Disparities in diabetes prevalence, treatment, clinical outcomes, and mortality were fundamental considerations in the development of the *Connecticut Diabetes Prevention and Control Plan.*

CONNECTICUT'S PEOPLE

The Aging of the Population

Diabetes prevalence increases with age. Connecticut's population is older, on average, compared to the U. S. population as a whole. Older adults are the fastest growing segment of our population. Between 1990 and 2000, the median age of Connecticut residents increased from 34.4 years to 37.4 years, or 2.1 years older than the national median age.[xv] During the same period, the number of people 65 years of age and older grew by more than 24,000 (Table 1).

Shifts in Racial and Ethnic Composition

Diabetes rates and patterns vary demographically. From 1990 to 2000, the number and proportion of White persons in Connecticut decreased, whereas minority populations increased,

in some cases by 50% or more (Table 1). Connecticut's population is still predominately White (81.6%) and non-Hispanic (90.6%); however, the racial and ethnic composition is dramatically different in the state's largest cities. Racial and ethnic minorities account for 72% of the population in Hartford, 57% in New Haven, and 55% in Bridgeport, and Hispanics (of any race) represent 41%, 21%, and 32%, respectively, of the population in these three cities.[xvi]

Hispanics are now the largest minority group in Connecticut and the United States, with the trend expected to continue.

Table 1 Population Changes for Certain Groups: Connecticut, 1990 to 2000

Population Group	1990		2000		Change from 1990 to 2000	
	Number	% of Total	Number	% of Total	Number	%
Total Population (all races and ages)	3,287,116	100	3,405,565	100	118,449	3.6
White	2,859,353	87.0	2,780,355	81.6	-78,988	-2.8
African American - Black	274,269	8.3	309,843	9.1	35,574	13.0
Asian American/Pacific Islander	50,698	1.5	83,679	2.5	32,981	65.1
American Indian/Alaskan Native	6,654	0.2	9,639	0.3	2,985	44.9
Hispanic/Latino (any race)	213,116	6.5	320,323	9.4	107,207	50.3
Older adults (65+ years of age)	445,907	13.6	470,183	13.8	24,276	5.4

Source: U.S. Census Bureau, 2000

Social and Economic Characteristics

Education Level: Compared to the American population as a whole, Connecticut residents have achieved higher levels of education (Table 2). In 2000, 84% of state residents 25 years of age and older were high school graduates or higher, 31% had completed a bachelor's degree or more, and less than 6% had less than a 9th grade education. In contrast, in the cities of Hartford and Bridgeport, only 61% and 65% of residents, respectively, were high school graduates, only about 12% had a baccalaureate degree or higher, and 17% and 15%, respectively had less than a 9th grade education.

Table 2: Changes in Selected Social and Economic Characteristics: Connecticut, 1990 and 2000 and United States, 2000

Characteristic	Connecticut		U.S.
	1990[xviii]	2000[xix]	(2000)[xvii]
Less than 9th grade education (age 25+)	8.4%	5.8%	7.5%
High school graduates (age 25+)	79.2%	84.0%	80.4%
Bachelor's degree or higher	27.2%	31.4%	24.4%
Speak language other than English	15.2%	18.3%	17.9%
Do not speak English "very well"	6.0%	7.4%	8.1%
Per capita income PP [7PP]	$20,198	$28,766	$21,587
Persons living below poverty level TPTP[xx]	6.6%	7.6%	12.4%

Source: U.S. Census Bureau, 2000

Language Spoken at Home

In 2000, nearly one in five Connecticut residents over 5 years of age spoke a language other than English, and more than 7% did not speak English "very well" (Table 2). In Hartford and Bridgeport, more than 40% of the population spoke a language other than English, and more than one in five of them spoke English less than "very well." People with a poor ability to read, write, and speak English often have a poor understanding of medical information and advice. As a result, they are more likely to engage in risky behaviors like smoking, they are less likely to access health services, such as screenings for diabetes, and they end up with poor health outcomes, compared to people with high English literacy.

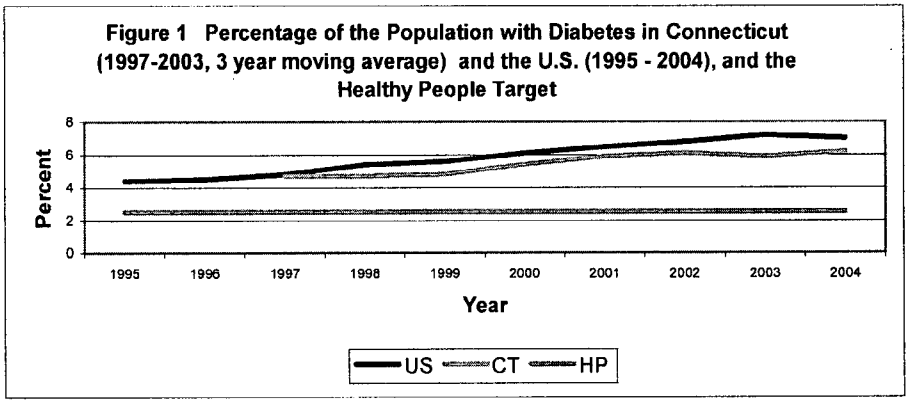
4. BURDEN OF DIABETES IN CONNECTICUT

Prevalence

An estimated 6.2% of the Connecticut adult population, or approximately 163,000 adults 18 years and older, have diagnosed diabetes (2003-2005 data) compared with about 7% of the U.S. population.[xxi, xxii] The Centers for Disease Control and Prevention (CDC) estimates that about 30% of all diabetes cases are undiagnosed, partly because symptoms develop gradually and severe symptoms may only occur after several years.[xxiii] An additional 70,000 Connecticut adults are estimated to have undiagnosed diabetes. Thus, a total of 233,000 Connecticut residents are estimated to have either diagnosed or undiagnosed diabetes. Prevalence estimates reported below refer to diagnosed cases of diabetes.

National survey data suggest that diabetes has continuously increased since the mid-1990s.[xxiv] The national Behavioral Risk Factor Surveillance System (BRFSS) survey estimated adult diabetes prevalence at 4.4% in 1995, 6.1% in 2000, and 7% in 2004. The prevalence of diabetes in Connecticut has gradually increased since 1999. Diabetes prevalence in the Connecticut adult population was 4.8% in 1998-2000 and 6.2% in 2003-2005.[xxv] The U.S. *Healthy People 2010* target for diabetes prevalence is 2.5%.

Figure 1 Percentage of the Population with Diabetes in Connecticut (1997-2003, 3 year moving average) and the U.S. (1995 - 2004), and the Healthy People Target



Sources: US Department of Health and Human Services, 1990; 2000; Centers for Disease Control and Prevention, 2005; Connecticut Department of Public Health, 2005.

Prevalence by Age, Race/Ethnicity and Household Income

Diabetes prevalence rates vary by age, race/ethnicity, and household income levels. Prevalence increases by age with Connecticut adults aged 60 and over having the highest rates and adults aged 18 to 29 having the lowest rates of diabetes (Figure 2). Among subpopulation groups, Black adults have significantly higher prevalence than White and Hispanic adults ($p<.05$) [Figure 3]. Lower-income adults are also more likely to have diagnosed diabetes than are higher-income adults in Connecticut (Figure 4). [xxvi]

The prevalence of diabetes in Connecticut and the United States is likely to increase for a few reasons. First, large segments of both populations are aging. Second, the fastest-growing segment of the U.S. and Connecticut populations include Hispanic Americans and other minority groups, who are considered at higher risk for diabetes nationwide. Finally, Americans are increasingly overweight and sedentary. According to recent estimates, the prevalence of diabetes in the United States is predicted to reach 8.9% of the population by 2025.[xxvii]

Figure 2
Diabetes Prevalence by Age Group
Connecticut Adults, 2003-2005

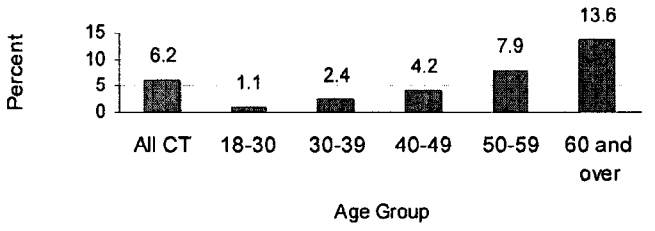


Figure 3
Diabetes Prevalence by Race/Ethnicity
Connecticut Adults, 2003-2005

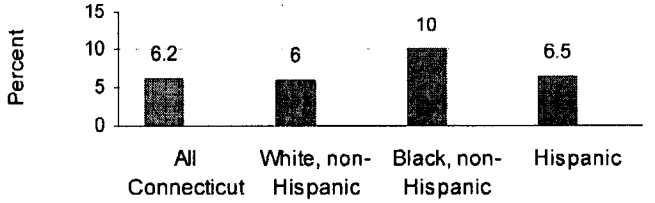
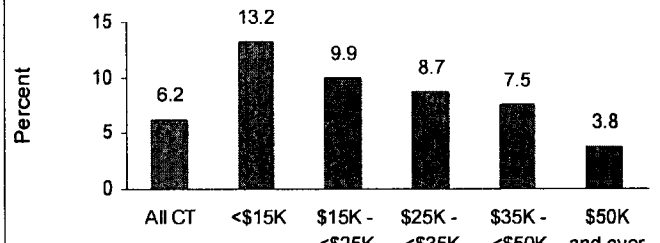


Figure 4
Diabetes Prevalence by Household Income
Connecticut Adults, 2003-2005



Source for Figures 2, 3, 4: Connecticut Department of Public Health. 2006.

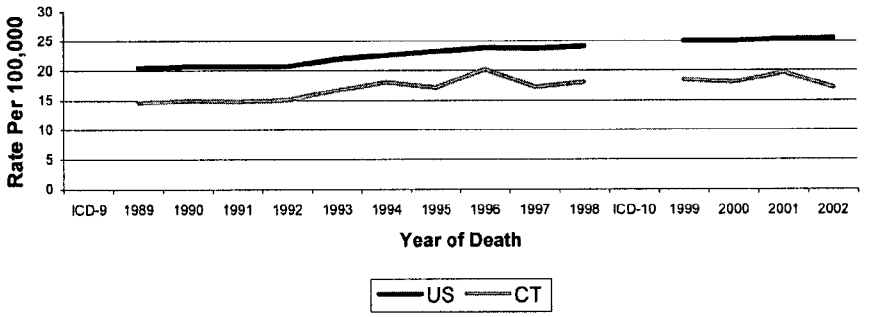
Mortality

Diabetes is the seventh leading cause of death in Connecticut. Most people with diabetes die from related complications rather than directly from the disease itself; therefore, examination of diabetes as the underlying cause of death alone does not accurately represent its extensive contribution to overall mortality. While diabetes was the underlying or "primary" cause of deaths for 674 residents in 2002, it was listed as a primary or secondary ("diabetes-related") cause of death for 2,771 Connecticut residents.[xxviii] National data suggest that diabetes is underreported on death certificates.[xxix]

Trends in Mortality

Age-adjusted death and premature mortality rates due to diabetes increased significantly in Connecticut during the 1990s ($p<.001$).[xxx] This increase mirrors a similar trend nationwide.[xxxi] Age-adjusted diabetes mortality rates for Connecticut residents have been consistently lower than comparable national rates (Figure 5). Diabetes-related mortality rates for Connecticut residents did not change significantly during the 1990s.[xxxii]

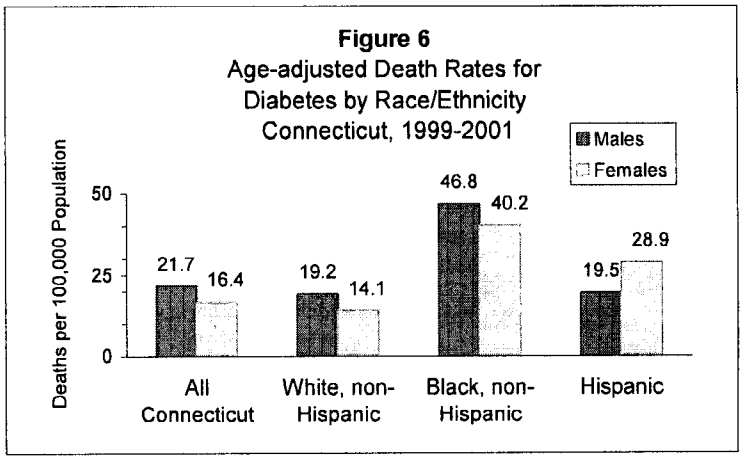
Figure 5 US and Connecticut Age-Adjusted Diabetes Mortality Rates, 1989-2002



Sources: Centers for Disease Control and Prevention; Connecticut Department of Public Health, 2005.
Note: Cause-of-death coding changed from ICD-9 to ICD-10 in 1999.

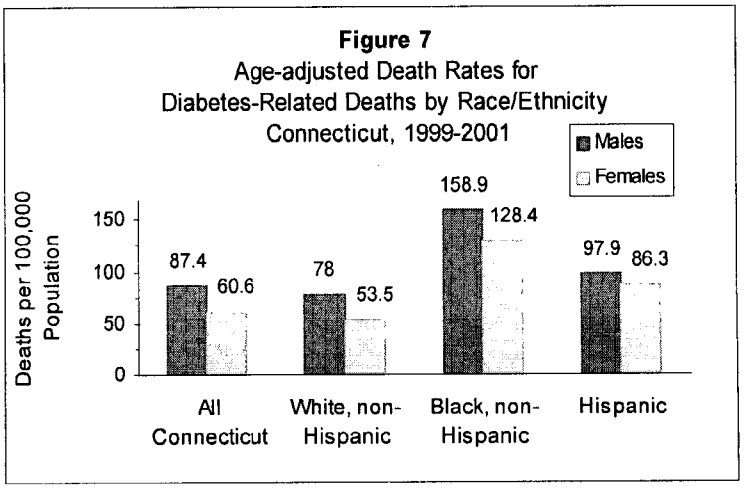
Diabetes Mortality by Gender, Race, and Ethnicity

Connecticut male residents have significantly higher mortality rates from both diabetes and diabetes-related causes than do Connecticut females ($p<.01$ for both comparisons) [Figures 6 and 7].[xxxiii] These findings are consistent with national data showing slightly higher diabetes mortality rates among males.



Of all subpopulation groups, Black (non-Hispanic) males and females have the highest mortality rates due to diabetes and diabetes-related causes and significantly higher mortality than the respective White (non-Hispanic) and Hispanic populations. Black males have 2.4 times the risk of death due to diabetes and twice the risk of diabetes-related deaths compared with White males ($p<.01$ for both comparisons). Black females have 2.9 times the risk of death due to diabetes and 2.4 times the risk of diabetes-related deaths compared with White females ($p<.01$ for both comparisons) [Figures 6 and 7].[xxxiv]

The diabetes and diabetes-related mortality rates of Hispanic males are not significantly different than the respective rates for White males. Hispanic females have twice the risk of diabetes death ($p<.01$) and 1.6 times the risk of diabetes-related



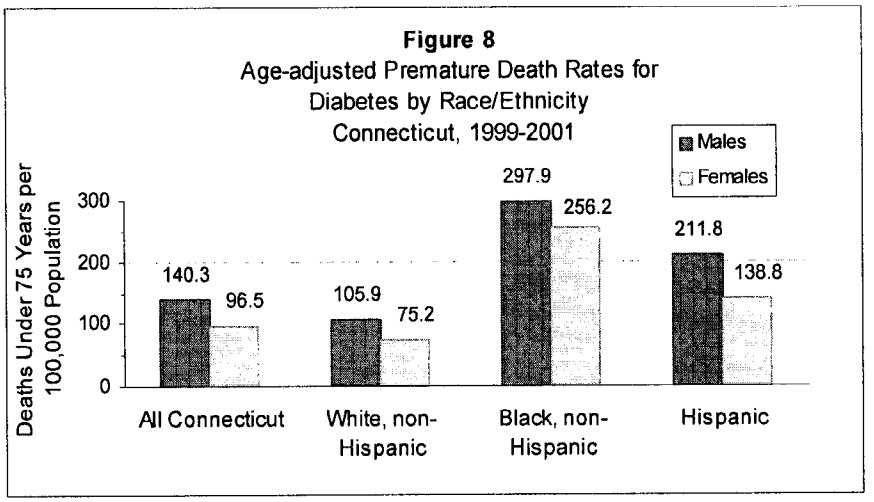
Source for figures 6, 7: Amadeo and Mueller, Connecticut Department of Public Health, 2005

death (p<.01) rates compared with White females (Figures 6 and 7).[xxxv]

Premature Mortality by Gender, Race, and Ethnicity

Premature mortality, defined as the "years of potential life lost before age 75," emphasizes deaths that occur at younger ages. For example, a person who dies at age 45 is considered to have lost 30 years of life, and a person who dies at 70 is considered to have lost 5 years of life.[xxxvi]

Premature mortality (to age 75) due to diabetes is significantly higher among Black (non-Hispanic) males and females compared with the respective White (non-Hispanic) and Hispanic populations (p<.01 for both comparisons). Black males have 2.8 times the risk of premature death due to diabetes compared with White males. Black females have 3.4 times the risk of premature death due to diabetes compared with White females (Figure 8).[xxxvii]



Source: Amadeo and Mueller, Connecticut Department of Public Health, 2005.

Hispanic females have 1.8 times the risk of premature death due to diabetes compared with White females, but this difference is not statistically significant. Hispanic males have twice the risk of premature death due to diabetes compared with White males (p<.01), and this difference is statistically significant (Figure 8).[xxxviii]

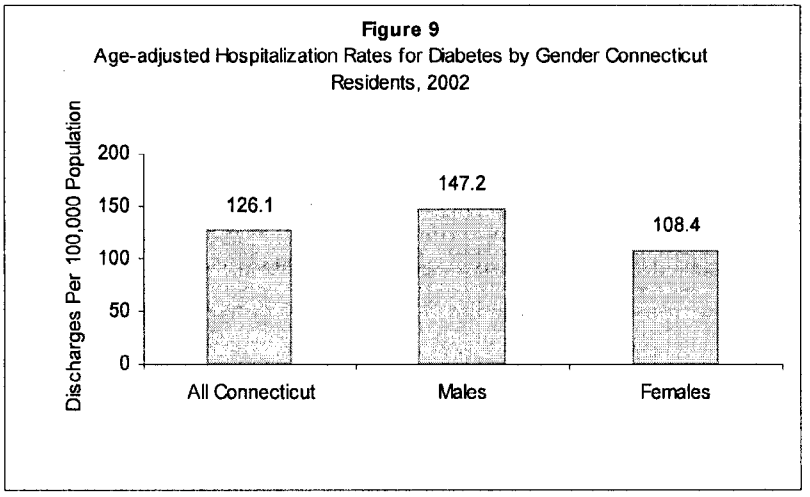
Morbidity

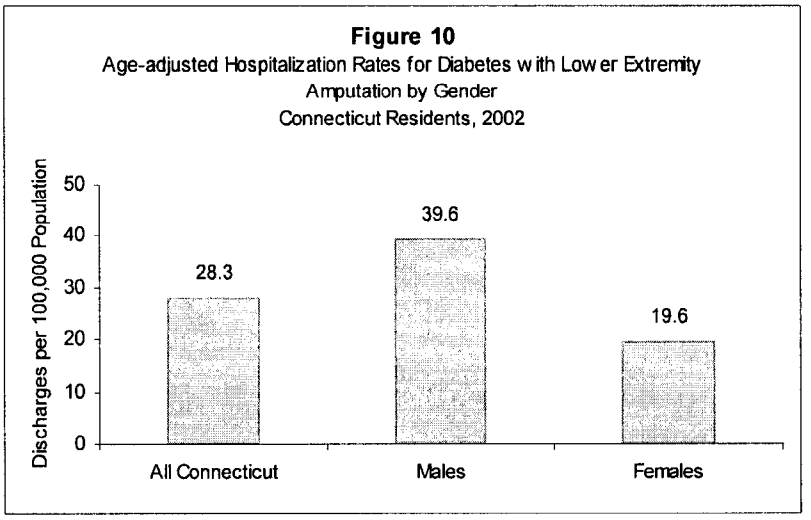
Lack of timely, appropriate medical care may contribute to the complications of diabetes, such as lower extremity amputations, end-stage renal disease, and blindness. For people living with diabetes, the impact of this disease may extend over many years. Cardiovascular disease and lower extremity amputations are significantly more likely to occur in patients with diabetes. For example, national data show that the risk of hospitalization from cardiovascular disease is two to four times higher for women with diabetes than women without the disease. Those hospitalized with diabetes are 28 times more likely to have an amputation than those without the disease.[xxxix]

Multiple hospitalizations are common among persons with diabetes. Nearly one-third are hospitalized two or more times in the same year due to complications associated with diabetes. Low-income people with diabetes are more likely to experience multiple hospitalizations. About 30% of all diabetes patients who are hospitalized are re-hospitalized in a one-year period.[xl]

Hospitalization Rates by Gender

Connecticut males are significantly more likely to be hospitalized for diabetes and lower-extremity amputations compared with Connecticut females ($p<.05$ for both comparisons). Connecticut males have 1.4 times the rate of hospitalization for diabetes and twice the rate of lower-extremity amputations compared with Connecticut females (Figures 9 and



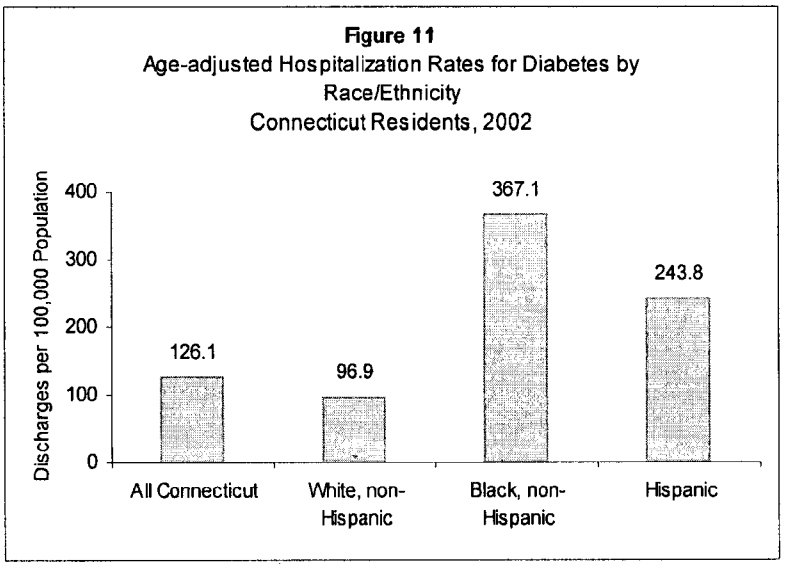


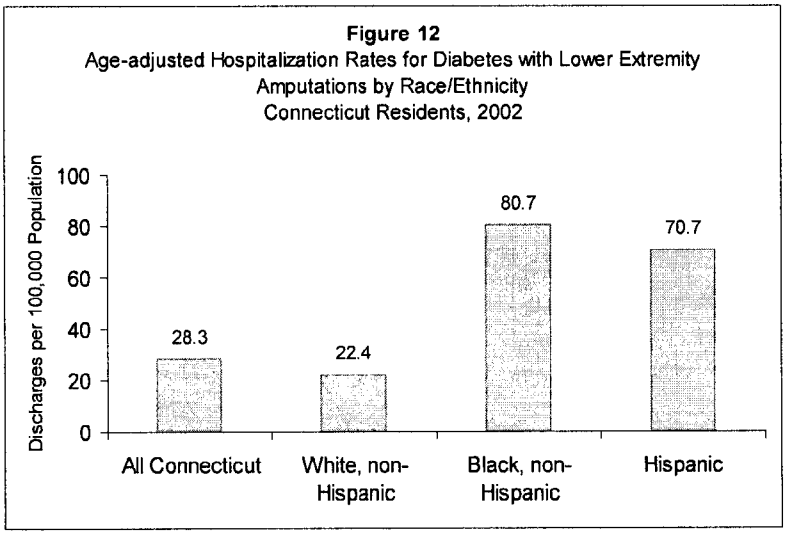
Source: Connecticut Department of Public Health, Hospital Discharge and Abstract Billing Data Base, 2005

10).[xli]

Hospitalization Rates by Race and Ethnicity

Black (non-Hispanic) and Hispanic Connecticut residents have significantly higher rates of hospitalizations for diabetes and for lower-extremity amputations than do White (non-Hispanic) residents ($p<.05$ for both comparisons). Black residents have 3.8 times the rate of diabetes hospitalizations and 3.6 times the rate of lower extremity amputations due to diabetes compared with White residents. Hispanics have 2.5 times the rate of diabetes hospitalizations and 3.2 times the rate of lower-extremity amputations due to diabetes compared with White (non-Hispanic) residents ($p<.05$ for both comparisons) [Figures 11





Source for figures 11,12: Connecticut Department of Public Health, Hospital Discharge and Abstract Billing Data Base, 2005.

and 12].[xlii]

Economic Costs

The cost of diabetes in Connecticut was estimated at $1.7 billion in 2003.[xliii] This estimate includes direct (medical) costs and indirect costs associated with lost productivity from illness and premature death. Diabetes can accrue enormous indirect costs. It is a major cause of disability and the ability to live independently. It can severely affect the quality of life for individuals and families.

Approximately $77 million was billed for hospitalizations in Connecticut due to diabetes as a principal diagnosis in 2002. Almost $39 million was billed for hospitalizations related to diabetes with a lower extremity amputation.[xliv]

Risk Factors for Diabetes

Risk factors for diabetes are classified as non-modifiable and modifiable factors. Non-modifiable risk factors include increasing age over 45 years; having a parent, brother or sister with diabetes; having a family background that is African American/Black, American Indian, Asian American, Pacific Islander, or Hispanic/Latino; and having had gestational diabetes, or giving birth to at least one baby weighing more than nine pounds. Modifiable risk factors include overweight or obesity; a blood pressure of 140/90 or higher; HDL cholesterol of 35 mg/dL or lower; triglyceride levels of 250 mg/dL or higher; and lack of physical activity.[xlv] Obesity is considered the chief modifiable risk factor for diabetes. People who are 20% or more above their desired weight have four times the risk of developing diabetes compared with those of normal weight.[xlvi]

Lower socioeconomic status has been consistently linked to higher prevalence of type 2 diabetes.[xlvii, xlviii, xlix] Low-income persons are less likely than higher-income persons to have an adequate diet, sufficient physical activity, and access to medical care, factors known to affect progression of the disease.

Table 1. Modifiable and Non-modifiable Risk Factors for Diabetes

Modifiable	Non-Modifiable
• Overweight or obesity	• Increasing age over 45 years
• Blood pressure of ≥ 140/90 mmHg	• Family history
• HDL cholesterol ≤ 35 mg/dL	• Black, Hispanic, Asian, Pacific Islander, American Indian family background
• Triglyceride levels of ≥ 250 mg/dL	• History of gestational diabetes
• Lack of physical activity	• Having given birth to a baby > 9 lbs.

Overweight and Obesity as Modifiable Risk Factors

Body mass index (BMI), or weight adjusted for height, is a widely used screening method for obesity. Medical guidelines identify normal/desirable weight as a BMI under 25, overweight as a BMI of 25 to 29.9, and obese as a BMI of 30 or more.[l] People who are overweight are at much greater risk of developing type 2 diabetes than are normal weight individuals. Being overweight puts added pressure on the body's ability to properly control blood sugar, therefore making it much more likely for diabetes to develop. Almost 90% of people with type 2 diabetes are overweight.[li] Obesity is a metabolic disorder, which can be explained by a combination of hereditary and environmental factors. High calorie diets along with less physical activity have contributed to the obesity epidemic.[lii] Abdominal obesity has been found to place individuals at higher risk for health problems, including high blood pressure, high blood cholesterol, high triglycerides, diabetes, and heart disease.[liii]

Approximately 20% of Connecticut adults are obese, about 37% are overweight, and 43% are normal or desired weight.[liv] Lower-income adults are more likely to be obese than higher-income adults (Figure 13).[lv] Black females are more likely to be

Figure 13
Obesity Prevalence by Household Income
Connecticut Adults, 2003-2005

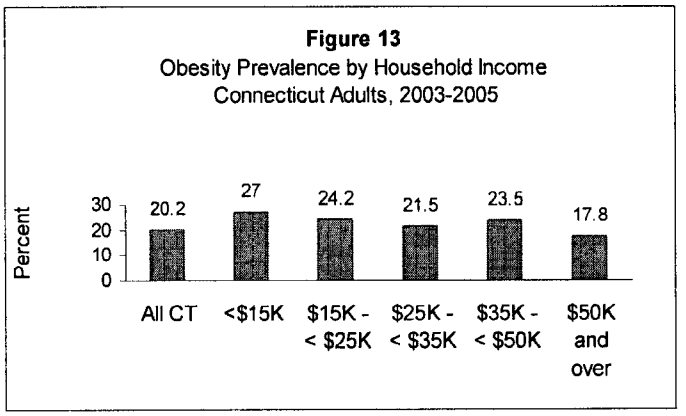
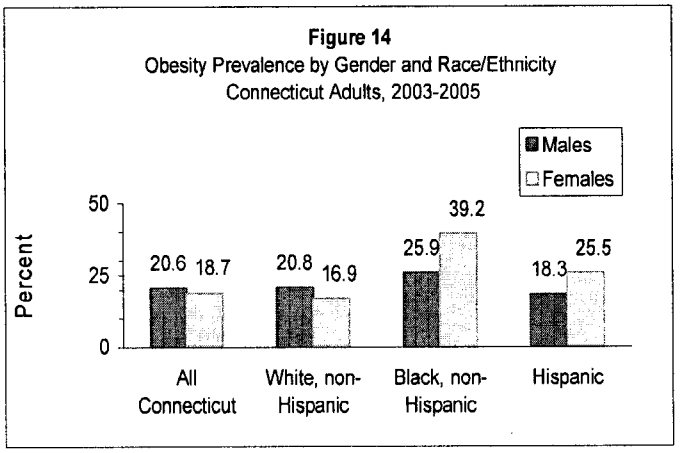


Figure 14
Obesity Prevalence by Gender and Race/Ethnicity
Connecticut Adults, 2003-2005



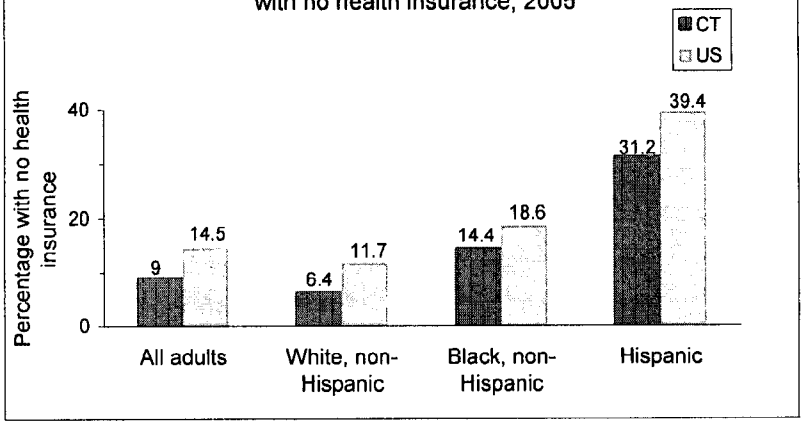
Source Figures 13 &14: Connecticut Department of Public Health, BRFSS Survey. 2006.

obese compared with White and Hispanic females ($p<.05$ for both comparisons). There are no significant differences in obesity among Connecticut adult males by race or Hispanic ethnicity (Figure 14).[lvi]

Access to Health care

Access to health care is key to the prevention, treatment, and management of heart disease and stroke. People without health insurance are less likely than others to have a usual source of care, to receive preventive health care services, and appropriate medical management of chronic conditions. About 9% of Connecticut adults aged 18 and over do not have health insurance compared with almost 15% of adults nationwide. Hispanic adults in Connecticut are least likely to report having health insurance (about 31%), followed by Black adults (14%), and White adults (6%). Comparable national figures show that about 31% of Hispanic adults, 19% of Black adults, and 12% of White adults nationwide reported having no health insurance (Figure 15).[lvii] The health status of the entire Connecticut population is compromised when large numbers of residents are uninsured, and it imposes a significant additional financial burden on our state.

Figure 15
Connecticut and US adults with no health insurance, 2005



Source: Centers for Disease Control &Prevention, BRFSS Survey, 2006.

Targeting High-Risk Populations

Black and lower-income adults in Connecticut have higher prevalence rates of diagnosed diabetes compared with non-Black and higher-income adults, respectively. Black and Hispanic Connecticut residents experience higher rates of premature mortality due to

diabetes and higher rates of hospitalization due to diabetes and lower-extremity amputations. They are significantly less likely than White residents to have health insurance, and thus access to preventive health care services. Targeted public health interventions that address the risk factors for the development of diabetes, timely diagnosis of the disease, as well as appropriate preventive care for those with diagnosed diabetes are warranted for the Connecticut Black, Hispanic, and low-income populations.

5. PREVENTING DIABETES BEFORE IT STARTS

Prevention Work Group

Rosa Browne	NAACP-Health Committee
Diane Creed	American Diabetes Association
Ana Lourdes Gomez, PhD	University of Connecticut
Paula Leibovitz, MS, RD, CD-N	Consultant, Briarwood College
Kevin Maloy	Pfizer
Phillip Montgomery	Connecticut Business and Industry Association
Rebecca Murray, MSN, FNP, CDE	West Side School-Based Health Center
Patricia O'Connell, MS, RD, CDE	Joslin Diabetes Center
Diane Sell	Consultant
Anne Wilson	CIGNA
Jean Zimkus, RN	Yale New Haven Hospital

GOAL: *Connecticut residents with pre-diabetes will have their pre-diabetes reversed or their progression to diabetes significantly slowed with an overall goal to reduce or prolong conversion to type 2 diabetes.*

Identified Problems:

- Inappropriate or insufficient education related to lifestyle change (including meal planning and physical activity) to prevent or decrease the risk of advancing from pre-diabetes to diabetes.
- Insufficient capacity to provide diabetes prevention education and intervention to all people in Connecticut with pre-diabetes.
- Public and private policies, insurance re-imbursement in particular, are obstacles to appropriate diabetes preventive care.
- There is a lack of knowledge among health care providers of how to screen for and treat pre-diabetes and how to code for pre-diabetes.

Rationale:

Overview

Results from the federal Diabetes Prevention Program (DPP) pilot indicate diabetes can be prevented or delayed in people with pre-diabetes who participate in intensive behavioral interventions to decrease their risk of progressing to diabetes.

The American Diabetes Association defines pre-diabetes as a metabolic disorder characterized by plasma glucose levels that are abnormally high but not sufficiently high for a diagnosis of diabetes. There are two methods to diagnose pre-diabetes: the Fasting Plasma Glucose (FPG) test and the Oral Glucose Tolerance Test (OGTT). Glucose levels equal to or greater than 100mg/dL, but less than 126 mg/dL in the FPG signal impaired fasting glucose (IFG) and are diagnostic for pre-diabetes. Random glucose levels greater than 140 mg/dL, but less than 200 mg/dL signal impaired glucose tolerance (IGT) and are also diagnostic for pre-diabetes.[lviii] The National Diabetes Education Program (NDEP) further suggests using the two-hour OGTT to screen for pre-diabetes because it is more sensitive than the FPG test, detecting people who might not be detected by the FPG test.

Obesity and lack of exercise contribute to developing diabetes, and are extremely common among Connecticut's residents. The widespread nature of behavioral risk factors for diabetes makes the task of selecting a group on which to focus prevention efforts difficult. The medical community describes the metabolic syndrome (abdominal obesity, dyslipidemia, elevated blood pressure, insulin resistance, etc.) as an intermediate state between normal metabolism and the cascade of events that lead to diabetes. Targeting people with the metabolic syndrome would have the greatest impact in averting diabetes in the greatest number of people. Yet, ill-defined guidelines for diagnosing the syndrome combined with the number of people believed to have the metabolic syndrome currently make such interventions impractical. The Prevention Work Group of the *Connecticut Diabetes Prevention and Control Plan* focused most of its efforts on people who meet the ADA criteria for pre-diabetes. Even though the committee recognized that it could not fully address the problem of the metabolic syndrome, it did devise recommendations for public information campaigns to alert at risk people of the need to be tested for diabetes and to change their behavior, and healthy people of the need to remain vigilant in preserving their health.

In the DPP, moderate weight loss (5-7%), increased physical exercise, and healthier food choices, when combined in a comprehensive program of health maintenance, were adequate to prevent or delay diabetes. An example of a prevention program that is successfully being implemented in Connecticut is the Diabetes Prevention Program at the

Hill Health Center. The Hill Health Center is one of five community health centers in the nation selected to be part of the Bureau of Primary Health Care Diabetes Prevention Pilot. The system of care was redesigned through implementation of the Care Model. This allowed for organizational intervention by identifying individuals at risk for the development of diabetes, and assisting them to achieve and sustain a 7% weight loss and an increase in physical activity of >150 minutes/week (for example, 30 minutes/day, 5 days/week).

PREVENTION OBJECTIVE 1: By 2012, reduce by 0.5% the prevalence of type 2 diabetes by preventing the progression of pre-diabetes to diabetes.

How this objective will be measured:

- Data source: BRFSS
- Baseline value: 6.2%
- Target value: 5.7%

Recommended Strategies

- Increase awareness of providers and people with pre-diabetes of the potential to prevent diabetes onset through lifestyle change.
- Develop and promote pre-diabetes screening programs accessible to all at risk Connecticut residents with referrals to health care providers as appropriate.
- Deliver cost-effective pre-diabetes interventions as efficiently as possible.
- Change Connecticut's health system to support healthy lifestyles for residents of all ages.
- Engage community organizations to ensure that messages about lifestyle modification are delivered in culturally relevant and positive ways.
- Support interventions promoted by other programs, such as the CT DPH Obesity Program, that include modifications to school lunch and physical education programs to provide healthy school environments.



References/Resources

"Reduction in the Incidence of Type 2 Diabetes with Lifestyle Intervention or Metformin," Knowler WC, Barrett-Connor E, Fowler SE, Hamman RF, Lachin JM, Walker EA, Nathan DM; Diabetes Prevention Program Research Group; Diabetes Prevention Program Coordinating Center, Biostatistics Center, George Washington University, 6110 Executive Blvd., Suite 750, Rockville, MD 20852, USA.

http://www.diabetes.org/home.jsp American Diabetes Association

All About Diabetes, "How to Tell if You Have Pre-Diabetes," http://www.diabetes.org/pre-diabetes/pre-diabetes-symptoms.jsp

The Diabetes Prevention Program which you have already on p 29 but the journal ref may be easier to locate: NEJM Vol 346, no 6 Feb 7, 2002 p 393-403

Pan, XR, Li G, Hu YH et al. The Effects of Diet and Exercise in Preventing NIDDM in People with Impaired Glucose Tolerance: The DaQuin IGT and Diabetes Study. Diabetes Care. 1997 20: 537-44.

Lindstrom, J., Louheranta, A et al The Finnish Diabetes Prevention Study:Lifestyle Intervention and 3 Year Results on Diet and Physical Activity. Diabetes Care.2003; 52: 2532-8

American Association of Diabetes Educators. White Paper on the Prevention of Type 2 Diabetes and the Role of the Diabetes Educator. Diabetes Educ. 2002;28: 964-71.

6. DISEASE MANAGEMENT

Disease Management Work Group

Daren Anderson, MD	Community Health Center, Inc.
Rosa Browne	NAACP-Health Committee
Mark Chasse, OD	Connecticut Association of Optometrists
Jyoti Chhabra, PhD	Hartford Hospital
James Cox-Chapman, MD	ProHealth Physicians
Patricia DeWitt	Yale-New Haven Hospital
Linda J. Ferraro, RDH	Department of Public Health
Marghie Giuliano, R Ph	Connecticut Pharmacists Association
Ana Lourdes Gomez, PhD	University of Connecticut
Molly Kirschner, MS, RD	Juvenile Diabetes Research Foundation, Hartford & Western Massachusetts
Thomas Meehan, MD, MPH, FACP	Qualidigm
Carolé Mensing, RN, MA, CDE	University of Connecticut Health Center
Rebecca Murray, MSN, FNP, CDE	West Side School-Based Health Center
Kelley Newlin, DNSc	Yale University
William A. Petit, Jr., MD, Co-Chair	Joslin Diabetes Center
Christine Pinette, APRN	Bristol Hospital
Joseph A. Rosa, MD	St. Vincent's Hospital
Katherine Schneider, MD	Middlesex Hospital
Eleanor Seiler, MD, Co-Chair	Anthem
Laura Shuey	American Heart Association
Anne Wilson	CIGNA
Ardell A. Wilson, D.D.S., M.P.H.	Department of Public Health
Donald Zetterval, Rph, CDE	The Diabetes Center

GOAL: *Connecticut health care providers adopt the widespread use of disease management practices in the treatment of diabetes.*

Identified Problems

- Evidenced based practices (American Diabetes Association and American Association of Clinical Endocrinology) are not consistently applied.
- Lack of process/clinical outcomes measurement, evaluation and management.
- Lack of collaborative practice models that include physicians and support service providers.
- Lack of a routine reporting feedback loop.
- Insufficient patient self-management education.
- Many people with diabetes are undetected and many patients with diagnosed diabetes are lost to follow-up.

Rationale:

Overview

Disease management is the delivery of quality care to those with chronic disease. An effective disease management program helps the person living with diabetes to understand their disease and the importance of their role as part of their own care and treatment team. Disease management may be the most significant factor in improving adherence, health outcomes, quality of life, and productivity. This translates into more efficient use of health care resources.

To ensure a common understanding of what disease management is, the work group agreed to adopt the Disease Management Association of America's definition of disease management. Disease management is a system of coordinated health care interventions and communications for populations with conditions in which patient self-care efforts are significant. Disease management includes:

- Support of the physician or practitioner/patient relationship and plan of care;
- Emphasis of prevention of exacerbations and complications utilizing evidence-based practice guidelines and patient empowerment strategies;
- Evaluation of clinical, humanistic, and economic outcomes on an on-going basis with the goal of improving overall health while using health care resources efficiently.

Full service disease management programs include the following six components:



1. Population identification processes;
2. Evidence-based practice guidelines;
3. Collaborative practice models to include physician and support-service providers;
4. Patient self-management education (may include primary prevention, behavior modification programs, and compliance/surveillance);
5. Process and outcomes measurement, evaluation, and management; and
6. Routine reporting/feedback loop (may include communication with patient, physician, health plan and ancillary providers, and practice profiling). [lix]

Disease Management Best Practices

Best practices for diabetes management are those clinical strategies that research studies have shown to be effective in improving the health status of individuals with this chronic disease. Given the limited time providers have to interact with patients, interventions must be based upon the most up-to-date knowledge. Adoption of best practices helps to ensure that all patients receive comparable treatment, and helps to increase the number of patients with positive care outcomes.

DISEASE MANAGEMENT OBJECTIVE 1: Best Practices: By 2012, increase by 50% the number of Connecticut physicians who use ADA and other evidence based guidelines to diagnose and monitor pre-diabetes and diabetes as measured by the number of physicians recognized by the ADA.

Recommended Strategies

- Promote adoption and integration of ADA and other evidence-based guidelines into clinical practice to support early diabetes diagnosis and use of ABC (A1c, blood pressure, cholesterol) values.
- Develop a pay-for-performance system that rewards physicians and patients for adhering to guidelines. [lx]
- Engage employers in encouraging and supporting more managed care organizations to offer incentives.

How this objective will be measured:

- Data source: ADA
- Baseline value: 34 Physicians (2006)
- Target value: 51 physicians

Effective Communication in a Comprehensive System of Diabetes Care

Disease registries and effective communication among providers and patients will help to reduce duplicated efforts and to improve outcomes. With increasing specialization of health care, it is possible that not all members of a patient's health care team have access to the same information. Discrepancies or deficiencies in knowledge about a specific patient could result in providers pursuing conflicting management approaches. Sharing information and maintaining regular communication will minimize the risks of treatment errors.

Note: EHEALTH Connecticut is a multi-stakeholder statewide data project that is currently being funded by the Department of Public Health and other sources. The

purpose of this project is to develop a system to compile health data, similar to proposed common disease registries, to facilitate the *real time* access to patient data to provide optimal care. Although currently not in place, the hope is that this project will be used for the care of persons living with chronic diseases such as diabetes.

DISEASE MANAGEMENT OBJECTIVE 2: Effective Communication in a Comprehensive System of Diabetes Care: By 2012, improve patient care by increasing the number of health care providers using Electronic Medical Records (EMRs) or disease registries by 10% to establish a statewide health data exchange, increase outreach and improve communication among providers.

Recommended Strategies

- Develop effective communication vehicles to demonstrate the value of reporting clinical outcomes to providers using evidenced based literature, peer-to-peer outreach and other means. Show providers how such clinical outcomes, reporting through incentive programs, or other vehicles can be valuable for their patients, their practices and others.

How this objective will be measured:
Periodic survey of physicians in Connecticut

- Data source: Survey response regarding number of health care providers using EMR/registries
- Baseline value: To be determined
- Target value: 10% over baseline

* Baseline value to be determined during first year of plan implementation

- Work collaboratively with managed care organizations to identify the current communication barriers for effective disease management. With MCOs, promote a process to simplify referrals and communication linkages that will create administrative efficiencies.
- Promote integrative processes among health plans to link diagnosis, treatment plans and education plans thus promoting communication among those who are providing services to persons with diabetes.

Measuring Clinical Outcomes

Measuring clinical outcomes provides data that individual providers can use to improve their own practices and that insurers can use to reward providers whose patients demonstrate clinical outcomes that evidence based research has shown to improve health status.

DISEASE MANAGEMENT OBJECTIVE 3: Measuring Clinical Outcomes: By 2012, establish a system of process and outcome measurement used by all health care providers on the patient care team.

Recommended Strategies

- Adopt evidence-based guidelines as evaluation benchmarks for clinical outcomes (e.g., A1c control, blood pressure control, lipid level controls, and smoking cessation). Highlight and communicate recommendations in these guidelines for provider accountability in monitoring clinical care.
- Use a quality assurance process to assess outcomes (e.g., behavioral/functional outcomes, impact of education, outreach, effects on caregivers and family members with chronic disease, end of life care and impact on mental health).
- Encourage employers to provide meaningful financial incentives for employees and their providers to reach established benchmarks.

How this objective will be measured:

Data source, Baseline and target values to be determined during first year of plan implementation

Self-Management

It is not realistic or cost-effective to require providers to be responsible for all aspects of diabetes care at all times. To maintain good control and to maintain or improve their health, people with diabetes must be involved in their own treatment programs. Greater patient understanding and adherence to treatment recommendations allows providers to assist more patients, especially those whose disease is more complex. Although this is important for all patients with diabetes, it may be more challenging for underserved populations due to additional complexities including language barriers, unsafe neighborhoods for walking, limited budgets for healthy food and medical supplies, access to dental care and other challenges.

DISEASE MANAGEMENT OBJECTIVE 4: Self-Management: By 2012, increase by 5% the percentage of adults age 18 and older with diabetes who are conducting comprehensive self-management to control their disease.

Recommended Strategies

- Assess current disparities and create plans to remove identified disparities through culturally-focused diabetes care.
- Involve community leaders in creating community health initiatives.
- Train health care professionals, including dental professionals, para-professionals and lay health workers in the community health setting on diabetes prevention, care and management.
- Create a standard self-management education program that is simple and user friendly and that involves a program for health care literacy that is language appropriate and culturally sensitive.
- Foster patient responsibility for diabetes care by promoting self-management education programs that engage the patient and provide patient financial incentives and personalized nutrition guides and exercise plans.
- Engage employers to work with managed care organizations in supporting the importance of simple, barrier-free self-management education.
- Support interventions promoted by other programs such as the Department of Public Health's Obesity Program that include modifications to companies, restaurants, the workplace, and school lunch programs to provide healthy nutrition environments.
- Collaborate with the Department of Public Health's Office of Oral Public Health to promote the integration of oral health and periodontal disease management into diabetes disease management practices including annual dental exams and the systemic effects of periodontal disease on people with diabetes.

How this objective will be measured:

- Data Source: BRFSS- class attendance and daily self monitoring of blood glucose
- Baseline: class attendance=47.7%, daily self monitoring=67.7%
- Target: Add 5% to each baseline

Screening and Follow-up

In some cases, people do not know they are at risk for diabetes. Screening services to diagnose diabetes or pre-diabetes can be helpful to motivate people to change risky behaviors. Often, however, a screened individual is lost to follow-up, or there are reporting problems that hamper providers and insurers from tracking diagnosed patients. Improved screening and proper disease reporting will reduce the number of individuals who are unaware of their increased risk and will improve follow-up for those who have been identified.

DISEASE MANAGEMENT OBJECTIVE 5: Screening: By 2012, increase by 10%, the proportion of at risk individuals who are screened for diabetes and pre-diabetes using evidence-based guidelines.

Recommended Strategies

- Promote new and enhanced screening programs in varied settings.
- Promote increased use in clinical practice of ADA and other evidence-based criteria for diabetes and pre-diabetes diagnosis.

How this objective will be measured:

Data source, Baseline and target values to be determined during first year of plan implementation

Reporting

A routine reporting/feedback loop is an important component of disease management. This includes communication with the patients, the health care provider, ancillary providers, and the health plan.

DISEASE MANAGEMENT OBJECTIVE 6: Reporting: By 2012, increase by 10% the proportion of providers who adopt a uniform system of reporting including the coding of diabetes diagnoses.

Recommended Strategy

- Promote and support standardized reporting tools and processes across providers.

How this objective will be measured:

Baseline and target values to be determined during first year of plan implementation

- Promote linkage of diagnosis plans with education plans.

References/Resources

Evidence Suggesting That a Chronic Disease Self-Management Program Can Improve Health Status While Reducing Hospitalization: A Randomized Trial. , Medical Care. 37(1):5-14, January 1999. Medical Care, Official Journal of the American Public Health Association

Lorig, Kate R. RN, DrPH *; Sobel, David S. MD, MPH +; Stewart, Anita L. PhD ++; Brown, Byron William Jr. PhD *; Bandura, Albert PhD [S]; Ritter, Philip PhD *; Gonzalez, Virginia M. MPH *; Laurent, Diana D. MPH *; Holman, Halsted R. MD *

Diabetes Care, Vol 20, Issue 4 568-576, Copyright © 1997 by American Diabetes Association "Diabetes Self-Management. Self-reported Recommendations and Patterns in a Large Population."

L Ruggiero, R Glasgow, JM Dryfoos, JS Rossi, JO Prochaska, CT Orleans, AV Prokhorov, SR Rossi, GW Greene, GR Reed, K Kelly, L Chobanian and S Johnson, University of Rhode Island Cancer Prevention Research Center, Kingston 02881, USA

Diabetes Care, Vol 20, Issue 4 556-561, Copyright © 1997 by American Diabetes Association "Personal-Model Beliefs and Social-Environmental Barriers Related to Diabetes Self-management," RE Glasgow, SE Hampson, LA Strycker and L Ruggiero , Oregon Research Institute, Eugene 97403-1983, USA. russ@ori.org

Improvements in Diabetes Care 1988 to 2002: Saaddine JB, Cadwell B, Gregg EW, Engelgau MM, Vinicor F, Imperatore G, Narayan KMV, Annals of Internal Medicine 2006; 144: 465-474

Effective Diabetes Self-Management, Journal of Diabetes Nursing, Sept, 2003 , Krichbaum K, Aarestad V, Buethe M (2003). "Exploring the Connection between Self-Efficacy and Effective Diabetes Self-Management." The Diabetes Educator 29(4): 653-61

A Community Case Study, Barriers to Diabetes Self-management Education Programs in Underserved Rural Arkansas: Implications for Program Evaluation; Balamurugan A, Rivera M, Jack L Jr., Allen K, Morris S. "Barriers to Diabetes Self-Management Education Programs in Underserved Rural Arkansas: Implications for Program Evaluation." Prev Chronic Dis [serial online] 2006 Jan [date cited]. Available from: URL: http://www.cdc.gov/pcd/issues/2006/jan/05_0129.htm.

Diabetes Care 29:S78-S85, 2006 ADA, National Standards for Diabetes Self-Management Education , Carolé Mensing, RN, MA, CDE, Task Force Chair, Jackie Boucher, MS, RD, LD, CDE, Marjorie Cypress, MS, C-ANP, CDE, Katie Weinger, EDD, RN, Kathryn Mulcahy, MSN, RN, CDE, Patricia Barta, RN, MPH, CDE, Gwen Hosey, MS, ARNP, CDE, Wendy Kopher, RN, C, CDE, HTP, Andrea Lasichak, MS, RD, CDE, Betty Lamb, RN, MSN, Mavourneen Mangan, RN, MS, ANP, C, CDE, Jan Norman, RD, CDE, Jon Tanja, BS, MS, RPh, Linda Yauk, MS, RD, LD, CDE, Kimberlydawn Wisdom, MD, MS and Cynthia Adams, PhD

Diabetes Control and Complications Trial, New England Journal of Medicine 329(14), Sept 30, 1993

United Kingdom Prospective Diabetes Study "Effect of Diet, Sulphonylurea, Insulin or Biguanide Therapy on Fasting Plasma Glucose and Body Weight Over One Year. UKPDS Study Group Diabetologia (1983); 24: 404-411

Diabetes Care Jan 2006, supplement 1, Clinical Practice Recommendations

---

[i] The Commissioner of the Department of Public Health appointed the Advisory Council members. The Advisory Council created an Executive Committee to manage the work groups and to report on the groups' progress. Each member of the Executive Committee was assigned to co-chair one of the five work groups.

[ii] National statistics reveal that in 2002 a person with diabetes spent an average of $13,243 on health care compared to $2,560 for his or her counterpart without diabetes. http://www.medscape.com/viewarticle/450150_3

[iii] This plan supports Connecticut's Public Act 05-149, "An Act Permitting Stem Cell Research and Banning the Cloning of Human Beings".

[iv] Anderson RJ, Freedland KE, Clouse RE, Lustman PJ: The prevalence of comorbid depression in adults with diabetes: a meta-analytic review of the literature. Diabetes Care 2001;24:1069-78

[v] Jacobson AM, de Groot M, Samson JA: The effects of psychiatric disorders and symptoms on quality of life in patients with type I and type II diabetes mellitus. Qual Life Res. 1997;6:11-20.

[vi] Egede LE: Diabetes, major depression, and functional disability among U.S. adults. *Diabetes Care.* 2004 Feb;27:421-8.

[vii] Lustman PJ, Anderson RJ, Freedland KE, de Groot M, Carney RM, Clouse RE: Depression and poor glycemic control: a meta-analytic review of the literature. *Diabetes Care* 2000;23:934-942

[viii] de Groot M, Anderson R, Freedland KE, Clouse RE, Lustman PJ: Association of depression and diabetes complications: a meta-analysis. *Psychosom Med* 2001;63:619-30

[ix] Zhang X, Norris SL, Gregg EW, Cheng YJ, Beckles G, Kahn HS: Depressive symptoms and mortality among persons with and without diabetes. Am J Epidemiol 2005;161:652-660.

[x] HCiechanowski PSH, HKaton WJH, HRusso JEH: Depression and diabetes: impact of depressive symptoms on adherence, function, and costs. *Arch Intern Med.* 2000 Nov 27;160(21):3278-85

xi See http://www.state.ct.us/dph/

[xii] U.S. Census Bureau. American FactFinder, Table P-2. Urban and rural [6] – Universe: Total Population, Data Set: Census 2000 Summary File 1 (SF-1). HTTUhttp://factfinder.csunsu.govUTTH.

[xiii] Miringoff, M.L., M-L Miringoff, and S. Opkycke. 1996. *The Social State of Connecticut '96.* Tarrytown, NY: Fordham Institute for Innovation in Social Policy.

[xiv] Levy, D., O. Rodriguez, and W. Villemez. 2004. *The Changing Demographics of Connecticut–1990-2000. Part 2: The Five Connecticuts.* Storrs, CT: University of Connecticut, Center for Population Research, CPR Series, no. OP 2004-01.

[xv] U.S. Census Bureau. Connecticut QuickFacts. HTTUhttp://quickfacts.census.gov/qfd/states/09000.htmlUTTH.

[xvi] U.S. Census Bureau. American FactFinder. Hartford City, New Haven City, and Bridgeport City, CT: Census 2000 Demographic Profile Highlights. HTTUhttp://factfinder.census.govUTTH.

[xvii] PTT U.S. Census Bureau. QTP-20. Educational Attainment by Sex: 2000. Census 2000 Summary File 3 (SF3) – Sample Data: United States. HTUhttp://factfinder.census.govUTH

[xviii] PTT U.S. Census Bureau. Table DP-2. Social Characteristics: 1990. 1990 Summary Tape File 3 (STF3) – Sample Data.

[xix] PTT U.S. Census Bureau. Table DP-2. Profile of Selected Social Characteristics: 2000. Census 2000 Summary File 3 (SF3) – Sample Data: Connecticut. HTUhttp://factfinder.census.govUTH

[xx] PTT Rodriguez, O., D. Levy, and W. Villermez. 2003. . 2003. The Changing Demographics of Connecticut – 1990 to 2000. Part 1: Comparing Connecticut to National Averages. Storrs, CT: University of Connecticut, Center for Population Research. Occasional Paper No. OP 2003-01.

[xxi] Connecticut Department of Public Health. 2006. *Trends in Diabetes Prevalence in Connecticut, 1996-2005.* Unpublished tables.

[xxii] Centers for Disease Control and Prevention. 2005. *National Diabetes Fact Sheet - United States, 2003.* Retrieved December 20, 2005, from Hhttp://www.cdc.gov/diabetes/pubs/pdf/ndfs_2005.pdfH

[xxiii] *Ibid.*

[xxiv] National Health Interview Survey. 2005. Preliminary Results. Retrieved December 21, 2005, from Hhttp://www.cdc.gov/nchs/data/nhis/earlyrelease/200512_14.pdfH

[xxv] Connecticut Department of Public Health. 2006. *Op cit.*

[xxvi] Connecticut Department of Public Health. 2005. *Diabetes Prevalence in Connecticut, 2002-2004.* Retrieved March 7, 2006 Hhttp://www.dph.state.ct.us/PB/HISR/BRFSS_Diabetes_prev.pdfH

[xxvii] National Diabetes Information Clearinghouse. (January, 2005). *Who Gets Diabetes?* Retrieved December 20, 2005, from: Hhttp://diabetes.niddk.nih.gov/dm/pubs/overview/H

[xxviii] Amadeo, F.A. and L.M. Mueller. 2005. *Connecticut Resident Deaths, 2002.* Hartford, CT: Connecticut Department of Public Health. Retrieved December 21, 2005 from Hhttp://www.dph.state.ct.us/PB/HISR/CT_resident_deaths_2002.pdfH

[xxix] CDC Diabetes. (2005). *National Diabetes Fact Sheet - United States 2005.* Retrieved December 20, 2005, from Hhttp://www.cdc.gov/diabetes/pubs/pdf/ndfs_2005.pdfH

[xxx] Hynes, M.M., L.M. Mueller, H. Li, and F. Amadeo. 2005. *Mortality and its Risk Factors in Connecticut, 1989-1998.* Hartford, CT: Connecticut Department of Public Health. Hhttp://www.dph.state.ct.us/OPPE/Mortality/mortalityriskfactors.htmH

[xxxi] Centers for Disease Control and Prevention. 2001. 1999 Diabetes Surveillance Report. Retrieved May 1, 2001. Hhttp://www.cdc.gov/diabetes/statisticsH

[xxxii] Hynes, Mueller, Li, and Amadeo. *Op. cit.*

[xxxiii] Hynes, M.M., F.A. Amadeo, and L.M. Mueller. 2005. *Connecticut Resident Mortality Summary Tables by Gender, Race, & Hispanic Ethnicity, 1999-2001.* Hartford, CT: Connecticut Department of Public Health. Hhttp://www.dph.state.ct.us/PB/HISR/CT_death_summary_1999-2001.pdfH. Retrieved January 24, 2006.

[xxxiv] *Ibid.*

[xxxv] *Ibid.*

[xxxvi] National Center for Health Statistics. 2004. *Health, United States with Chartbook on Trends in the Health of Americans.* Hyattsville, MD: NCHS. Hhttp://www.cdc.gov/nchs/data/hus/hus04acc.pdfH. Retrieved January 5, 2006.

[xxxvii] Hynes, Amadeo, and Mueller. *Op. cit.*

[xxxviii] Hynes, Amadeo, and Mueller. *Op. cit.*

[xxxix] Agency for Health care Research and Quality. 2005. *HCUP Highlight Issue 1: Economic and Health Costs of Diabetes.* Retrieved December 21, 2005 from: Hhttp://www.ahrq.gov/data/hcup/highlight1/high1.htmH

[xl] *Ibid.*

[xli] Connecticut Department of Public Health. 2005 a. *Connecticut Resident Hospitalizations, 2002.* Retrieved March 21, 2006 from: Hhttp://www.dph.state.ct.us/PB/HISR/CDI_Tables.pdfH

[xlii] *Ibid.*

[xliii] Department of Health and Human Services, Centers for Disease Control and Prevention, 2005. *The Burden of Diabetes in Connecticut.* Unpublished document.

[xliv] Connecticut Department of Public Health. 2005 a. *Op cit.*

[xlv] National Diabetes Information Clearinghouse. (January, 2005). *What Factors Increase my Risk for Diabetes?* Retrieved December 14, 2005, from: Hhttp://www.diabetes.niddk.nih.gov/dm/pubs/diagnosis/index.htmH

[xlvi] Bishop, D.B., B.R. Zimmerman, and J.S. Roesler. 1998. Chapter 14 in Brownson, R.C., P.L. Remington, and J.R. Davis, eds., *Chronic Disease Epidemiology and Control, 2nd Edition* Washington, DC: American Public Health Association.

[xlvii] Brancati, F.L., P.K. Whelton, L.H. Kuller, and M.J. Klag. 1996. Diabetes mellitus, race, and socioeconomic status. A population-based study. *Annals of Epidemiology* 6(1): 67-73.

[xlviii] Robbins, J.M., V. Vaccarino, H. Zhang, and S.V. Kasl. 2000. Excess type 2 diabetes in African American women and men aged 40-74 and socioeconomic status: Evidence from the Third National Health and Nutrition Examination Survey. *Journal of Epidemiology and Community Health* 54(11): 839-845.

[xlix] Connolly, V., N. Unwin, P. Sherriff, R. Bilous, and W. Kelly. 2000. Diabetes prevalence and socioeconomic status: A population based study showing increased prevalence of type 2 diabetes mellitus in deprived areas. *Journal of Epidemiology and Community Health* 54(3): 173-177.

[l] U.S. Preventive Services Task Force. 2005. *The Guide to Clinical Preventive Services, Recommendations of the U.S. Preventive Services Task Force.* Washington, DC: US Department of Health and Human Services, Agency for Health care, Research and Quality.

[li] NAASO, The Obesity Society. 2005. *Your Weight and Diabetes.* Retrieved December 22, 2005 from: Hhttp://www.naaso.org/information/diabetes_obesity.aspH

[lii] Eckel. R.H. 1997. Obesity and Heart Disease. *Circulation.* 96:3248-3250. Retrieved September 8, 2005, from: Hhttp://circ.ahajournals.org/cgi/content/full/96/9/3248H

[liii] American Heart Association. Women, Heart Disease and Stroke. Retrieved September 8, 2005, from: Hhttp://www.americanheart.org/presenter.jhtml?identifier=4786H

[liv] Connecticut Department of Public Health, Behavioral Risk Factor Surveillance System (BRFSS) Program. 2006. 2003-2005 BRFSS Survey data. Unpublished tables.

[lv] Connecticut Department of Public Health, Behavioral Risk Factor Surveillance System (BRFSS) Program. 2006. 2003-2005 BRFSS Survey data. Unpublished tables.

[lvi] *Ibid.*

[lvii] Centers for Disease Control and Prevention. 2005 Connecticut and US BRFSS data. Retrieved December 13, 2006. Hhttp://apps.nccd.cdc.gov/brfss/H

[lviii] From "How to Tell if You Have Pre-Diabetes" in *All About Diabetes.* Accessed at: <http://www.diabetes.org/pre-diabetes/pre-diabetes-symptoms.jsp>

[lix] http://www.dmaa.org/definition.html

[lx] Note: Pay for performance is a practice that has been proven to work in some circumstances. However, there are views that find this practice counter productive.

7. EDUCATION AND AWARENESS

Education and Awareness Work Group

Patricia Bak, RN, CDE	Windham Community Memorial Hospital
Rosa Browne	NAACP-Health Committee
Louise Butcher, Co-Chair	American Diabetes Association
Anne Somsel, RN, MS	Fair Haven Community Health Center
Sally Cooney, RN, BSN, CDE	St. Francis Hospital and Medical Center
Diane Creed	American Diabetes Association
Patricia DeWitt	Yale-New Haven Hospital
Linda Ferro, APRN, CDE	Norwalk Hospital
Kimberly Hathaway, CEO	National Kidney Foundation of CT
Marcia Hilditch	National Kidney Foundation of CT
Michelle Kelvey-Albert	Qualidigm
Paula Leibovitz, MS, RD, CD-N	Briarwood College
Hilary Norcia, MPH	American Heart Association
Patricia O'Connell, MS, RD, CDE	Joslin Diabetes Center
Richard Roy, Co-Chair	CT State House of Representatives
Joan Schwartz, MS, RN, CDE	Eastern Connecticut Health Network
Maredia Warren	American Heart Association

GOAL: *To ensure that all people with diabetes and at risk for diabetes and their health care providers all have current knowledge and can apply evidence-based guidelines.*

Identified Problems:

- The general public is unaware of:
  - Behaviors and risk factors that lead to diabetes and the seriousness of diabetes diagnosis
  - Economic and quality of life burden that diabetes imposes on the state of Connecticut
- Many primary care providers have not received adequate up-to-date professional education.

Rationale:

Overview

The treatment of diabetes has advanced rapidly in the last decade. Since the Diabetes Control and Complications Trial, the United Kingdom Prospective Diabetes Study, and other landmark studies showing tight control decreases diabetes complications, new medications, new insulin delivery mechanisms, and new treatment regimens have been

developed. Staying current with these advances is difficult for the primary care provider, as well as for the person with diabetes.

Diabetes Self-Management Education (DSME)

Diabetes is a chronic disease that requires the patient to learn how to manage their disease (self-management). Although the health care provider role is important for prescribing medication, monitoring lab results, and following up with patients, the patient must take on the majority of diabetes management including blood glucose monitoring, nutrition choices, and physical activity. Learning and applying these skills is critical to diabetes self-management. They are the primary determinants of diabetes-related health outcomes. Positive clinical outcomes are only possible if patients receive and internalize effective disease management education.

EDUCATION AND AWARENESS OBJECTIVE 1: Patient Education: By 2012, Increase by 5% the proportion of people with diabetes participating in diabetes self-management education programs in order to learn about controlling their diabetes.

Recommended Strategies

For Patients with Diabetes:

- Make available training curricula options for patient education.
- Create partnerships with hospitals, Community Health Centers (CHCs), volunteer health organizations, Connecticut Association of Directors of Health (CADH), American Heart Association (AHA), and local health departments to ensure staff has information relevant to care through education resources added to organizational newsletters (hospitals, CT DPH, etc.) and Web sites.
- Train non-Certified Diabetes Educators (CDE), including school nurses, medical assistants, certified nurse aides, peer-to-peer educators, faith organization members, senior center staff, local health department educators, and lay persons as referral resources, to augment traditional education programs.
- Engage Health Maintenance Organizations (HMO) to standardize access to education programs by taking advantage of Connecticut law that requires diabetes education for persons with diabetes.

How this objective will be measured:

- Data source: BRFSS
- Baseline value: 47.7%
- Target value: 52.7%

- Partner with grocery stores, libraries, senior centers, town halls, and other public places to make diabetes, nutrition, and general health information available.
- Outreach to leaders of large group practices to encourage their members' physicians to refer to diabetes education programs.
- Make people with pre-diabetes aware of the potential to prevent diabetes onset through lifestyle change.

For Education of Primary Care Providers:

Often best practices have changed since health professionals have completed their training. Therefore, professional education is critical to ensure that providers are treating their patients according to the most recent standards. Given the long lag between when best practices are approved by national organizations, and when individual providers regularly make use of best practices, professional education is an essential tool to improve clinical outcomes in people with diabetes.

EDUCATION AND AWARENESS OBJECTIVE 2: Professional Education: Increase by 10% the number of providers who participate in continuing education programs focused on diabetes.

Recommended Strategies

- Expand physician participation in professional education programs by encouraging insurers and pharmaceutical companies to offer scholarships for doctors to attend the national scientific sessions or diabetes post graduate conferences and providing materials on these programs to doctor office staff.

How this objective will be measured:

Data source, Baseline and target values to be determined during first year of plan implementation

- Conduct ongoing professional education with a curriculum that incorporates best practices and prevention (e.g., Grand Rounds, continuing medical education [CMEs], etc.) for physicians involved in providing diabetes services.
- Engage hospital and clinic administrators to foster mentoring or peer education to change physician behavior and to support the increased number of, and enrollment in, patient education programs; engage medical directors from Managed Care Organizations and Physicians Health Organizations to encourage their members to receive regular diabetes education.

- Promote the use of relevant billing and reimbursement codes for screening, education, and treatment.

General Awareness

Effective disease management through patient and professional education will reduce costs and improve outcomes in people with diabetes, but to make substantial reductions in new diabetes cases, an effective information campaign for the at risk public is needed. Increased public awareness of the dangers of diabetes, and just as importantly, of the methods to reduce the risk of developing diabetes, has the potential to save many lives in Connecticut. Per person costs of public information campaigns are much lower than per person costs for disease management, so an effective public education campaign makes good economic sense as well as good public health sense.

EDUCATION AND AWARENESS OBJECTIVE 3: Public Awareness: By 2012, improve public awareness of the impact of diabetes by increasing by 10% the number of partnerships with community organizations such as schools, libraries, media, town halls and other public places.

Recommended Strategies

How this objective will be measured:

Data source, Baseline and target values to be determined during first year of plan implementation

- Engage schools, libraries, senior centers, town halls and other public places, workplaces, faith-based and community-based organizations to share information on the risks, burden, and impact of diabetes, and on the availability of screenings.
- Train non-CDEs to provide accurate information on signs and symptoms of diabetes and to refer people to formal education programs; develop a proficiency measure for community and peer diabetes health educators.
- Launch an information campaign drawing on partnerships, existing programs, and national campaigns to highlight the rapid rise in diabetes diagnoses; connect with a public figure to promote the message.
- Engage community organizations to ensure that messages about lifestyle modification are delivered in culturally relevant and positive ways.

8. ACCESS AND POLICY: ASSURING ACCESS TO TREATMENT

Access & Policy Workgroup

Ann Agro	Yale Prevention Research Center
Joni Arvai	American Heart Association
Patricia Bak, RN, CDE	Certified Diabetes Educator
Rosa Browne	NAACP-Health Committee
Nanette Char	Consultant
Kari Davis, APRN	Generations Family Health Center
Brenda DelGado, MS, Exe. Dir.	Area Health Education Center
Patricia DeWitt	Yale-New Haven Hospital
Georgia Jennings, MPH	Yale Prevention Research Center
Kristin Mattocks, MPH, PhD	Qualidigm
Barbara McCabe, APRN	AmeriCares Clinic
Kit McKinnon, RN, CDE	Middlesex Hospital
Cheryl Resha, RN, EdD	CT State Department of Education
Hilary Silver	Department of Social Services
Maureen Smith, Dir. Consumer Rel.	Office of the Health Care Advocate
Gary Spinner, PA	Hill Health Center
Julie Wagner, PhD	University of Connecticut Health Center
Jeffrey Yale, DPM	Griffin Hospital

GOAL: *Comprehensive diabetes care, i.e., diabetes preventive care, treatment, supplies, equipment, medication, diabetes self-management education, and medical nutrition therapy is offered, available and affordable across the public and private sectors to every citizen in Connecticut in need.*

Identified Problems:

- Many people with diagnosed or undiagnosed diabetes do not have regular access to preventive education, care, and medications (e.g., the uninsured, underinsured, migrant workers and employees of companies that are self insured).
- Insufficient capacity in our medical care system and communities to prevent and treat diabetes (e.g., insufficient numbers of specialists and certified diabetes educators).

Rationale:

Overview

The Connecticut Diabetes Bill of Rights states all Connecticut based health insurance policies must cover diabetes medications, supplies, and education. People with an insurance policy not based in Connecticut, those on Medicaid, and those without insurance at all, however, are not afforded these rights. Consequently, their access to comprehensive diabetes care is often compromised.

Accessible Services

Making diabetes services accessible will increase the number of people who receive effective disease management or preventive training. Increased accessibility, in turn, will yield better outcomes in patients with diabetes and help to prevent additional cases thereby decreasing complications and the social and economic impact of this disease.

ACCESS AND POLICY OBJECTIVE 1: Accessible Services/Comprehensive Diabetes Care: By 2012, increase by 5% the proportion of people who receive comprehensive diabetes care, i.e., diabetes preventive care, treatment, supplies, equipment, medication, diabetes self-management education, and medical nutrition therapy.

Recommended Strategies

Universal

- Demonstrate the cost-effectiveness of diabetes education programs and promote a partnership among CT DPH, private groups, and public groups to implement diabetes education.
- Engage the state legislature to appropriate funds for pilot programs to spread the message about diabetes, both how to prevent it, and how to treat it.
- Secure commitment of the health care delivery system to the Diabetes Bill of Rights, and expand the definition of those covered under the Diabetes Bill of Rights.
- Encourage diabetes-friendly policies at businesses and schools.
- Determine how to find people at high-risk for diabetes and deliver cost-effective interventions as efficiently as possible.

How this objective will be measured:

- Data source: BRFSS
- Baseline value: Seeing health care professional 86%, obtaining foot exam 72%, getting dilated eye exam 78%, self monitoring blood sugar: 68%, attending class: 47.7%
- Target value: Plus 5%

For Persons with Insurance Coverage

- Encourage insurers to cover diabetes preventive care, treatment, supplies, education, and treatment with co-payments that do not exceed 25% of the covered item's total cost, and include diabetes education and medical nutrition therapy as a reimbursable service across insurance programs.
- Work to change Federal ERISA provisions to require self-insured employers to cover diabetes supplies, education, and treatment, and adopt the ADA Diabetes Bill of Rights to guide insurance regulation in Connecticut.
- Develop "Report Cards" for insurance plans on 1) what is covered and 2) on A1c levels and rates for flu shots, foot exams, and eye exams. (HEDIS /NCQA Measures).

For Persons Covered under Medicaid

- Support efforts to ensure all Medicaid eligible persons with diabetes are enrolled and receiving medically appropriate care and treatment, in their community when possible, including podiatric care and diabetes education services.

Uninsured

- Pilot a program with appropriate legislative and private foundation support to provide lab tests, supplies, medicines, and education for uninsured people with diabetes through a variety of providers and settings.
- Develop and seek legislative support for a program with community clinics, hospitals, and other health care providers to provide free or low cost access to preventive education and care, and treatment for uninsured or underinsured persons with diabetes.
- Expand use of patient access programs sponsored by major pharmaceutical companies.

Public Health Infrastructure

With the exception of those recommendations dealing with education for the general public, all the other recommendations within this plan rely upon increased capacity in the diabetes care system. Education services, disease management support, and insurance coverage must be in place to allow the community-level efforts to be effective. Increased capacity will result in better outcomes when diabetic emergencies arise and will help to prevent such emergencies and even diabetes onset.

ACCESS AND POLICY OBJECTIVE 2: Public Health Infrastructure: By 2012, increase by 5% the number of diabetes education services, disease management supports, and insurance coverage for people with diabetes.

Recommended Strategies

- Assess diabetes public health infrastructure to determine system gaps and develop policies that encourage the development of strong, efficient networks of providers by engaging legislators and insurers to make them aware of the barriers that exist to proper care.

How this objective will be measured:*

- Data source: Delphi technique using key informants
- Baseline and target values to be determined during first year of plan implementation

- Develop improved capacity to address the behavioral causes of poor diabetes patient outcomes, including defining and addressing reimbursement issues that may inhibit access to psychologists' services.
- Address shortages of specialists with focus on diabetes by expanding the number of nurse practitioners and physician assistants that specialize in diabetes care through educational incentives and policy development to support creation of teams of connected diabetes professionals.
- Expand the role of licensed health care professionals to provide more diabetes care including more frequent follow-up.

- Publish HEDIS measures related to diabetes for health plans; develop benchmarks on diabetes measures to inform policy; and develop mandated reporting of specific diabetes-related measures by hospitals and other health providers.

9. SURVEILLANCE: TRACKING AND MONITORING

Surveillance Work Group

Christian D. Andresen	CT Department of Public Health
Stephanie Belding	Community Renewal Team
Rosa Browne	NAACP-Health Committee
Louise Butcher	American Diabetes Association CT chapter
Jyoti Chhabra, PhD	Hartford Hospital
Grace Damio, MS, CD/N	Hispanic Health Council
Steven Delaronde, MPH, MSW	ConnectiCare
Gail D'Eramo Melkus, EdD, C-ANP, FAAN	Yale School of Nursing
Anne Elwell, RN, BS, MPH, CPHQ	Qualidigm
R. Allen Frommelt. PhD	Connecticut Hospital Association
Ana Lourdes Gomez, PhD	University of Connecticut
Shih-Yieh Ho, MPH, PhD	Qualidigm
Sheryl Horowitz, PhD	Griffin Hospital
Margaret M. Hynes, PhD, MPH, Co-Chair	Department of Public Health
Betty C. Jung, RN, MPH, CHES, Co-Chair	CT Department of Public Health
Brenda Kelley, Dir. Connecticut chapter	AARP Connecticut
Cynthia Kozak, RD, MPH, CDE	CT Department of Public Health
Kevin Maloy	Pfizer
Carolé Mensing, RN, MA, CDE	University of Connecticut
Susan McKenney	Anthem Blue Cross & Blue Shield
Rafael Perez-Escamilla PhD	University of Connecticut
James Rawlings	NAACP Health Committee
Katherine Schneider, MD	Integrated Resources Middlesex Area (IRMA)
Eric Triffin, Dir. of Health	City of West Haven
Carmela Valentino, MPH, CHES	Healthnet
Jean Zimkus, RN	Yale-New Haven Hospital

GOAL: *Diabetes surveillance data are available to all state partners and the general public.*

Identified Problems:

- Inadequate data on racial, ethnic, and economic disparities.

- Incomplete information on sub populations within the state including town-specific and race/ethnic group specific data on diabetes.
- Inadequate information sharing with statewide partners.

Rationale:

Public health interventions addressing the burden of diabetes in Connecticut can be effectively implemented when those populations most affected by the disease are identified through surveillance efforts. The dissemination of diabetes surveillance data can enhance statewide efforts to assess the needs of population subgroups, and form the basis for monitoring progress and evaluating the effectiveness of interventions.

SURVEILLANCE OBJECTIVE 1: Increase Hits to Web Page: By 2012, increase by 5% the number of hits to the Diabetes Surveillance Web page as a means of increasing the accessibility to diabetes prevalence, morbidity and mortality data.

Recommended Strategies

- Develop partnerships with a variety of organizations collecting and/or using health risk and health outcome information on diabetes.
- Identify other data sources and data-collecting agencies to meet with state planning groups to determine how best to create data sharing networks.
- Provide technical assistance on how to collect data to organizations that provide diabetes services.
- Provide resources to community-based organizations to gather data about diabetes services.
- Conduct surveillance of priority subpopulations, as limited resources allow, and make information resources available to non-DPH as appropriate.

How this objective will be measured:

- Data source: Connecticut vital records, mortality files, BRFSS, YRBS, Connecticut Hospital Discharge Abstract Billing Data Base
- Baseline value: Seventy-five hits a month to the Diabetes Surveillance Web page.
- Target value: Seventy-nine hits a month to the Diabetes Surveillance Web page.

- Disseminate available diabetes surveillance data to the general public through the CT DPH Web site and other appropriate venues.

10. CROSS-CUTTING ISSUES

The planning partners have agreed on the adoption of The Chronic Care Model as an approach for diabetes care in Connecticut. Developed in 1993 by Edward Wagner, MD, MPH at the Robert Wood Johnson Foundation to address deficiencies in the process that care for chronically ill patients, the model's goal is to transform health care from a system that is essentially reactive (responding mainly when a person is sick) to one that is proactive with the goal of keeping the person as healthy as possible.

The Chronic Care Model is founded on the belief that chronically ill patients can become successful self-managers when provided with adequate education and planned, informative structured primary care visits. The six elements of the model are described below.

The Chronic Care Model Recommends Six Health System Improvements to improve health outcomes in people with chronic diseases: (See Figure I following.)

1) **The Community** - Resources and Policies: Encourage patients to participate in effective community programs and work with community organizations to develop programs to fill in gaps in the care system; advocate for policies to improve patient care.

2) **Health System** - Organization of Health Care: Support improvement at all levels of health organizations; promote comprehensive system change; encourage open handling of errors and quality problems to improve care; provide incentives based on quality of care and adherence to guidelines; develop agreements between organizations to ease cooperation in health care delivery.

3) **Self-Management Support** Emphasize patients' central role in managing their health and connect them with appropriate internal and community resources to provide on-going self-management support; use effective self-management support strategies that include assessment, goal-setting, action planning, problem-solving and follow-up.

4) **Delivery System Design**: Define roles and distribute tasks among team members and use planned interactions to support evidence-based care; provide clinical case management for complex patients and ensure regular follow-up by the care team for all patients; deliver care that patients understand and that fits with their cultural background.

5) **Decision Support**: Use evidence-based guidelines in daily clinical practice and educate patients in evidence-based guidelines to encourage their participation; use proven provider education methods; integrate specialist expertise with primary care to ensure patients receive comprehensive care.

6) **Clinical Information Systems:** Support individual patient care planning and provide timely reminders to patients and providers. Identify subpopulations to receive pre-emptive care. Establish a disease registry and distribute information to patients and providers to coordinate care. Using disease registries, monitor performance of providers and of the whole care system.

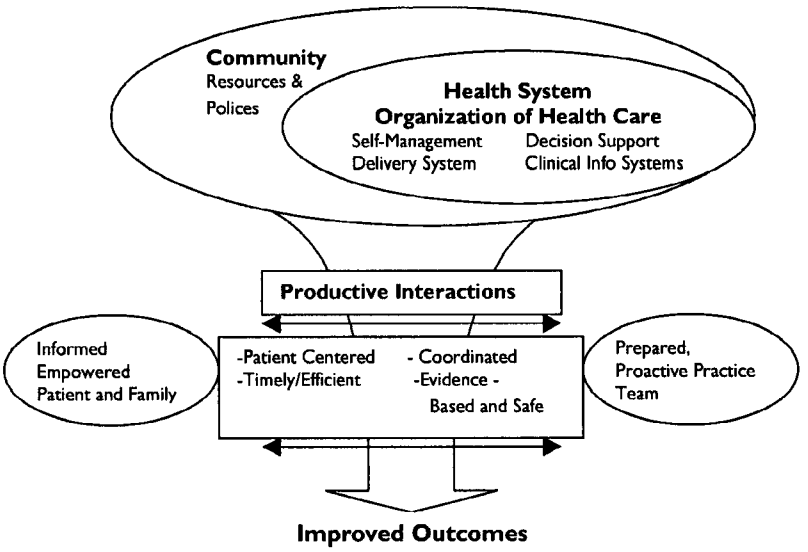


Figure I. Wagner Model of Chronic Care
For more detail on the model see:
http://www.improvingchroniccare.org/change/model/components.html.

A Chronic Care Model Approach for Connecticut

The Connecticut planning partners worked with the Robert Wood Johnson Chronic Care Model and recommend the following elements that should be part of Connecticut's Chronic Disease Model: (See Figure 2. CT's adaptation of the RWJ Wagner Model p.50)

- **Productive Interactions among Patients and Provider Teams:** Communication should be regular and useful. Providers should communicate in ways that are easy for patients to understand, and patients should use time with providers to ask questions and make certain their providers understand their needs.
- **Regular Assessment of Patients:** Patients should receive laboratory testing and face-to-face meetings with providers according to best practice guidelines.

- **Development of Treatment Plans** that consider cultural, linguistic, psychosocial, and physiological needs of the patient.
- **Systematic Application of Proven Therapies:** Providers integrate accepted best practices into their clinical practices.
- **Sustained Follow-up for Treatment Adherence:** Patient compliance with disease management protocols is one of the best ways to reduce costs and improve outcomes.
- **User Friendly Delivery System:** Patients are more likely to be compliant with their treatment programs when they are treated with respect, and when accessing needed services is easy.
- **Scheduling of Appointments:** managed care organizations and providers communicate to allow scheduling of all related appointments in one day. The current fragmentation of services is a barrier to many seeking care.
- **Get Managed Care Organizations to Recognize Barriers:** In some cases, payers may not be aware of the steps they can take to improve chronic disease management.
- **Address Payment Issues:** In some cases, insurance does not cover a service or treatment necessary to proper chronic disease management.
- **Set Up Communication Protocols:** Regular communication among patients, providers, and payers will help to eliminate some of the misunderstanding that can hamper good care.
- **Accepted/Uniform Provider Responsibilities:** Best practices should be in place for all providers in the state and provider responsibilities should be standardized for all payer organizations.
- **Multi-Pronged Case Finding Approach:** Develop multiple surveillance strategies to document chronic disease cases because not all patients access care the same way.

The system proposed by the planning partners will allow for comprehensive care of Connecticut residents living with chronic diseases. The benefits of putting Connecticut's Chronic Care Model into practice include decreased sick days, lowered health care costs, and higher quality of life for people living with chronic disease.

Significant barriers still exist, both to establishing Connecticut's Chronic Care Model, and to stopping the rise in chronic disease burden. The planning partners recognize the following as the most important challenges in the area of chronic disease prevention and control:

- **Preventing Chronic Disease:** Often, there are many people at risk for chronic disease but they do not realize it. Even those individuals who are aware of the risk may not know what steps they can take to improve their health.
- **Academic Detailing/Provider Attention:** There is too often a lag between when best practices are recommended and when providers begin using them in their daily clinical practice. Using academic detailing, peer-reviewed research, and peer-to-peer interactions will accelerate the pace of best practice adoption.
- **Systemic Change/Creating a User-Friendly System:** A simple system will increase compliance among patients and providers. Frustration with the current system can lead those who need care to abandon their search for care.
- **Insurance/Ensuring Access to Services:** All insurers must agree to provide a level of coverage for chronic disease services that is sufficient to maintaining good health. Basic covered services should be invariant among insurers.
- **Disparities:** There are substantial differences in care outcomes among patients from different racial/ethnic groups and different socioeconomic backgrounds. Public assistance must provide a minimum level of coverage to ensure that all people have access to needed services.
- **Coding Issues:** Though disease coding has become standardized, some providers still do not fill out forms such as death certificates with sufficient detail. Improving reporting will allow public health officials to have an accurate picture of chronic diseases in the state.
- **Referral/Follow-up/Tracking/Monitoring Patients:** Many diagnosed patients are lost to the care system and do not receive the treatment they need. Linking chronic disease efforts to community groups will expand the ability of the care system to retain patients.

Diabetes Care in a Chronic Care Model

- Middlesex Center for Chronic Care Management incorporates all care managers in a central, integrated program model that includes diabetes education and disease management programs in practice and infrastructure to improve care of chronic conditions.

A successful example of the application of the chronic care model is The Middlesex Center for Chronic Care Management.[i] This program and others like it demonstrate the Chronic Care Model conscientiously applied results in significant cost savings and improved health outcomes. The disease management program includes case managers who assist the referred populations with congestive heart failure, smoking behaviors, asthma, and diabetes in varied aspects of living with a chronic condition.[ii] Patients receive a one-to-one initial assessment appointment for education, medication adherence, blood sugar monitoring, and assessment of barriers. These include, but are not limited to, out of pocket expenses,

such as, co-pay, impact of "not preferred" products, health literacy issues, and psychosocial issues, including a screening for depression.

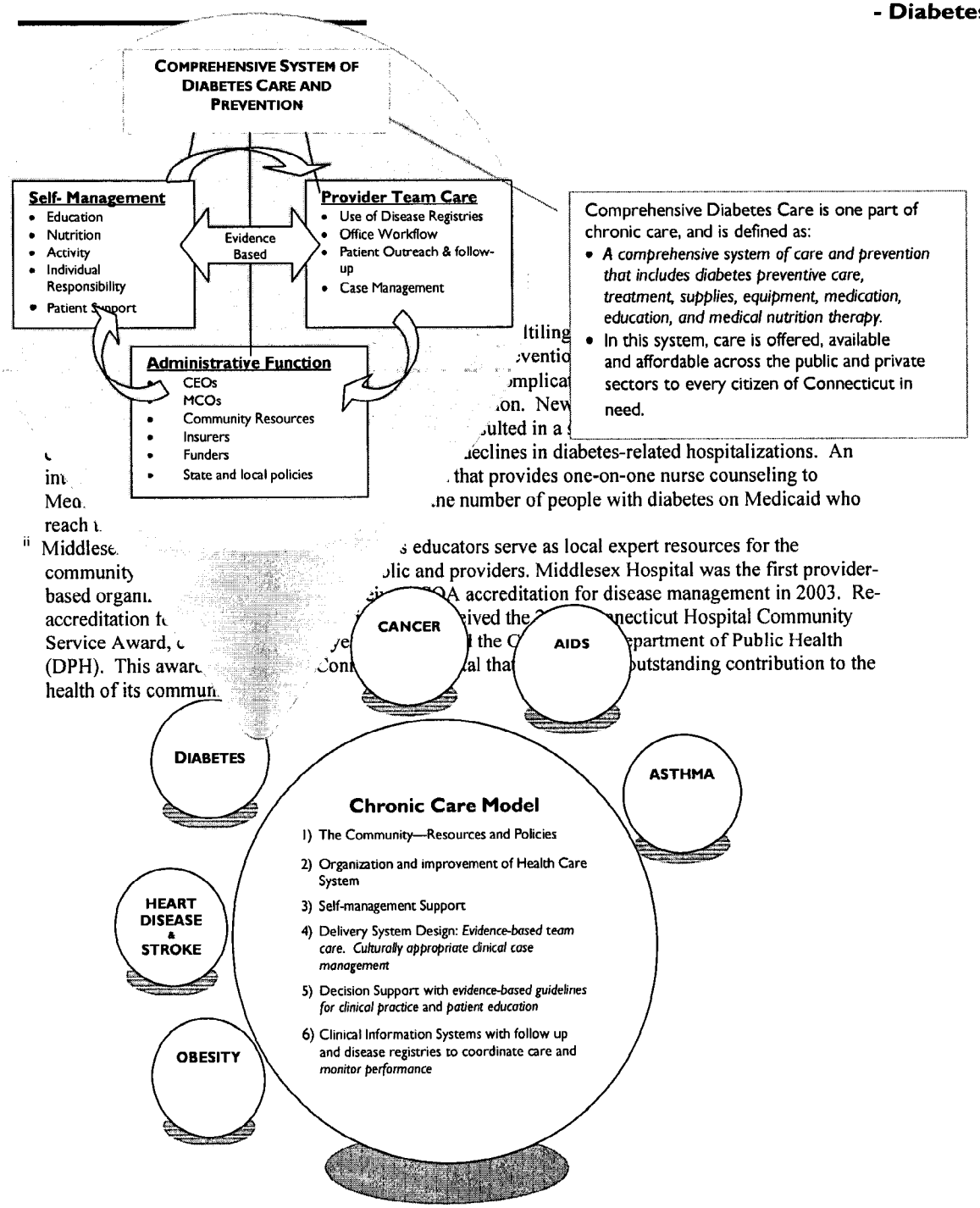
Patients enrolled in disease management programs are offered follow-up based on agreed upon self-management goals. This includes additional appointments and telephone contact to assess progress. The integration of chronic disease management programs allows the patient exponential benefit as people generally have co-morbid conditions. For instance, a patient with diabetes, hospitalized with an acute asthma exacerbation, and referred to the asthma program, is able to work with a smoking intervention counselor, attend a diabetes education group class, and work with a registered dietician to avoid weight gain associated with giving up smoking. All these services are "under one roof," which provides the patient participating in one program ease and comfort when accessing additional services.

Outcomes in the Middlesex Chronic Care Model

- % of patients with A1C<9: Before enrollment 38%, six months after enrollment 79%.
- % of patients reporting daily foot self-care goes from 49% to 98%
- % of patients reporting a physician foot exam in past year goes from 75% to 100%
- % of patients reporting a dilated retinal exam in past year goes from 41% to 87%
- $71,000 in avoided hospital costs in one year

Measured outcomes have included better disease control in patients with diabetes. Some recent specific outcomes for the diabetes disease management program (this is for patients referred for active case management not just education) are included in the outcomes box.

Connecticut's Comprehensive Public Health System
Model for Chronic Care
- Diabetes



Comprehensive Diabetes Care is one part of chronic care, and is defined as:

- *A comprehensive system of care and prevention that includes diabetes preventive care, treatment, supplies, equipment, medication, education, and medical nutrition therapy.*
- In this system, care is offered, available and affordable across the public and private sectors to every citizen of Connecticut in need.

ltiling
:ventio
mplica
on. New
ulted in a
eclines in diabetes-related hospitalizations. An
that provides one-on-one nurse counseling to
ne number of people with diabetes on Medicaid who

[ii] Middlese
community
based organi
accreditation f
Service Award,
(DPH). This awar
health of its commun

s educators serve as local expert resources for the
lic and providers. Middlesex Hospital was the first provider-
A accreditation for disease management in 2003. Re-
ived the
necticut Hospital Community
the C
partment of Public Health
Con
al tha
outstanding contribution to the

Figure 2. CT's Chronic Care Model

11. IMPLEMENTATION AND FUNDING

a. Phase I - The Plan for 2007

During the May 10, 2006 meeting, the combined work groups evaluated the recommendations of all five work groups to select outcomes and strategies to pursue for the first year of plan execution. The group agreed on the need for the Plan to yield significant results during its first year of execution to attract additional funding to diabetes prevention and control efforts in Connecticut. Two outcomes and strategies have been selected as the foundation for the 2007 Diabetes Work Plan. Please note that the order in which these objectives and strategies are listed should **not** be taken as an indication of which order the planning group intends them to be accomplished. They should be pursued simultaneously during the first year:

Access and Policy Objective 1: Accessible Services/Comprehensive Diabetes Care:
By 2012, increase by 5% the proportion of people who receive comprehensive diabetes care; i.e., diabetes preventive care, treatment, supplies, equipment, medication, diabetes self-management education, and medical nutrition therapy.

Recommended Strategies

- Support efforts to ensure that all Medicaid-eligible persons with diabetes are enrolled and receiving medically appropriate preventive care and treatment, in their community when possible, including podiatric care and diabetes self-management education services.
- Develop a plan to seek legislative support for a program with community clinics, hospitals, and other health care providers to provide free or low cost access to preventive education and care, and treatment for uninsured and underinsured persons with diabetes.

Education and Awareness Objective 1: Patient Education: By 2012, increase by 5% the proportion of people with diabetes participating in diabetes self-management education programs in order to learn about controlling their diabetes.

Recommended Strategies

- Make available training curricula options for patient education.
- Train non-CDEs to augment traditional education programs.
- Partner with grocery stores, libraries, and other public places to make diabetes, nutrition, and general better health information available.
- Engage HMOs to standardize access to education programs.

b. Phase II – 2008 to 2011

Annual Reports on Progress

During each year of the plan, the CT DPH and the Diabetes Advisory Council will prepare a report that describes the activities undertaken in the previous year and the results of those activities. The reports may be used in support of funding applications and in media campaigns publicizing the activities and successes of the Diabetes Prevention and Control Plan.

Action Steps for the Subsequent Year

Based upon information in the annual report, the CT DPH in conjunction with the Diabetes Advisory Council will create an action plan for the subsequent year. The action plan will clearly state the objectives and the recommended strategies to realize those objectives in the next calendar year. The action plan will also include specific steps to be taken with specific groups and individuals to forward the plan's goals.

c. Funding

To fully implement the recommendations of Connecticut's Diabetes Prevention and Control Plan, a diverse group of funding agencies, from state and federal government to private foundations, must be recruited. In 2007 diabetes control efforts in the state received $111,000 from the state government in salary, fringe and indirect costs, and $280,000 from the CDC. While government provides a useful starting point for diabetes prevention and control efforts, additional funding sources will be needed to realize a comprehensive system of diabetes care and prevention. The list of philanthropic organizations included in the appendix provides examples of funders in Connecticut and in the nation that have a history of contributing funds to public health initiatives, or whose mission of furthering the health of the public makes them likely supporters of public health projects. The list is not intended to be comprehensive, however, it is meant to be used as a resource for organizations seeking funding to implement diabetes activities.

d. Evaluation

DPH and its partners will be responsible for measuring progress towards each of the results in the previous section. While some of the results can be measured by the CT DPH epidemiology section, others, such as numbers of doctors achieving ADA recognition, will be monitored by Connecticut CT DPH partners. All data collected will be tabulated each year by the Diabetes Prevention and Control Program staff and a report will be prepared by CT DPH and the Diabetes Advisory Council to update funding agencies, partner health care organizations, and concerned citizens on the plan's progress.

Using information contained in the evaluation report, CT DPH and the DAC will plan future activities and adjust expectations as needed.

12. APPENDICES

Appendix A: Action Steps

Within many of the strategies, the work groups developed a number of specific action steps. The action steps, taken together, form a suggested means of putting a given strategy into practice. To assist with plan execution, the recommended action steps are listed below, introduced by the strategy to which they pertain. Only those strategies for which action steps have been developed are listed. Year one strategies are presented first; the remaining strategies are listed by issue area, in priority order, as determined by the work group (note: no strategies are listed for Surveillance as this work group's tasks are defined by the CT DPH):

Year 1

- Train non-CDEs to augment traditional education programs.
  - Work with health professionals and para-professionals operating in faith-based initiatives, schools, senior centers, local health departments, health care offices, and other venues.
  - Train peer-to-peer and lay people as referral resources and educators.
- Partner with grocery stores, libraries, and other public places to make diabetes, nutrition, and physical activity information available.
  - Use local newspaper circulars to distribute nutrition messages.
  - Print diabetes information on grocery bags.
- Engage HMOs to standardize access to education programs.
  - Take advantage of Connecticut educational requirements for people with diabetes to ensure that people with diabetes receive the required education.

Action Steps Beyond Year 1

Managing Diabetes Care and Prevention

1. Promote adoption of ADA and other evidence-based guidelines by providers to support an early diagnosis and provide good care through.
   - Promotion of ADA guidelines for diagnosis, ABC values (A1c, blood pressure, cholesterol) and other aspects of clinical care.
   - Expand access to eye and foot exams, flu shots, and A1c testing in all health care settings.
   - Promote smoking cessation as an evidence-based guideline.

2. Develop a pay-for-performance system that rewards physicians and patients for adhering to guidelines.
   - Engage employers in convincing MCOs to offer incentives.
   - Implement economically feasible recommendations.

3. Increase the number of health care providers using an electronic medical record or disease registry to establish a statewide health data exchange to increase outreach and improve communication among providers.
   - Communicate to providers the value of reporting clinical outcomes.
   - Work with MCOs to identify communication barriers for effective disease management.

4. Adopt evidence-based guidelines as evaluation benchmarks for clinical outcomes (e.g., A1c control, blood pressure control, lipid levels control, smoking cessation).
   - Make explicit the financial benefits for payers and providers who evaluate outcomes.

5. Assess current disparities and create plans to remove those disparities through culturally-focused diabetes care.
   - Create culturally-focused diabetes care guidelines and programs.
   - Involve community leaders in creating community health initiatives.
   - Provide culturally appropriate diabetes training in health care offices.
   - Train lay health workers in the community setting.
   - Encourage programs to increase the numbers of allied health professionals.
   - Partner with community health centers/other agencies to continue to improve diabetes outreach and care.

09/15/08 0679

Fostering Self-Management

1. Provide a self-management education program that is simple and user friendly and that involves a program for health care literacy that is language appropriate and culturally sensitive.
   - Create program for health care literacy.
   - Assess provider language/cultural competency.
   - Adopt standardized written materials.
2. Foster patient responsibility for diabetes care by adopting self-management education programs that engage the patient and provide patient financial incentives and personalized nutrition guides and exercise plans.
   - Promote self-management education program that engages the patient.
   - Encourage the use of personalized nutrition guides and exercise plans for people with diabetes using existing planning tools.
3. Engage employers in conveying the importance of simple, barrier-free self-management education to MCOs.
   - Create employee financial incentives to increase patient responsibility.

Linking Systems for Efficacy and Quality

1. Promote the adoption of ADA and other evidence-based criteria for diabetes diagnosis and pre-diabetes diagnosis, and link diagnosis plans with education plans.
   - Create a system to identify patient care needs post-diagnosis.
   - Link diagnosis plans with education plans.
2. Create partnerships with hospitals, CHCs, volunteer health organizations, CADH, AHA, and local health departments to ensure staff has information relevant to care through education resources added to organizational newsletters (hospitals, CT DPH, etc.) and Web sites.
   - Add education resources to organizational newsletters (hospitals, CT DPH, etc.) and Web sites.
   - Ensure staff has information relevant to patient care.
3. Train non-CDEs, including school nurses, peer-to-peer educators, faith organization members, senior center staff, local health department educators, and lay persons as referral resources, to augment traditional education programs.
   - Train health professionals operating in faith-based initiatives, schools, senior centers, local health departments.
   - Use peer-to-peer and lay people as referral resources and educators.
4. Increase the number of physicians who refer their patients to diabetes education programs by targeting the presidents of large group practices to encourage their member physicians to participate in education.
   - Outreach the presidents/chief medical officers of large group practices to encourage their member physicians to participate in education.

0680
09/15/08

5. Expand physician participation in professional education.
   - Encourage insurers and pharmaceutical companies to offer scholarships for health care providers to attend the national ADA or diabetes post-graduate conferences.
   - Provide materials on programs to doctor office staff.

6. Conduct ongoing professional education with a curriculum that incorporates best practices and prevention (e.g., Grand Rounds, CMEs, etc.) for physicians involved in providing diabetes services, and encourage financial incentives, and doctors who champion the benefits of education programs to other physicians.
   - Provider training for physicians with a curriculum that incorporates best practices (e.g., Grand Rounds, CMEs, etc.).
   - Education of team of clinicians involved in providing diabetes services.
   - Expand physicians' awareness of prevention programs.
   - On-going messages to MDs about education programs.
   - Identify doctors to champion the benefits of education programs to other physicians.

7. Engage hospital and clinic administrators to foster mentoring or peer education to change physician behavior and to support the increased number of, and enrollment in, patient education programs; engage medical directors from MCOs and PHOs to encourage their members to receive regular diabetes education.
   - Engage medical directors from MCOs and PHOs to encourage their members to receive regular diabetes education.
   - Engage hospital administrators to support the increased number of patient education programs and the increased enrollment in those programs.

Information That Is Accurate and Moves People to Action

1. Engage schools, public places, workplaces, faith-based and community-based organizations to share information on the risks, burden, and impact of diabetes, and on the availability of screenings:
   - Increase the number of community and faith-based organizations that provide diabetes education and refer at risk people to curricula and programs.
   - Support workplaces in offering healthy office food and exercise opportunities.
   - Recommend screenings at local YMCAs and other community groups to find people who should be referred for further testing and education.
   - Partner with grass roots and community organizations to share information on diabetes.
   - Trained non-CDEs can provide education at community health fairs.

0681
09/15/08

2. Use local health departments and other venues to train additional non-CDEs to provide accurate information on signs and symptoms of diabetes, and to refer people to formal education programs, and develop a competency for community and peer diabetes health educators:
   - Training of non-CDEs to deliver accurate diabetes information.
   - Advocate with local health departments to provide education through the Preventive Services Block Grant and other means.
   - Expand capacity to educate the population by developing education programs for the community.

3. Launch an information campaign drawing on partnerships, existing programs, and national campaigns to highlight the rapid rise in diabetes diagnoses; connect with a public figure to promote the message:
   - Adapt national media campaigns to CT's needs.
   - Adapt ADA education campaigns.
   - Use allied health professionals and existing programs.
   - Expand distribution of the statewide diabetes newsletter.
   - Form partnerships with hospitals and CHCs.
   - Engage local media/community access.
   - Expand prevention efforts.
   - Radio: NPR (e.g., the Faith Middleton Show)
   - Connect with public figures (e.g., CT State Representative Toni Harp and CT State Representative Richard Roy).

0682
09/15/08

Appendix B: Healthy People 2010 Diabetes Specific Objectives

1-9 Reduce hospitalization rates for three ambulatory care-sensitive conditions–pediatric asthma, uncontrolled diabetes, and immunization-preventable pneumonia and influenza.

4-7 Reduce kidney failure due to diabetes.

4-8 (Developmental) Increase the proportion of persons with type 1 or type 2 diabetes and proteinuria who receive recommended medical therapy to reduce progression to chronic renal insufficiency.

5-1 Increase the proportion of persons with diabetes who receive formal diabetes education.

5-2 Prevent diabetes.

5-3 Reduce the overall rate of diabetes that is clinically diagnosed.

5-4 Increase the proportion of adults with diabetes whose condition has been diagnosed.

5-5 Reduce the diabetes death rate.

5-6 Reduce diabetes-related deaths among persons with diabetes.

5-7 Reduce deaths from cardiovascular disease in persons with diabetes.

5-8 (Developmental) Decrease the proportion of pregnant women with gestational diabetes.

5-9 (Developmental) Reduce the frequency of foot ulcers in persons with diabetes.

5-10 Reduce the rate of lower extremity amputations in persons with diabetes.

5-11 (Developmental) Increase the proportion of persons with diabetes who obtain an annual urinary microalbumin measurement.

5-12 Increase the proportion of adults with diabetes who have a glycosylated hemoglobin measurement at least once a year.

5-13 Increase the proportion of adults with diabetes who have an annual dilated eye examination.

5-14 Increase the proportion of adults with diabetes who have at least an annual foot examination.

5-15 Increase the proportion of persons with diabetes who have at least an annual dental examination.

5-16 Increase the proportion of adults with diabetes who take aspirin at least 15 times per month.

5-17 Increase the proportion of adults with diabetes who perform self blood-glucose monitoring at least once daily.

7-11 Increase the proportion of local health departments that have established culturally appropriate and linguistically competent community health promotion and disease prevention programs.

12-9 Reduce the proportion of adults with high blood pressure.

12-10 Increase the proportion of adults with high blood pressure whose blood pressure is under control.

12-11 Increase the proportion of adults with high blood pressure who are taking action (for example, losing weight, increasing physical activity, and reducing sodium intake) to help control their blood pressure.

14-29 Increase the proportion of adults who are vaccinated annually against influenza and ever vaccinated against pneumococcal disease.

19-1 Increase the proportion of adults who are at a healthy weight.

19-2 Reduce the proportion of adults who are obese.

19-17 Increase the proportion of physician office visits made by patients with a diagnosis of cardiovascular disease, diabetes, or hyperlipidemia that include counseling or education related to diet and

nutrition.

22-1 Reduce the proportion of adults who engage in no leisure-time physical activity.

28-5 (Developmental) Reduce visual impairment due to diabetic retinopathy.

Appendix C: The 10 Essentials of Public Health

1. **Monitor Health Status to Identify and Solve Community Health Problems**: This service includes accurate diagnosis of the community's health status; identification of threats to health and assessment of health service needs; timely collection, analysis, and publication of information on access, utilization, costs, and outcomes of personal health services; attention to the vital statistics and health status of specific-groups that are at higher risk than the total population; and collaboration to manage integrated information systems with private providers and health benefit plans.
2. **Diagnose and Investigate Health Problems and Health Hazards in the Community**: This service includes epidemiologic identification of emerging health threats; public health laboratory capability using modern technology to conduct rapid screening and high volume testing; active infectious disease epidemiology programs; and technical capacity for epidemiologic investigation of disease outbreaks and patterns of chronic disease and injury.
3. **Inform, Educate, and Empower People about Health Issues**: This service involves social marketing and targeted media public communication; providing accessible health information resources at community levels; active collaboration with personal health care providers to reinforce health promotion messages and programs; and joint health education programs with schools, churches, and worksites.
4. **Mobilize Community Partnerships and Action to Identify and Solve Health Problems**: This service involves convening and facilitating community groups and associations, including those not typically considered to be health-related, in undertaking defined preventive, screening, rehabilitation, and support programs; and skilled coalition-building ability in order to draw upon the full range of potential human and material resources in the cause of community health.
5. **Develop Policies and Plans that Support Individual and Community Health Efforts**: This service requires leadership development at all levels of public health; systematic community-level and state-level planning for health improvement in all jurisdictions; development and tracking of measurable health objectives as a part of continuous quality improvement strategies; joint evaluation with the medical health

care system to define consistent policy regarding prevention and treatment services; and development of codes, regulations, and legislation to guide the practice of public health.

6. **Enforce Laws and Regulations that Protect Health and Ensure Safety**: This service involves full enforcement of sanitary codes, especially in the food industry; full protection of drinking water supplies; enforcement of clean air standards; timely follow-up of hazards, preventable injuries, and exposure-related diseases identified in occupational and community settings; monitoring quality of medical services (e.g., laboratory, nursing homes, and home health care); and timely review of new drug, biologic, and medical device applications.

7. **Link People to Needed Personal Health Services and Assure the Provision of Health care when Otherwise Unavailable**: This service (often referred to as "outreach" or "enabling" services) includes assuring effective entry for socially disadvantaged people into a coordinated system of clinical care; culturally and linguistically appropriate materials and staff to assure linkage to services for special population groups; ongoing "care management"; transportation services; targeted health information to high-risk population groups; and technical assistance for effective worksite health promotion/disease prevention programs.

8. **Assure a Competent Public and Personal Health care Workforce**: This service includes education and training for personnel to meet the needs for public and personal health service; efficient processes for licensure of professionals and certification of facilities with regular verification and inspection follow-up; adoption of continuous quality improvement and life-long learning within all licensure and certification programs; active partnerships with professional training programs to assure community-relevant learning experiences for all students; and continuing education in management and leadership development programs for those charged with administrative/executive roles.

9. **Evaluate Effectiveness, Accessibility, and Quality of Personal and Population-Based Health Services**: This service calls for ongoing evaluation of health programs, based on analysis of health status and service utilization data, to assess program effectiveness and to provide information necessary for allocating resources and reshaping programs.

10. **Research for New Insights and Innovative Solutions to Health Problems**: This service includes continuous linkage with appropriate institutions of higher learning and research and an internal capacity to mount timely epidemiologic and economic analyses and conduct needed health services research.

Appendix D: Resources (note: these lists are sample programs for reference and do not represent an exhaustive listing)

DPH Programs

Name	Purpose/Activities	Areas Served	Phone
Improving Quality of Diabetes Care in Community Health Centers (CHC)	Plan to improve quality of care in the CHCs participating in the diabetes collaborative.	Connecticut (CHCs involved in the diabetes collaborative)	For information on all CT DPH sponsored diabetes programs, please call 860-509-7802
Development of the Statewide Diabetes Prevention and Control Plan	To collaborate with partners to develop a comprehensive diabetes prevention and control plan for Connecticut.	Connecticut	
State Agency Worksite Wellness	To bring diabetes prevention, awareness, and education to the employees of state agencies	Connecticut (selected state agencies)	
Improving Diabetes Self-Management Skills	To improve access to information on diabetes management services through the ADA Expo and incentives.	Connecticut (ADA recognized education centers, CT Expo Center)	
Diabetes Workforce Enhancement	Increase health education skills and cultural competency of the non-certified diabetes educator (CDE) workforce by developing curriculum. Improve diabetes knowledge in health care professional work force	Connecticut	
Diabetes Advisory Committee	To gather input, increase leverage of resources, expand reach into partners, and develop advisory council to provide direction to develop and implement the CT DPCP.	Statewide	

Quality Assurance

Name	Purpose/Activities	Areas Served	Phone
CT Policy & Economic Council (CPEC)	Provides program evaluation for communities and local government in CT.	Statewide	860-571-7500
CT Health Policy Project	Research and education to improve access to health care in CT.	Statewide	203-562-1636
Qualidigm	Consulting and research company focused on improving the quality and safety of health care.	Statewide	860-632-2008

ADA Recognized Diabetes Education Programs

Facility	Program Name	Town	Phone
William W. Backus Hospital	Diabetes Self-Management Education Program	Norwich	860-892-6906
Bridgeport Hospital	Diabetes Education Program	Bridgeport	203-384-4723
Hospital of Central CT/ Joslin Diabetes Center affiliate	Know Diabetes, Know Yourself And Outpatient Diabetes Self-Management Program	Southington	860-224-5672
Bristol Hospital	The Diabetes Education and Self-Management Outpatient Program at Bristol Hospital Wellness Center	Bristol	860-582-9355
Charlotte Hungerford Hospital	Hungerford Diabetes Center	Torrington	860-489-0661
Day Kimball Hospital	Diabetes Self-Management Education Program	Plainfield	860-928-4344
Day Kimball Hospital	Diabetes A Self-Management Outpatient Education	Putnam	860-928-6541 x2593
Diabetes Resource Center	Diabetes Self-Management Education Program	Watertown	860-274-6254
Hartford Hospital	Diabetes LifeCare Outpatient Adult and Diabetes in Pregnancy Self-Management Education	Hartford	860-545-3526
Eastern Connecticut Health Network, Inc.	Manchester Memorial Hospital Diabetes Self-Management Education Program	Manchester	860-647-6824
Hartford Hospital	Diabetes LifeCare Outpatient Adult & Diabetes in Pregnancy Self-management Education Programs	Hartford	860-545-3526
Ivery & Dudley, Inc.	Northwest Connecticut Diabetes Center	Winsted	860-379-4772
Two programs: Lawrence & Memorial Hospital Joslin Diabetes Ctr. affiliate	Know Diabetes, Know Yourself And Outpatient Diabetes Self-Management Program	New London Mystic	860-444-4737 x2124 860-245-0565
Middlesex Hospital	Diabetes Self-Management Education Program	Middletown	860-358-8840
MidState Medical Center	The Diabetes Center Outpatient Self-Management Program	Meriden	203-630-5364
Hospital of Central CT/ Joslin Center for Diabetes	Know Diabetes, Know Yourself And Outpatient Diabetes Self-Management Program	New Britain	860-224-5672
Hospital of Central CT/ Joslin Center for Diabetes	Know Diabetes, Know Yourself And Outpatient Diabetes Self-Management Program	Southington	860-224-5672
New Milford Hospital	Diabetes Education Program	New Milford	860-350-7263
Norwalk Hospital	Diabetes Outpatient Self-Management Education Program	Norwalk	203-852-2181
Phoenix Internal Medicine Assoc.	Central Connecticut Diabetes Center	Waterbury	203-754-5504
St. Francis Hospital & Medical Center	Diabetes Care Center	Hartford	860-714-4402
Hospital of Saint Raphael	Diabetes Health care Program	New Haven	203-789-3355

Stamford Hospital Health System	Diabetes Management Program	Stamford	203-325-7286
VA Health care System, VA CT	Diabetes Self-management Education Program	West Haven	203-932-5711 x 5189
University of Connecticut Health Center	Diabetes Outpatient Self-Management Education Program	Farmington	860-679-2273
Windham Community Memorial Hosp.	Hatch Hospital Corp. Diabetes Education Program	Willimantic	860-456-6727

Community-Based Organizations (note: these lists are sample programs for reference and do not represent an exhaustive listing)

Name	Purpose/Activities	Areas Served	Phone
Hispanic Health Council	Six Centers of Excellence provide service in their areas of expertise. Education, prevention, and community/bilingual/multicultural support to address current Latino health issues.	Hartford	860-527-0856
Bristol Community Organization	Programs focus on the young, the disabled, the elderly, economically disadvantaged. Head Start, homemaking/care service for disabled, etc.	Greater Bristol	860-584-2725
Urban League of Greater Hartford	Focuses on African Americans and other groups. Education, community health, employment training services to help urban people become self-sufficient.	Greater Hartford	860-527-0147
New Haven Family Alliance	Provides services and resources to help families become self-reliant.	Downtown New Haven	203-782-3110
CT Association for United Spanish Action (CAUSA)	Group of Latino service organizations. Provides education, health, elderly services, HIV/AIDS support to the communities it serves.	Statewide	860-424-0077
Sickness Prevention Achieved through Regional Collaboration (SPARC)	Works with community organizations and health care providers to identify people in need of medical services, coordinate existing health services, and develop programs to expand access to health care services.	Fairfield, Litchfield, Hartford, and Tolland Counties	860-435-2896
Hill Health Corporation Diabetes Prevention Team	Provides health services (primary care, dental, laboratory, nursing, etc.) to underserved populations.	Greater New Haven	203-503-3087
Thames Valley Council for Community Action (TVCCA)	Works through community organizations (churches, municipal entities, educational institutions) to provide social services to the economically disadvantaged.	Southeastern Connecticut	860-889-1365

AmeriCares Free Clinics	Provides free medical care to economically disadvantaged working families.	Danbury, Bridgeport, Norwalk areas	800-486-4357
Khmer Health Advocates Inc. National Cambodian American Health Initiative (NCAHI)	Seeks to improve access to health care and disease management education for Cambodian Americans living with diabetes.	Connecticut	860-561-3345
CT AHEC System	Provides information on health careers and works to remove health care disparities with programs to increase minority representation in the health professions.	Four regional offices located around the state	860-679-7968

Disease Management Programs (note: these lists are sample programs for reference and do not represent an exhaustive listing)

Name	Purpose/Activities	Areas Served	Phone
Aetna Healthy Outlook	Insurer disease management program	Connecticut	
Anthem Healthy Solutions for Chronic Diseases	Insurer disease management program	Connecticut	
ConnectiCare DiabetiCare	Insurer disease management program	Connecticut	800-390-3522
Cigna Well Aware Program	Insurer disease management program	Connecticut	800-882-4462
Delphi Diabetes Manager	Electronic management system for physicians to track their diabetic patients' management programs.	Connecticut	860-687-4700
St. Vincent's Diabetes Initiative	Blood testing, education, nutrition counseling, exercise counseling, newsletters.	Connecticut, Greater Bridgeport	877-255-7847

Support Groups (note: most of the hospitals in the previous section also offer support groups)

Name	Purpose/Activities	Areas Served	Phone
Home and Community Health Services	Diabetes education and support group.	Enfield, Connecticut	860-763-7600
Groton Board of Education	A school-based health center offering diabetes support groups.	Groton, Connecticut	860-572-2100
Town of Manchester Health Department	Diabetes support groups.	Manchester, Connecticut	860-647-3173
Norwich Senior Center	Diabetes support groups.	Norwich, Connecticut	860-889-5960

09/15/08
0689

Estuary Council of Seniors	Diabetes support groups.	Old Saybrook Connecticut	860-388-1611
Haven Health Center of Rocky Hill	Diabetes support groups	Rocky Hill, Connecticut	860-529-2521
Stamford Health System Staying Well Program	Diabetes education and support groups.	Stamford, Connecticut	877-233-9355
Poquonock Family Resource Center	Community diabetes support and education groups.	Windsor, Connecticut	860-687-2070

Community Foundations in Connecticut (note: these lists are sample programs for reference and do not represent an exhaustive listing)

Name	Purpose/Activities	Areas Served	Phone
Branford Community Foundation	Grants for education, health, cultural projects in the city of Branford	Branford ONLY	203-481-0661
Greater Bridgeport Area Foundation	Grants for the arts, community/economic development, education, health/human services	Greater Bridgeport	203-334-7511
Community Foundation for Greater New Haven	Grants for projects to benefit undeserved populations: racial/ethnic minorities, women, children, etc.	Greater New Haven	203-777-2386
Community Foundation of Greater New Britain	Grants for improvement projects in the areas it serves.	Berlin, New Britain, Plainville, Southington	860-229-6018
Community Foundation of Northeast Connecticut	Grants for projects to benefit the underserved in Windham County.	Windham County	860-423-4373
Community Foundation of Northwest Connecticut	Grants to non-profits for community improvement: education, health, culture, etc.	Litchfield County	860-489-0026
Community Foundation of Southeastern Connecticut	Awards grants to strengthen educational, cultural, health, social service, other charitable organizations.	Southeastern Connecticut	860-442-3572
Connecticut Community Foundation	Awards grants to non-profits.	Naugatuck Valley and Litchfield Hills	203-753-1315
Eastern Connecticut Community Foundation	Provides grant support to non-profits for educational, health, cultural endeavors.	Eastern Connecticut	860-887-3303
Fairfield County Community Foundation	Strategic grant-making to respond to community needs.	Fairfield County	203-834-9393
Hartford Foundation for Public Giving	Brings together people and organizations to find solutions to pressing problems. Makes grants to	Hartford County	860-548-1888

	support worthy projects in education, health, culture, etc.		
Main Street Community Foundation	Provides grant support to local organizations.	Bristol, Burlington, Plainville, Plymouth, Southington, Wolcott	860-583-6363
New Canaan Community Foundation	Provides grant support to local organizations.	New Canaan Area	203-966-0231

Health Foundations Operating in Connecticut (note: these lists are sample programs for reference and do not represent an exhaustive listing)

Name	Purpose/Activities	Areas Served
Boehringer-Ingleheim Cares Foundation	Grants for research and educational programs. Provides free pharmaceuticals to those in need.	National
Bayer Foundation	Grants for projects in health and human services.	Connecticut
Pfizer Foundation	Grants and direct aid to improve access to pharmaceuticals.	National, based in CT
CIGNA Foundation	Grants in health and human services, education, community and civic affairs, the arts.	National, office in CT
Bristol-Myers Squibb Foundation	Grants to non-profits.	Connecticut
ConnectiCare Foundation	Grants to public and community health projects.	Connecticut
Anthem Foundation	Grants to expand health care access for the underserved.	Connecticut
Universal Health Care Foundation of CT	Funds projects that support its mission to ensure that quality health care is available to all Connecticut residents.	Connecticut
Connecticut Health Foundation	Funds programs to improve access to children's mental health services, reduce racial / ethnic health disparities, expand access to oral health services.	Connecticut
Connecticut Pharmacists Foundation	Makes grants for programs to support pharmacy outreach, education, and to support new pharmaceutical developments	Connecticut
Aetna Foundation	Funds grants in health, arts, culture, and education.	National, based in CT

Other Foundations (note: These lists are sample programs for reference and do not represent an exhaustive listing.)

Name	Purpose/Activities	Areas Served
Daphne Seybolt Culpeper Memorial Foundation, Inc	Grants for health, culture, and other projects.	Fairfield County
Louis H. Aborn Foundation	Grant-making foundation.	Fairfield County
Kurt Berliner Foundation	Grant-making foundation.	Fairfield County
Bondi Foundation	Grant-making foundation.	Fairfield County
Ensworth Charitable Foundation	Grants for health/welfare, housing/economic development, family service, and education projects.	Hartford and contiguous surrounding towns
First County Bank Foundation, Inc.	Grants to non-profits that support community and economic development or children/youth/families	Lower Fairfield County
Fischbach Foundation, Inc	Grant-making foundation.	Connecticut
R. S. Gernon Trust	Grants for art, health, culture projects.	Norwich only
The Gryphon Fund	Grant-making foundation.	Hartford area
George J. and Jessica Harris Foundation	Grant-making foundation	Connecticut
James H. Napier Foundation	Grants in health, education.	Meriden Area
Robert & Margaret Patricelli Family Foundation	Funds annual campaigns, general/operating support, program development, research.	Connecticut
Vain and Harry Fish Foundation, Inc	Has given substantial funding to the Juvenile Diabetes Research Foundation	New York
George A. and Grace L. Long Foundation	Grant-making foundation	Connecticut

13. END NOTES

[1] The Commissioner of the Department of Public Health appointed the Advisory Council members. The Advisory Council created an Executive Committee to manage the work groups and to report on the groups' progress. Each member of the Executive Committee was assigned to co-chair one of the five work groups.

[1] National statistics reveal that in 2002 a person with diabetes spent an average of $13,243 on health care compared to $2,560 for his or her counterpart without diabetes. http://www.medscape.com/viewarticle/450150_3

[1] This plan supports Connecticut's Public Act 05-149, "An Act Permitting Stem Cell Research and Banning the Cloning of Human Beings".

[1] Anderson RJ, Freedland KE, Clouse RE, Lustman PJ: The prevalence of comorbid depression in adults with diabetes: a meta-analytic review of the literature. Diabetes Care 2001;24:1069-78

[1] Jacobson AM, de Groot M, Samson JA: The effects of psychiatric disorders and symptoms on quality of life in patients with type I and type II diabetes mellitus. Qual Life Res. 1997;6:11-20.

[1] Egede LE: Diabetes, major depression, and functional disability among U.S. adults. *Diabetes Care.* 2004 Feb;27:421-8.

[1] Lustman PJ, Anderson RJ, Freedland KE, de Groot M, Carney RM, Clouse RE: Depression and poor glycemic control: a meta-analytic review of the literature. *Diabetes Care* 2000;23:934-942

[1] de Groot M, Anderson R, Freedland KE, Clouse RE, Lustman PJ: Association of depression and diabetes complications: a meta-analysis. *Psychosom Med* 2001;63:619-30

[1] Zhang X, Norris SL, Gregg EW, Cheng YJ, Beckles G, Kahn HS: Depressive symptoms and mortality among persons with and without diabetes. Am J Epidemiol 2005;161:652-660.

[1] Ciechanowski PS, Katon WJ, Russo JE: Depression and diabetes: impact of depressive symptoms on adherence, function, and costs. *Arch Intern Med.* 2000 Nov 27;160(21):3278-85

1 See http://www.state.ct.us/dph/

[1] U.S. Census Bureau. American FactFinder, Table P-2. Urban and rural [6] – Universe: Total Population, Data Set: Census 2000 Summary File 1 (SF-1). TTUhttp://factfinder.csunsu.govUTT.

[1] Miringoff, M.L., M-L Miringoff, and S. Opkycke. 1996. *The Social State of Connecticut '96.* Tarrytown, NY: Fordham Institute for Innovation in Social Policy.

[1] Levy, D., O. Rodriguez, and W. Villemez. 2004. *The Changing Demographics of Connecticut–1990-2000. Part 2: The Five Connecticuts.* Storrs, CT: University of Connecticut, Center for Population Research, CPR Series, no. OP 2004-01.

[1] U.S. Census Bureau. Connecticut QuickFacts. TTUhttp://quickfacts.census.gov/qfd/states/09000.htmlUTT.

[1] U.S. Census Bureau. American FactFinder. Hartford City, New Haven City, and Bridgeport City, CT: Census 2000 Demographic Profile Highlights. TTUhttp://factfinder.census.govUTT.

[1] PTT U.S. Census Bureau. QTP-20. Educational Attainment by Sex: 2000. Census 2000 Summary File 3 (SF3) – Sample Data: United States. TUhttp://factfinder.census.govUT

[1] PTT U.S. Census Bureau. Table DP-2. Social Characteristics: 1990. 1990 Summary Tape File 3 (STF3) – Sample Data.

[1] PTT U.S. Census Bureau. Table DP-2. Profile of Selected Social Characteristics: 2000. Census 2000 Summary File 3 (SF3) – Sample Data: Connecticut. TUhttp://factfinder.census.govUT

[1] PTT Rodriguez, O., D. Levy, and W. Villermez. 2003. . 2003. The Changing Demographics of Connecticut – 1990 to 2000. Part 1: Comparing Connecticut to National Averages. Storrs, CT: University of Connecticut, Center for Population Research. Occasional Paper No. OP 2003-01.

[1] Connecticut Department of Public Health. 2006. *Trends in Diabetes Prevalence in Connecticut, 1996-2005.* Unpublished tables.

[1] Centers for Disease Control and Prevention. 2005. *National Diabetes Fact Sheet - United States, 2003.* Retrieved December 20, 2005, from http://www.cdc.gov/diabetes/pubs/pdf/ndfs_2005.pdf

[1] *Ibid.*

[1] National Health Interview Survey. 2005. Preliminary Results. Retrieved December 21, 2005, from http://www.cdc.gov/nchs/data/nhis/earlyrelease/200512_14.pdf

[1] Connecticut Department of Public Health. 2006. *Op cit.*

[1] Connecticut Department of Public Health. 2005. *Diabetes Prevalence in Connecticut, 2002-2004.* Retrieved March 7, 2006 http://www.dph.state.ct.us/PB/HISR/BRFSS_Diabetes_prev.pdf

[1] National Diabetes Information Clearinghouse. (January, 2005). *Who Gets Diabetes?* Retrieved December 20, 2005, from: http://diabetes.niddk.nih.gov/dm/pubs/overview/

[1] Amadeo, F.A. and L.M. Mueller. 2005. *Connecticut Resident Deaths, 2002.* Hartford, CT: Connecticut Department of Public Health. Retrieved December 21, 2005 from http://www.dph.state.ct.us/PB/HISR/CT_resident_deaths_2002.pdf

[1] CDC Diabetes. (2005). *National Diabetes Fact Sheet - United States 2005.* Retrieved December 20, 2005, from http://www.cdc.gov/diabetes/pubs/pdf/ndfs_2005.pdf

[1] Hynes, M.M., L.M. Mueller, H. Li, and F. Amadeo. 2005. *Mortality and its Risk Factors in Connecticut, 1989-1998.* Hartford, CT: Connecticut Department of Public Health. http://www.dph.state.ct.us/OPPE/Mortality/mortalityriskfactors.htm

[1] Centers for Disease Control and Prevention. 2001. 1999 Diabetes Surveillance Report. Retrieved May 1, 2001. http://www.cdc.gov/diabetes/statistics

[1] Hynes, Mueller, Li, and Amadeo. *Op. cit.*

[1] Hynes, M.M., F.A. Amadeo, and L.M. Mueller. 2005. *Connecticut Resident Mortality Summary Tables by Gender, Race, & Hispanic Ethnicity, 1999-2001.* Hartford, CT: Connecticut Department of Public Health. http://www.dph.state.ct.us/PB/HISR/CT_death_summary_1999-2001.pdf. Retrieved January 24, 2006.

[1] *Ibid.*

[1] *Ibid.*

[1] National Center for Health Statistics. 2004. *Health, United States with Chartbook on Trends in the Health of Americans.* Hyattsville, MD: NCHS. http://www.cdc.gov/nchs/data/hus/hus04acc.pdf. Retrieved January 5, 2006.

[1] Hynes, Amadeo, and Mueller. *Op. cit.*

[1] Hynes, Amadeo, and Mueller. *Op. cit.*

[1] Agency for Health care Research and Quality. 2005. *HCUP Highlight Issue 1: Economic and Health Costs of Diabetes.* Retrieved December 21, 2005 from: http://www.ahrq.gov/data/hcup/highlight1/high1.htm

[1] *Ibid.*

[1] Connecticut Department of Public Health. 2005 a. *Connecticut Resident Hospitalizations, 2002.* Retrieved March 21, 2006 from: http://www.dph.state.ct.us/PB/HISR/CDI_Tables.pdf

[1] *Ibid.*

[1] Department of Health and Human Services, Centers for Disease Control and Prevention, 2005. *The Burden of Diabetes in Connecticut.* Unpublished document.

[1] Connecticut Department of Public Health. 2005 a. *Op cit.*

[1] National Diabetes Information Clearinghouse. (January, 2005). *What Factors Increase my Risk for Diabetes?* Retrieved December 14, 2005, from: http://www.diabetes.niddk.nih.gov/dm/pubs/diagnosis/index.htm

[1] Bishop, D.B., B.R. Zimmerman, and J.S. Roesler. 1998. Chapter 14 in Brownson, R.C., P.L. Remington, and J.R. Davis, eds., *Chronic Disease Epidemiology and Control, 2nd Edition* Washington, DC: American Public Health Association.

[1] Brancati, F.L., P.K. Whelton, L.H. Kuller, and M.J. Klag. 1996. Diabetes mellitus, race, and socioeconomic status. A population-based study. *Annals of Epidemiology* 6(1): 67-73.

[1] Robbins, J.M., V. Vaccarino, H. Zhang, and S.V. Kasl. 2000. Excess type 2 diabetes in African American women and men aged 40-74 and socioeconomic status: Evidence from the Third National Health and Nutrition Examination Survey. *Journal of Epidemiology and Community Health* 54(11): 839-845.

[1] Connolly, V., N. Unwin, P. Sherriff, R. Bilous, and W. Kelly. 2000. Diabetes prevalence and socioeconomic status: A population based study showing increased prevalence of type 2 diabetes mellitus in deprived areas. *Journal of Epidemiology and Community Health* 54(3): 173-177.

[1] U.S. Preventive Services Task Force. 2005. *The Guide to Clinical Preventive Services, Recommendations of the U.S. Preventive Services Task Force.* Washington, DC: US Department of Health and Human Services, Agency for Health care, Research and Quality.

[1] NAASO, The Obesity Society. 2005. *Your Weight and Diabetes*. Retrieved December 22, 2005 from: http://www.naaso.org/information/diabetes_obesity.asp

[1] Eckel. R.H. 1997. Obesity and Heart Disease. *Circulation.* 96:3248-3250. Retrieved September 8, 2005, from: http://circ.ahajournals.org/cgi/content/full/96/9/3248

[1] American Heart Association. Women, Heart Disease and Stroke. Retrieved September 8, 2005, from: http://www.americanheart.org/presenter.jhtml?identifier=4786

[1] Connecticut Department of Public Health, Behavioral Risk Factor Surveillance System (BRFSS) Program. 2006. 2003-2005 BRFSS Survey data. Unpublished tables.

[1] Connecticut Department of Public Health, Behavioral Risk Factor Surveillance System (BRFSS) Program. 2006. 2003-2005 BRFSS Survey data. Unpublished tables.

[1] *Ibid.*

[1] Centers for Disease Control and Prevention. 2005 Connecticut and US BRFSS data. Retrieved December 13, 2006. http://apps.nccd.cdc.gov/brfss/

[1] From "How to Tell if You Have Pre-Diabetes" in *All About Diabetes*. Accessed at: <http://www.diabetes.org/pre-diabetes/pre-diabetes-symptoms.jsp>

[1] http://www.dmaa.org/definition.html

[1] Note: Pay for performance is a practice that has been proven to work in some circumstances. However, there are views that find this practice counter productive.

[1] For example, in Oregon, efforts to make low-literacy and multilingual educational materials available as well as a campaign to assist community groups prepare prevention resource guides have resulted in significant increases in general public awareness of the complications of diabetes and in the number of adults with diabetes who receive formal diabetes education. New York's efforts to provide consistent and culturally appropriate education materials have resulted in a significant decline in serious diabetes complications like lower extremity amputation and declines in diabetes-related hospitalizations. An intensive disease management program in Indiana that provides one-on-one nurse counseling to Medicaid recipients has substantially increased the number of people with diabetes on Medicaid who reach their goals.

[1] Middlesex Hospital's care managers/diabetes educators serve as local expert resources for the community providing education to the public and providers. Middlesex Hospital was the first provider-based organization in the country to receive NCQA accreditation for disease management in 2003. Re-accreditation for disease management in 2006. Received the 2006 Connecticut Hospital Community Service Award, co-sponsored each year by CHA and the Connecticut Department of Public Health (DPH). This award recognizes a Connecticut hospital that has made an outstanding contribution to the health of its community.

APPENDIX 5.C.

Letter from Campion Ambulance

Connecticut Economic Resource Center Data
(www.cerc.com)

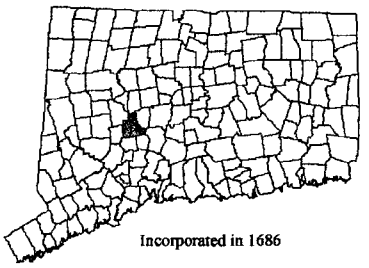
OHCA Report of Investigative Proceedings
Docket Number 06-30760-VST

Waterbury, Connecticut

CERC Town Profile 2008

Town Hall
235 & 236 Grand Street
Waterbury, CT 06702
(203) 574-6716

Belongs to
New Haven County
Waterbury Labor Market Area
Naugatuck Valley Economic Dev. Region
Central Naugatuck Valley Planning Area



Incorporated in 1686

Demographics

Population (2007)	*Town*	*County*	*State*
1990	108,961	804,219	3,287,116
2000	107,271	824,008	3,405,565
2007	108,751	855,457	3,549,606
2012	109,917	877,523	3,647,526
'07-'12 Growth / Yr	0.2%	0.5%	0.5%
Land Area (sq. miles)	29	606	5,009
Pop./ Sq. Mile (2007)	3,808	1,412	709
Median Age (2007)	37	39	39
Households (2007)	42,574	326,684	1,332,283
Med HH Inc. (2007)	$41,470	$58,854	$65,859

Race/Ethnicity (2007)	*Town*	*County*	*State*
White	75,184	676,386	2,875,466
Black	17,109	96,649	324,251
Asian Pacific	2,642	29,620	125,880
Native American	293	1,380	8,220
Other/Multi-Race	13,523	51,422	215,789
Hispanic (any race)	29,562	108,246	405,662
Poverty Rate (1999)	16.0%	9.5%	7.9%

Educational Attainment (2000)

Persons Age 25 or Older	*Town*	*%*	*State*	*%*
High School Graduate	23,961	35%	653,300	28%
Some College	16,411	24%	553,667	24%
Bachelors or More	9,678	14%	720,994	31%

Age Distribution (2007)

	0-4		*5-17*		*18-24*		*25-49*		*50-64*		*65+*		*Total*
Male	3,757	3%	9,660	9%	5,250	5%	18,006	17%	8,685	8%	6,254	6%	51,612
Female	3,709	3%	9,632	9%	5,500	5%	18,867	17%	9,938	9%	9,493	9%	57,139
County Total	50,587	6%	145,630	17%	82,770	10%	297,311	35%	159,565	19%	119,594	14%	855,457
State Total	211,025	6%	609,581	17%	332,254	9%	1,223,861	34%	683,396	19%	489,489	14%	3,549,606

Economics

Business Profile (2005)

Sector	*Establishments*	*Employment*
	% of Total	
Agriculture	1.1%	0.4%
Const. and Mining	8.3%	3.7%
Manufacturing	5.6%	14.3%
Trans. and Utilities	2.4%	3.7%
Trade	29.3%	23.0%
Finance, Ins. and Real Estate	7.6%	4.4%
Services	42.4%	39.4%
Government	3.3%	11.1%

Top Five Grand List (2006)	*Amount*	*% of Net*
Waterbury Hosp	$119,162,540	4.2%
GGP Brass Mill Inc	$62,225,870	2.2%
Inland SE Naugatuck LLC	$20,325,970	0.7%
GGP Brass Mill Inc	$15,400,000	0.5%
Waterbury VF LLC	$13,139,560	0.5%
Net Grand List (2006)	$2,839,269,740	

Top Five Major Employers (2006)

Webster Bank - Corporate headqu
Webster Bank - regional branch
St. Mary's Hospital
Connecticut Light & Power
The Waterbury Hospital

	Town	*State*
Retail Sales (2006) *All Outlets*	$1,768,931,596	$131,862,299,674

Education

2004-2005 School Year	*Town*	*State*
Total Town School Enrollment	17,525	567,138

Most public school students in Waterbury attend Waterbury School District, which has 17,667 students.

Connecticut Mastery Test Percent Above Goal

	Grade 4		*Grade 6*		*Grade 8*	
	Town	*State*	*Town*	*State*	*Town*	*State*
Reading	28	0	28	0	40	0
Math	30	0	28	0	18	0
Writing	50	0	36	0	38	0

For more education data please see: http://www.state.ct.us/sde/

Students per Computer	*Town*	*State*
Elementary:	4.0	4.2
Middle:	7.8	3.5
Secondary:	3.3	3.4

Average Class Size

Grade K 17.6 Grade 2 21.1
Grade 5 23.6 Grade 7 27.8
High School 21.0

Average SAT Score

	Town	*State*
Verbal	433	504
Math	430	508

www.cerc.com

No representation or warranties, expressed or implied, are given regarding the accuracy of this information.

0697
09/15/08

Waterbury
Connecticut

CERC start here
Connecticut Economic Resource Center, Inc.

Government

Government Form: Mayor-Council

Total Revenue (2006)	$349,954,000
Tax Revenue	$188,416,000
Non-tax Revenue	$161,538,000
Intergovernmental	$137,672,000
Per Capita Tax (2006)	$1,730
As % of State Average	82.8%

Total Expenditures (2006)	$322,515,000
Education	$144,916,000
Other	$177,599,000
Total Indebtness (2006)	$119,895,000
As % of Expenditures	37.2%
Per Capita	$1,101
As % of State Average	54.7%

Annual Debt Service (2006)	$18,278,000
As % of Expenditures	5.7%
Eq. Net Grand List (2004)	$6,659,092,769
Per Capita	$61,006
As % of State Average	44%
Date of Last Revaluation (2005)	2002
Moody's Bond Rating (2006)	Baa2
Actual Mill Rate (2006)	53.97
Equalized Mill Rate (2006)	27.89
% of Grand List Com/Ind (2003)	22.2%

Housing/Real Estate

Housing Stock (2007)	*Town*	*County*	*State*
Existing Units (total)	47,448	351,139	1,445,682
% Single Unit	40.8%	59.4%	64.8%
New Permits Auth. (2007)	146	1,256	7,746
As % Existing Units	0.31%	0.36%	0.54%
Demolitions (2007)	23	270	1,285
House Sales (2007)	810	7,111	32,395
Median Price	$159,500	$261,155	$295,000
Built Pre 1950 share (2000)	40.0%	33.2%	31.5%

Owner Occupied Dwellings (2000)	20,299	201,349	869,742
As % Total Dwellings	43%	59%	63%
Subsidize Housing (2001)	10,391	42,124	148,930

Distribution of House Sales (2007)	*Town*	*County*	*State*
Number of Sales			
Less than $100,000	94	155	495
$100,000-$199,999	565	1,602	5,866
$200,000-$299,999	140	2,612	10,094
$300,000-$399,999	9	1,340	5,655
$400,000 or More	2	1,402	10,285

Labor Force

Place of Residence (2007)	*Town*	*County*	*State*
Labor Force	50,031	445,698	1,865,499
Employed	46,354	423,224	1,780,481
Unemployed	3,677	22,474	85,018
Unemployment Rate	7.3%	5.0%	4.6%
Place of Work (2007)			
# of Units	2,326	22,502	104,094
Total Employment	42,470	366,841	1,686,262
2000-'07 Growth AAGR	-0.1%	0.0%	0.1%
Mfg Employment	4,099	41,361	191,264

Commuters (2000)

Commuters into Town from:		Town Residents Commuting to:	
Waterbury	18,170	Waterbury	18,170
Watertown	2,385	Watertown	2,604
Naugatuck	2,162	Cheshire	1,797
Wolcott	1,978	Naugatuck	1,449
Cheshire	1,105	Southbury	1,389
New Haven	1,075	New Haven	1,380
Prospect	1,003	Wolcott	1,080
Middlebury	747	Danbury	773
Southington	704	Meriden	729
Meriden	685	Hartford	696

Quality of Life

	Town	*State*
Banks (2007)	24	1,029
Lodging (1998)	8	756
Day Care Facilities (1999)	33	1,721
Infant Mortality Rate Per 1,000 births (2001)	8.6	4.5
Crime Rate (2004) Per 100,000 Residents	6,379	2,981

	Town	*County*
Hospitals (1999)	2	7
Total Beds	716	2,487

Library (2001)	*Town*
Total Volumes	243,783
Circulation Per Capita	1.9

Distance to Major Cities	*Miles*
Hartford	23
Boston	117
New York City	77
Providence	85

Residential Utilities

Electric Provider
Connecticut Light & Power
(800) 286-2000

Gas Provider
Yankee Gas Company
(800) 989-0900

Water Provider
Connecticut Water Company
(800) 286-5700

Cable Provider
Tele-Media of Waterbury
203-755-1178

No representation or warranties, expressed or implied, are given regarding the accuracy of this information



Office of Health Care Access

Report of Investigative Proceedings

Docket Number 06-30760-VST

May 23, 2007

Cristine A. Vogel
Commissioner
Office of Health Care Access

Table of Contents

I. Executive Summary

II. Summary of Findings

III. Findings of Fact

IV. Discussion and Conclusion

Attachments:

A. Report of Socio-Economics and Health Care Services Utilization of the Waterbury Area

B. The Chartis Group, LLC. Report

C. StayWell Health Center letter

D. Hospital Closures and Mergers in Connecticut

E. Report of the Region 5 Pediatric Inpatient Psychiatric Services Implementation Group

I. Executive Summary

The health care services provided in the Waterbury area appear to be fragmented, competitive and in financial distress. Although utilization of inpatient and outpatient services is high -- profit margins remain low at both St. Mary's Hospital and the Waterbury Hospital. Access to care is not yet impacted; however, the long-term viability of the health care delivery system is at risk -- presenting an opportunity to restructure and develop an efficient and responsive health care delivery system. After an extensive review of data in this investigation, some of the findings are:

- Saint Mary's Hospital's financial measures indicate that the hospital is insolvent.
- Data suggest that the financial viability of the health system is more sustainable with one hospital and one outpatient system of care.
- Duplication of services is competitive and costly and limits profitability.
- A merger of St. Mary's Hospital and Waterbury Hospital is an option; however, many major issues exist.
- A planned closure of St. Mary's Hospital may be a viable solution providing a pre-determined integration plan is in place.
- Utilization data demonstrate a consistent and steady demand for inpatient and outpatient services will continue in the community.
- A comprehensive primary care system needs to be developed to respond to the immediate need for access which will ultimately improve the hospitals' financial viability and the health status of the community. Data suggest a lack of primary care services exists forcing individuals to utilize the Emergency Department as their health care provider.
- Behavioral health services must be expanded in a comprehensive and cohesive manner.

The financial hardship that St. Mary's Hospital (SMH) and the Waterbury Hospital (WH) struggle with is mostly a result of an economically challenged city. Waterbury experiences a higher rate of uninsured and unemployed compared to the state as a whole and has a lower per capita income. Socioeconomics and demographics play a significant role in the financial condition of hospitals since they rely on philanthropic donations and the balance of government and non-government reimbursement to offset losses.

Additionally, financial hardship can be created when two hospitals are located in close proximity to each other. The expenses related to marketing, advertising, recruitment and retention are increased as each hospital is competing for the most qualified employees and the most profitable patients. Related to the expenses of competition – is duplication. The duplication that exists in the outpatient market results in the thinning out of profitable services so neither organization can leverage the profit. These costs are in addition to those targeted at competing hospitals located in the secondary market. Also

related to competition is the lack of negotiating power the hospitals face during the contracting phase with managed care organizations. Typically the commercial discounts are greater in an area served by two hospitals which decreases the reimbursement from the most lucrative payer source.

This investigation conducted by the Office of Health Care Access (OHCA) was initiated to assess the viability of the health care delivery system in the Waterbury area. Several state agencies have been periodically meeting and discussing the information that OHCA has been collecting. The other state agencies involved are: Department of Public Health (DPH), Department of Social Services (DSS), Office of Policy and Management (OPM), and the Connecticut Health and Educational Facilities Authority (CHEFA).

The purpose of this investigation was to study the socioeconomic factors, utilization of hospitals services and a review of the financial condition of SMH and WH and the impact these factors have on ensuring sustainable access to hospital care in the Waterbury area. Both hospitals have reported negative operating margins for the past two years and have not experienced a strong fiscal year in some time. For Fiscal Year 2006, SMH reported a Total Margin of 0.4% and an Operating Margin of (3.7)%; and WH reported a Total Margin of (2.4)% and an Operating Margin of (3.7)%.

The distressed financial condition of both hospitals, although more severe with SMH, has restricted access to capital for facilities improvement and renovation projects. Both of the hospitals' facilities are aging, they lack sufficient parking, and increasing the capacity to meet demand for services in the Emergency Departments and patient floors has become cost-prohibitive. Thus, occupancy rates are high in many service lines and yet beds, although within licensed bed count, cannot be added.

According to FY06 audited financial statements, St. Mary's Hospital has enough cash to pay one (1) day of its short-term commitments and is taking longer than normal to pay its creditors. Although Waterbury Hospital has more cash on hand and is paying its creditors earlier than prior years, both hospitals are exhibiting the classic symptoms of financial distress.

Each of the findings mentioned above will be further discussed in the Discussion and Conclusions section of this report. All data used in this report can be found in the Findings of Fact section and the Attachments.

II. Summary of Findings

This investigation thoroughly reviewed the socio-economic characteristics, the utilization of services, and the financial challenges of St. Mary's Hospital and the Waterbury Hospital. A detailed analysis of these factors is contained in Attachment A of this report. This summary is provided as an overview of the key factors that contribute to the on-going financial losses of the hospitals.

Socio-economic Characteristics:

Although there are seven towns that best define the "Waterbury Area" included in the investigation, a significant portion of residents who rely on and access St. Mary's Hospital and the Waterbury Hospital for health care services live in the towns of Waterbury, Naugatuck or Watertown. This area consists mostly of:

- young adults who may be full-time students, single, unemployed or have no permanent full-time jobs and therefore, likely to be uninsured;
- a disproportionate share of residents who are over 75 years old and live in the city of Waterbury who maybe inclined to suffer from chronic diseases that need management;
- minorities that have high hospitalization and uninsured rates;
- residents who are less likely to have a college degree or higher, to be skilled professionals or employed;
- a labor force that has a comparably higher tendency to work in service, production, transportation and material moving industries that are seasonal, temporary or part-time in nature;
- people who earn less than the statewide average per capita or household income;
- a population that has a high incidence of hospitalizations that could have been prevented if residents had adequate access to community health services; and
- a federally medically and primary care underserved population.

Utilization:

Utilization data collected in this investigation demonstrated an active use of inpatient and outpatient health care services. There was no significant decline in utilization which in other circumstances would be a reason for a deterioration of financial stability – the Waterbury hospitals show steady volume. This data is summarized for FY 2006 for SMH and WH combined:

- 27,562 Inpatient discharges (remained steady for the past 3 years)
- 116,644 Emergency Department visits (slight increase over the past 3 years)
- 91,684 Medical and Behavioral Health Clinic visits (overall no increase)
- 245,638 Other "outpatient" visits (i.e., surgery, radiology, etc.)

Fundamental system issues exist so although there is steady utilization of services, it is difficult to assess the necessary "size" of the health care system. The Emergency Departments show a higher utilization than typical – probably related to the lack of alternatives available; and each hospital stated the difficulty of discharging certain patients due to an inability to transfer patients to the next level of care.

Combined, the hospital system in the Waterbury area has 704 inpatient beds and 68 bassinets. Over a three-year period, the two hospitals gradually increased the number of staffed beds to 447 or 62% of licensed beds and 68 bassinets. Most of the beds (72% or 323) are for medical/surgical and critical care, 62 beds are for OB/GYN care, 42 beds for psychiatry and 36 beds for pediatric care. Based on the demographic profile of the area, there is excess demand for medical/surgical, critical care and psychiatric beds and insufficient demand for OB/GYN and pediatric beds. Although the high demand have resulted in rather high average occupancy rates (approximately 80%) over the year, the two hospitals have been limited in how many additional beds they can staff because of space constraints, capital costs, staffing shortages or difficulty with discharging patients to the appropriate level of care to a different facility (i.e., skilled nursing, rehabilitation).

Medical care is about one-half of the inpatient care the hospitals provide, surgical and maternity/pediatric care make up one-quarter each and behavioral health care is 5%. While over the three-year period the number of patients discharged increased by only 1%, patient days grew by 5%. With the increases in volumes, the cost of providing care per discharge in the area rose by 20% but growth in revenue did not keep pace with the cost as would be expected, rather loss per discharge more than doubled. Although both hospitals were incurring losses in all inpatient care service lines, larger losses were associated with behavioral health and surgical care. In FY 2006, the loss per discharge (both hospitals combined) in each service line was $2,834 for behavioral health, $1,871 for surgical care, $794 for maternity/pediatrics care and $127 medical care. But loss per service line per discharge varied between the two hospitals, the losses for medical, behavioral health and maternity/pediatric care were lower at St. Mary's Hospital, while the loss per discharge associated with surgical care was lower at Waterbury Hospital. However, some of the differences are explained by what each hospital includes in its components of costs.

The two hospitals combined have 73 Emergency Department (ED) beds and both experience the "boarding" of patients that require admission to an inpatient unit. The hospitals state that staffing, space constraints, and the lack of access to capital constrain their ability to improve through-put of patients in their respective EDs. Approximately 14% of ED visits in the area result in an inpatient admission and like the state and nation account for about one-half of all discharges. As in the case of inpatient services, both hospitals provide ED services at a loss per case.

In the area of medical and dental outpatient care, an affiliate of St. Mary's Hospital provides these services at a loss per visit despite high volumes. An affiliate of Waterbury Hospital provides some outpatient and HIV treatment services and records high volumes but was unable to provide cost data for evaluation. Affiliates of both hospitals also provide outpatient behavioral health clinic services; however, the Waterbury Hospital provides 90% of these services. Loss per visit is almost the same for both facilities, but visits per case to the St. Mary's Hospital behavioral health clinic are three times the visits made to the Waterbury Hospital clinic.

Other outpatient services such as one-day surgery, radiology/imaging, laboratory, gastroenterology and other services are the most profitable services both hospitals provide although the cost at Waterbury Hospital is 1.5 times the cost at St. Mary's Hospital.

The financial instability of both hospitals is not a result of low utilization. The hospitals' combined inpatient discharges for FY06 are 27,562; however, on average the hospitals combined lose $899 per case. In surgical cases, typically a profitable service, the combined hospital loss per case is $1,871. The utilization of the emergency departments is higher than that of the state average which is indicative of a lack of alternative primary health care services. In FY06, the two hospitals reported 116,644 visits to their EDs. This presents a fiscal challenge when 42% of their patients are covered by Medicaid and 10% are uninsured. Of the patients that were treated and discharged (not admitted) from the ED, the hospitals lose a combined $28 per case. This amount of loss per case for such a large volume is difficult to offset since they realize losses in their inpatient services and they have a relatively low reimbursement rate from commercial payers.

Hospital Payer Mix:

When all services are combined (inpatient and outpatient) for both hospitals, commercial payers are the dominant primary payer in the Waterbury Area accounting for 41% of total patient volume. Medicare accounts for 30%, Medicaid for 23% and the uninsured for 4% (Table 1). In fact, commercial payers are the leading primary payer (46%) in the sole profitable areas of service for the hospitals in the "other outpatient services" category, which include medical clinics, one-day surgery, radiology, laboratory, gastroenterology and all other services except ED and outpatient psychiatry. The payer mix varies between services and hospitals. EDs in the area have an unfavorable payer mix with over one-half of their patient volume being either Medicaid-covered or uninsured and an annually declining share of commercially-covered patients. Although both hospitals provide care to a large portion of uninsured patients (9% for St. Mary's Hospital and 11% for Waterbury Hospital), St. Mary's Hospital treats a disproportionate share (49%) of Medicaid patients in the ED. The payer mix presented in Table 1 is highly correlated to the demographic profile outlined in Section 3.0 of Attachment A.

Table 1: Waterbury Area Hospitals Payer Mix by Department, FYs 2004 - 2006

Services	Primary Payer	St. Mary's (%)			Waterbury (%)			Waterbury Area Hospitals (%)		
		FY06	FY05	FY04	FY06	FY05	FY04	FY06	FY05	FY04
Inpatient Discharges	Medicare	42	43	43	44	43	43	43	43	43
	Medicaid	25	23	23	21	20	20	23	22	21
	Commercial	31	32	32	33	34	34	32	33	33
	Worker's Compensation	1	1	1	1	1	1	1	1	1
	Self-pay/uninsured	1	1	1	1	2	1	1	1	1
	Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Emergency Department Treated and Discharged Visits	Medicare	14	15	15	17	18	18	15	16	16
	Medicaid	49	46	43	34	33	32	42	40	38
	Commercial	26	27	29	36	37	37	30	32	33
	Worker's Compensation	2	2	3	3	3	3	2	3	3
	Self-pay/uninsured	9	9	10	11	10	10	10	10	10
	Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Outpatient Behavioral Health Visits	Medicare	9	13	9	46	47	45	43	44	42
	Medicaid	55	58	54	37	35	38	38	37	39
	Commercial	36	28	36	15	16	16	17	17	17
	Worker's Compensation	0	0	0	0	0	0	0	0	0
	Self-pay/uninsured	1	1	0	2	2	2	2	2%	2
	Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
All Other Outpatient Visits	Medicare	32	33	32	30	31	32	31	32	32
	Medicaid	17	17	16	18	18	18	18	18	17
	Commercial	47	47	46	45	45	45	46	46	45
	Worker's Compensation	1	1	3	1	1	1	1	1	2
	Self-pay/uninsured	2	2	3	5	5	4	4	3	4
	Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Hospital Total	**Medicare**	**28**	**28**	**28**	**32**	**33**	**33**	**30**	**31**	**31**
	Medicaid	**26**	**26**	**24**	**20**	**19**	**19**	**23**	**23**	**22**
	Commercial	**41**	**41**	**41**	**42**	**42**	**42**	**41**	**42**	**41**
	Worker's Compensation	**2**	**1**	**3**	**1**	**1**	**1**	**1**	**1**	**2**
	Self-pay/uninsured	**4**	**4**	**4**	**5**	**4**	**4**	**4**	**4**	**4**
	Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Financial Indicators:

There is no single financial measure that, by itself, indicates the financial health of or the financial difficulty faced by a hospital. Important indicators to consider are the utilization of services, the payer mix, reimbursement, profit/loss of services, the ability the hospital has to meet its short-term obligations and its access to capital in order to continue to improve facilities and equipment. For consecutive years, both hospitals experienced negative operating margins, also a signal of financial distress.

St. Mary's Hospital's financial performance has deteriorated in the past three (3) years its low current assets to current liabilities ratio, 0.8 in FY06, put the hospital at a higher risk for technical insolvency (below 10th percentile). To improve cash flow, the hospital

shortened the average time it took to collect revenues from billed patients by ten days down to 38 days but that was not enough to improve the average time it took to pay creditors, that increased by a day to 72 days (Table 2).

Waterbury Hospital has experienced deterioration in its cash flows as well. The hospital's days of cash on hand have reduced from 42 days to 20 days, which is below state and national medians. It took the hospital seven days more to collect revenues from billed patients on average, but it paid its creditors five days earlier than it did the year before. Waterbury Hospital is at very low risk of technical insolvency since its current assets to current liabilities ratio in FY06 was 2.03 which is above the median for the state and nation (Table 2).

A serious concern for both hospitals is the difficulties they will have in financing future debt for capital projects. In order for any hospital to maintain standards of care and to remain competitive, they need to be able to invest in aging facilities, upgrade to advanced technologies, and expand or renovate to meet patient demands.

Table 2. Financial Indicators of St. Mary's Hospital and Waterbury Hospital (FY 2004 – 2006)

	St. Mary's Hospital			Waterbury Hospital		
Financial Statistics	**2006**	**2005**	**2004**	**2006**	**2005**	**2004**
Net Assets						
Hospital	($136,000)	$23,760,000	$26,430,000	$124,628,134	$126,535,925	$119,504,105
Health System	$1,424,000	$8,469,000	$16,197,000	$163,330,870	$166,079,218	$158,400,874
Financial Indicators						
Current ratio	0.8	1.96	1.78	2.03	2.15	1.93
Days of expenses in accounts payable	72	71	69	42	47	56
Days cash on hand	1	3	5	20	34	42
Days of revenue in accounts receivable	38	48	60	49	42	37

Source: *Annual Report on the Financial Status of Connecticut's Short Term Acute Care Hospitals for Fiscal Year 2005, the hospitals' Audited Financial Statements &*data submitted by the hospitals in response to the investigation.*

Current Ratio: the Current Ratio is the most widely used measure of liquidity. The value of the Current Ratio measures the number of dollars held in current assets per dollar of current liabilities. From an evaluation perspective, high values for the Current Ratio imply a good ability to pay short term obligations and thus a low probability of technical insolvency. Nationally, Current Ratios fluctuate around 2.0.

System of Care

The infrastructure that provides access to outpatient primary care and behavioral health services overall appears to be fragmented and at capacity. The lack of access to primary health care is demonstrated by the high utilization of emergency departments and the high incidence of hospitalizations that could have been prevented if residents had adequate access to preventive community services (Attachment A). The clinics that each

hospital operates and the Federally Qualified Health Center in Waterbury also appear to be at capacity. Additionally, there is a serious concern with the ability for clinic patients to access specialty care since the majority of physicians do not accept many Medicaid patients.

In continued research regarding access to pediatric inpatient psychiatric services (Attachment E), it was recommended that Region 5 (Waterbury being part of) expand inpatient beds as well as develop a Psychiatric Residential Treatment Facility (PRTF). The lack of availability of different levels of care is creating long delays to transfer behavioral health patients to other providers and typically those referrals are out of the region.



Office of Health Care Access

Report of Investigative Proceedings

Subject Title:	**An Investigation to review utilization and capacity of acute care general hospital services provided in the "Waterbury Area"**
Docket Number:	**06-3070-VST**
Statutory Reference:	**Section 19a-633 of the Connecticut General Statutes**
Proceeding Date:	**December 19, 2006**
Presiding Officer:	**Cristine A. Vogel**
Date of OHCA Report:	**May 23, 2007**

Cristine A. Vogel
Commissioner
Office of Health Care Access

Findings of Fact

1. Saint Mary's Hospital ("SMH") is an acute care hospital located at 56 Franklin, Waterbury, Connecticut. SMH's total license capacity is 379 beds and bassinets.

2. Waterbury Hospital ("WH") is an acute care hospital located at 64 Robbins Street in Waterbury, Connecticut. WH's total licensed bed capacity is 393 beds and bassinets.

3. On May 25, 2006, the Office of Health Care Access (OHCA) pursuant to Connecticut General Statutes (C.G.S.) Section 19a-633 initiated an investigation to review utilization and capacity of acute care general hospital services provided in the "Waterbury Area." The general acute care hospitals located in the city of Waterbury are St. Mary's Hospital and The Waterbury Hospital.

4. **Table 1: Financial Performance of St. Mary's and Waterbury Hospitals (FYs 2004 – 2006)**

Financial Indicators	St. Mary's Hospital			Waterbury Hospital		
	FY 2004	FY 2005	FY 2006	FY 2004	FY 2005	FY 2006
Operating Loss/Gain[1]	$6,306,000	$(15,270,000)	$(6,393,000)	$(448,506)	$(2,431,845)	$(8,069,534)
Excess of Revenue over Expenses[2]	$11,480,000	$(6,581,000)	$744,000	$2,275,334	$(30,448)	$(5,303,186)
Operating Margin[3]	4.2%	(10.02)%	(3.7)%	(0.2)%	(1.2)%	(3.7)%
Total Margin[4]	7.68%	(4.3)%	0.44%	1.2%	(0.01)%	(2.4)%

Source: *Audited Financial Statements.*

[1] Loss or gain from reimbursement of patient services from government and non-government payers.

[2] Difference between revenue obtained from direct patient care and funds from other sources and expenses.

[3] Measures profitability and is the ratio of loss or gain per unit total operating revenue.

[4] Measures profitability and is the ratio of total operating and non-operating revenue loss or surplus to total operating revenue.

5. The investigation reviews current availability and utilization of, and demand for hospital services, system capacity and the challenges these two hospitals face in meeting demands from the community they serve. This involves an evaluation of:
   - the socio-economic make-up of the community that relies on services of the hospitals, implications on the hospitals' patient payer-mix and the effect of reimbursements on hospital operations and future plans;
   - current utilization and future demand for all hospital services including inpatient, emergency department, primary care clinics, outpatient psychiatric care and ancillary outpatient services in the area; and
   - challenges that exist in the market in general and their impact on the hospitals' operations.

6. OHCA determined that the following seven towns most frequently access health care services at "SMH" and "WH": Middlebury, Naugatuck, Prospect, Southbury, Waterbury, Watertown and Wolcott.

Table 2: Other Connecticut hospitals' percentage share of discharges originating from the seven selected towns, FYs 2003-2005

Acute Care Hospital	Middlebury %	Naugatuck %	Prospect %	Southbury %	Waterbury %	Watertown %	Wolcott %	% of Hospital Total
St. Mary's	**21.5**	**32.5**	**35.7**	**7.7**	**44.6**	**20.3**	**41.2**	**81.2**
Waterbury	**53.5**	**41.2**	**37.4**	**34.9**	**42.4**	**62.7**	**30.7**	**86.5**
Bridgeport	2.0	3.1	2.6	2.1	1.4	2.1	1.6	2.6
Danbury	5.7	2.1	0.5	38.9	1.1	1.9	0.5	6.8
John Dempsey	0.8	0.8	1.1	0.7	0.8	0.7	1.9	2.7
Griffin	1.1	5.9	1.4	1.7	0.5	0.4	0.3	5.2
St. Raphael's	2.8	2.5	4.8	1.8	1.5	1.4	2.6	2.1
Yale	6.8	5.9	8.7	6.2	3.6	4.7	4.2	2.8
Other*	5.7	6.0	7.8	6.0	4.3	5.8	17.1	0.6
Total (%)	**100**	**100**	**100**	**94**	**100**	**100**	**100**	
# of Discharges	**2,062**	**11,365**	**3,144**	**7,413**	**49,156**	**7,349**	**5,395**	

Source: *Office of Health Care Access Acute Care Discharge Database*
*Includes the other 23 hospitals, which individually did not discharge a significant share of patients from the seven towns.

7. According to Census 2000 data, approximately 208,861 residents live in the "Waterbury Area" as defined in Fact 6.

8. A significant portion of residents who rely on services provided by SMH and WH live in Waterbury, Naugatuck or Watertown and the socio-economics of this population is described as follows:

- young adults who may be full-time students, single, unemployed or have no permanent full-time jobs and therefore likely to be uninsured;
- a disproportionate share of residents who are over 75 years old live in the city of Waterbury who maybe inclined to suffer from chronic diseases that need management.
- minorities that have high hospitalization and uninsured rates;
- residents less likely to have a college degree or higher, to be skilled professionals or employed;
- a labor force that has a comparably higher tendency to work in service, production, transportation and material moving industries that are seasonal, temporary or part-time in nature;
- people who earn less than the statewide average per capita or household income;
- a population that has a high incidence of hospitalizations that could have been prevented if residents had adequate access to community health services; and
- a federally medically and primary care underserved population.

9. In November 2005, the Primary Care Office of the Connecticut Department of Public Health designated the city of Waterbury as a medically and a primary care underserved area under federal laws.

10.

Table 3: Licensed and Staffed Acute Care Beds in Waterbury Area by Service Line, FYs 2004 - 2006

Service Line	Licensed Beds	Staffed Beds					Share of Staffed Beds	
		FY 2006	FY 2005	FY 2004	% of Licensed Beds Staffed in FY 2006	% of All Staffed Beds in FY 2006	St. Mary's Hospital	Waterbury Hospital
Medical/Surgical	479	260	257	249	54%	58%	40%	60%
OB/GYN	64	62	63	63	97%	14%	50%	50%
Psychiatry	50	42	42	42	84%	9%	29%	71%
Critical Care	75	63	55	55	84%	14%	68%	32%
Pediatric	36	20	20	20	56%	4%	50%	50%
Total Beds	**704**	**447**	**437**	**429**	**63%**	**100%**	**45%**	**55%**
Total Bassinets	**68**	**68**	**68**	**68**	**100%**	**n/a**	**47%**	**53%**

11. Utilization for inpatient hospital services for the two hospitals combined:

Table 4: Waterbury Area Hospitals Acute Care Discharges by Service Line, FYs 2004 - 2006

Service Line	Discharges				% Change		
	FY 2006	FY 2005	FY 2004	3 yr Average	06/05	05/04	06/04
Medical	12,546	12,563	12,055	**12,388**	0	4	4
Surgical	7,548	7,527	7,352	**7,476**	0	2	3
Behavioral Health	1,538	1,721	1,650	**1,636**	-11	4	-7
Maternity/Pediatrics	5,930	5,942	6,118	**5,997**	0	-3	-3
Total	**27,562**	**27,753**	**27,175**	**27,497**	**-1**	**2**	**1**

12. The two hospitals combined have 73 emergency "beds" with the following breakdown by hospital:

Table 5: Waterbury Area Hospitals Emergency Department Beds, 2006

St. Mary's Hospital		Waterbury Hospital	
Description	Beds	Description	Beds
Treatment Room	24	Acute ER	21
Trauma room	2	Prompt Care	5
Behavioral Health	5	Behavioral Health	4
Urgi-care room	7	Surge (for high census & boarders)	5
Total	**38**	**Total**	**35**

13. SMH and WH report high utilization rates of emergency department (ED) visits when compared to the state and nation.

14. ED utilization broken down by hospital and combined:

Table 6: Waterbury Area Hospital Emergency Department Utilization, FYs 2004 - 2006

Hospital		FY 2006	FY 2005	FY 2004	3-yr Average
St. Mary's	Treated & Discharged[1]	56,170	55,165	52,044	54,460
	Treated & Admitted[1]	8,286	8,177	7,581	8,015
	All ED Visits	64,456	63,342	59,625	62,474
Waterbury	Treated & Discharged	43,360	45,506	44,581	44,482
	Treated & Admitted	8,828	8,126	8,075	8,343
	All ED Visits	52,188	53,632	52,656	52,825
Waterbury Area Hospitals	**Treated & Discharged**	**99,530**	**100,671**	**96,625**	**98,942**
	Treated & Admitted	**17,114**	**16,303**	**15,656**	**16,358**
	All ED Visits	**116,644**	**116,974**	**112,281**	**115,300**
ED Utilization Per 1,000		**558**	**560**	**538**	**552**

15. Utilization of medical outpatient clinics vary by hospital as well as which type of services are offered. The two tables measure such activity; however, it was not determined that this data is comparable.

Table 7: St. Mary's Hospital Medical Clinic Visits by Service Line, FYs 2004 – 2006

	Visits				% Change		
Clinic Service	FY 2006	FY 2005	FY 2004	3-yr Average	06/05	05/04	06/04
Family Health	21,830	25,313	22,927	**23,357**	-14	10	-5
Children's Health	17,732	18,146	17,524	**17,801**	-2	4	1
Dental	7,460	6,715	6,342	**6,839**	11	6	15
Total	**47,022**	**50,174**	**46,793**	**47,996**	-6	7	0

Table 8: Waterbury Hospital Clinic Visits by Service Line, FYs 2004 - 2006

	Visits				% Change		
Clinic Service	FY 2006[1]	FY 2005	FY 2004	3-yr Average	06/05	05/04	06/04
Chase Outpatient Center	10,712	8,581	10,806	**10,033**	25	-21	-1
HIV	1,138	997	451	**862**	14	121	60
Total	**11,850**	**9,578**	**11,257**	**10,895**	24	-15	5

16. Utilization of Outpatient Psychiatric Clinics vary by hospital as well as which type of services are offered. The table below measures such activity; however, it was not determined that this data is comparable.

Table 9: Waterbury Area Hospitals Outpatient Psychiatric Cases, Visits and Average Visits per Case, FYs 2004 - 2006

	Number of Cases				% Change		
Hospital	FY 2006	FY 2005	FY 2004	3-yr Average	06/05	05/04	06/04
St. Mary's	1,026	929	816	**924**	10	14	26
Waterbury	10,978	11,428	11,854	**11,420**	-4	-4	-7
Waterbury Area	**12,004**	**12,357**	**12,670**	**12,344**	-3	-2	-5
	Number of Visits				% Change		
Hospital	FY 2006	FY 2005	FY 2004	3-yr Average	06/05	05/04	06/04
St. Mary's	6,712	5,898	3,731	**5,447**	14	58	80
Waterbury	26,100	28,601	29,566	**28,089**	-9	-3	-12
Waterbury Area	**32,812**	**34,499**	**33,297**	**33,536**	-5	4	-1
	Average Visits/Case						
Hospital	FY 2006	FY 2005	FY 2004	3-yr Average			
St. Mary's	7	6	5	**6**			
Waterbury	2	3	2	**2**			
Waterbury Area	**3**	**3**	**3**	**3**			

17. Utilization of "other" outpatient services (one-day surgery, radiology, laboratory, GI, etc.) is presented below. Data varies between each hospital and may not be consistent or necessarily comparable.

Table 10: Waterbury Area Hospitals Other Outpatient Utilization, FYs 2004 - 2006

	Visits				% Change		
Hospital	FY 2006	FY 2005	FY 2004	3-yr Average	06/05	05/04	06/04
St. Mary's	135,516	131,538	141,478	136,177	3	-7	-4
Waterbury	110,122	111,971	119,728	113,940	-2	-6	-8
Waterbury Area	**245,638**	**243,509**	**261,206**	**250,118**	1	-7	-6
Utilization Per 1,000	1,176	1,166	1,251	1,198			

18.

Table 11: Waterbury Area Hospitals Primary Payer Payment to Cost, FYs 2003 - 2005

	St. Mary's Hospital			Waterbury Hospital			Connecticut		
	FY03	FY04	FY05	FY03	FY04	FY05	FY03	FY04	FY05
Ratio of cost to charges	0.44	0.44	0.47	0.42	0.36	0.34	0.49	0.46	0.44
Medicare payment to cost	1.03	1.12	1.03	0.89	0.95	0.96	0.97	0.97	0.97
Medicaid payment to cost	0.85	0.80	0.47	0.68	0.82	0.79	0.73	0.73	0.72
Private payment to cost	0.95	1.08	0.96	1.02	1.07	1.06	1.14	1.18	1.20

Source: *Office of Health Care Access Hospital Financial Stability Reports for multiple years*

19.

Table 12: Waterbury Area Hospitals Payer Mix by Department, FYs 2004 - 2006

Services	Primary Payer	St. Mary's (%)			Waterbury (%)			Waterbury Area Hospitals (%)		
		FY06	FY05	FY04	FY06	FY05	FY04	FY06	FY05	
Inpatient Discharges	Medicare	42	43	43	44	43	43	43	43	43
	Medicaid	25	23	23	21	20	20	23	22	21
	Commercial	31	32	32	33	34	34	32	33	33
	Worker's Compensation	1	1	1	1	1	1	1	1	1
	Self-pay/uninsured	1	1	1	1	2	1	1	1	1
		100%	100%	100%	100%	100%	100%	100%	100%	100%
Emergency Department Treated and Discharged Visits	Medicare	14	15	15	17	18	18	15	16	16
	Medicaid	49	46	43	34	33	32	42	40	38
	Commercial	26	27	29	36	37	37	30	32	33
	Worker's Compensation	2	2	3	3	3	3	2	3	3
	Self-pay/uninsured	9	9	10	11	10	10	10	10	10
		100%	100%	100%	100%	100%	100%	100%	100%	100%
Outpatient Behavioral Health Visits	Medicare	9	13	9	46	47	45	43	44	42
	Medicaid	55	58	54	37	35	38	38	37	39
	Commercial	36	28	36	15	16	16	17	17	17
	Worker's Compensation	0	0	0	0	0	0	0	0	0
	Self-pay/uninsured	1	1	0	2	2	2	2	2%	2
		100%	100%	100%	100%	100%	100%	100%	100%	100%
All Other Outpatient Visits	Medicare	32	33	32	30	31	32	31	32	32
	Medicaid	17	17	16	18	18	18	18	18	17
	Commercial	47	47	46	45	45	45	46	46	45
	Worker's Compensation	1	1	3	1	1	1	1	1	2
	Self-pay/uninsured	2	2	3	5	5	4	4	3	4
		100%	100%	100%	100%	100%	100%	100%	100%	100%
Hospital Total	**Medicare**	28	28	28	32	33	33	30	31	31
	Medicaid	26	26	24	20	19	19	23	23	22
	Commercial	41	41	41	42	42	42	41	42	41
	Worker's Compensation	2	1	3	1	1	1	1	1	2
	Self-pay/uninsured	4	4	4	5	4	4	4	4	4
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

20.

Table 13: Waterbury Area Hospitals Acute Care Gain or Loss per Discharge or Case by Service Line, FYs 2004 - 2006

Service Line	Gain or Loss Per Discharge/Case ($)[1]				% Change		
	FY 2006	FY 2005	FY 2004	3-yr Average	06/05	05/04	06/04
Medical	(127)	62	322	**82**	-306	-81	353
Surgical	(1,871)	(1,112)	(850)	**(1,282)**	68	31	55
Behavioral Health	(2,834)	(1,805)	(1,472)	**(2,015)**	57	23	48
Maternity/Pediatrics	(794)	(765)	(927)	**(830)**	4	-18	-17
Total	**(899)**	**(549)**	**(386)**	**(612)**	64	42	57

[1] The combined per case gain/loss is sum of total revenue for the two hospitals minus the sum of their total costs divided by sum of discharges from both hospitals.

Table 14: Waterbury Area Hospital Emergency Department Gain or Loss Per Treated & Discharged Visit, FYs 2004 - 2006

	Gain or Loss Per Discharge/Visit ($)[1]			
Hospital	FY 2006	FY 2005	FY 2004	3 yr Average
St. Mary's	(22)	(15)	24	(5)
Waterbury[2]	(36)	(29)	(30)	(32)
Waterbury Area Hospitals	**(28)**	**(21)**	**(1)**	**(17)**

[1] For each cell, the combined per case gain/loss is sum of net revenues for the two hospitals minus the sum of total costs for the two divided by sum of discharges from both hospitals.

21. SMH and WH jointly contracted with The Chartis Group, LLC to conduct an assessment and financial review to present options of integration of the two hospitals. The table below summarizes the costs associated with the different Levels:

Table 15: Projected Costs Associated with Levels of Integration.

	Level One ("Millions")	**Level Two** ("Millions")	**Level Three** ("Millions"
A. Affiliation Costs	$ 12.0	$ 17.0	$ 25.0
B. Technical Costs	$ 12.2	$ 12.2	$ 12.2
C. Facilities Costs	$ 1.0	$ 3.9	$ 62.2
	$ 25.2	**$ 33.1**	**$ 99.4**

Level 1: Administrative and Operational Support Integration only
Level 2: Limited Clinical Integration and Level 1
Level 3: Full Administrative and Clinical Integration

22. According to The Chartis Group presentation, all levels of integration show a positive financial gain 5 years out. There would be a significant spend down or depletion of WH cash reserves to facilitate the affiliation. Therefore, WH would be at risk of violating some of its bond covenants and possibly alter its credit profile and its future access to capital.

23. According to The Chartis Group presentation, SMH and WH have internal issues that would need to be addressed, such as: Catholic and Secular organizations, WH has a unionized workforce, SMH liabilities, and a general cultural divide between the two organizations.

24. StayWell Health Center is a federally-qualified health center located in Waterbury, Connecticut, and provides primary care, dental and behavioral health services.

25. In fiscal year 2006, StayWell provided 55,687 visits, a rate of growth of 275% When compared to fiscal year 2000.

26. According to StayWell's letter to the agency, the organization struggles with staffing. "With the shortage in qualified nurses, we are frequently competing for staff. We have seen this to be the case for physicians also. Hiring culturally competent staff is always a struggle and then unfortunately added to the existing community shortages. Ultimately, staffing shortages impact access to care when special outreach services or walk-in hours need to be suspended due to inadequate staff to assign."

27. According to StayWell's letter, "We have difficulty getting access to Specialists who are not interested in seeing our patients. The low reimbursement rates for Title 18 and Title 19 for non-community health care providers has a trickle down effect on our patients."

28. According to a recent telephone conversation held between Commissioner Vogel and Donald Thompson of StayWell, in general StayWell Health Center's growth is limited by the space it occupies.

29. Connecticut has experienced 6 mergers; one closure of a small rural community hospital; one acquisition and conversion of a small non-profit to the state's only for-profit hospital; and the construction of a new children's hospital and a 94-bed community hospital (both results of mergers).

30. After reviewing the closures and mergers, it was apparent that each circumstance was different depending upon the financial strengths and weakness of the hospitals involved. In all of the mergers (in the cities of Bridgeport, Hartford and Meriden) one hospital was financially capable of absorbing the debt of the less viable; and in no circumstances was the State of Connecticut financially responsible for merger/closure activity.

31. The "Report of the Region 5 Pediatric Inpatient Psychiatric Services Implementation Group" examined the previous report regarding the current situation of inpatient services available for children & adolescents and offered recommendations to address the need and capacity for such services.

32. Region 5 has six acute care hospitals (Charlotte Hungerford, New Milford, Sharon, Danbury, St. Mary's and Waterbury) but has only five inpatient beds to serve the area and no free-standing psychiatric hospital.

33. The five inpatient beds for adolescent behavioral health services are located at Waterbury Hospital.

34. The Implementation Group recommends an additional 20 to 30 inpatient psychiatric beds are required in Region 5.

35. The data indicate that the majority of discharges are from the areas of Waterbury (27%), Danbury (11%), and Torrington (8%).

36. The Implementation Group recommends to establish 15 – 25 Psychiatric Residential Treatment Facility beds in Region 5.

IV. Discussion and Conclusion

The main purpose and intent of the processes undertaken by OHCA under the Investigative Proceeding of Docket Number 06-30760-INV was to gather and analyze pertinent data and facts regarding the utilization, capacity and demand, and the challenges to meet these demands in the Waterbury area. The financial condition of both SMH and WH were critical to this assessment. The following is a discussion of the results of the analysis and OHCA's conclusions. All conclusions are independent of Certificate of Need decisions and any review and issuance of CHEFA bonds. Any coordination of services must proceed in full conformance with the antitrust laws.

Throughout this investigation it became evident, either through data or by comments of those involved, that having two hospitals within the city of Waterbury is a root cause for the financial hardship experienced by both hospitals. As a community served by one hospital and one outpatient services system the financial stability of the remaining hospital would return through:

- Improved commercial payer rates
- Improved payer mix of patients
- Reduced expenses related to marketing/advertising/recruitment
- Reduced expenses in duplicative services
- Gain a competitive advantage over hospitals located in the secondary markets

Ideally this one inpatient/outpatient system would further develop an integrated and comprehensive primary care and behavioral health care system with the overriding goal to improve the health status of the community and reduce the number of ED visits and unnecessary hospitalizations.

There has been much discussion regarding the state's Medicaid reimbursement being a lead factor in the financial deterioration since a large portion of the patients are covered by Medicaid. A brief review of the percentage of Medicaid inpatient discharges from other hospitals located in similar markets shows that St. Mary's is the third highest Medicaid inpatient provider and Waterbury Hospital is within the state's average. As Table 1 demonstrates, it is difficult to directly correlate the percentage of inpatients by payer source to profit margins. Payer mix is a strong variable in a hospital's financial condition, but other operational factors play a significant role as well. The patient mix for ED discharges for St. Mary's is 49% and for Waterbury Hospital is 34% (comparable data for other hospitals is not available).

Table 1. FY06 Inpatient Discharge Patient Mix by Payer Source; Total Discharges, Total Profit Margin and Operating Profit Margin

Hospital	Medicare	Medicaid	Private	Uninsured	Total Discharges	Total Margin	Operating Margin
Bridgeport	34%	25%	38%	2%	19,574	4.1%	1.4%
St. Vincent's	46%	14%	35%	5%	19,672	9.4%	3.8%
Hartford	38%	18%	41%	3%	39,323	2.4%	0.0%
St. Francis	41%	20%	37%	2%	31,647	1.0%	-0.1%
Yale-New Haven	28%	25%	44%	2%	50,354	3.9%	2.1%
St. Raphael	53%	13%	33%	1%	25,354	-2.1%	-2.6%
Stamford	35%	16%	46%	4%	17,003	6.1%	5.1%
New Britain	41%	21%	35%	3%	18,585	4.3%	3.3%
St. Mary's	42%	23%	33%	2%	12,718	0.4%	-3.7%
Waterbury	45%	18%	35%	2%	15,000	-2.4%	-3.6%
Statewide	40%	17%	39%	3%	423,051	2.5%	0.6%

Source: OHCA Discharge Database and FY06 Financial Audited Statements (profit margins are hospital only)

Although any improvement to any of the payer reimbursement will benefit the two hospitals – it alone will not address the fundamental issues of fragmentation, duplication, competition and the ability to improve access to capital.

Recently the hospitals have engaged in discussions on the matter of integrating or consolidating services. They jointly contracted a consultant and shared some of the findings as part of this investigation. The consultant's analysis explored the potential options and the costs associated with each option. Realizing that "Level 1 Integration of Administrative and Operational Support Only" would be the most achievable first step, it offers limited long-term sustainability, costs an estimated $25 million, would continue the two-hospital campus with different organizational cultures, and it would have difficulties differentiating itself in the marketplace. The other levels of integration begin to consolidate services and structurally become one hospital with two locations. The costs rise significantly with these options from approximately $33 to $100 million; however, they begin to realize the benefits of a merged entity.

These figures are only estimates; however, they provide insight to the real costs of integration. In other mergers that have occurred in Connecticut (Attachment D), typically one of the hospitals involved was financially capable of absorbing the debt of the less viable hospital and the associated costs of the merger. Of concern is the inability of the hospitals to fund the potential integration.

This situation differs from other mergers in the state because both hospitals are in financial distress and utilization of services remains active. If a merger were to occur, Waterbury Hospital would be responsible to absorb any liabilities and debt of St. Mary's Hospital and that will further weaken the stability of Waterbury Hospital. The hospitals

are aware of some services that can be consolidated (termination of services from one hospital and transferring the patients to the remaining program may require Certificate of Need approval). Such services may include neurology, certain surgical procedures, orthopedics, cardiology, maternity, neonatology, the on-call system for the coverage of two EDs, trauma services, and ancillary services (i.e., laundry, laboratory, pathology, etc.). A slow and deliberate closure of St. Mary's Hospital may also be a viable option.

In conclusion, St, Mary's Hospital's financial measures indicate that the hospital is insolvent. The annual infusion of state funding, although enabling continued access for patients, does not address nor resolve the fundamental system issues that are creating the on-going losses. St. Mary's Hospital should be responsible for providing adequately for its employees during this transition and fully fund the pension obligation. In the event of a closure or merger, the remaining hospital will be able to absorb some of the volume; however, it will need to reconfigure and possibly expand the inpatient services. Removing the competition and duplication in the profitable outpatient market is critical to be able to flow funds back into the remaining hospital system to ensure sustainability.

The infrastructure for primary care and behavioral health care services needs to be re-designed and a comprehensive and integrated system developed. Ideally, a system of care that involves the hospital, the community health centers, community providers and school-based clinics will serve the population well. Additionally, the community may benefit from a workforce development plan as the system begins to reshape the health care delivery system.

St. Mary's Hospital, the Waterbury Hospital and the state agencies were actively involved in this investigatory process. Both hospitals are committed to providing high quality patient care and continue discussions regarding how to best sustain access and return financial stability to the delivery system of the Waterbury community.

State of Connecticut

REPORT OF SOCIO-ECONOMICS AND HEALTH CARE SERVICES UTILIZATION OF THE WATERBURY AREA

Docket Number 06-30760-VST

Cristine A. Vogel
Commissioner
Office of Health Care Access

Table of Contents

		Page
1.0	Introduction	1
2.0	Determining the towns of the "Waterbury Area"	2
3.0	Socio-economic profile of the Waterbury Area	4
	A. Population and age distribution	4
	B. Gender mix	5
	C. Racial composition	5
	D. Educational attainment	6
	E. Employment status and occupation	6
	F. Per capita and average household incomes	7
	G. Estimated rate and number of uninsured	8
	H. Rate of preventable hospitalization	8
	I. Primary care physicians per 1,000 of area population	9
4.0	Hospital services utilization, area needs and payer mix	10
	A. Inpatient bed capacity, occupancy and availability	10
	B. Acute care inpatient utilization by service type	12
	C. Emergency Department utilization	14
	D. Outpatient services utilization	17
	i. Medical clinics utilization	17
	ii. Behavioral health services utilization	19
	iii. Other outpatient services utilization	21
	E. Payer reimbursement and mix	22
	i. Hospital payer mix	23
	ii. Medical clinics payer mix	24
5.0	Financial status of the hospitals at the end of FY 2006	26

APPENDICES

Appendix A:	Connecticut General Statutes Section 19a-633	28
Appendix 1:	Saint Mary's Hospital Licensed and Staffed Beds by Service Line, FYs 2004 - 2006	29
Appendix 2:	Waterbury Hospital Licensed and Staffed Beds by Service Line, FYs 2004 - 2006	29
Appendix 3:	Saint Mary's Hospital Acute Care Discharges by Service Line, FYs 2004 – 2006	30

		Page
Appendix 4:	Waterbury Hospital Acute Care Discharges by Service Line, FYs 2004 – 2006	30
Appendix 5:	Saint Mary's Hospital Acute Care Days by Service Line, FYs 2004 – 2006	31
Appendix 6:	Waterbury Hospital Acute Care Days by Service Line, FYs 2004 – 2006	31
Appendix 7:	Case Mix Indices for St. Mary's and Waterbury Hospitals FYs 2003 – 2005	31
Appendix 8:	Saint Mary's Hospital Acute Care Gain or Loss per Discharge or Case by Service Line, FYs 2004 – 2006	32
Appendix 9:	Waterbury Hospital Acute Care Gain or Loss per Discharge or Case by Service Line, FYs 2004 – 2006	32
Appendix 10:	St. Mary's Hospital Top Ten Principal Reasons for Emergency Department Treated and Discharged Visits, FYs 2004 - 2006	33
Appendix 11:	Waterbury Hospital Top Ten Primary Reasons for Emergency Department Treated and Discharged Visits, FYs 2004 – 2006	33
Appendix 12:	Waterbury Hospitals Top Ten Primary Reasons for Emergency Department Treated and Admitted to Acute Care, FYs 2004 – 2006	34
Endnotes		35

1.0 Introduction

On May 25, 2006, the Office of Health Care Access (OHCA) pursuant to Connecticut General Statutes (C.G.S.) Section 19a-633 (Appendix A), initiated an investigation to review utilization and capacity of acute care general hospital services provided in the "Waterbury Area." The general acute care hospitals located in the city of Waterbury are St. Mary's Hospital and The Waterbury Hospital.

The investigation stemmed from concerns about the long-term viability of either or both hospitals, and their ability to provide and maintain needed health care services in the communities they serve vis-à-vis their financial performance in the last two fiscal years (FY) (Table 1). In addition to providing acute inpatient care, the hospitals serve as a safety net for residents of the area who do not have access to or cannot afford primary care. Based on the hospitals audited financial statements, both hospitals are operating at a loss from direct patient care; the hospitals' expenses exceed revenue from direct patient care and other operating revenue; inadequate funds obtained from philanthropic or non-philanthropic sources not directly related to patient care; as well as other issues discussed in this report.

Table 1: Financial Performance of St. Mary's and Waterbury Hospitals (FYs 2004 – 2006)

Financial Indicators	St. Mary's Hospital			Waterbury Hospital		
	FY 2004	FY 2005	FY 2006	FY 2004	FY 2005	FY 2006
Operating Loss/Gain[1]	$6,306,000	$(15,270,000)	$(9,694,000)	$(448,506)	$(2,431,845)	$(5,262,405)
Excess of Revenue over Expenses[2]	$11,480,000	$(6,581,000)	$(6,197,000)	$2,275,334	$(30,448)	$(2,479,026)
Operating Margin[3]	4.2%	(10.02)%	(4.7)%	(0.2)%	(1.2)%	(2.2)%
Total Margin[4]	7.68%	(4.3)%	(3.0)%	1.2%	(0.01)%	(1.1)%

Source: *Audited Financial Statements.*

[1] Loss or gain from reimbursement of patient services from government and non-government payers.

[2] Difference between revenue obtained from direct patient care and funds from other sources and expenses.

[3] Measures profitability and is the ratio of loss or gain per unit total operating revenue.

[4] Measures profitability and is the ratio of total operating and non-operating revenue loss or surplus to total operating revenue.

The investigation reviews current availability and utilization of, and demand for hospital services, system capacity and the challenges these two hospitals face in meeting demands from the community they serve. This involves an evaluation of:

- the socio-economic make-up of the community that relies on services of the hospitals, implications on the hospitals' patient payer-mix and the effect of reimbursements on hospital operations and future plans;
- current utilization and future demand for all hospital services including inpatient, emergency department, primary care clinics, outpatient psychiatric care and ancillary outpatient services in the area; and
- challenges that exist in the market in general and their impact on the hospitals' operations.

On the basis of this investigative proceeding, OHCA will make recommendations for ensuring continued availability and access to health care for the area.

2.0 Determining the towns of the "Waterbury Area"

The towns a hospital provides services to make up its primary and secondary service areas. Primary service area towns are either a significant portion of the hospital's patient base or most residents from the towns access services at the hospital; and the secondary service area consists of all other towns whose residents access the hospital's services at a steady but lower rate. This investigation determines which towns will be most adversely impacted if one of the two hospitals or both are unable to provide services. Therefore, to determine which towns rely significantly on health care services that the two hospitals provide, OHCA first included towns that comprise the top 70% of each of the two hospitals' acute care inpatient discharges. Based on this definition, OHCA identified Waterbury and Naugatuck for St. Mary's Hospital and these same towns and an additional two, Watertown and Southbury, for the Waterbury Hospital (Table 2).

Table 2: Towns of Origin for St. Mary's Hospital and Waterbury Hospital Top Seventy Percent Discharges (FY 2003 – 2005)

	St. Mary's Hospital			Waterbury Hospital		
Patient Town	Discharges	% of Hospital Total	Cum % Total	Discharges	% of Hospital Total	Cum % Total
Waterbury	21,903	60.2	60.2	20,818	46.1	46.1
Naugatuck	3,693	10.2	70.4	4,685	10.4	56.5
Watertown	n/a	n/a	n/a	4,610	10.2	66.7
Southbury	n/a	n/a	n/a	2,588	5.7	72.4

Source: *Office of Health Care Access Acute Care Discharge Database*

Other towns were included if the combined share of patients originating from that town for the two hospitals exceeded 70%, demonstrating a significant reliance of the town on the health care system in Waterbury. Middlebury, Prospect and Wolcott became part of the group because the two hospitals account for about three-quarters of discharges originating from each town, bringing the number of towns in the "Waterbury Area" to seven, namely Middlebury, Naugatuck, Prospect, Southbury, Waterbury, Watertown and Wolcott (Table 3).

Table 3: Percent of Patients from Selected Towns Discharged from St. Mary's Hospital and Waterbury Hospital (FY 2003-2005)

Patient Town	St. Mary's Hospital % Share	Waterbury Hospital % Share	Combined % Share
Middlebury	21.5%	53.5%	75.0%
Naugatuck	32.5%	41.2%	73.7%
Prospect	35.7%	37.4%	73.1%
Southbury	7.7%	34.9%	42.6%
Waterbury	44.6%	42.4%	87.0%
Watertown	20.3%	62.7%	83.0%
Wolcott	41.2%	30.7%	71.9%

Source: *Office of Health Care Access Acute Care Discharge Database*

Patients residing in the seven towns included make up over 80% of each hospital's discharges. Although residents of those towns migrate to nearby hospitals to receive care most utilize the Waterbury hospitals more than any other single hospital (Table 4). Patient migration to access care in other areas depends on factors such as patient preference, patient ability to travel and physician referral patterns. Out-migration from local areas also occurs because certain treatment modalities or physician specialists are available outside the Waterbury area.

Table 4: Other Connecticut hospitals' percentage share of discharges originating from the seven selected towns, FYs 2003-2005

Acute Care Hospital	Middlebury %	Naugatuck %	Prospect %	Southbury %	Waterbury %	Watertown %	Wolcott %	% of Hospital Total
St. Mary's	**21.5**	**32.5**	**35.7**	**7.7**	**44.6**	**20.3**	**41.2**	**81.2**
Waterbury	**53.5**	**41.2**	**37.4**	**34.9**	**42.4**	**62.7**	**30.7**	**86.5**
Bridgeport	2.0	3.1	2.6	2.1	1.4	2.1	1.6	2.6
Danbury	5.7	2.1	0.5	38.9	1.1	1.9	0.5	6.8
John Dempsey	0.8	0.8	1.1	0.7	0.8	0.7	1.9	2.7
Griffin	1.1	5.9	1.4	1.7	0.5	0.4	0.3	5.2
St. Raphael's	2.8	2.5	4.8	1.8	1.5	1.4	2.6	2.1
Yale	6.8	5.9	8.7	6.2	3.6	4.7	4.2	2.8
Other*	5.7	6.0	7.8	6.0	4.3	5.8	17.1	0.6
Total (%)	**100**	**100**	**100**	**94**	**100**	**100**	**100**	
# of Discharges	**2,062**	**11,365**	**3,144**	**7,413**	**49,156**	**7,349**	**5,395**	

Source: *Office of Health Care Access Acute Care Discharge Database*

*Includes the other 23 hospitals, which individually did not discharge a significant share of patients from the seven towns.

3.0 Socio-economic profile of the Waterbury Area

Socio-economic status, that is age, gender, race or ethnicity, educational attainment, employment status and income and physician availability, are well-documented joint indicators of health status, need for health care services, timeliness of heath care treatment, and ability to pay for health care services. Therefore, this section examines the social and economic characteristics of the Waterbury area population for insight into the type of services needed, the ability to pay for and the ease of access to health care services. The section also provides information on the inherent patient payer mix experienced by both hospitals.

A. Population and age distribution

According to Census 2000, there are approximately 208,861 residents in the Waterbury area, which is 6% of the state's population. About 51.4% of the area's residents live in Waterbury, 14.8% in Naugatuck and 10.4% in Watertown and a combined 23.4% in Southbury, Wolcott, Prospect and Middlebury (Table 5).

Table 5: Population and Age Distribution of the Waterbury Area

Patient Town	0-19	20-44	45-64	65-74	75+	2000 Population	% of Total
Middlebury	26.0%	28.0%	29.3%	8.0%	8.4%	6,451	3.1%
Naugatuck	29.1%	38.1%	21.0%	5.4%	6.3%	30,989	14.8%
Prospect	26.9%	33.7%	26.0%	6.8%	6.3%	8,707	4.2%
Southbury	24.0%	24.8%	25.1%	9.9%	16.2%	18,567	8.9%
Waterbury	28.9%	36.3%	19.7%	6.7%	8.2%	107,271	51.4%
Watertown	26.7%	34.2%	24.8%	7.0%	7.0%	21,661	10.4%
Wolcott	27.9%	34.9%	23.9%	6.9%	6.1%	15,215	7.3%
Total	**28.1%**	**34.9%**	**21.8%**	**6.9%**	**8.3%**	**208,861**	**100.0%**
Connecticut	**27.1%**	**35.8%**	**23.1%**	**6.7%**	**7.0%**	**3,405,565**	

Source: *U.S. Census Bureau Census 2000*

Some age characteristics of this area are:

- Children under 19 years old are overrepresented in Naugatuck although there is no significant difference between children's share of the area and state population.
- Naugatuck and Waterbury residents, representing almost two-thirds of the area, have a relatively larger share of 20 to 44-year olds. According to OHCA research, 19 to 29 year-olds are four times as likely to be uninsured because they may be full-time students, single, unemployed or have no permanent full-time jobs. This means they are less likely to have health insurance coverage through an employer, are too old to receive coverage from a parent who has coverage through an employer and are ineligible for Medicaid.[1]
- Fewer adults in the 45 to 64 age range, a group that is likely to be employed and insured, compared to the state.[2] In Waterbury, there are only 19.7% in this age range compared to 23.1% in the state.
- Waterbury, representing about one-half of the area, has relatively more residents over 75 years than the state, 8.2% versus 7.0%. This age group has the highest potential to suffer from chronic diseases, experiences greater disease acuity and tend to have higher hospitalization rates than the general population and therefore costs more to treat.[3] Older residents are also less mobile and tend to access care in the local area.

B. Gender mix

The gender mix provides information on the types and volume of services the area needs. The gender mix of the area is similar to that of the state with slightly more women than men, although Southbury, Waterbury, Watertown have relatively more women than average (Table 6). Generally younger women tend to require hospitalization 2.5 times as more frequently as their male counterparts due to pregnancies and childbirth, but this disparity narrows, as women get older. In fact, even at age 65 and over when hospitalizations are 2.6 times the rate for the general population, men tend to require acute care at a higher rate than women of the same age cohort.[4]

Table 6: Gender Mix of Waterbury Area

Patient Town	Males	Females	Males %	Females %
Middlebury	3,127	3,324	48.5	51.5
Naugatuck	15,069	15,920	48.6	51.4
Prospect	4,255	4,452	48.9	51.1
Southbury	8,633	9,934	46.5	53.5
Waterbury	50,781	56,490	47.3	52.7
Watertown	10,379	11,282	47.9	52.1
Wolcott	7,411	7,804	48.7	51.3
Total	**99,655**	**109,206**	**47.7**	**52.3**
Connecticut	**1,649,319**	**1,756,246**	**48.4**	**51.6**

Source: *U.S. Census Bureau Census 2000*

C. Racial composition

Research shows that minorities[5], especially Blacks and Hispanics or Latinos, are hospitalized at rates disproportionate to their share of the population than Whites.[6] Hispanics or Latinos are also 3.5 times as likely to be uninsured as all races in the state.[7] Six of the towns in the area are predominantly White compared to the state in general, but because Waterbury, which is about one-half of the area, has a significantly large minority population, mostly Hispanics and Blacks, the area has almost 1.5 times more minorities than the state (Table 7).

Table 7: Racial and Ethnic Distribution of Residents in the Waterbury Area

			Minorities			
Patient Town	Total Population	% White Alone	% Hispanic/ Latino (of any race)	% Black Alone	% Asian Alone	% Other races excluding Hispanics/ Latinos
Middlebury	6,451	96.2	1.2	0.4	1.3	0.9
Naugatuck	30,989	88.9	4.5	2.8	1.7	2.1
Prospect	8,707	95.0	1.9	1.4	0.7	1
Southbury	18,567	96.1	1.6	0.5	1.2	0.7
Waterbury	107,271	58.2	21.8	16.3	1.5	2.3
Watertown	21,661	95.2	1.9	0.7	1.3	0.8
Wolcott	15,215	95.2	1.8	1.2	0.7	1
Total	**208,861**	**75.4**	**12.4**	**9.1**	**1.4**	**1.8**
Connecticut	**3,405,565**	**77.5**	**9.4**	**9.1**	**2.4**	**1.6**

Source: *U.S. Census Bureau Census 2000*

D. Educational attainment

In general, higher educational attainment enhances employment prospects and the chances of gaining employment with an employer who provides health insurance coverage for eligible employees, especially for skilled labor. In the Waterbury area, fewer residents 25 years and over graduated from high school or have a college degree than the state in general, 78.9% compared to 84.0%. The residents are also 1.5 times less likely to have a bachelor's degree or higher (Table 8).

Table 8: Educational Attainment of the Waterbury Area 25 Years and Over Population

Patient Town	Population 25 Years and Over	% High School Graduate or Higher	% with a Bachelor's Degree or Higher
Middlebury	4,662	91.9	41.5
Naugatuck	20,451	83.0	19.0
Prospect	6,015	87.1	22.8
Southbury	13,727	89.2	31.4
Waterbury	69,791	71.7	13.9
Watertown	14,922	83.8	25.0
Wolcott	10,350	87.8	19.3
Total	139,918	78.9	20.3
Connecticut	2,295,617	84.0	31.4

Source: *U.S. Census Bureau Census 2000*

E. Employment status and occupation

There are also fewer residents of the Waterbury area in the civilian labor force relative to the state, 49.3% versus 51.6%. The area total is lower mainly because only 46.4% of the city of Waterbury's residents are in the labor force (Table 9). Regardless, the city also has the highest unemployment rate, over 1.5 times the rate for the state, 8.6% versus 5.3%. This means potentially more people in the area are unable to afford needed health care services.

Table 9: Employment Status of Waterbury Area 16 Years and Over Civilian Labor Force

		Population 16 Years and Over		
Patient Town	Population	% in Civilian Labor Force	% of Civilian Labor Force Employed	% of Civilian Labor Force Unemployed
Middlebury	6,451	52.9	97.5	2.5
Naugatuck	30,989	53.1	94.7	5.3
Prospect	8,707	55.1	97.9	2.1
Southbury	18,567	44.6	96.9	3.1
Waterbury	107,271	46.4	91.4	8.6
Watertown	21,661	54.9	95.4	4.6
Wolcott	15,215	54.6	95.7	4.3
Total	**208,861**	**49.3**	**93.7**	**6.3**
Connecticut	**3,405,565**	**51.6**	**94.7**	**5.6**

Source: *U.S. Census Bureau Census 2000*

Only 56.1% residents of the area are in "management and professional' and "sales and office" occupations compared to 65.6% of the state as a whole (Table 10). These occupations tend to be higher paying and permanent full-time positions, which increase the likelihood of being able to afford and/or qualify for employer-sponsored health insurance (ESI) coverage. Instead, area residents, especially those residing in Waterbury, have a comparatively higher tendency to be in "service" and "production, transportation and material moving," occupations that are seasonal, temporary or part-time in nature which lessen residents' ability to qualify for or to afford ESI when offered.

Table 10: Occupations of Waterbury Area 16 Years and Over Civilian Labor Force

Patient Town	% Management, Professional & Related Occupations	% in Service	% in Sales & Office	% in Farming, Fishing, Forestry	% in Construction, Extraction, Maintenance	% in Production, Transportation, Material Moving
Middlebury	52.1	13.3	20.6	0.0	6.0	8.0
Naugatuck	30.3	15.6	25.1	0.1	10.1	19.0
Prospect	37.1	11.3	28.0	0.1	8.6	14.7
Southbury	47.6	11.6	24.2	0.3	8.3	8.0
Waterbury	25.1	20.1	24.6	0.1	8.8	21.4
Watertown	35.5	16.4	23.6	0.1	8.5	15.9
Wolcott	33.9	14.6	28.3	0.1	9.6	13.5
Total	**31.2**	**17.1**	**24.9**	**0.1**	**8.9**	**17.8**
Connecticut	**39.1**	**14.3**	**26.5**	**0.2**	**8.0**	**12.0**

Source: *U.S. Census Bureau Census 2000*

F. Per capita and average household incomes

Higher individual or family incomes are linked to greater ability and willingness to spend on needed health care services. Per capita and average household incomes are the proxies for measuring what an individual or a family can afford. For most towns in the Waterbury area, both amounts are below the state average, resulting in a low average for the area in general, $28,505 versus the state's $31,816 and $76,939 compared to $82,601 (Table 11).

Table 11: Per Capita and Average Household Income for Waterbury Area Residents

Patient Town	Per Capita Income ($)	Median Household Income ($)	Average Household Income ($)
Middlebury	39,129	68,090	105,684
Naugatuck	25,477	56,677	67,314
Prospect	26,881	68,770	79,946
Southbury	34,318	64,437	85,269
Waterbury	21,238	41,258	51,888
Watertown	24,276	57,832	66,766
Wolcott	28,214	71,144	81,709
Total	**28,505**	**64,437**	**76,939**
Connecticut	**31,816**	**59,697**	**82,601**

Source: *CT Department of Economic & Community Development 2000 Data from Claritas*

G. Estimated rate and number of uninsured

The "estimated" uninsured rate for Waterbury area residents based on the OHCA 2006 Household Survey is over 1.5 times the rate for the state, that is, 9.8% compared to 6.4% (Table 12).

Table 12: Estimated rate and number of uninsured in Waterbury Area, 2006

Uninsured Rate (%)			Estimated Number of Uninsured		
Lower	Estimate[1]	Upper	Lower	Estimate[1]	Upper
5.9	**9.8**	13.7	12,688	**21,034**	28,380

Source: *CT Office of Health Care Access 2006 Household Survey and U.S. Census Bureau 2005 Population Estimates*

[1] The estimated uninsured rate will fall within the given lower and upper boundaries 95% of the time if the survey were repeated 100 times. The estimated rate of uninsured for the state is 6.4%.

H. Rate of preventable hospitalization

Preventable hospitalizations (PH) are acute care admissions that would not have occurred, if patients had received "timely and effective primary care and medical management."[8] Such conditions include asthma, angina, bacterial pneumonia, chronic obstructive pulmonary disease, congestive heart failure, dehydration, diabetes, hypertension, low birth weight, lower extremity amputation, pediatric gastroenteritis, perforated appendix and urinary infection. Based on a methodology developed by the federal Agency for Healthcare Research and Quality (AHRQ), the Waterbury area has a relatively higher incidence of PH than the state for children and adults, 1.9 versus 1.2 and 1.5 versus 1.2 per 1,000 of the respective population (Table 13). For both age groups, the city of Waterbury had the highest incidence of PH, which was also twice the state rate.

Table 13: Ambulatory Care Sensitive Condition* Discharges per 1,000 population, FYs 2000 – 2004

Patient Town	Children (0-17)	Adults (18+)
Middlebury	2	1.3
Naugatuck	1.9	1.8
Prospect	1.7	1.5
Southbury	0.7	1.3
Waterbury	4.2	2.5
Watertown	2.3	1.4
Wolcott	1.8	1.5
Median for Area	**1.9**	**1.5**
Median for Connecticut	**1.2**	**1.2**

Source: *Office of Health Care Access Acute Care Discharge Database*

*Conditions include asthma, angina, bacterial pneumonia, chronic obstructive pulmonary disease, congestive heart failure, dehydration, diabetes, hypertension, low birth weight, lower extremity amputation, pediatric gastroenteritis, perforated appendix and urinary infection.

I. Primary care physicians per 1,000 of area population

There is a recognized link between receiving primary care and improved health status. Payers of health care services broadly define primary care physicians (PCP) to include family or general practice physicians, pediatricians, internists, nurse practitioners, physician assistants and naturopathic physicians. These PCPs, including being trained to treat a wide range of diseases, maintain comprehensive records of patients, refer patients to specialists, coordinate care provided to patients by specialists and facilities, and manage patients' chronic health conditions. Ideally, a PCP should be a patient's first contact in a health care system. But generally, these PCPs are not distributed evenly between communities in the state and across the nation. In November 2005, the Primary Care Office of Connecticut Department of Public Health (DPH) designated the city of Waterbury as a medically and a primary care underserved area under federal law as an initial step to improving access to primary health care in the area.[9]

4.0 Hospital services utilization, payer reimbursement and mix

This section discusses the utilization of hospital services in the Waterbury area and identifies the payers of those services. This includes a discussion of acute care inpatient bed capacity, availability and utilization; emergency department use; outpatient psychiatric and other outpatient services utilization; and payer mix in these areas of operation. Unless otherwise stated, the two hospitals provided all the data for this section in response to OHCA's preliminary questions for the investigation; FY 2006 data are annualized.

A. Inpatient bed capacity, occupancy and availability

The "size" or "capacity" of inpatient services is the average number of inpatient beds a hospital staffs. Occupancy is the average number of staffed beds in use by midnight census throughout the year. The Department of Public Health (DPH) has licensed the two hospitals in the Waterbury area to operate a maximum of 704 beds and 68 bassinets. But over the last three years, the hospitals have gradually increased staffed beds to make available 63% or 447 beds in FY 2006 (Table 15). As a rule of thumb, hospitals obtain bed licenses to their maximum allowable capacity and staff beds based on demand and ability to staff them adequately.

Including critical care beds, about 70% of staffed beds in the area are medical or surgical. According to the two hospitals, in the last year, both have experienced increases in volumes associated with those beds, raising their medical/surgical occupancy rates to over 86% and ICU beds to over 80% for most of the year. Over a three-year period ending in FY 2006, both hospitals gradually added to the number of beds staffed for those services to bring the total to 323 (Table 15, see Appendices 1 and 2 for hospital details). But they staffed psychiatric beds at the same level in three consecutive years although they report occupancy at over 80%.

Table 15: Licensed and Staffed Acute Care Beds in Waterbury Area by Service Line, FYs 2004 - 2006

		Staffed Beds					Share of Staffed Beds	
Service Line	Licensed Beds	FY 2006	FY 2005	FY 2004	% of Licensed Beds Staffed in FY 2006	% of All Staffed Beds in FY 2006	St. Mary's Hospital	Waterbury Hospital
Medical/Surgical	479	260	257	249	54%	58%	40%	60%
OB/GYN	64	62	63	63	97%	14%	50%	50%
Psychiatry	50	42	42	42	84%	9%	29%	71%
Critical Care	75	63	55	55	84%	14%	68%	32%
Pediatric	36	20	20	20	56%	4%	50%	50%
Total Beds	704	447	437	429	63%	100%	45%	55%
Total Bassinets	68	68	68	68	100%	n/a	47%	53%

The high demands for medical/surgical, critical care and psychiatric beds are from:

- Growing demand for monitored beds at both hospitals due to an aging population with more complex medical conditions that require higher intensity nursing care;
- Systemic issues caused by difficulty in discharging patients to either extended care facilities or other next level of care resources. Delayed discharge of patients to step down

care because of insufficient availability of the next level of care in the community for both elderly and behavioral health patients; and

- Waterbury Hospital is the only provider of hospital inpatient behavioral health care to adolescents in mental health Region 5[10].

Both hospitals' ability to increase staffed beds to accommodate rising demand for medical, surgical and critical care beds is limited by factors either unique to the individual hospital or widespread in the hospital industry. Some limitations, which continue to exist, include:

- A decommissioned 27-bed unit at St. Mary's Hospital;
- Conversion of semi-private rooms to single occupancy rooms stemming from need to provide privacy and isolation for patients that require it at both hospitals.
- Physical plant constraints including aging building and inefficient configuration of nursing units;
- Restricted access to capital for renovating decommissioned units or converting administrative space to clinical space;
- Difficulty in recruiting additional and retaining existing staff; and
- Regulatory challenges.

In FY 2006, both St. Mary's Hospital and Waterbury Hospital held staffing levels for OB/GYN and pediatric beds consistent with prior years even though both hospitals continue to report low occupancy for the beds.

Based on the area towns identified, which constitutes over 80% of the hospitals' discharges, the area seems to have relatively more staffed medical and surgical acute care beds available per 100,000 of the population than the state as a whole, that is 209 versus 186 per 100, 000 (Table 16). Although psychiatric beds seem sufficient for the area, Waterbury is the sole provider of behavioral health care for residents less than 18 years old in Region 5 and the hospital has assigned five beds to the age group, already deemed inadequate for the region.[11]

Table 16: Licensed and Staffed Acute Care Bed Availability in the Waterbury Area by Service Line, FYs 2004 - 2006

			Waterbury Area			
Service Line	Licensed Beds	FY 2006 Staffed beds	Census 2000 Population	Licensed Bed Availability per 100,000	Staffed Bed Availability per 100,000	CT Staffed Bed Availability per 100,000*
Medical/Surgical[1]	554	323	154,773	358	209	186
OB/GYN[2]	64	62	82,519	78	75	80
Psychiatry[3]	50	42	194,438	26	22	21
Pediatric[4]	36	20	51,520	70	39	33
Total Beds	**704**	**447**	**206,293**	**341**	**217**	**209**
Total Bassinets[5]	**68**	**68**	**2,568**	**2,648**	**2,648**	**-**

Source: *US Census 2000 & * Studying Health Care Utilization in Connecticut, A Report to the Governor and General Assembly.*
[1] Adults over 17 years old. Beds include critical care beds.
[2] Females over 17 years old.
[3] Ages 5 and over.
[4] Population under 18 years old (54,088) minus discharges reported for (5) below.
[5] Bassinets for both nursery and NICU. Population is three-year average number of discharges reported by the two hospitals for discharges assigned Diagnosis Related Group (DRGs) 385-391in the OHCA Acute Care Discharge Database.

B. Acute care inpatient utilization by service type

This section provides an overview of the inpatient (IP) services that Waterbury area residents utilized over the three-year period ending in FY 2006. It combines utilization at both hospitals to better assess the needs of the community overall.

Inpatient medical care is almost one-half of the services the two hospitals provide; surgical and maternity/pediatrics care each account for about one-quarter; and behavioral health is 5%. The two hospitals started a joint advance cardiac services program over a year ago, which generated an increase in volume that was offset by a decline in behavioral health care. The combined inpatient services provided grew by 2% although maternity/pediatric care accessed declined by 3% in FY 2005 (Table 17, see Appendices 3 and 4 for hospital details). The overall increase in discharges in the area was no different from state level increases. Annualized volumes for FY 2006 indicate a significant drop in behavioral health discharges (11%) while discharges for other services will be close to their FY 2005 levels altogether resulting in a 1% decline in inpatient care utilization for the area.

Table 17: Waterbury Area Hospitals Acute Care Discharges by Service Line, FYs 2004 - 2006

	Discharges				% Change		
Service Line	FY 2006	FY 2005	FY 2004	3-Yr Average	06/05	05/04	06/04
Medical	12,546	12,563	12,055	**12,388**	0	4	4
Surgical	7,548	7,527	7,352	**7,476**	0	2	3
Behavioral Health	1,538	1,721	1,650	**1,636**	-11	4	-7
Maternity/Pediatrics	5,930	5,942	6,118	**5,997**	0	-3	-3
Total	**27,562**	**27,753**	**27,175**	**27,497**	**-1**	**2**	**1**

By the end of FY 2006, although total medical and surgical discharges are expected to remain the same and behavioral health and maternity/pediatric days to reduce, the hospitals anticipate 3% and 10% increases in medical and surgical patient days respectively. The result is a net increase in patient days of 4% for the year and 5% over the three-year period (Table 18, see Appendices 5 and 6 for hospital details).

Table 18: Waterbury Area Hospitals Acute Care Days by Service Line, FYs 2004 - 2006

	Acute Care Days				% Change		
Service Line	FY 2006	FY 2005	FY 2004	3-Yr Average	06/05	05/04	06/04
Medical	63,472	61,732	58,829	**61,344**	3	5	7
Surgical	39,926	36,345	37,832	**38,034**	10	-4	5
Behavioral Health	11,206	11,893	11,364	**11,488**	-6	5	-1
Maternity/Pediatrics	15,802	15,969	15,980	**15,917**	-1	0	-1
Total	**130,406**	**125,939**	**124,005**	**126,783**	**4**	**2**	**5**

Costs per discharge for all services are rising at both hospitals. Inpatient medical care cost per discharge was higher at Waterbury Hospital while inpatient surgical care cost per discharge was higher at St. Mary's Hospital. But by the end of FY 2006, the costs for both services at the hospitals were almost similar, $8,302 and $15,269 at St. Mary's Hospital versus $8,323 and $15,236 at Waterbury Hospital (Table 19). The converging unit cost for those service lines is better illustrated by the patient resource usage indicator or case mix index which was higher in FY 2003 for Waterbury Hospital but reduced for the hospital for two consecutive years to become almost equivalent to St. Mary's Hospital in FY 2005, 1.3534 versus 1.3577 respectively (for hospital details see Appendix 7). On the other hand, cost per discharge for behavioral health and maternity/pediatric inpatient care continue to be lower at St. Mary's Hospital. Generally, some of the variations in cost are attributable to what is included in cost, which tend to vary from hospital to hospital.

Table 19: Waterbury Area Hospitals Acute Care Cost[1] Per Discharge by Service Line, FYs 2004 - 2006

	St. Mary's Hospital ($)				Waterbury Hospital ($)			
Service Line	FY 2006	FY 2005	FY 2004	3-yr Average	FY 2006	FY 2005	FY 2004	3-yr Average
Medical	8,302	7,043	6,189	**7,211**	8,323	7,779	6,926	**7,676**
Surgical	15,269	12,874	12,391	**13,507**	15,236	12,843	11,776	**13,311**
Behavioral Health	7,303	6,612	5,999	**6,648**	9,376	8,059	7,620	**8,301**
Maternity/Pediatrics	3,095	3,980	3,662	**3,553**	4,260	3,548	3,581	**3,773**
Total	**8,817**	**7,998**	**7,305**	**8,058**	**9,590**	**8,227**	7,527	**8,433**

[1] There may be a variation in the components of cost between hospitals.

Medical care, which showed a gain of $62 per case in FY 2005 is projected to convert to a loss of $127 per case in FY 2006; behavioral health care although not the most expensive service to provide, lost the hospitals the most money per discharge, at a loss of $1,805 per case in FY 2005 and is expected to almost double to $2,834 per case in FY 2006 (Table 20, see Appendices 8 and 9 for hospital details). Despite sporadic growth in surgical care, losses per case for the service continue to rise. Based on annualized figures, loss per case for all services will grow by 64% by the end of FY 2006.

Table 20: Waterbury Area Hospitals Acute Care Gain or Loss per Discharge or Case by Service Line, FYs 2004 - 2006

	Gain or Loss Per Discharge/Case ($)[1]				% Change		
Service Line	FY 2006	FY 2005	FY 2004	3-yr Average	06/05	05/04	06/04
Medical	(127)	62	322	**82**	-306	-81	353
Surgical	(1,871)	(1,112)	(850)	**(1,282)**	68	31	55
Behavioral Health	(2,834)	(1,805)	(1,472)	**(2,015)**	57	23	48
Maternity/Pediatrics	(794)	(765)	(927)	**(830)**	4	-18	-17
Total	**(899)**	**(549)**	**(386)**	**(612)**	64	42	57

[1] The combined per case gain/loss is sum of total revenue for the two hospitals minus the sum of their total costs divided by sum of discharges from both hospitals.

C. Emergency Department utilization

Emergency Departments (ED) are an essential part of a health care system as they serve as the safety net for communities. For vulnerable populations, they can also be the primary mode of access to health care in general.

Between the two hospitals, the Waterbury area has 73 ED beds (Table 21); St. Mary's Hospital recently added eight of beds in response to continuous growth in volumes. Both hospitals experience "boarding" in the ED where patients wait over 12 hours for admission to an inpatient bed or transferred to mostly psychiatric facilities, throughout the year. Longer wait times and boarding occur mostly for medical/surgical, telemetry and psychiatric patients despite improvements in patient flow processes. The wait for inpatient admits is mostly related to staffing constraints or physical limitations to increase available beds.

Table 21: Waterbury Area Hospitals Emergency Department Beds, 2006

St. Mary's Hospital		Waterbury Hospital	
Description	Beds	Description	Beds
Treatment Room	24	Acute ER	21
Trauma room	2	Prompt Care	5
Behavioral Health	5	Behavioral Health	4
Urgi-care room	7	Surge (for high census & boarders)	5
Total	**38**	**Total**	**35**

Area residents recorded an average of 115,300 ED visits or 552 visits per 1,000 of their population per year (Table 22) which is over 1.3 times the average rate for the state and the nation,[12] an average that continues to rise from year to year. The high utilization rate may be associated with insufficient availability of primary care services in the area; increased demand on EDs to provide primary care after hours coverage; admission of physician referred patients through the ED because of limited capacity to accommodate direct admit patients; and increased patient disease acuity from lack of ongoing preventive care or management.

Table 22: Waterbury Area Hospital Emergency Department Utilization, FYs 2004 - 2006

Hospital		FY 2006	FY 2005	FY 2004	3-yr Average
St. Mary's	Treated & Discharged[1]	56,170	55,165	52,044	54,460
	Treated & Admitted[1]	8,286	8,177	7,581	8,015
	All ED Visits	64,456	63,342	59,625	62,474
Waterbury	Treated & Discharged	43,360	45,506	44,581	44,482
	Treated & Admitted	8,828	8,126	8,075	8,343
	All ED Visits	52,188	53,632	52,656	52,825
Waterbury Area Hospitals	**Treated & Discharged**	**99,530**	**100,671**	**96,625**	**98,942**
	Treated & Admitted	**17,114**	**16,303**	**15,656**	**16,358**
	All ED Visits	**116,644**	**116,974**	**112,281**	**115,300**
ED Utilization Per 1,000		538	560	538	552

When a patient visits an ED, the patient is either "treated and discharged" or "treated and admitted" to inpatient care or transferred to other types of health care institutions. In the Waterbury area, an average of 16,358 or 14% of ED visits result in an acute care admission, which is similar to 15% in the state. Also similar to the state, inpatients admitted through the ED at the two hospitals have increased from one-third of all acute care inpatients in FY 2004 to one-half in FY 2006. In both instances, admissions through the ED have effectively replaced physician referrals as the primary source of admissions to acute care.

Some of the top ten primary reasons for ED visits for the "treated and discharged" probably could have been taken care of in a doctor's office or a primary care center providing one was available at onset of symptoms (for details see Appendices 10 and 11). The top ten primary reasons Waterbury area hospitals admitted ED patients to inpatient care were mostly cardiac, respiratory or infection related (for details see Appendix 12).

On average, Waterbury Hospital cost per ED per visit is almost 1.5 times St. Mary's cost (Table 23). According to the hospitals, the difference is in the items each hospital includes in its cost structure. For example, in this case St. Mary's Hospital excludes ED-related physician cost but accounts for it in the cost structure of its for-profit affiliate, the Franklin Medical Group, PC. Waterbury Hospital's cost structure also includes the cost of medical liability.

Table 23: Waterbury Area Hospital Emergency Department Cost[1] Per Treated and Discharged Visit, FYs 2004 - 2006

	Average Cost per Visit ($)			
Hospital	FY 2006	FY 2005	FY 2004	3-yr Average
St. Mary's	290	290	242	274
Waterbury	484	454	444	460
Waterbury Area Hospitals	**374**	**364**	**335**	**358**

[1] There may be a variation in the components of cost between hospitals.

Similar to inpatient care services, both hospitals provide emergency services at a loss per visit; the three-year combined average loss was $17 per "treated and discharged" visit (Table 24). The losses are increasing from year to year. Waterbury Hospital experienced the higher losses per visit than St. Mary's Hospital.

Table 24: Waterbury Area Hospital Emergency Department Gain or Loss Per Treated & Discharged Visit, FYs 2004 - 2006

	Gain or Loss Per Discharge/Visit ($)[1]			
Hospital	FY 2006	FY 2005	FY 2004	3-yr Average
St. Mary's	(22)	(15)	24	(5)
Waterbury[2]	(36)	(29)	(30)	(32)
Waterbury Area Hospitals	**(28)**	**(21)**	**(1)**	**(17)**

[1] For each cell, the combined per case gain/loss is sum of net revenues for the two hospitals minus the sum of total costs for the two divided by sum of discharges from both hospitals.

D. Outpatient services utilization

Outpatient (OP) services the two hospitals provide in the area include medical and dental clinics; behavioral health care and other OP care such as one-day surgery, radiology, laboratory, gastroenterology and other services.

i. Medical clinic utilization

Affiliates of each hospital own and operate the medical outpatient clinics for both hospitals.

Franklin Medical Group, PC (FMG) a for-profit entity, provides adult primary care in its Family Health Center, pediatric primary care in its Children's Health Center and dental care in the Dental Health Center for St. Mary's Hospital. On average, FMG records 47,996 visits per year at the three clinics combined (Table 25). In the last three years, area residents made the largest number of visits in FY 2005 at 50,174, but this dropped by 6% by the end of FY 2006.

Table 25: St. Mary's Hospital Medical Clinic Visits by Service Line, FYs 2004 - 2006

	Visits				% Change		
Clinic Service	FY 2006	FY 2005	FY 2004	3-yr Average	06/05	05/04	06/04
Family Health	21,830	25,313	22,927	**23,357**	-14	10	-5
Children's Health	17,732	18,146	17,524	**17,801**	-2	4	1
Dental	7,460	6,715	6,342	**6,839**	11	6	15
Total	**47,022**	**50,174**	**46,793**	**47,996**	-6	7	0

While visits to the clinics will drop in FY 2006, cost per visit will rise in each clinic to an average $132 for all clinics (Table 26). Except for dental care, cost per visit at each of the other two clinics was lowest at the three-year peak volumes.

Table 26: St. Mary's Hospital Clinics Cost per Visit by Service, FYs 2004 - 2006

	Cost Per Visit ($)				% Change		
Clinic Service	FY 2006	FY 2005	FY 2004	3-yr Average	06/05	05/04	06/04
Family Health	140	117	125	**127**	20	-7	11
Children's Health	138	122	144	**134**	13	-15	-5
Dental	94	79	57	**78**	20	38	39
Total	**132**	**113**	**123**	**123**	16	-8	7

From year to year, FMG operated the three clinics at a loss per visit; by the end of FY 2006, loss per visit will increase by 10% to $77 (Table 27).

Table 27: St. Mary's Hospital Clinics Gain or Loss per Visit by Service, FYs 2004 - 2006

	Gain/Loss Per Discharge/Case ($)				% Change		
Clinic Service	FY 2006	FY 2005	FY 2004	3-yr Average	06/05	05/04	06/04
Family Health	(93)	(89)	(89)	(90)	4	0	4
Children's Health	(69)	(55)	(79)	(67)	25	-31	-15
Dental	(51)	(40)	(35)	(42)	28	12	30
Total	**(77)**	**(70)**	**(78)**	**(75)**	10	-11	-2

Greater Waterbury Network, Inc owns Chase Outpatient Center and the HIV clinic; but the Greater Waterbury Management Resources, Inc. and Alliance Medical Group, PC operate the two clinics on behalf of Waterbury Hospital. The outpatient center provides primary care, neurology, orthopedics, podiatry and urology services and the other provides HIV-related medical services and counseling to the Waterbury area.

Together the two clinics record an average of 10,895 visits per year and the number of visits is expected to grow by 24% by the end of FY 2006 and 5% in the three-year period (Table 28).

Table 28: Waterbury Hospital Clinic Visits by Service Line, FYs 2004 – 2006

	Visits				% Change		
Clinic Service	FY 2006	FY 2005	FY 2004	3-yr Average	06/05	05/04	06/04
Chase Outpatient Center	10,712	8,581	10,806	**10,033**	25	-21	-1
HIV	1,138	997	451	**862**	14	121	60
Total	**11,850**	**9,578**	**11,257**	**10,895**	24	-15	5

The Waterbury Hospital only provided revenue data for the two clinics because cost at service line level is not available; as a result, OHCA is unable to determine gain or loss per visit at this time.

ii. Behavioral health services utilization

Patients in need of behavioral health care who receive adequate and continuous outpatient care have a reduced tendency to require emergency or inpatient care; therefore, there is a community benefit associated with providing outpatient psychiatric care. The FMG provides adult behavioral and substance abuse care for St. Mary's Hospital, while Behavioral Health of Waterbury Hospital Mental Health Outpatient Services and Behavioral Health of Waterbury Hospital Mental Addiction Services, both owned by Waterbury Hospital, provide psychiatry and addiction treatment for adolescents and children (ten years and older), adults and geriatrics.

Over the three-year period, the psychiatric clinics operated by or on behalf of the two hospitals experienced some decline in number of cases and visits, the facilities treated an average of 12,344 cases in 33,536 visits or 3 visits per case (Table 29). Although Waterbury Hospital clinics treated the overwhelming majority, on average, St. Mary's cases visited the clinics three times as often.

Table 29: Waterbury Area Hospitals Outpatient Psychiatric Cases, Visits and Average Visits per Case, FYs 2004 - 2006

	Number of Cases				% Change		
Hospital	FY 2006	FY 2005	FY 2004	3-yr Average	06/05	05/04	06/04
St. Mary's	1,026	929	816	**924**	10	14	26
Waterbury	10,978	11,428	11,854	**11,420**	-4	-4	-7
Waterbury Area	**12,004**	**12,357**	**12,670**	**12,344**	-3	-2	-5
	Number of Visits				% Change		
Hospital	FY 2006	FY 2005	FY 2004	3-yr Average	06/05	05/04	06/04
St. Mary's	6,712	5,898	3,731	**5,447**	14	58	80
Waterbury	26,100	28,601	29,566	**28,089**	-9	-3	-12
Waterbury Area	**32,812**	**34,499**	**33,297**	**33,536**	-5	4	-1
	Average Visits/Case						
Hospital	FY 2006	FY 2005	FY 2004	3-yr Average			
St. Mary's	7	6	5	**6**			
Waterbury	2	3	2	**2**			
Waterbury Area	**3**	**3**	**3**	**3**			

The three-year average costs per visit to psychiatric clinics were similar, $161 for St. Mary's and $162 for Waterbury (Table 30). Prior to FY 2006, the cost of an outpatient psychiatric clinic visit at St. Mary's Hospital was at least 1.5 times higher than one at Waterbury Hospital, but in FY 2006 there was substantial decline in the cost at St. Mary's. Cost per case is higher at St. Mary's Hospital because of relatively more frequent of visits per case (Table 29). Generally, some of the variations in cost are attributable to what is included in cost; components of cost tend to vary from hospital to hospital especially in cases where affiliates provide the service on behalf of the hospital.

Table 30: Waterbury Area Hospitals Outpatient Psychiatric Cost Per Case or Visit, FYs 2004 - 2006

	Cost Per Case ($)[1]			
Hospital	FY 2006	FY 2005	FY 2004	3-yr Average
St. Mary's	1,625	2,427	2,276	**950**
Waterbury	669	686	638	**398**
	Cost Per Visit ($)[1]			
Hospital	FY 2006	FY 2005	FY 2004	3-yr Average
St. Mary's	248	382	498	**161**
Waterbury	281	274	256	**162**

[1] There may be a variation in the components of cost between hospitals.

Each hospital's affiliate provides outpatient psychiatric services at a loss per case; the average combined losses over the three-year period was $328 with most of the losses occurring at St. Mary's Hospital, because the hospital had higher average number of visits and per unit cost (Table 31). Losses per visit for the hospitals converge in FY 2006 at $115 for St. Mary's and $113 for Waterbury.

Table 31: Waterbury Area Hospital Outpatient Psychiatric Gain or Loss Per Case and Visit, FYs 2004 - 2006

	Gain or Loss Per Case ($)[1]				% Change		
Hospital	FY 2006	FY 2005	FY 2004	3-yr Average	06/05	05/04	06/04
St. Mary's	(755)	(915)	(1,586)	**(1,053)**	7	-12	-7
Waterbury	(268)	(251)	(287)	**(269)**	3	-19	-16
Waterbury Area	**(310)**	**(301)**	**(370)**	**(328)**	-3	19	-13
	Gain or Loss Per Visit ($)[1]						
Hospital	FY 2006	FY 2005	FY 2004	3-yr Average			
St. Mary's	(115)	(144)	(347)	**(179)**	12	-13	-2
Waterbury	(113)	(100)	(115)	**(109)**	5	-23	-20
Waterbury Area	**(113)**	**(108)**	**(141)**	**(121)**	-5	23	-17

[1] Combined per case gain/loss is sum of total net revenue for the two hospitals minus the sum of their total costs divided by sum of cases or visits from both hospitals.

iii. Other outpatient services utilization

Other outpatient services utilization based on data received from the two hospitals consist of services such as one-day surgery, radiology, laboratory, gastroenterology and other services. Ownership structures vary between hospitals and private practice physicians so the data may not be consistent or necessarily comparable.

In the three-year period combined other OP services declined by 6% (Table 32).

Table 32: Waterbury Area Hospitals Other Outpatient Utilization, FYs 2004 – 2006

	Visits				% Change		
Hospital	FY 2006	FY 2005	FY 2004	3-yr Average	06/05	05/04	06/04
St. Mary's	135,516	131,538	141,478	136,177	3	-7	-4
Waterbury	110,122	111,971	119,728	113,940	-2	-6	-8
Waterbury Area	**245,638**	**243,509**	**261,206**	**250,118**	1	-7	-6
Utilization Per 1,000	1,176	1,166	1,251	1,198			

Other OP services cost per visit at Waterbury was 1.5 times St. Mary's, although this may vary from service to service (Table 33).

Table 33: Waterbury Area Hospital Other Outpatient Cost Per Visit, FYs 2004 - 2006

	Cost Per Visit ($)			
Hospital	FY	FY 2005	FY 2004	3-yr Average
St. Mary's	224	230	214	223
Waterbury	363	354	320	345
Waterbury Area	**286**	**287**	**263**	**278**

[1] There may be a variation in the components of cost between hospitals.

Despite the declining volumes, both hospitals made some gains per case providing other outpatient services. The two hospitals made experienced gains per visit for three consecutive years with most of the gains occurring at St. Mary's Hospital, (Table 34)

Table 34: Waterbury Area Hospitals Other Outpatient Gain or Loss Per Visit, FYs 2004 - 2006

	Gain or Loss Per Visit ($)[1]			
Hospital	FY 2006	FY 2005	FY 2004	3-yr Average
St. Mary's	25	13	32	23
Waterbury[2]	16	15	15	15
Waterbury Area Hospitals	**21**	**14**	**24**	**20**

[1] The combined per case gain/loss is sum of total revenue for the two hospitals minus the sum of their total costs divided by sum of discharges from both hospitals.

D. Payer reimbursement and mix

Hospital profitability relies significantly on a balance between patients covered by commercial/private insurance, government sponsored programs, such as Medicare, Medicaid or state or local programs in Connecticut such as State-Administered General Assistance (SAGA), and self-pay or uninsured patients. The driving force behind the gain or loss per case is the source of reimbursement.

Federal and state governments predetermine payment rates for Medicare and Medicaid patients, while hospitals negotiate reimbursement rates with private and commercial payers. In general, Medicaid rates do not fully cover cost while private or commercial programs traditionally reimburse at or above costs, depending on how the negotiated rates favor the hospitals.

In the Waterbury area, Medicare and private payers reimburse slightly above cost but reimbursement rates have been declining from year to year (Table 35). Currently, the two payers reimburse the two hospitals just enough to offset each other's underpayments. In FY 2005, Medicaid reimbursed less than one-half of St. Mary's Hospital's cost and less than 80% of Waterbury Hospital's.

Table 35: Waterbury Area Hospitals Primary Payer Payment to Cost, FYs 2003 - 2005

	St. Mary's Hospital			Waterbury Hospital			Connecticut		
	FY03	FY04	FY05	FY03	FY04	FY05	FY03	FY04	FY05
Ratio of cost to charges	0.44	0.44	0.47	0.42	0.36	0.34	0.49	0.46	0.44
Medicare payment to cost	1.03	1.12	1.03	0.89	0.95	0.96	0.97	0.97	0.97
Medicaid payment to cost	0.85	0.80	0.47	0.68	0.82	0.79	0.73	0.73	0.72
Private payment to cost	0.95	1.08	0.96	1.02	1.07	1.06	1.14	1.18	1.20

Source: *Office of Health Care Access Hospital Financial Stability Reports for multiple years*

i. Hospital payer mix

Commercial payers are the dominant primary payer in the Waterbury Area accounting for 41% of total patient volume all services combined. Medicare accounts for 30%, Medicaid for almost one-quarter and self-pay or the uninsured for 4% (Table 36). In fact, commercial payers are the leading primary payer (46%) in the sole profitable areas of service for the hospitals; other outpatient services, which include one-day surgery, radiology, laboratory, gastroenterology and all other services except ED and outpatient psychiatry. The payer mix varies between services and hospitals. EDs in the area have an unfavorable payer-mix with over one-half of their patient volume being either Medicaid-covered or self-pay or uninsured and an annually declining share of commercially-covered patients. Although both hospitals provide care to a large portion of uninsured patients, 9% for St. Mary's Hospital and 11% for Waterbury Hospital, St. Mary's Hospital treats a disproportionate share (49%) of Medicaid patients in the ED. The payer mix presented in Table 36 is directly and highly correlated to the demographic profile outlined in Section 3.0.

Table 36: Waterbury Area Hospitals Payer Mix by Department, FYs 2004 - 2006

Services	Primary Payer	St. Mary's (%)			Waterbury (%)			Waterbury Area Hospitals (%)		
		FY06	FY05	FY04	FY06	FY05	FY04	FY06	FY05	FY04
Inpatient Discharges	Medicare	42	43	43	44	43	43	43	43	43
	Medicaid	25	23	23	21	20	20	23	22	21
	Commercial	31	32	32	33	34	34	32	33	33
	Worker's Compensation	1	1	1	1	1	1	1	1	1
	Self-pay/uninsured	1	1	1	1	2	1	1	1	1
	Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Emergency Department Treated and Discharged Visits	Medicare	14	15	15	17	18	18	15	16	16
	Medicaid	49	46	43	34	33	32	42	40	38
	Commercial	26	27	29	36	37	37	30	32	33
	Worker's Compensation	2	2	3	3	3	3	2	3	3
	Self-pay/uninsured	9	9	10	11	10	10	10	10	10
	Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Outpatient Behavioral Health Visits	Medicare	9	13	9	46	47	45	43	44	42
	Medicaid	55	58	54	37	35	38	38	37	39
	Commercial	36	28	36	15	16	16	17	17	17
	Worker's Compensation	0	0	0	0	0	0	0	0	0
	Self-pay/uninsured	1	1	0	2	2	2	2	2%	2
	Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
All Other Outpatient Visits	Medicare	32	33	32	30	31	32	31	32	32
	Medicaid	17	17	16	18	18	18	18	18	17
	Commercial	47	47	46	45	45	45	46	46	45
	Worker's Compensation	1	1	3	1	1	1	1	1	2
	Self-pay/uninsured	2	2	3	5	5	4	4	3	4
	Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Hospital Total	**Medicare**	**28**	**28**	**28**	**32**	**33**	**33**	**30**	**31**	**31**
	Medicaid	**26**	**26**	**24**	**20**	**19**	**19**	**23**	**23**	**22**
	Commercial	**41**	**41**	**41**	**42**	**42**	**42**	**41**	**42**	**41**
	Worker's Compensation	**2**	**1**	**3**	**1**	**1**	**1**	**1**	**1**	**2**
	Self-pay/uninsured	**4**	**4**	**4**	**5**	**4**	**4**	**4**	**4**	**4**
	Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

ii. Medical clinics payer mix

Based on a three-year average, four of every five visits to St. Mary's Hospital medical clinics were Medicaid covered or self-pay or uninsured, 14% of the visits were commercially-covered and 7% were covered by Medicare (Table 37). An overwhelming majority of visits to the Children's Health and Dental clinics were Medicaid covered, while family health has seen a sharp rise in self-pay or uninsured visits for family health care.

Table 37: St. Mary's Hospital's Outpatient Medical Clinics Payer Mix, FYs 2004 - 2006

		St. Mary's Hospital			
Clinic Services	Primary Payer	FY 2006	FY 2005	FY 2004	3-Yr Average
Family Health	Medicare	17%	14%	13%	14%
	Medicaid	58%	69%	73%	69%
	Commercial	11%	12%	10%	11%
	Self-pay	14%	5%	4%	6%
	Total	**100%**	**100%**	**100%**	**100%**
Children's Health	Medicare	0%	0%	0%	0%
	Medicaid	86%	83%	83%	83%
	Commercial	11%	15%	15%	14%
	Self-pay	3%	2%	2%	2%
	Total	**100%**	**100%**	**100%**	**100%**
Dental	Medicare	0%	0%	0%	0%
	Medicaid	96%	66%	66%	73%
	Commercial	3%	28%	28%	22%
	Self-pay	1%	6%	6%	5%
	Total	**100%**	**100%**	**100%**	**100%**
Clinic Total	**Medicare**	**6%**	**7%**	**7%**	**7%**
	Medicaid	**78%**	**73%**	**76%**	**75%**
	Commercial	**10%**	**15%**	**14%**	**14%**
	Self-pay	**6%**	**4%**	**4%**	**4%**
	Total	**100%**	**100%**	**100%**	**100%**

The Waterbury Hospital medical clinics payer mix is similar to St. Mary's Hospital's, primarily covered by Medicaid or self-pay or uninsured (Table 38).

Table 38 : Waterbury Hospital Outpatient Medical Clinics Payer Mix, FYs 2004 – 2006

		Waterbury Hospital			
Clinics	Primary Payer	FY 2006	FY 2005	FY 2004	3-yr Average
Chase Outpatient Center	Commercial	13%	9%	10%	11%
	Medicaid	54%	52%	54%	54%
	Medicare	24%	26%	25%	25%
	Self-pay/Uninsured	10%	12%	10%	11%
	Worker's Compensation	0%	0%	0%	0%
	Total	**100%**	**100%**	**100%**	**100%**
HIV Clinic	Commercial	20%	22%	31%	23%
	Medicaid	50%	44%	45%	47%
	Medicare	15%	14%	19%	16%
	Self-pay/Uninsured	15%	19%	5%	15%
	Worker's Compensation	0%	0%	0%	0%
	Total	**100%**	**100%**	**100%**	**100%**
Clinic Total	**Commercial**	**13%**	**10%**	**11%**	**12%**
	Medicaid	**54%**	**52%**	**54%**	**53%**
	Medicare	**23%**	**25%**	**24%**	**24%**
	Self-pay/Uninsured	**10%**	**13%**	**10%**	**11%**
	Worker's	**0%**	**0%**	**0%**	**0%**
	Total	**100%**	**100%**	**100%**	**100%**

5.0 Financial status of the hospitals at the end of FY 2006

Although by the end of FY 2006 St. Mary's Hospital decreased its operating losses, it continued to operate at a deficit, (3.7%) in FY 2006 compared to (10.02%) in FY 2005, (Table 1). Operating loss, for Waterbury Hospital more than tripled from the year before. For both hospitals, expenses continue to exceed revenues and since patient care is the primary source of operating revenue, the cost and the payer mix are critical to the bottom line.

Revenue from government payers (Medicare and Medicaid) to the two hospitals have dropped to 59% in FY 2006 while costs for patients covered by these payers continue to account for about 64% the costs of providing care (Table 39). Government underpayments to the hospitals are augmented by little or no revenues from self-pay patients who account for 2% of the cost of care. Revenues from patients covered by commercial and workers compensation payers although more than cover the costs of caring for those patients (about 41% versus 35% respectively) is still insufficient to make up for the deficit from government payers.

Table 39: Financial profile of St. Mary's Hospital and Waterbury Hospital, FYs 2004 – 2006

	St. Mary's Hospital			Waterbury Hospital		
Financial Statistics	2006*	2005	2004	2006	2005	2004
Net Assets						
Hospital	($136,000)	$23,760,000	$26,430,000	$124,628,134	$126,535,925	$119,504,105
Health System	$1,424,000	$8,469,000	$16,197,000	$163,330,870	$166,079,218	$158,400,874
Hospital Net Revenue Payer Mix*						
Medicare	45%	46%	46%	45%	46%	45%
Medicaid	14%	14%	14%	12%	17%	14%
Commercial	37%	36%	37%	38%	34%	37%
Workers Compensation	4%	3%	3%	4%	1%	3%
Self Pay	0%	0%	0%	0%	2%	0%
	100%	**100%**	**100%**	**100%**	**100%**	**100%**
Hospital Cost Payer Mix*						
Medicare	44%	44%	44%	46%	46%	46%
Medicaid	20%	19%	19%	17%	18%	18%
Commercial	31%	33%	33%	34%	33%	33%
Workers Compensation	2%	2%	2%	1%	1%	1%
Self Pay	2%	2%	2%	2%	2%	2%
	100%	**100%**	**100%**	**100%**	**100%**	**100%**
Financial Indicators						
Current ratio	0.8	1.96	1.78	2.03	2.15	1.93
Days of expenses in accounts payable	72	71	69	42	47	56
Days cash on hand	1	3	5	20	34	42
Days of revenue in accounts receivable	38	48	60	49	42	37
Equity financing ratio	(13%)	3%	7%	35%	37%	36%

Source: *Annual Report on the Financial Status of Connecticut's Short Term Acute Care Hospitals for Fiscal Year 2005, the hospitals' Audited Financial Statements 6 & *data submitted by the hospitals in response to the investigation.*

For consecutive years both hospitals experienced negative operating margins, a sign of financial distress. This is more apparent with St. Mary's Hospital whose rather low current liabilities to current asset ratio, 0.8 in FY 2006, put the hospital at a higher risk for technical insolvency[13]. The hospital's cash flow position worsened with the amount of cash on hand to meet its short-term obligations during the year dropping from three days in FY 2005 to one day in FY 2006. The median number of days of cash on hand for the state and the nation in FY 2005 were 37.6 and 25.8 days respectively and an increasing trend is more favorable. To improve cash flow, the hospital shortened the average time it took to collect revenues from billed patients by ten days down to 38 days but that was not enough to improve the average time it took to pay creditors, which increased by one day up to 72 days.

Over the last three years, Waterbury Hospital has experienced deterioration in its cash flows; the hospital's days of cash on hand have reduced from 42 days to 20 days, which is below state and national medians. This may relate to the fact that it took the hospital seven days more to collect revenues from billed patients on average, and it paid its creditors five days earlier than the year prior. However, Waterbury Hospital is at very low risk of technical insolvency indicated by its current assets to current liabilities ratio in FY 2006 of 2.03 which is above the median for the state and nation.

Appendix A

C.G.S. §19a-633

Investigative powers. The commissioner or any agent authorized by him to conduct any inquiry, investigation or hearing under the provisions of this chapter, shall have power to administer oaths and take testimony under oath relative to the matter of inquiry or investigation. At any hearing ordered by the office, the commissioner or such agent having authority by law to issue such process may subpoena witnesses and require the production of records, papers and documents pertinent to such inquiry. If any person disobeys such process or, having appeared in obedience thereto, refuses to answer any pertinent question put to him by the commissioner or his authorized agent or to produce any records and papers pursuant thereto, the commissioner or his agent may apply to the superior court for the judicial district of Hartford or for the judicial district wherein the person resides or wherein the business has been conducted, or to any judge of said court if the same is not in session, setting forth such disobedience to process or refusal to answer, and said court or such judge shall cite such person to appear before said court or such judge to answer such question or to produce such records and papers.

Appendix 1: Saint Mary's Hospital Licensed and Staffed Beds by Service Line, FYs 2004 - 2006

Service Line	Licensed Beds	Staffed Beds				% of Licensed Beds Staffed in FY 2006
		FY 2006	FY 2005	FY 2004	3-yr Average	
Medical/Surgical	228	105	102	102	103	46%
OB/GYN	32	31	31	31	31	97%
Psychiatry	20	12	12	12	12	60%
Critical Care	55	43	35	35	38	78%
Pediatrics	12	10	10	10	10	83%
Total	347	201	190	190	194	58%
Total Bassinets	32	32	32	32	32	100%

Appendix 2: Waterbury Hospital Licensed and Staffed Beds by Service Line, FYs 2004 - 2006

Service Line	Licensed Beds	Staffed Beds				% of Licensed Beds Staffed in FY 2006
		FY 2006	FY 2005	FY 2004	3-yr Average	
Medical/Surgical	251	155	155	147	152	62%
OB/GYN	32	31	32	32	32	97%
Psychiatry	30	30	30	30	30	100%
Critical Care	20	20	20	20	20	100%
Pediatrics	24	10	10	10	10	42%
Total	357	246	247	239	244	69%
Total Bassinets	36	36	36	36	36	100%

Appendix 3: Saint Mary's Hospital Acute Care Discharges by Service Line, FYs 2004 - 2006

	Discharges				% Change		
Service Line	FY 2006	FY 2005	FY 2004	3-Yr Average	06/05	05/04	06/04
Medical	6,000	5,702	5,467	**5,723**	5	4	9
Surgical	3,320	3,403	3,308	**3,344**	-2	3	0
Behavioral Health	602	590	574	**589**	2	3	5
Maternity/Pediatrics	3,044	2,570	2,739	**2,784**	18	-6	10
Total	**12,966**	**12,265**	**12,088**	**12,440**	6	1	7

Appendix 4: Waterbury Hospital Acute Care Discharges by Service Line, FYs 2004 - 2006

	Discharges				% Change		
Service Line	FY 2006	FY 2005	FY 2004	3-Yr Average	06/05	05/04	06/04
Medical	6,546	6,861	6,588	**6,665**	-5	4	-1
Surgical	4,228	4,124	4,044	**4,132**	3	2	4
Behavioral Health	936	1,131	1,076	**1,048**	-17	5	-15
Maternity/Pediatrics	2,886	3,372	3,379	**3,212**	-14	0	-17
Total	**14,596**	**15,488**	**15,087**	**15,057**	**-6**	3	**-3**

Appendix 5: Saint Mary's Hospital Acute Care Days by Service Line, FYs 2004 - 2006

	Days				% Change		
Service Line	FY 2006[1]	FY 2005	FY 2004	3 yr Average	06/05	05/04	06/04
Medical	29,890	27,678	26,297	**27,955**	8	5	12
Surgical	18,272	16,931	17,307	**17,503**	8	-2	5
Behavioral Health	3,864	3,709	3,588	**3,720**	4	3	7
Maternity/Pediatrics	7,966	6,781	7,008	**7,252**	17	-3	12
Total	**59,992**	**55,099**	**54,200**	**56,430**	**9**	**2**	**10**

Appendix 6: Waterbury Hospital Acute Care Days by Service Line, FYs 2004 - 2006

	Days				% Change		
Service Line	FY 2006	FY 2005	FY 2004	3 yr Average	06/05	05/04	06/04
Medical	33,582	34,054	32,532	**33,389**	-1	5	3
Surgical	21,654	19,414	20,525	**20,531**	12	-5	5
Behavioral Health	7,342	8,184	7,776	**7,767**	-10	5	-6
Maternity/Pediatrics	7,836	9,188	8,972	**8,665**	-15	2	-14
Total	**70,414**	**70,840**	**69,805**	**70,353**	**-1**	**1**	**1**

Appendix 7: Case Mix Index for St. Mary's and Waterbury Hospitals, FY 2003 - 2005

	FY 2006[1]	FY 2005	FY 2004	FY 2003
St. Mary's	-	1.3577	1.3576	1.3733
Waterbury	-	1.3534	1.3848	1.4015

Source: *OHCA Hospital Budget System*
[1] Not yet available to OHCA.
Case mix index - measures the relative cost of treating patients at a hospital, the average cost is 1.0.

Appendix 8: Saint Mary's Hospital Acute Care Gain or Loss per Discharge or Case by Service Line, FYs 2004 – 2006

	Gain or Loss Per Discharge/Case ($)				% Change		
Service Line	FY 2006	FY 2005	FY 2004	3-yr Average	06/05	05/04	06/04
Medical	69	431	617	**364**	-84	-30	-790
Surgical	(2,809)	(1,493)	(1,550)	**(1,947)**	88	-4	45
Behavioral Health	(2,543)	(2,162)	(1,594)	**(2,107)**	18	36	37
Maternity/Pediatrics	(561)	(1,275)	(1,298)	**(1,022)**	-56	-2	-131
Total	**(937)**	**(585)**	**(515)**	**(684)**	60	14	45

Appendix 9: Waterbury Hospital Acute Care Gain or Loss per Discharge or Case by Service Line, FYs 2004 – 2006

	Gain or Loss Per Discharge/Case ($)				% Change		
Service Line	FY 2006	FY 2005	FY 2004	3-yr Average	06/05	05/04	06/04
Medical	(308)	(245)	76	**(160)**	25	-422	125
Surgical	(1,135)	(797)	(278)	**(743)**	42	187	75
Behavioral Health	(3,021)	(1,618)	(1,407)	**(1,964)**	87	15	53
Maternity/Pediatrics	(1,040)	(376)	(627)	**(663)**	177	-40	40
Total	**(866)**	**(521)**	**(282)**	**(553)**	66	85	67

Appendix 10: St. Mary's Hospital Top Ten Principal Reasons for Emergency Department Treated and Discharged Visits, FYS 2004 – 2006q1q2

ICD-9-CM Diagnosis Code	Code Description	FY 2006[1]	FY 2005	FY 2004
465.9	Acute upper respiratory infections, unspecified site, not otherwise specified (NOS)	1,069	1,406	1,364
382.9	Otitis Media, NOS	832	1,590	1,458
34	Strep sore throat	637		
V58.3	Attending-surgical dressing/suture	617	1,050	862
79.99	Viral infection, NOS	595	1,010	1,096
462	Acute pharyngitis	529	809	760
599	Urinary tract infection, NOS	426	842	840
789	Abdominal Pain, Unspecified site	419		
493.92	Asthma NOS with acute exacerbation	409	868	794
786.59	Chest Pain Nec	406	846	772
847	Sprain Of Neck			818
786.5	Chest Pain NOS		867	797
784	Headache		876	
	Top Ten Total	**5,939**	**10,164**	**9,561**
	% of ED Treated & Discharged	**10%**	**18%**	**18%**

Appendix 11: Waterbury Hospital Top Ten Primary Reasons for Emergency Department Treated and Discharged Visits, FYs 2004 - 2006

ICD-9-CM Diagnosis Code	Diagnosis Description	FY 2006[1]	FY 2005	FY 2004
789	Abdominal pain unspecified site	714	1,512	1,377
382.9	Otitis media NOS	519	1,008	1,072
780.6	Fever	502	950	844
786.5	Chest Pain NOS	493	932	834
465.9	Acute URI NOS	390	629	663
462	Acute pharyngitis	346		
786.59	Chest pain NEC	338	775	737
883	Open wound of finger	296	730	674
845	Sprain of ankle NOS	276	654	
784	Headache	275	638	
847.2	Sprain lumbar region			640
847	Sprain of neck		677	836
490	Bronchitis NOS			657
	Top Ten Total	**4,149**	**8,505**	**8,334**
	% of ED Treated & Discharged	**19%**	**19%**	**19%**

Appendix 12: Waterbury Hospitals Top Ten Primary Reasons for Emergency Department Treated and Admitted to Acute Care, FYs 2004 - 2006

ICD-9-CM Diagnosis Code	Diagnosis Description	FY 2006	FY 2005	FY 2004
486	Pneumonia	658	528	514
428	Congestive heart failure	517	455	377
786.59	Other chest pain	304	307	246
427.31	Atrial fibrillation	297	251	193
414.01	Coronary atherosclerosis	304	178	168
410.71	Subendocardial infarction	247	254	278
38.9	Unspecified septicemia	258		
518.81	Acute respiratory failure	256	193	150
599.0	Urinary tract infection, site not specified	262	224	204
780.2	Syncope and collapse	263		
276.5	Volume depletion		250	242
491.21	Obstructive chronic bronchitis with acute exacerbation			224
584.9	Acute renal failure, unspecified		173	
Total		**3,366**	**2,813**	**2,596**

Source: *OHCA Acute Care Discharge Database*

[1] *Snapshot: Connecticut's Health Insurance. Results of the Office of Health Care Access 2004 Household Survey. January 2005.*
[2] *Who are the Uninsured? Characteristics of Uninsured Workers in Connecticut.* Office of Health Care Access. January 2003.
[3] *Rising Acute Care Hospitals Inpatient Charges – FYs 1991 – 1999.* Office of Health Care Access. June 2001
[4] *Studying Health Care Utilization in Connecticut: Report to the General Assembly.* Office of Health Care Access. June 2006.
[5] Minorities include Blacks, American Indians or Eskimos or Aleuts, Hawaiian or Pacific Islanders, Asians, other non-whites and Hispanics or Latinos of any race.
[6] *Studying Health Care Utilization in Connecticut: Report to the General Assembly.* Office of Health Care Access. June 2006.
[7] *Snapshot: Connecticut's Health Insurance. Results of the Office of Health Care Access 2004 Household Survey. January 2005.*
[8] *Databook - Preventable Hospitalizations in Connecticut: Assessing Access to Community Health Services, FYs 2000 - 2004.* Office of Health Care Access. September 2005.
[9] *Health Care for Connecticut's Underserved Populations.* Connecticut Department of Public Health. November 2005.
[10] Department of Mental Health and Addiction Services (DHMAS) mental health service area which comprises of the towns of Barkhamsted, Beacon Falls, Bethel, Bethlehem, Bridgewater, Brookfield, Canaan, Cheshire, Colebrook, Cornwall, Danbury, Goshen, Hartland, Harwinton, Kent, Litchfield, Middlebury, Morris, Naugatuck, New Fairfield, New Hartford, New Milford, Newtown, Norfolk, North Canaan, Oxford, Prospect, Redding, Ridgefield, Roxbury, Salisbury, Sharon, Sherman, Southbury, Thomaston, Torrington, Warren, Washington, Waterbury, Watertown, Winchester, Wolcott, and Woodbury.
[11] *Report of the Committee to Examine Hospital Inpatient Behavioral Health Bed Capacity for Children* .Submitted to the General Assembly. January 2006.
[12] *Studying Health Care Utilization in Connecticut: Report to the General Assembly.* Office of Health Care Access June 2006.
[13] *Almanac of Hospital Financial and Operating Indicators, A comprehensive benchmark of the nation's hospitals.* Ingenix 2007.

Attachment B

State of Connecticut

THE CHARTIS GROUP, LLC. REPORT

Docket Number 06-30760-VST

Cristine A. Vogel
Commissioner
Office of Health Care Access

St. Mary's Hospital (SMH) and Waterbury Hospital (WH) jointly contracted with The Chartis Group, LLC. to conduct a market overview, a financial review and community needs assessment and present options in the planning efforts to integrate the hospitals.

The consultants projected the financial impact of different levels of possible integration:

Level 1: Administrative and Operational Support Integration only
Level 2: Limited Clinical Integration and Level 1
Level 3: Full Administrative and Clinical Integration

The consultant's model included integration expenses that would be necessary depending on the level of integration required. In summary, these expenses related to cost associated with:

A. Integration Costs: consulting and legal fees, public relations costs, reduction in workforce severance, etc.

B. IT Platform Alignment: Cerner rollout to SMH, fiber optic cable linkage, PACs, telecommunication system integration, etc.

C. Facility Renovation: Emergency Department, inpatient unit expansion, outpatient facilities, etc.

With the assumptions above, the consultants then estimated costs for each level of integration over 5 years:

	Level One ("Millions")	**Level Two** ("Millions")	**Level Three** ("Millions"
A. Affiliation Costs	$ 12.0	$ 17.0	$ 25.0
B. Technical Costs	$ 12.2	$ 12.2	$ 12.2
C. Facilities Costs	$ 1.0	$ 3.9	$ 62.2
	$ 25.2	**$ 33.1**	**$ 99.4**

All levels of integration show a positive financial gain 5 years out. There would be a significant spend down or depletion of Waterbury Hospital cash reserves to facilitate the affiliation. Therefore, WH would be at risk of violating some of its bond covenants and possibly alter its credit profile and its future access to capital.

Summary of Consultant's report:

- SMH is cash flow negative, has a drained balance sheet and is outside its Bond Covenants
- WH has a stronger Balance Sheet but faces income and cash flow challenges that will make it increasingly difficult to fund future capital requirements
- According to the report, it may take more than 10 years to get to the point where the combined entity could afford to build a new combined hospital
- A closer affiliation between WH and SMH can yield significant cost savings opportunity and long term financial benefit to the region's health care delivery system
- While full clinical integration (Level 3) might be too costly in the near term, Level 1 and Level 2 can provide ample net cash flow to stabilize operations and position the delivery system to move toward full clinical integration in the future
- SMH and WH have internal issues that would need to be addressed, such as: Catholic and Secular organizations, WH has a unionized workforce, SMH liabilities, and a general cultural divide between the two organizations.

Attachment C

StayWell
HEALTH CENTER

December 11, 2006

Cristine A. Vogel, Commissioner
State of Connecticut, Office of Health Care Access
410 Capitol Avenue, MS #13HCA
P.O. Box 340308
Hartford, CT 06134-0308

Dear Commissioner Vogel:

Thank you for inviting StayWell Health Center to respond to the recent Draft Study that was completed on the two hospitals in Waterbury. We agree that there are some concerns with the structure of healthcare that impact our community. StayWell is committed to being a part of the solution so that our patients and our community can continue to have quality care that is accessible.

In the past, StayWell has partnered with both hospitals in many successful projects. Most recently we have been working on an integrated network of services for uninsured adults that includes enrollment in Pharmacy Assistance Programs, Linkage with Primary Care, Medicaid Eligibility Screening, Application Assistance and the pursuit of an Electronic Health Record.

However, we want to alert you to the many barriers to providing services that StayWell contends with because they will not make it easy to resolve the community-based issues of access that the Study discusses.

- We have difficulty getting access to Specialists who are not interested in seeing our patients. The low reimbursement rates for Title 18 and Title 19 for non-community health center providers has a trickle down effect on our patients. Not only is this barrier influenced by low reimbursement rates, but when patients have delayed care they become more complicated to manage and pose a greater malpractice risk. At StayWell, we repeatedly encounter patients who have suffered poorer outcomes either due to the lack of specialty access or due to a delay in seeking/receiving primary care because they were uninsured.

- StayWell has a base of $1 million in federal support through HRSA. Other community health centers on average are funded at a significantly higher amount. Federal support has not kept pace with the rapid growth in its client base that StayWell has experienced. In fiscal year 2000, StayWell provided 14,856 health care visits. Six years later, in fiscal year 2006, we provided 55,687 visits, a growth of 275%. StayWell employs 110 health professionals to care for these patients.

80 Phoenix Avenue ✝ Waterbury, CT 06702 ✝ Tel: (203) 756-8021 ✝ Fax: (203) 596-9038

- StayWell does receive funding from the State of Connecticut to assist with providing services to the uninsured. StayWell receives approximately $118,000 from the Department of Public Health on an annual basis to cover costs associated with the uninsured in the Adult Medicine and Dental Departments. This has been reduced over the years with a loss of over $100,000 to cover the costs of Pediatric uninsured services a few years ago. With our uninsured rate rising to 20% of all patient visits, this loss has been a struggle. Again, it is our understanding that our DPH funding for services to the uninsured is much lower than our colleagues throughout the State of Connecticut.

- There are commonalities in the struggles that our healthcare organizations face on a daily basis, primarily staffing. With the shortage in qualified nurses, we are frequently competing for staff. We have seen this to be the case for physicians also. Hiring culturally competent staff is always a struggle and then unfortunately added to the existing community shortages. Ultimately, staffing shortages impact access to care when special outreach services or walk-in hours need to be suspended due to inadequate staff to assign.

Thank you in advance for your consideration of the above-mentioned concerns that must be taken into account when designing a solution. Again, we look forward to continued conversation that will result in a solution for our patients and community.

Respectfully submitted,

Donald J. Thompson, MPS
President/CEO

cc: Robert Ritz
John Tobin
John Blair
Susan Cole England
Karen Roberts

State of Connecticut

HOSPITAL CLOSURES AND MERGERS

IN CONNECTICUT

Docket Number 06-30760-VST

Cristine A. Vogel
Commissioner
Office of Health Care Access

In 1990 Connecticut had 36 acute care general hospitals – today there are 30. The state has experienced the similar national trend with the decreasing number of acute care hospitals. The primary drivers of these closures and mergers are related to reimbursement, competition and shifting population demographics.

After reviewing the state's closures and mergers, it was apparent that each circumstance was different depending upon the financial strengths and weaknesses of the hospitals involved. In all of the mergers (in the cities of Bridgeport, Hartford and Meriden) one hospital was financially capable of absorbing the debt of the less viable hospital; and in no circumstances was the State of Connecticut financially responsible for the merger or closure activity.

Connecticut has experienced 6 mergers; one closure of a small rural community hospital; one acquisition and conversion of a small non-profit to the state's only for-profit hospital. The construction of a new children's hospital and a 94-bed community hospital were both results of mergers. Table 1 provides an overview of the closure and merger activity.

Table 1. Hospital Closures and Mergers in Connecticut

Year	Activity	Surviving Entity	Number of Licensed Acute-Care Hospitals
1990			36
1991	Meriden-Wallingford Hospital merges with WWII Memorial Hospital to form Veterans Memorial Medical Center	Veterans Memorial Medical Center	35
1993	Park City Hospital merges with Bridgeport Hospital	Bridgeport Hospital	34
1995	Mount Sinai Hospital merges with Saint Francis Hospital and Medical Center	Saint Francis Hospital and Medical Center	33
1996	Connecticut Children's Medical Center opens (consolidating services previously provided at three hospitals - Hartford, John Dempsey and Newington Children's Hospital) and succeeding Newington Children's Hospital	Connecticut Children's Medical Center	33
1997	Bankruptcy of Winsted Hospital	Winsted Health Center	32
1998	MidState Medical Center opens as successor to Veterans Memorial Medical Center	MidState Medical Center as successor to VMMC	32
1998	Saint Joseph's Hospital merges with Stamford Hospital	Stamford Hospital	31
2002	Not-for-profit Sharon Hospital acquired by for-profit Essent Healthcare (CT's first for-profit acute care hospital)	Sharon Hospital	31
2006	New Britain Hospital merges with Bradley Memorial Hospital	The Hospital for Central Connecticut	30

The one merger that closely resembles the circumstances with St. Mary's Hospital and the Waterbury Hospital would be the merger of Park City Hospital and Bridgeport Hospital. Below is a brief summary of facts:

Merger of Park City Hospital and Bridgeport Hospital

On March 30, 1993, OHCA issued a decision which authorized the merger of Park City Hospital into Bridgeport Hospital, with Bridgeport Hospital being the surviving entity.

The projects total capital expenditure was $14,327,000 plus $1,561,000 in capitalized financing, for a total capital expenditure of $15,888,000. The $14,388,000 Park City Hospital expenditure component was financed through CHEFA revenue bonds and the remaining $1,000,000 was equity-financed from internally generated funds.

Park City Hospital's Reasons for Merging:

- financial condition was negatively impacted by low and declining utilization of inpatient services
- inability to compete on services
- unable to renegotiate outstanding loan obligations or obtain new sources of capital
- reported long term debt payable of $810,777 and total assets of $23,547,109

Outcome of merger:

- Park City Hospital converted to an inpatient/outpatient rehabilitation center that provided inpatient psychiatric services (eventually relocated to Bridgeport Hospital)
- Park City Hospital's emergency services were replaced with primary care/walk-in center
- all acute care services provided at Park City Hospital (with the exception of ambulatory surgery) would be provided at Bridgeport Hospital site
- the merger resulted in the termination of 194 acute care beds

STATE OF CONNECTICUT

Report of the Region 5 Pediatric Inpatient Psychiatric Services Implementation Group

March 2007

Prepared for:

Cristine A. Vogel, Commissioner
Office of Health Care Access

I. Background

In January 2006, the *Report of the Committee to Examine Hospital Inpatient Behavioral Health Bed Capacity for Children* was issued. The report was prepared in response to Public Act 05-280, "An Act Concerning the Expenditures of the Department of Social Services." The report examined the challenges faced by the 31 acute care hospitals in Connecticut in providing inpatient behavioral health services to pediatric[1] patients, particularly in Mental Health Region 5 (Region 5). Currently, statewide only four of the hospitals have inpatient psychiatric units for children (ages 0 to 12) and six for adolescents (ages 13 to 17). Although not all hospitals have inpatient pediatric behavioral health services, hospitals attempt to accommodate these pediatric patients either in other units within the hospital or transfer them to other facilities for inpatient care.

The committee was to focus on the existing situation in Region 5 which has six acute care hospitals, Charlotte Hungerford, New Milford, Sharon, Danbury, St. Mary's and Waterbury, but only five beds for adolescent behavioral health patients at Waterbury Hospital and none at all for children in any of the hospitals (see Table 1). Also, there are no freestanding psychiatric hospitals in the region. According to the committee's report, in 2004, at least 200 the pediatric patients from the region had to access needed acute inpatient psychiatric care outside the region.

Table 1: CT acute care pediatric behavioral health beds, FY 2004

	# of Operational Beds					
Acute Care Hospitals	**Age 0 - 12**	**Age 13 - 17**	**Swing beds[1]**	**Age 0 - 17**	**Location**	**Region**
Hospital of Saint Raphael	10	5	5	20	New Haven	2
Yale New Haven Psychiatric Hospital	15	14	0	29	New Haven	2
St. Francis Medical Center[2]	12	8	0	20	Hartford	4
Hartford/Institute of Living/CT Children's	9	13	0	22	Hartford	4
Manchester Hospital[3]	0	10	0	10	Manchester	4
Waterbury Hospital	0	5	0	5	Waterbury	5
Sub-Total	**46**	**55**	**5**	**106**		
Psychiatric Hospitals						
Public						
Riverview Children & Youth[4]	-	-	85	85	Middletown	2
Sub-Total	**0**	**0**	**85**	**85**		
Free-standing						
Hall-Brooke Behavioral Health Services	-	-	20 - 34	20 – 34	Westport	1
Silver Hill Hospital	0	10	0	10	New Canaan	1
Natchaug Hospital	6	12	3	21	Mansfield	3
Stonington Institute	0	4	0	4	N. Stonington	3
Sub-Total	**6**	**26**	**23 - 37**	**55 – 69**		
Statewide	**52**	**81**	**113 - 127**	**246 - 260**		

Source: *Report of the Committee to Examine Hospital Inpatient Behavioral Health Bed Capacity for Children, Table 2, page 10.*

[1] Hospitals swing beds between the two age groups on as needed basis.

[2] Physical capacity is 23 beds.

[3] Survey was not administered to hospital.

[4] CT Department of Children and Families (DCF) provided the information; the facility has 12 additional sub-acute care beds.

[1] Under 18 years old.

In accordance with Public Act 05-280, the committee's report contains recommendations concerning the expansion of licensed hospital psychiatric inpatient bed capacity for children in Region 5. These recommendations are:

1. *Increase the number of acute care general hospital and/or psychiatric hospital beds and Psychiatric Residential Treatment Facility (PRTF) beds for children and adolescents in Region 5 based on the process outlined in Recommendation # 2.*

2. *The commissioner or designee of the Office of Health Care Access (OHCA) will convene an implementation group including the six general hospitals in Region 5, other behavioral health service providers to Region 5 residents under the age of 18, and representatives of state agencies for input on the appropriate number and location of beds. Execution of the group's proposal(s) will be subject to Certificate of Need (CON) authorization.*

To fulfill these recommendations, the Office of Health Care Access established an Implementation Group consisting of representatives of the six general hospitals in the region and of the Department of Children and Families (DCF), the Department of Social Services, Wellspring Foundation, the Child Guidance Clinic of Waterbury and the Northwest Center for Family Services and Mental Health (see Attachment 1).

The Implementation Group, which met three times during the summer and autumn, reviewed the most current pediatric inpatient behavioral health utilization data available to develop recommendations for the region. This report presents the recommendations about the appropriate number and locations of acute care, PRTF and emergency crisis stabilization beds needed in the region to facilitate patient access and transfer to appropriate levels of care and reflects the opinion of the majority of the group.

II. Implementation Group Recommendations and Rationale

Recommendation 1: Any Certificate of Need application for adding to behavioral health pediatric beds in Region 5 must include a plan for coordinating proposed additions with existing community-based services.

The overriding concern of the group is that an evaluation to establish the appropriate number of acute care beds should be system-based and not done in a vacuum. The behavioral health system includes emergency, acute and step down levels of care, all of which needed to be evaluated concurrently and any changes to be implemented should be coordinated with existing community-based services.

Recommendation 2: An additional 20 to 30 acute care general hospital and/or psychiatric hospital beds are required in Region 5. In order to provide developmentally appropriate care for children and adolescents, the additional beds should be allocated to two discrete units, one for children (up to 12 years old) and one for adolescents (13 – 18 years old).

According to the Committee's January 2006 report, there are 2.1 acute care pediatric behavioral health beds available per 10,000 residents under age 18 in Connecticut, but only 0.3 per 10,000 for the same age cohort in Region 5 (see Table 2). This demonstrates that Region 5 has substantially lower number of beds available for its pediatric population than the state in general. As a result, hospitals in the region admit children needing inpatient behavioral health services to general pediatric and adolescent units and adolescents to adult psychiatric and medical/surgical units; and the remaining are transferred or referred to hospitals located elsewhere in Connecticut or out-of-state. Currently, about one-half of the pediatric patients transferred out-of-state for behavioral health services are from Region 5. Area hospitals transferred one-third of pediatric patients from the region to other acute care providers in Connecticut for acute behavioral health treatment.

Table 2: Pediatric acute care behavioral health bed availability

Geographical Location	Regions	Acute Care Beds*	Share	Bed per 10,000 of child population
Southwest	1	44	25%	2.6
South Central	2	49	28%	2.6
Eastern	3	25	14%	2.6
North Central	4	52	30%	2.2
Northwest	5	5	3%	0.3
Statewide		**175**	**100%**	**2.1**

Source: *Report of the Committee to Examine Hospital Inpatient Behavioral Health Bed Capacity for Children, Table 3, page 11.*

* Includes beds in acute care psychiatric units and freestanding psychiatric hospitals.

Patients receiving behavioral health treatment benefit most when their families are involved. Hence, additional acute care beds should be located in the region to improve families' ability to participate in care. In the absence of a state adopted standard bed need methodology, the group applied the statewide standard of 2.1 beds per 10,000 to the pediatric population of Region 5, of 149,927 based on Census 2000, to determine the maximum number of beds the area needs. Based on this methodology, there should be up to 31 beds in total in the region, or about 26 new beds given that five already exist in Waterbury. According to the experts in the group, a 10 to 15-bed unit is the most efficient and clinically appropriate size for an acute care behavioral health unit. The treatment of children and adolescents in the same milieu is developmentally inappropriate and may be counter-therapeutic. Consequently, the group recommends establishing two discrete units in the region, with a combined capacity of 20 to 30 new acute beds.

Recommendation 3: Locate any additional acute care pediatric psychiatric units in one of the three major population centers in Region 5; Danbury, Torrington and Waterbury.

Region 5 is a geographically large and diverse area that consists of 43 cities and towns. Table 3 is an analysis of acute care hospital Region 5 pediatric behavioral health discharges by town of origin. The data indicate that the majority of discharges and their associated patient days are from three metropolitan areas, Waterbury (27% and 33%), Torrington (8% and 12%) and Danbury (11% and 7%). In order to enhance access to acute programs, the group recommends the location of any additional programs in one of the three metropolitan areas.

Table 3: Region 5 Average Annual Acute Care Pediatric Behavioral Health[1] Discharges and Days by Town of Origin: SFYs 2004 - 2006q1-q3

	Children Ages 0 - 12	Adolescents Ages 13 - 17	Ages 0 - 17
Town of Origin	Discharges = 86	Discharges = 234	Discharges = 320
Waterbury	35%	24%	27%
Danbury	16%	9%	11%
Naugatuck	6%	7%	7%
Torrington	11%	7%	8%
Cheshire	5%	6%	6%
All other towns in region[2]	27%	48%	42%
Total	100%	100%	100%
Town of Origin	Patient Days = 1,777	Patient Days = 2,053	Patient Days = 3,830
Waterbury	47%	21%	33%
Torrington	15%	9%	12%
Cheshire	6%	10%	8%
Naugatuck	4%	10%	7%
Danbury	9%	5%	7%
All other towns in region[2]	20%	46%	34%
Total	100%	100%	100%

Source: *CT Office of Health Care Access Acute Care Discharge Database*

[1]Acute care hospitals' behavioral health discharges assigned Diagnosis Related Group (DRG) 424 to 437 or 521 to 523.

[2]For this purpose, discharges and patient days for the other 37 towns in the region were not significant individually.

Recommendation 4: Establish fifteen to twenty five Psychiatric Residential Treatment Facility (PRTF) beds in Region 5. These beds should be located in proximity to existing beds or as part of the establishment of a new program or facility, which includes acute beds.

Psychiatric residential treatment facilities (PRTFs) provide inpatient psychiatric care to Medicaid-covered patients under 21 years old. PRFTs facilitate acute care hospitals' patient "throughput" to ease system gridlock and "boarding" in the EDs.

In SFY 2004, over one-half (or 167) of acute care inpatient transfers to another type of institution were Medicaid beneficiaries who might have been better served by a step down level of care at facilities such as a PRTF or community-based alternatives;[2] this is an average of 14 patients per month. According to data from the Connecticut Behavioral Health Partnership (CT BHP) at four points in time for each month between September and November of 2006, on average 9.1 patients from the region were placed in mostly non-area PRTFs (Table 4). The highest number of patients placed within a month during the period was 11.5.

Table 4: Region 5 PRTF average admissions from September to November 2006

Region 5 Hospitals	Average # in all PRTFs	Average # in Wellspring	Average # in Non-Area PRTFs
Danbury	0.7	0.1	0.7
Charlotte Hungerford	4.0	1.5	3.0
Waterbury	4.5	2.0	3.4
St.Mary's			
Total	**9.1**	**3.6**	**7.1**

Source: Department of Social Services Region 5 hospital and PRTF admits under the CT BHP between September and November 2006 taken at four points in time per month.

Within a month, an average of 1.5 patients awaited placement in a PRTF. The highest number of patients who awaited placement in the three-month period was 2.0.

In all, there was an average of 10.6 PRTF placements needed in the region during the three months. The highest number of placement needed within a month was 12.75. This means, between 50 and 60 percent of the region's acute care pediatric patients admitted during the period, required placement in a PRTF after acute care. The need for a PRTF level of care has increased with Wellspring's decision to discontinue its PRTF service in November 2006.

[2] *Report of the Committee to Examine Hospital Inpatient Behavioral Health Bed Capacity for Children*. Submitted to the Connecticut General Assembly. January 2006. Ibid.

Emergency Crisis Stabilization Beds

In evaluating the needs of the region, the group discussed the feasibility of establishing emergency crisis stabilization beds (ESC) as part of the continuum of care. ECS beds are used for managing demand spikes, extended patient observation and minimizing "boarding" or patients waiting in the ED for more than 23 hours before admission to an inpatient bed or discharged to the community. Based on the committee's report, in FY 2004, hospitals in Region 5 evaluated 660 children and adolescents with a behavioral health diagnosis in the ED before transferring them to inpatient acute care. As many as one-quarter of those patients, waited in the ED for over 23 hours before the inpatient admission (see Table 3); [3] that is, an average of 15 boarders per month.

Table 3: Number of pediatric behavioral health patients evaluated in Region 5 Emergency Departments and length of stay in hours prior to inpatient admission, FY 2004

	Ages 0 - 12		Ages 13 - 17		Ages 0 - 17	
	≤ 23 hours	> 23 hours	≤ 23 hours	> 23 hours	≤ 23 hours	> 23 hours
Charlotte Hungerford	56	6	149	32	205	38
Danbury	27	0	122	6	149	6
New Milford	2	0	8	0	10	0
Sharon	0	0	2	0	2	0
St. Mary's	0	56	0	74	0	130
Waterbury	35	4	77	3	112	7
Total	**120**	**66**	**358**	**115**	**478**	**181**

Source: *Report of the Committee to Examine Hospital Inpatient Behavioral Health Bed Capacity for Children.* Submitted to the Connecticut General Assembly. January 2006. Table 6, page 15.
[1] One adolescent outlier spent 170 hours in ED.

Assuming an average stay of 48 hours in the ED for those boarders, then the average daily census is one. According to information provided by DSS, a hospital based ED affiliated crisis unit is only economically viable if it serves more than 800 to 1,000 pediatric patients per year with an average overnight census of three or more patients. Therefore, currently there is not sufficient need to sustain a hospital based crisis stabilization unit in the region. The additional acute care and PRTF beds will be enough to handle potential demand spikes and extended stays, thus eliminate boarding.

[3] Ibid.

Attachment 1

Region 5 Pediatric Inpatient Psychiatric Services Implementation Workgroup

The membership of the Region 5 Pediatric Inpatient Psychiatric Services Implementation Workgroup included the following persons:

1. Susan Cole, Director of Certification, Financial Analysis and Forecasting & Chair	Office of Health Care Access
2. Mark Schaefer, Ph.D., Director, Medical Policy and Behavioral Health, Medical Care Administration	Department of Social Services
3. Karen Andersson	Department of Children and Families
4. Peter Johnson, Ph.D.	Department of Children and Families
5. Dr. Charles Herrick, Medical Director, Inpatient Psychiatric Services	Danbury Hospital
6. Dr. Steven Singer, Chief of Psychiatry	Charlotte Hungerford Hospital
7. Thomas Narducci, LCSW	Charlotte Hungerford Hospital
8. Maureen Salerno, Director of Social Work	New Milford Hospital
9. Jena Brebbia, LCSW	Sharon Hospital
10. Dr. Peter Jacoby, Chairman of Emergency Services Department	St. Mary's Hospital
11. Doreen Elnitsky, Administrative Director, Behavioral Health	Waterbury Hospital
12. Tom Czarkosky, Manager, Child & Adolescent Behavioral Health Services	Waterbury Hospital
13. Gary Steck, Executive Director	Child Guidance Clinic of Waterbury
14. Herb Hall	Wellspring Foundation, Inc.
15. Donna Campbell	Northwest Center for Family Services and Mental Health

Staff to the Implementation Group

1. Olga Armah, Associate Research Analyst, Research and Evaluation	Office of Health Care Access
2. Steven Lazarus, Associate Health Care Analyst, Certification, Financial Analysis and Forecasting	Office of Health Care Access

The People Who Care When People Need Care - Since 1947

CAMPION Ambulance Service, Inc.

15 West Dover Street, Waterbury, CT 06706

Business: (203) 753-5055 · Administration: (203) 753-9953 · Fax: (203) 754-3237

September 8, 2008

Office of Health Care Access
Commissioner Cristine Vogel
410 Capital Avenue
MS# 13HCA, P.O. Box 340308
Hartford, CT 06134

Dear Commissioner Vogel:

Campion Ambulance Service strongly supports and advocates for the continuation of the current level of services provided by the Heart Center of Greater Waterbury. I see the continuation of this level of services as vital to the high quality of prehospital care provided by our organization as well as every other Emergency Medical Service operating in the greater Waterbury region.

The Heart Center of Greater Waterbury provides much needed services to the residents of our community which in turn prevents the necessity to travel longer distances to obtain the same services. These type transports are unnecessarily stressful to our patients and our personnel. They are increasingly stressful and prolonged when conditions for transport are less than optimal, such as during inclement weather or during road construction projects. Additionally these transports take resources and personnel away from our primary serviced area. This creates operational inefficiencies within our service areas which over time lead to higher operational costs. The revenue derived from these transports in most cases is not a direct offset of these higher operational costs. Historically Campion Ambulance Service has always provided transports to patients needing this level of transport regardless of a patient's ability to pay for service.

Advancements in technology have greatly improved the delivery of emergency medical services to the citizens of our community. One such advancement is the ability to transmit via the cellular network exact data about the condition of our patient well in advance of arrival in the emergency department. This invaluable information regarding a patient's electrocardiogram, blood pressure and other information has led to an exceptional performance in the period of time from which a patient calls for help to the delivery of definitive care. These recent investments in technology and commitment to the quality of care delivered will be lost if the Heart Center of Greater Waterbury ceases to exist.

This situation cannot be allowed to happen in a community that currently enjoys the same high quality as other urban areas in our state. Such an action would have a dramatically negative effect on the quality of life in the Greater Waterbury community.

Sincerely,

William Campion Jr.

William Campion Jr. BS,RN,EMT-P
President, CEO

0776
09/15/08

APPENDIX 5.D.c.

Patient Census Reports – Catheterization Data

PATIENT CENSUS REPORT # 9
CONNECTICUT HOSPITAL ASSOCIATION
June 2008 vs 2007

CARDIAC CATHETERIZATION PROCEDURES

Year-To-Date: October 1 Thru June 30

FACILITY	---Inpatient Procedures--- 2008	2007	NET CHANGE	% CHANGE	----Outpatient Procedures---- 2008	2007	NET CHANGE	% CHANGE	------Total Procedures------ 2008	2007	NET CHANGE	% CHANGE
Bridgeport	598	608	-10	-1.6	201	244	-43	-17.6	799	852	-53	-6.2
Gmwich	130	120	10	8.3	100	66	34	51.5	230	186	44	23.7
Norwalk	61	63	-2	-3.2	53	61	-8	-13.1	114	124	-10	-8.1
St Vincent	1,145	1,088	57	5.2	409	442	-33	-7.5	1,554	1,530	24	1.6
Stamford	249	212	37	17.5	193	198	-5	-2.5	442	410	32	7.8
HSA 1 TOTAL	2,183	2,091	92	4.4	956	1,011	-55	-5.4	3,139	3,102	37	1.2
Saint Raphael	869 #	946	-77	-8.1	691 #	717	-26	-3.6	1,560	1,663	-103	-6.2
YNHH	1,415	1,447	-32	-2.2	679	649	30	4.6	2,094	2,096	-2	-0.1
HSA 2 TOTAL	2,284	2,393	-109	-4.6	1,370	1,366	4	0.3	3,654	3,759	-105	-2.8
Backus	74	101	-27	-26.7	132	148	-16	-10.8	206	249	-43	-17.3
L & M	238	242	-4	-1.7	245	329	-84	-25.5	483	571	-88	-15.4
Middlesex	120	98	22	22.4	233	260	-27	-10.4	353	358	-5	-1.4
HSA 3 TOTAL	432	441	-9	-2.0	610	737	-127	-17.2	1,042	1,178	-136	-11.5
CCMC	7	21	-14	-66.7	36	32	4	12.5	43	53	-10	-18.9
Hartford	1,551	1,550	1	0.1	827	833	-6	-0.7	2,378	2,383	-5	-0.2
HCC	609	466	143	30.7	621	294	327	111.2	1,230	760	470	61.8
John Dempsey	381	346	35	10.1	292	291	1	0.3	673	637	36	5.7
Rockville	0	4	-4	-100.0	14	40	-26	-65.0	14	44	-30	-68.2
Saint Francis	1,438	1,541	-103	-6.7	895	1,007	-112	-11.1	2,333	2,548	-215	-8.4
HSA 4 TOTAL	3,986	3,928	58	1.5	2,685	2,497	188	7.5	6,671	6,425	246	3.8
Dnby	252	246	6	2.4	332	276	56	20.3	584	522	62	11.9
New Milford	56	29	27	93.1	51	55	-4	-7.3	107	84	23	27.4
Saint Mary's	322	316	6	1.9	196	206	-10	-4.9	518	522	-4	-0.8
Waterbury	459	428	31	7.2	177	178	-1	-0.6	636	606	30	5.0
HSA 5 TOTAL	1,089	1,019	70	6.9	756	715	41	5.7	1,845	1,734	111	6.4
CT GRAND TOTAL	9,974	9,872	102	1.0	6,377	6,326	51	0.8	16,351	16,198	153	0.9

This hospital did not submit data for the current month. Therefore, current year columns reflect estimated data.

Please refer to the Qualifying Conditions section at the end of this report for additional information.

CARDIAC CATHETERIZATION PROCEDURES

Year-To-Date: October 1 Thru September 30

FACILITY	----Inpatient Procedures---- 2007	2006	NET CHANGE	% CHANGE	----Outpatient Procedures---- 2007	2006	NET CHANGE	% CHANGE	------Total Procedures------ 2007	2006	NET CHANGE	% CHANGE
Bridgeport	806	905	-99	-10.9	325	388	-63	-16.2	1,131	1,293	-162	-12.5
Grnwich	170	167	3	1.8	91	118	-27	-22.9	261	285	-24	-8.4
Norwalk	72	132	-60	-45.5	67	104	-37	-35.6	139	236	-97	-41.1
St Vincent	1,439	1,492	-53	-3.6	572	576	-4	-0.7	2,011	2,068	-57	-2.8
Stamford	303	351	-48	-13.7	249	282	-33	-11.7	552	633	-81	-12.8
HSA 1 TOTAL	2,790	3,047	-257	-8.4	1,304	1,468	-164	-11.2	4,094	4,515	-421	-9.3
Saint Raphael	1,220	1,394	-174	-12.5	939	1,066	-127	-11.9	2,159	2,460	-301	-12.2
YNHH	1,942	2,024	-82	-4.1	804	930	-126	-13.5	2,746	2,954	-208	-7.0
HSA 2 TOTAL	3,162	3,418	-256	-7.5	1,743	1,996	-253	-12.7	4,905	5,414	-509	-9.4
Backus	109	156	-47	-30.1	188	197	-9	-4.6	297	353	-56	-15.9
L & M	296	415	-119	-28.7	424	420	4	1.0	720	835	-115	-13.8
Middlesex	169	182	-13	-7.1	345	371	-26	-7.0	514	553	-39	-7.1
HSA 3 TOTAL	574	753	-179	-23.8	957	988	-31	-3.1	1,531	1,741	-210	-12.1
CCMC	22	30	-8	-26.7	32	49	-17	-34.7	54	79	-25	-31.6
Hartford	1,994	2,079	-85	-4.1	1,096	1,025	71	6.9	3,090	3,104	-14	-0.5
HCC	663	604	59	9.8	486	425	61	14.4	1,149	1,029	120	11.7
John Dempsey	474	569	-95	-16.7	366	305	61	20.0	840	874	-34	-3.9
Rockville	4	5	-1	-20.0	47	82	-35	-42.7	51	87	-36	-41.4
Saint Francis	2,024	1,989	35	1.8	1,310	1,297	13	1.0	3,334	3,286	48	1.5
HSA 4 TOTAL	5,181	5,276	-95	-1.8	3,337	3,183	154	4.8	8,518	8,459	59	0.7
Dnby	318	371	-53	-14.3	374	450	-76	-16.9	692	821	-129	-15.7
New Milford	60	41	19	46.3	97	105	-8	-7.6	157	146	11	7.5
Saint Mary's	417	400	17	4.3	279	246	33	13.4	696	646	50	7.7
Waterbury	607	447	160	35.8	251	333	-82	-24.6	858	780	78	10.0
HSA 5 TOTAL	1,402	1,259	143	11.4	1,001	1,134	-133	-11.7	2,403	2,393	10	0.4
CT GRAND TOTAL	13,109	13,753	-644	-4.7	8,342	8,769	-427	-4.9	21,451	22,522	-1,071	-4.8

Please refer to the Qualifying Conditions section at the end of this report for additional information.

APPENDIX 6.C.

Curriculum Vitae for the following individuals:

John Tobin

William Casey

James Thornton

Colleen Scott

Robert Halko

Daniel Upton

Loraine Shea

Henry Borkowski, MD

Stephen Widman, MD

Ehsan Ansari, MD

Ragurahmen Vidhun, MD

Suphichaya Muangman, MD

Paul Preissler, MD

APPENDIX 6.C. (con't)

Daniel Fusco, MD

Jonathan Hammond, MD

David Underhill, MD

Paul Langevin, MD

Ronald Burt, MD

David Heimbinder, MD

Ricardo Cardenas, MD

David Rosinski

David D'Onofrio

Ronald Salonia

Paul Juregei

189 Hunters Ridge Road
Southbury, Connecticut 06488
Office Phone: (203) 573-7334
Office Fax: (203) 573-7325
Email: jtobin@wtbyhosp.chime.org

John H. Tobin

Occupational History:

February 2, 1987 to present:	President – Greater Waterbury Health Network, Inc.
	The current corporate structure consists of a holding Company, Greater Waterbury Health Network, Inc. and several affiliates and subsidiaries: The Waterbury Hospital (acute care), VNA Health at Home, Inc. (home health care), Access Rehab (outpatient rehabilitation), Greater Waterbury Imaging Center (ambulatory imaging), Children's Center (on-site day care for employees' children), Greater Waterbury Management Resources (physician practice management) and Alliance Medical Group (multi-specialty group practice). The Network is also 50% owner of the Harold Leever Regional Cancer Center (radiation and medical oncology services) and the Heart Center of Greater Waterbury (management services for WH/STM cardiac program)
	The President of the Network is responsible to the Board of Directors of the Network for all activities within that Board's scope of authority. Responsibilities include safeguarding the assets of the Network and overseeing the activities and development of the subsidiary corporations.
	The President serves as a member (Incorporator) of Great Waterbury Health Network, Inc. and the Board of Trustees of The Waterbury Hospital.
January 20, 1986 to Present	President – The Waterbury Hospital
	The President is responsible to the Board of Trustees of the Hospital for all activities within that Board's authority including compliance with all applicable laws and regulations, accreditation, organization and management of administrative functions, management and safeguarding the Hospital's assets, management support for the Hospital's patient care and education programs.
September 1980 to January	Director of Administrative Services/Chief Operating Officer – The Waterbury Hospital
June 1976 to January 1986	Assistant Administrator – The Waterbury Hospital
July 1975 to July 1976	Administrative Assistant – The Waterbury Hospital

January 1975 to June 1975	Administrative Resident – The Griffin Hospital
October 1972 to September 1974	Administrative Extern – The Waterbury Hospital

---

Significant Experiences and Accomplishments:

Only management representative, other than the CEO, to participate in the special Board committee which led to the 1984 reorganization of The Waterbury Hospital.

Responsible for the creation of a physician hospital organization in the early 1980's. This organization remains the Hospital's main managed care vehicle.

Became President and CEO of The Waterbury Hospital just prior to a four-month nurses' strike. First two years of administration involved resolving the strike and its aftermath, restoring the institution to a stable operation, and rebuilding the management team.

Instituted first major physical plant renovations since 1970's. Accessory developments were the first capital campaign since the late 1960's, and the re-establishment of an active capital development program. Balance of the project was financed through the organization's first tax-exempt bond issue since the early 1970's.

Revamped strategic planning process to provide for a significantly greater board and medical staff involvement. First iteration of this planning process focused on organizational change. Major outcomes were:

(a) Experimenting with product line/centers of excellence (orthopaedics, laser surgery, and others).
(b) Institution of total quality management program which recently resulted in Waterbury Hospital's receiving the Connecticut Award for Excellence.
(c) The development of this organization's first information systems strategic plan.

Developed an outpatient-imaging center as a Hospital/medical staff joint venture. Successfully unbundled project when it became necessary to do so.

Performed this community's fist health needs assessment with St. Mary's Hospital, which led to creation of Harold Leever Regional Cancer Center, a joint venture with St. Mary's Hospital . Construction of this freestanding facility currently in planning stages. Strategic Plan for Behavioral Health services included completion of a new inpatient unit that opened in 1977.

Initiated strategy of developing a hospital affiliated primary care physician's practice. Currently have an MSO and have an active multi-specialty and primary care practices.

Reengineering of the Hospital (1996-1998) resulted in approximately $10 million in savings.

Achieved Level II Trauma Center status for Waterbury Hospital in 1995.

Major renovation and expansion of the Emergency Department in 1998.

Completed construction of the Reed Ambulatory Surgery Center, a seven operating suite surgical facility in 2002. This is the first new construction on the hospital campus since 1972.

A partnership with St. Mary's Hospital resulted in the construction of the Harold Leever Regional Cancer Center, a full service facility housing radiation oncology suites, medical oncology physicians offices and support facilities in October 2002

A partnership with St. Mary's Hospital relating to the expansion of cardiology services (to include angioplasty and open heart surgery) the Greater Waterbury Health Center.

Recently completed the first phase of the replacement of the Hospital's clinical information system, a $25 million, 3-5 year project.

Professional Memberships:

American College of Healthcare Executives (Diplomate)
American Hospital Association
Connecticut Hospital Association

Education:

Doctor of Management (DMan) degree, University of Hertfordshire in the UK, 2003
M.P.H. – Yale University (Hospital Administration), 1975
B.A. – University of Connecticut (Bacteriology), 1968

Current Board Memberships include:

- Board of Trustees, Connecticut Association (Chair 200-2001)
- Member of Executive Committee of the CHA Board of Trustees
- Member of Financial Oversight Committee of CHA Board of Trustees
- Chair Board of Diversified Network Services (CHA's fee-for-service companies)
- American Hospital Association Regional Policy Board, State Delegate
- Member of Connecticut Mental Health Strategy Board (complete term in 2007)
- Board of Directors, Harold Leever Regional Cancer Center
- Board of Directors, Naugatuck Savings Bank
- University of Connecticut, Health Care Administration Program Advisory Board
- University of Connecticut, School of Nursing Advisory Board
- Board of Directors, Greater Waterbury Chamber of Commerce
- Board of Directors, Waterbury Development Corporation
- Board of Directors, Palace Theater
- United Way of Greater Waterbury, Co-Chair Leavenworth Society
- Board of Health Alliance Insurance Company (Malpractice Captive)
- Leadership Group of Reaching for Home
- Board of Directors VHA Northeast
- Mayor's Blue Ribbon Commission on School Attendance and Truancy

Military Experience:

September 1968 to May 1972 – signal Officer, United States Army Signal Corps. Duty stations: Washington State, Turkey (NATO Headquarters, Southeastern Europe), Republic of Vietnam.
Awards: Vietnamese Armed Forces Honor medal, Bronze Star medal. Rank at release from active duty: Captain.

Marital Status:
Married: 3 children

8/2007

William Casey
603 John S. Mosby Drive ■ Wilmington, NC 28412-7152
910.395.1961 Office ■ 910.395.4596 Home
631.312.1976 Cell ■ 910.395.0430 Fax
CrosierLLC@gmail.com

EXECUTIVE SUMMARY

Healthcare executive with more than 20 years experience as CEO of hospital and health systems. Recognized as a turnaround specialist with proven skills in expense reduction, revenue generation, productivity enhancement, quality improvement, physician integration, team building, and system development.

PROFESSIONAL EXPERIENCE

CROSIER CONSULTING, LLC
Wilmington, North Carolina
A consulting entity providing interim executive services to hospitals in crisis, needing to manage significant change, or successfully mount a complex turnaround. 2005-Present

CATHOLIC HEALTH SERVICES OF LONG ISLAND, New York
ST.CHARLES HOSPITAL
Port Jefferson, New York
St. Charles is a 289 bed general acute hospital located in a competitive market on the North Shore of Long Island, with centers of excellence in orthopedics, rehabilitation, and maternity. Recruited by the System CEO to orchestrate a comprehensive turnaround of an institution in serious trouble. 2001-2004

PRESIDENT & CEO
- Managed within budget each year, and ahead of the turnaround plan.
- Reversed severe losses from $25.8 million to a $500,000 gain, before System overhead, in less than three years, a 211% improvement. Regained a positive EBITDA less than two years.
- Produced tightest staffing ratios of Catholic Health Service's five hospitals.
- Returned physician satisfaction and confidence to positive levels.
- Grew patient satisfaction from the lowest to one of the highest in the 12 hospital Long Island Health Network(Press Ganey, 92nd percentile).
- Negotiated a difficult nursing contract without taking a strike. Additionally, employees rejected a fierce Local 1199 organizing campaign.
- Strengthened weak emergency services. Recruited entirely new physician team. Only ER on Long Island known to be staffed totally by ER residency trained physicians. Moved patient satisfaction from mediocre to #1 on Long Island.
- Installed comprehensive and sophisticated root cause analysis system that improved clinical outcomes, reduced outliers, near misses, and sentinel events.
- Reduced $54 million supply budget by $7 million per year even in the face of rising volumes & acuity.

- Introduced several new clinical services to enhance revenue stream.
- Championed broad corporate identity program to repair image and increase brand recognition.
- Instilled a sense of optimism, pride, accountability, & entrepreneurialism to a once demoralized management team, physician cadre, and employee corps.
- Made dramatic gains in thru-put and process improvement through the introduction of Malcom Baldrige philosophies, axioms, and techniques.

PROVENA HEALTH SYSTEM
Frankfort, Illinois
Provena Health, is a $1.2B IDS, with 7 owned hospitals, 2 additional in joint ventures, 17 LTC centers, and several related companies serving the greater Chicago area and Central Illinois.

PROVENA HOSPITALS
PRESIDENT
Comprehensive responsibility for operations and performances of all system hospitals. Recruited to pilot needed turn around of all nine hospitals. 2000 to 2001

- Reversed losses from $13M in FY 99 to profit of $12M in FY 2000, a 208% improvement. Improved bottom line another 110% in FY 2001.
- Dramatically improved "systemness" in attitude, strategic planning, and in pursuit of savings.
- Drove collaborative managed care product design, pricing strategies, and rate negotiations with carriers.
- Chaired Value & Excellence Committee; booked $50M in savings first year.
- Documented significant improvement in morbidity and mortality, mostly through better documentation, coding and key DRG best practice efforts.
- Substantially improved care management and utilization.
- Initiated dramatic new strategic direction to alter course of two at-risk hospitals.
- Centralized managed care operations and re-negotiated contracts, netting over $2M in rate improvements.
- Retooled division-wide clinical engineering capturing $1.2M in savings.
- Negotiated clinical alliance with Loyola University Health System; setting up joint centers of excellence, shared physician recruiting, remote cooperative quaternary clinics, etc.

CONEMAUGH HEALTH SYSTEM
CHIEF EXECUTIVE OFFICER
Johnstown, Pennsylvania
Assembled an integrated health system (1034 beds), anchored by Memorial Medical Center and serving a four county region of South Central Pennsylvania. Operating units include 4 acute care hospitals, 1 additional in JV, sub acute services, 2 nursing homes, assisted living center, freestanding comprehensive rehabilitation hospital, employed physician group of PCP's, faculty, and

PROFESSIONAL AFFILIATIONS

Hospital Financial Management Association, member
American Hospital Association, member
ProPapa Missions America, board member

FAMILY

Wife; Phyllis, Volunteer Reading Instructor, Wilmington Public Schools
Daughter; Erica in Public Relations, Wilmington, North Carolina
Daughter; Brianne a refugee resettlement manager, Raleigh, North Carolina
Son; Robert, is in the culinary arts. Currently a practicing chef.

PERSONAL PURSUITS

Reading
Kayaking
Long distance bicycle tours
Health missions in Central America

REFERENCES

References furnished upon request

specialists, a PHO, and multiple related for-profit businesses. System net revenue was $235M. 21,700 admissions with 707,000 outpatient visits. 4,350 employees with a total of 527 physicians residing on system medical staffs. The education mission (allied health education, and school of nursing) brought 250 students to the main campus annually.

- Strategically positioned Conemaugh to compete with aggressive entry of University of Pittsburgh, Allegheny, and Geisinger Health Systems by creating Conemaugh Health System, a regional IDS that earned $4.3M in net revenue in FY 98.
- Increased net revenue by 85% and increased EBITDA by 56% to $28M annually.
- Turned a sagging 47% market share into a dominant position of 73%.
- Created a $28M not-for-profit taxable organization, Conemaugh Health Initiatives, to hold employed physicians and serve as a vessel to hold for-profit ventures.
- Struck a unique Favored Nation Clause with Highmark (market leading Blue Cross/Blue Shield carrier), introduced PPO and RAPPO products into the region.
- Recruited 55 boarded physicians into the area; a key in reducing out migration.
- Expanded market into fourth county by striking a joint venture with Bon Secours Health System.
- Initiated open-heart program, and soon reached 600 cases per year. Earned HCIA's Top 100 Heart Programs.
- Crafted unique canonical arrangement to bring Good Samaritan Medical Center into System while preserving their Catholic identity & carisms.

SERVANTCOR HEALTH SYSTEM
COVENANT MEDICAL CENTER
PRESIDENT AND CHIEF EXECUTIVE OFFICER
Champaign,Illinois
Covenant was the anchor of the ServantCor Health System, now Provena Health. It was a 262 bed regional medical center offering select specialty services with strong centers of excellence in open-heart, neonatology, rehabilitation, nephrology, and psychiatry. Clinical teaching site for the University of Illinois, College of Medicine with a medical staff of 310. Major accomplishments shoring up operating performance, escorting three other general acute hospitals out of the over bedded market. Began as third in market, captured 1st position. 1982 – 1989.

ALLINA HEALTH SYSTEM
UNITED & CHILDREN'S HOSPITALS
VICE PRESIDENT-ADMINISTRATION
St. Paul, Minnesota
A 572 adult and 116 pediatric bed medical center. An operating budget of $72M with $92M of assets. United Hospitals is the St. Paul anchor for Allina Health System. 1976 - 1982

CHRISTIAN HEALTH SERVICES
CHRISTIAN HOSPITAL NORTHWEST
ADMINISTRATIVE INTERNSHIP
St. Louis, Missouri
Preceptor Ron Aldrich, S-COO of Christian Hospitals now BJC Heath System, 1975

OTHER EXPERIENCE

PROPAPA MISSIONS • AMERICA
Johnstown, Pennsylvania
Co-founded a philanthropic foundation that has developed 2 medical centers for the poor in Honduras. In addition, ProPapa organizes and funds 4 American medical, dental and vision brigades per year that travel to Central America to serve the poor. Additional projects include shipping nearly 20 tons of relief supplies per year, food for work programs, clean water projects, education scholarships, habitat houses, and U.S. case management services.

DIVINE PROVIDENCE MEDICAL CENTER
PROJECT CHIEF
Corquin, Copan, Honduras, Central America
In 1999 and again in 2004 took several months of sabbatical to fulfill dream of building second clinic/hospital for the poor of Honduras. Crafted first of its kind collaboration between, U.S. Government, U.S. Military, Honduran Government, the local community, and an NGO. Completed construction and start up of the clinic/hospital. Trained caregivers, and transitioned the facility to the Hondurans. Designed demonstration projects w/ World Bank & United Nations, and currently crafting alliance with U.S. donor to build multi-million dollar clinic.

EDUCATION

Master of Science, Public Health, 1976 — University of Missouri
Program Focus; Health & Hospital Management — Columbia, Missouri

B.A., Business Administration, 1971 — University of Missouri
Major; Personnel Management — Columbia, Missouri
Minor; Industrial Sociology

MILITARY SERVICE

U.S. Army, 1971-1973
Army Leadership Training Academy - Honor Graduate
Military Police Corps - Top Graduate, Fort Gordon, Georgia
Correctional Specialist School - Top Graduate
Social Psychology Specialist doing crisis intervention at the Mental Hygiene Directorate, United States Military Prison, Fort Leavenworth, Kansas.

James H. Thornton

16 Ash Court
Farmington, CT 06032
860-677-4120

Professional Experience

January 2007 to present
John Dempsey Hospital, University of Connecticut
263 Farmington Avenue
Farmington, CT 06030

Director

Responsible for the administration and management of the day-to-day operations of the John Dempsey Hospital including strategic planning and direction, personnel, patient care the financial operations for the hospital and compliance with all regulatory requirements. Provide oversight for the development of quality, cost effective and integrated clinical programs within the hospital which would optimally satisfy the health care needs of the community and advance the education, research and health care mission of the University of Connecticut Health Center.

December 2005 to December 2006 (Special Assignment)
Connecticut Children's Medical Center (CCMC)
282 Washington Street Hartford, CT 06106
Chief Operating Officer

On assignment from the University of Connecticut Health Center to assist the CCMC Executive Management Team with the following:

- A plan of process improvement and responses regarding quality of care issues raised by the Connecticut Department of Public Health
- Merging the physician's Faculty Practice Plan (FPP) into CCMC's corporate structure by July 1, 2006
- Strategic planning focused on the three years ending September 30, 2009
- Review of senior management candidates for Chief Executive and Chief Operating Officers and certain physician managers.
- Education and mentoring of senior and middle managers.
- Improve daily operations in Surgery and Intensive Care
- Development of a business plan for a Pediatric Transport Service
- Development of a Level I Trauma Service with Hartford Hospital.

October 2003 to December 2006
University of Connecticut Health Center (UCHC)
263 Farmington Avenue
Farmington, CT 06030
Controller, John Dempsey Hospital and Director of Procurement Services, UCHC

Responsible for the daily management of General Accounting, Patient Accounting, Reimbursement, Purchasing and Materials Management and the Finance Corporation.

Led the development of the automation and modernization of the Purchasing and Materials Management and Warehouse functions through the development of e-Portal, Bid Authorization Portal, Shipping and Receiving System and nationally recognized Value Analysis System

Led the development of automated inventory control systems for Surgical Services, Radiology and Nursing Units

Independent Consultant (Jan 2000 to November 2003)

President and Chief Executive Officer (June 1994-Jan 2000)
Brandywine Health Services (BHS)
Coatesville, Pennsylvania

Reporting directly to the Board of Directors; responsible for the total management of Brandywine Health Services, a Pennsylvania non-profit corporation and its entities, including Brandywine Hospital and Trauma Center, and Brandywine Health Enterprises, Inc., a for-profit corporation.

Selected Accomplishments:
Innovative:

- Developed Pennsylvania's first cooperative joint venture between Level I and Level II Trauma Centers. Participants Brandywine Hospital and Division of Traumatology and Surgical Critical Care of the University of Pennsylvania Medical Center.
- Initiated a Legislative Advocacy Program with Board participation that led to measurable improvements in payer reimbursement and cash flow.
- Testified before Pennsylvania Senate Majority Policy Committee, March and July 1999, on Healthcare Accountability Act of 1998 (Act 68) compliance issues.
- Received Hospital Association of Pennsylvania/Delaware Valley Healthcare Council's 1999 Advocacy Award.
- Developed new outpatient services in Radiology, Ophthalmology, and Integrative Medicine.
- Directed installation of Quality Process throughout organization focus on customer service.

Results oriented:

- Improved financial performance through combination of improved reimbursement, new programs and aggressive cost reductions.
- Implemented Labor Productivity System including pension plan Voluntary Early Retirement Incentive Program with annualized labor savings in excess of $3 million.
- Implemented Value Analysis program with annualized non-labor savings in excess of $1.2 million.
- Negotiated favorable rate agreements with major insurance providers when benchmarked to a comparable hospital database by an independent CPA firm.
- Coordinated three merger and affiliation transactions. In most recent experience led merger/affiliation task force resulting in completed transaction within one year and vote of confidence from Medical/Dental Staff.
- Directed accreditation surveys, JCAHO with Commendation, 1998. Pennsylvania Trauma Systems Foundation, three-year accreditation, required directing three surveys in four years.
- ***Community Involvement:***
- Elected to Board of Directors of Coatesville Area Partners for Progress.
- Juvenile Diabetes Foundation (JDF), 1998 Chester County, Chairman
- Speaker at Eastern Association for Surgery of Trauma, January 1999 and International Conference on Pediatric Trauma, June 2000.
- Directed the successful fund raising campaigns for Trauma and Women's Health.

Chief Financial Officer (July 1992-June 1994)
Brandywine Health Services (BHS)
Coatesville, Pennsylvania

Reporting to CEO and Board of Directors; responsible for all financial management and treasury functions for non-profit and for-profit entities within the Health System. Leader of senior management team responsible for development and maintenance of strategic financial plan.

Selected Accomplishments:

- Negotiated favorable rate agreements with major insurance providers. Averted potentially disruptive contract dispute.
- Coordinated financial management of non-profit and for-profit entities.
- Enhanced profitability of Trauma Program, the flagship service line.
- Responsible for development and installation of cost accounting system that measured profitability at the procedure level.

Chief Financial Officer (1990-1992)
Mercy Community Hospital
Haverford, Pennsylvania

Reported to the President and Board of Directors; responsible for all financial management and treasury functions for Hospital. Member of the senior management team responsible for completion of merger transaction and development and maintenance of strategic financial plan.

Selected Accomplishments:

- Increased cash flow and bottom line performance to optimize merger value.
- Supervised installation of Information System, post merger.

Chief Financial Officer (1979-1989)
Keystone Health System
Drexel Hill, Pennsylvania

Reported to the President and Board of Directors. Responsible for all financial management and treasury functions for Health System with both non-profit and for-profit entities. Member of the senior management team responsible for development and maintenance of strategic financial plan.

Selected Accomplishments:

- Increased cash flow and bottom line performance in preparation for transition from community hospital to restructured, diversified Health System.
- Responsible for placement of $100 million of long term debt to finance expansion of Health System Long Term Care, Home Care, Drug and Alcohol Rehabilitation, Physical Medicine and Rehabilitation.
- Optimized investment performance to take advantage of existing arbitrage opportunities.
- Supervised installation of Information Systems in both clinical and business application.
- Supervised non-financial departments.

Other Professional Experience

Chief Financial Officer (1974 –1979)
Friends Hospital
Philadelphia, Pennsylvania

Assistant Controller (1971-1974)
Mercy Catholic Medical Center

Philadelphia, Pennsylvania

Senior Accountant (1967-1971)
Main & Company
Philadelphia, Pennsylvania

Education

Villanova University
Bachelor of Science, Economics, 1967
Continuing Education: Finance, Banking, Process Improvement

Affiliations

Pennsylvania Institute of Certified Public Accountants, 1972

Vice Chairman, Board of Directors (1995 to present)
DNB First (symbol: DNBF)
Downingtown, PA

DNB First is a national bank corporation supervised by the Federal Reserve. Responsibilities include Chairman of Audit & Compliance and Compensation & Benefits Committees

COLLEEN M. SCOTT, CPA, MBA

7 Beaver View Court
Woodbury, Connecticut 06798
(203)573-7280 (office) / (203)263-0609 (home)

PROFESSIONAL EXPERIENCE:

5/90 - Present	Vice President of Finance Waterbury Hospital Greater Waterbury Health Network Waterbury, Connecticut 367-Bed Acute Care Teaching Hospital Annual Net Revenues: $245,000,000 2000 Employees (1630 FTEs) Network consists of multiple affiliates & subsidiaries - taxable & tax-exempt.
4/89 - 5/90	Director of Finance
5/88 - 4/89	Financial Planner

Responsible for management of the Financial Services Division (130 FTES), including general ledger, cost accounting, accounts payable, accounts receivable, credit, collections, budget and reimbursement, registration, scheduling, information services, grants and medical records. Responsible for the development of strategic plans for finance and information technology. Develop strategic plans for Hospital and Network in conjunction with CEO, senior management, physicians and the Board of Trustees. Develop and implement divisional goals, policies, and guidelines. Formulate, review, and implement the financial policies and plans for the organizations.

Develop short-term and long-range capital and financial plans for Hospital and Network. Responsible for obtaining financing, both taxable and tax exempt, to meet long term capital needs. Negotiate contracts with payors, physicians, joint ventures, unions and vendors. Responsible for the development of Certificate of Needs for approval by the Office of Health Care Access.

Coordinate and control cash management functions and audit of financial records for Hospital, Network and affiliates. Review and approve operating and capital budgets for Hospital and Network. Oversee the implementation of the Information Systems Strategic Plans. Represent senior management at board and committee meetings and other financial negotiations.

12/85 - 4/88	Controller, Acting Chief Financial Officer
12/83 - 12/85	Associate Controller, Accounting Manager
	Griffin Hospital
	Derby, Connecticut
	281-Bed Acute Care Teaching Hospital
	Annual Revenue: $60,000,000
	1000 Employees (800 FTEs)

Responsible for management of fiscal services functions (56 FTEs), including general ledger, accounts payable, payroll, accounts receivable, credit, collection and registration, and coordination of semi-annual physical inventory.

Prepared and reviewed operating and capital budgets (exceeding $1.7 million) for finance, business services, and registration departments. Coordinated MIS conversion of accounts payable system and implementation and maintenance of microcomputer systems.

Directed accounting functions, compiled internal financial reports, and prepared tax returns for holding company and all other profit and non-profit subsidiary corporations. Represented management at board and committee meetings and financial negotiations: acted in CFO role for several months.

Coordinated and controlled cash management and audit of financial records, reducing audit hours by 13%. Established effective management of accounts receivable area with subsequent reductions in outstanding accounts receivable days by 13% and the billing cycle by 2 days. Developed departmental objectives, policies and guidelines.

7/82 – 12/83	Accountant
	Waterbury Hospital
	Waterbury, Connecticut

Responsible for preparation of all internal and external financial and statistical reports, state and federal tax returns, and auditing projects.

7/79 - 7/82	Accountant Kelley & Fitzgerald, PC, CPAs John S. Monagan III, CPA (Firms merged 10/80) Waterbury, Connecticut

Responsible for a wide range of manufacturing, service, construction, wholesale, retail, non-profit accounts for individuals, partnerships, and corporations. Scope of projects included preparation of financial statements, federal and state tax returns, and complete accounting, auditing and analysis functions. Also assisted clients in developing, implementing, and improving management information systems. Assisted in management of firm during merger, particularly in training and supervision of staff.

EDUCATION:

M.B.A. - University of New Haven (1987)

B.S. - Accounting, Central Connecticut State College (1979)

PROFESSIONAL MEMBERSHIPS:

Healthcare Financial Management Association

American College of Health Care Executives

ROBERT M. HALKO

309 Beardsley Road
Shelton, CT 06484
Residence: 203-929-4628
E-mail: halculus@juno.com

Other Contact Information
Business: 203-709-5871
Cell: 203-521-0453
E-mail: bob.halko@stmh.org

An experienced and creative health care financial professional with more than 30 years experience and a proven record of combining strong technical skills with excellent interpersonal skills to obtain outstanding results. An energetic leader with proven success and broad experience in strategic financial planning, mergers and acquisitions, budget and reimbursement, decision support, managed care strategy, and general management.

Professional Experience:

Saint Mary's Health System, Waterbury, CT

Vice President and Chief Financial Officer **August, 2007 to present**

Responsible for management and overall direction of finance division including accounting and financial reporting, budget and decision support, information technology, patient financial services, health information management, and treasury management. Also responsible for the financial management of all health system subsidiaries including Diagnostic Imaging of Southbury, Naugatuck Valley Surgical Center, and several other physician groups and outpatient centers.

Corporate Director of Revenue Cycle and Financial Planning **February, 2006 to August, 2007**

Managed 5 areas of SMHI financial operations encompassing; Patient Financial Services (PFS), Medical Records (MR), Decision Support, Budget and Revenue Cycle. These areas have 86 FTEs. Responsible for the coordination of fiscal year Budgets, as well as analysis of monthly (hospital and subsidiaries) budget versus actual results.

- Successfully reduced Days in AR from 57 to 47
- Successfully increased cash from an average of $11.2m per month to $12.1m per month
- Review and recommend changes of preliminary monthly activity with the CFO
- Successfully reduced AP balance from $13,619 to $7,010
- Cash on hand has increased 300% from FY 06 to present

Bridgeport Hospital and Healthcare System, Bridgeport, CT
Member of Yale New Haven Health System

Director of Budget and Financial Planning **August, 2003 to February, 2006**

Manage 4 health care financial professionals in a 425-bed comprehensive teaching health system affiliated with the Yale University School of Medicine with annual net revenue of over $290 million. Directly responsible for the areas of budgeting, cost accounting, and flexible budget. Report directly to the Senior Vice President and Chief Financial Officer of the hospital. Key accomplishments include:

- Successfully led and managed the re-development of the flexible budget system (TSI) allowing the hospital to better analyze productivity and control costs.
- Successfully led and implemented capital budgeting system (Strata Cap) as well as forecasting system (Strata Cast).
- Actively participate in the financial statement review.
- Team member and active participant in Clinical Program Teams.
- Perform business line profit and loss analysis.

Director of Revenue Enhancements **January, 2003 to August, 2003**

Manage two health care professionals in the task of maximizing net revenue for the hospital, through interactive dialogue and technical support to the ancillary departments in revenue issues. Responsible for the development and accuracy of Net Revenue Budget for Bridgeport Hospital. Coordinated the monthly net revenue close and actively participated in the financial statement review. Manage the TSI department. Participate in ad hoc activities as requested. Responsible for establishing and managing the revenue enhancement committee. Directly responsible for managing the Denial Committee, seeking strategies and changing processes to ensure limited exposure to denial of accounts while maximizing net revenues. Directly responsible for managing the Medicare APC Committee, seeking to minimize compliance exposure and maximize net revenue. Key accomplishments include:

- Successfully managed and led the APC Medicare rebilling initiative for Fiscal Year 2000, resulting in additional reimbursement of $67,000.
- Successfully led and managed revenue enhancement efforts in the area of Ambulatory Surgery resulting in additional $300,000 net revenue.
- Developed and implemented a process to capture "carve out" items for additional reimbursement by payers in the amount of $65,000.
- Developed process to review contract compliance resulting in additional reimbursement for Burn Unit of approximately $85,000.

Director of Budget, Reimbursement and Decision Support **May, 1998 to January, 2003**

Mange 7 health care financial professionals in a 425-bed comprehensive teaching health system affiliated with the Yale University School of Medicine with annual net revenues of over $260 million. Directly responsible for the areas of budgeting, cost accounting, decision support, managed care contract analysis,

reimbursement and regulatory reporting. Report directly to the Senior Vice President and Chief Financial Officer of the hospital. Key accomplishments include:

- Successfully led and managed the development of the cost accounting and decision support system (TSI) allowing the hospital to better analyze managed care contracts and contracting, utilize flexible budgeting, perform business line profit and loss analysis and control costs.
- Successfully enhanced the hospital's reimbursement for teaching programs and disproportionate share that resulted in over $3 million of revenue per year for the past 9 years.
- Developed a rolling five-year analytical model, which was used as the corner stone to the hospitals long-range financial stability. Established expense reduction targets that facilitated a re-engineering process that eliminated over $40 million of operating expense while balancing "Quality of Care" issues.
- Performed a major rile in the Yale New Haven Health System management information system (Lawson) conversion process including general ledger, accounts payable and purchasing modules.
- Performed a significant role in the Yale New Haven Health System patient accounting system (SDK) successful conversion process.
- Participated in the merger of a community-based hospital with Bridgeport Hospital. Performed invaluable effort and obtained accurate results through due diligence, financial analysis and regulatory reporting related to the merger.
- Developed outstanding and long-term relationships with key members of the Connecticut Hospital Association, Office of Health Care Access, Healthcare Financial Management Association, major accounting and consulting firms and other health care organizations and providers.

Newington Children's Hospital, Newington, CT **1987 to 1989**
Director of Corporate Fiscal Services

- Reported directly to the Vice President of Finance and Chief Financial Officer and acted as such in his absence.
- Managed the daily financial operations of the only Children's Hospital in the state of Connecticut.
- Daily responsible for the financial professionals in the areas of general accounting, restricted funds and corporate accounting.
- Managed the year-end audit for all entities as well as financial reporting.
- Directed annual budget preparation, both internal and external.

New Milford Hospital, New Milford, CT **1980 to 1987**
Controller

- Reported directly to the Vice President of Finance, responsible for the direction of the professional financial staff in the areas of general accounting, restricted funds, corporate accounting, revenue and billing and data processing.
- Successfully designed, implemented and converted payroll/personnel system (ADP of New Haven, CT).
- Successfully coordinated the conversion and Implementation of billing system from Tymshare to McAuto.
- Directed the implementation and conversion to UB-82.

- Preparation of cost reports, internal and external Hospital budgets. Coordinated year-end audit.

Danbury Hospital, Danbury, CT **1974-1980**
Accounting Manager

- Managed the general accounting area (Payroll, A/P, G/L, Cashiers, Cash Application).
- Responsibilities included general ledger and revenue accounting, preparation of monthly financial reports, payroll taxes, accounts payable distribution, account reconciliation and analysis.

Perkin Elmer (Non-Gov't) – Instrument Division, Norwalk, CT **1970-1974**
Accountant
Financial Analyst

Education:

1999 Sacred Heart University - MBA
1969-1970 Sacred Heart University – BA

Associations:

Health Care Financial Management Association (HFMA) – Past President, Connecticut Chapter
Speaker and Presenter for Connecticut HFMA sponsored educational seminars
Former Councilmen Committee member for the Boy Scouts – Derby Troop 3

Personal:
Former Soccer Coach for town league and town travel league
Member ITF-USTF, 1st Degree Black Belt, Tae Kwon Do
Member Institute of American Tae Kwon Do 2nd Degree Black Belt
Previous member of NAPMA (National Association of Professional Martial Artists)

Daniel L. Upton

103 Old Farms Road
West Simsbury, Connecticut 06092
(860) 651-8936 (Home)
(860) 679-1145 (Work)
upton@adp.uchc.edu

Professional Experience

Chief Financial Officer (Jan 2000-Present)
University of Connecticut Health Center (UCHC)
Farmington, Connecticut

Reporting directly to the Chief Financial Officer of the University of Connecticut and to the Chief Executive Officer for the Health Center; responsible for the financial management of the entire University of Connecticut Health Center that includes the School of Medicine, School of Dental Medicine, Graduate Programs, John Dempsey Hospital, UConn Medical Group (300 Physician faculty practice plan), Correctional Managed HealthCare, and an extensive Research grants and awards program. UCHC is a State of Connecticut Agency and has total budgeted revenues of $470 million.

Highlights at UCHC

- ❑ Participating as a member of the turnaround team, improved the financial results from a forecasted deficit of $20 million to breakeven.
- ❑ Implemented Action Plan of cost reductions, efficiency improvements and revenue enhancements of over $30 million over last two years.
- ❑ Implemented a new Budget process for Fiscal Year 2001 and made further improvements for Fiscal Year 2002.
- ❑ Revised and improved financial reporting package to the Board of Trustees.
- ❑ Reorganization of Finance Division to improve reporting tools and data to senior and line management.
- ❑ Improved relationships between Legislative Committees and other State agencies.
- ❑ Hospital Days Revenue in Accounts Receivable decreased from 85 days at January 2000 to 50 days at October 2001
- ❑ Faculty Practice Plan Days Revenue in Accounts Receivable decreased from 86 days at March 2000 to 67 days at September 2001.
- ❑ Implemented action plan to resolve seven years of open Medicare Cost Reports.

Vice President of Finance/CFO (1996-Dec 1999)
Brandywine Health Services (BHS)
Coatesville, Pennsylvania

Reporting directly to the Chief Executive Officer and to the Board of Directors; responsible for the financial management of the entire non-profit Brandywine Health Services and its entities, including: Brandywine Hospital and Trauma Center, and Brandywine Health Enterprises, Inc., a for-profit corporation.

Senior management team responsibilities including financial planning, participating in the development of the system's strategic plan, administrative on-call duty, financial feasibility research. Specific departments directed include: Admissions/Registration, General Accounting, Cost, Budget, Patient Accounting, Medical Records, Materials Management, Information Services, Managed Care Contracting.

Highlights at Brandywine

- ❑ Negotiated favorable rate agreements with major insurance providers when benchmarked to a comparable hospital database, as reported by an independent CPA analysis.
- ❑ Participated in due diligence for affiliation with the Lancaster Health Alliance.
- ❑ Refinanced long term debt generating over $600,000 in annual interest savings.
- ❑ Developed new business product lines (Eye Center, Imaging Center, O/P Rehab, Fitness)
- ❑ Improved functionality of cost accounting system (KREG)
- ❑ Directed with Senior Management cost reduction programs and FTE reductions of 60+.
- ❑ Implemented Value Management Labor Productivity System.
- ❑ Implemented Value Analysis program with non-labor savings of over $1.2 million.
- ❑ Directed the pension plan Voluntary Early Retirement Incentive Programs.
- ❑ Managed termination of Defined Benefit Pension Plan and replaced with a Defined Contribution Pension Plan.
- ❑ Lifted hospital from a $1.3 million loss to a $3.9 million profit.
- ❑ Improved commercial banking relationships and letters of credit.
- ❑ Developed MIS Strategic Plan. Insured Y2K compliance. Installed SMS Invision System and Lawson Accounting Software(GL, AP, Payroll, Materials Management)
- ❑ Implemented a Departmental Management Variance Reporting System
- ❑ Maximized revenues through extensive cost report reviews
- ❑ Automated Accounts Receivable; installed Contract Manager; improved VOF files and Insurance Master.
- ❑ Implemented performance improvement programs to enhance customer service.
- ❑ Experienced savings by introduction of National/Regional Group Purchasing.

Chief Financial Officer (1989-1996)
The Bucks County Health System (BCHS)
Bristol, Pennsylvania

Reporting directly to the Chief Executive Officer and to the Board of Directors; responsible for the financial management of the entire non-profit Bucks County Health System and its entities, including: Lower Bucks Hospital, Bucks County Health Foundation, Bucks County Health Services, and Bucks County Health Enterprises, Inc., a for-profit corporation. Bucks County Health System is the fifth largest employer in Bucks County.

Senior management team responsibilities including financial planning, total development of the system's strategic plan, crisis response, administrative on-call duty, certificate of need process, and financial feasibility research.

Specific departments directed: Admissions, General Accounting, Cost, Budget, Patient Accounting, Medical Records, Transport, Materials Management, Central Supply, Laundry, Nutritional Services, Information Services, Physician-Hospital Organization, Physician Practices, Real Estate Purchase, Pre-Admission Testing, Occupational Medicine, Managed Care Contracting, and Physician Billing Corporation. Physician Hospital Organization (PHO); Board (Treasurer).

Highlights

- ❑ Issued $35 million hospital construction bond issue.
- ❑ Directed Strategic Planning Process; new three year plan developed 1994-1996
- ❑ Lifted hospital from $3.5 million loss to $1.6 million profit.
- ❑ Financed $9 million off-balance sheet outpatient Surgery Center.
- ❑ Developed the 3rd largest Physician Hospital Organization in the Delaware Valley.
- ❑ Built and leased first-ever physician offices on the Lower Bucks Hospital campus.
- ❑ Evaluated, acquired, and managed primary care physician practices.
- ❑ Revamped pension fund administration and investment strategy.
- ❑ Directed the pension plan Voluntary Early Retirement Incentive Program.
- ❑ Implemented new MIS services with system wide physician connectivity, including SMS Signature, Invision, Radiology, Laboratory and Remote Physician Access.
- ❑ Led successful Certificate of Need process; directed campus master plan
- ❑ Outsourced laundry services; saving more than $1.6 million.
- ❑ Financed new equipment acquisitions through operating leases.
- ❑ Arranged membership in the Voluntary Hospitals of America.
- ❑ Enforced new physician policy for delinquent records resulting in reduction of delinquent medical reports from 2,200+ to below 300 charts.
- ❑ Maximized revenue through the installation of DRG Check.
- ❑ Recruited multidisciplinary design team to reformat Pre-Admission Testing.

- ❑ Installed new Telecommunications System.
- ❑ Introduced Prime Vendor supply agreement and forms management program.

Hospital Controller 1985-1989
Delaware County Memorial Hospital
Drexel Hill, Pennsylvania

Reporting directly to the Chief Operating Officer. Responsible for the financial management of the hospital and its affiliates, including Keystone Health System. Management responsibilities provided the experience for advancement to Chief Financial Officer.

Cost and Budget Manager 1980-1985
Delaware County Memorial Hospital
Drexel Hill, Pennsylvania

Director of Accounting 1976-1980
Temple University Hospital
Philadelphia, Pennsylvania

Education

Master of Business Administration, Health and Medical Services
Widener University, Chester, Pennsylvania, 1984
Bachelor of Science, Accounting
Widener College, Chester, Pennsylvania, 1975

Affiliations (Present and Past)

American College of Health Care Executives
Health Care Financial Management Association (Advanced)
Pennsylvania Hospital Services Association (Board Member)
HAPSCO Group, Inc. (Financial Advisory Committee)
Community Care Programs, Lansdowne, PA (Board Treasurer)
Coatesville Rotary (past member)

Personal

Married, three children.

LORAINE C. SHEA

88 Rockwell Ave
Naugatuck, CT 06770

H (203)723-4048
JMacShea@msn.com

SUMMARY

Healthcare Director with executive level experience in managing multiple priorities, collaborating with physicians, executive and operational leadership to meet mutual goals. Extensive experience in operational oversight of multiple departments. Skilled in budgeting, project leadership, operational problem solving, development of high performance teams, customer satisfaction, recruitment and retention of staff, strategic planning and making process improvements.

PROFESSIONAL EXPERIENCE

HEART CENTER OF GREATER WATERBURY, Waterbury, CT **2005- Present**
Executive Director –

- Facilitates coordination and collaboration between partner hospitals, physicians, clinical and professional staff in a one Program two campus advanced cardiac care program
- Manages data collection, analysis and reporting functions for cardiac program
- Provides oversight to the Quality Management functions including extensive knowledge of cardiac data registries
- Provides leadership to all community outreach program development and implementation
- Directs and oversees marketing and media functions for the organization
- Directs all compliance with Office of Health Care Access orders, maintains and coordinates all scheduled and formal communications with the Office including Certificate of Need applications and other applicable documents.

HOSPITAL FOR SPECIAL CARE, New Britain, CT **1993-2005**
Director of Hospital Business Units – 2000-2005

- Managed multi-million dollar budget with accountability for 15 departments and approximately 600 employees in a 200 bed Long Term Acute Care Hospital
- Oversaw patient outcomes including patient satisfaction
- Provided leadership and management to Admissions Department including maintaining the budgeted average daily census
- Identified areas of cost containment and revenue enhancement with direction and leadership to accomplish established goals.
- Reduced the use of contracted personnel with an annual savings of $2 million dollars

- Provided oversight for the redevelopment of the Outpatient Department into three separate business areas with increased visits and revenue
- Ensured compliance for all regulatory and accrediting agencies (State of Connecticut Department of Health, JCAHO and CARF).
- Restructured management teams and support teams to effectively utilize resources without additional costs.
- Led and participated in organization wide projects including recruitment and retention initiatives, development of patient care delivery models, satellite development, and employee health initiatives.
- Senior leadership position with overall accountability to daily clinical operations and patient care activities

Business Unit Director for Respiratory and Pediatric Services – 1998-2000

- Managed daily clinical operations of three adult respiratory and one pediatric units
- Redesigned care delivery for increase in efficiency and communication between staff members
- Participated in hospital wide initiatives to increase communication on all levels
- Lead a team designed to prepare the organization for the clinical care needs of patients during Y2K
- Devised employee incentive plans to facilitate organizational goal achievement.

Administrative Manager for Respiratory Service Line--1995-1998

- Designed and implemented this new role within the adult respiratory units
- Served as team leader for a Staffing and Scheduling Quality Improvement Team
- Implemented all recommendations of this team including policy development, scheduling systems and increased fairness and equity for all clinical staff
- Reduced work related employee injuries through implementation of employee health initiatives

Clinical Manager--1993-1995

- Managed delivery of care activities and day to day operations for 10 bed, secured, Neurobehavioral Unit.
- Established clinical and operational policies and procedures for this new program

1982-1992 Held various staff and leadership positions in Therapeutic Recreation working directly with patients in the field of Rehabilitation and Geriatrics. Positions held were in the Massachusetts, Connecticut and North Carolina.

EDUCATION

M.S., Business Management , Albertus Magnus College 2001

B.S., Therapeutic Recreations, Green Mountain College, Poultney, VT 1982

Community Affiliations: BOD Health Care Council- Waterbury Regional Chamber 2007-Present

Office: 455 Chase Parkway
Waterbury CT 06708
(203) 573-1435

Home: Beacon Hill Rd
Middlebury Ct 06762
(203) 758-1047

HENRY BORKOWSKI, MD

Positions:

Cardiology Associates of Waterbury, PC 1977-Present.
President and CEO
Founder, Senior Partner

Heart Center of Greater Waterbury
Medical Director, July 2005- Present

St. Mary's Hospital, Waterbury 1977-Present
Attending in Cardiology

Waterbury Hospital, Waterbury 1977-Present
Attending in Cardiology

St. Mary's Hospital, Waterbury 1979-Present.
Director of Cardiovascular Laboratories

St. Mary's Hospital, Waterbury 1994- Present
Board of Directors
Finance Committee
Contract Negotiating Committee

Yale Cardiology Network 1998 – Present.
Information Systems Committee, Chairman
Contract Negotiation Committee

Heart One, Inc. 1991- Present
President and CEO

Heart One Motorsports 1979-1995
President

Heart One Realty 1984-1986.
Developer,general contractor.
Owner/manager of Commercial real estate, 1984- Present

Education:

Yale School of Medicine- Yale New Haven Hospital 1975-1977
Subspecialty training in Cardiovascular Disease
Harvard Medical School 1970-1972 Medical Degree
Dartmouth Medical School 1968-1970
Dartmouth College 1965-1968 B.A.
Magna Cum Laude 1969

Honors:

Phi Beta Kappa

Publications:

1. Global and regional left ventricular response to bicycle exercise in Coronary artery disease. Assessment by quantitative radionuclide Angiography.
   American Journal of Medicine 66:13, 1979

2. Rapid assessment of left ventricular performance during exercise Induced myocardial ischemia: First pass radionuclide technique. (Abstract)
   Circulation 56 (Suppl) : III-198,1977

Certifications:

Diplomat of the American Board of Internal Medicine, June 18, 1975
51472

Diplomat in the Subspecialty of Cardiovascular Disease, June 1979
514725

Associations

Connecticut State Medical Association
New Haven County Medical Association
Waterbury Medical Association

Licenses:

Connecticut # 17679

Stephen C. Widman, M.D.

CURRICULUM VITAE

455 Chase Parkway
Waterbury, CT 06708
203 (573-1435)

Positions:

Cardiology Associates of Waterbury, P.C., Waterbury, CT
1990 – present
Cardiology Private Practice

Board of Directors, St. Mary's Hospital, Waterbury, CT
2007 – present

Director of Intervention, Heart Center of Greater Waterbury, Waterbury, CT
2005 – present

Attending in Department of Medicine and Cardiology, St. Mary's Hospital, Waterbury, CT
1990 – present
Interventional Cardiology

Attending in Department of Medicine and Cardiology, Waterbury Hospital, Waterbury, CT
1990 – present
Interventional Cardiology

Board of Trustees, Waterbury Hospital, Waterbury, CT
2000 – 2006

Attending in Department of Medicine, Division of Cardiology, Bridgeport Hospital, Bridgeport, CT
1994 – 2005
Interventional Cardiology

Attending in Department of Medicine and Cardiology, University of Connecticut Health Center, Farmington, CT
1/2005 – 7/2005

Courtesy Provisional Staff in Department of Medicine, Section of Cardiology, Yale Hospital, New Haven, CT
2003-2004
Interventional Cardiology/Brachytherapy

Consulting Staff Department of Medicine, Division of Cardiology, St. Vincent's Hospital, Bridgeport, CT
1990 – 2006
Interventional Cardiology

Education:

Strong Memorial Hospital, Rochester, NY
1987 – 1990
Medicine, Cardiology Fellowship

Dartmouth Hitchcock Medical Center, Lebanon, NH
1985 – 1987
Medicine, Residency

Dartmouth Hitchcock Medical Center, Lebanon, NH
1984 – 1985
Medicine, Internship

Bowman Gray School of Medicine, Winson-Salem, NC
1980 – 1984
Medicine, M.D

College of the Holy Cross, Worcester, MA
1971 – 1975
Biology, AB

Military Service:

United States Navy
1975 – 1980
United State Naval Officer Highest Rank: Lieutenant
Activities: Shipboard Duties

University of North Carolina, Chapel Hill
1979 – 1980

Post Doctoral Training:

University of Rochester, Strong Memorial Hospital
1988 – 1990
Chief Fellow in Cardiology

University of Rochester, Strong Memorial Hospital
1987-1990
Fellow in Cardiology

Dartmouth Hitchcock Medical Center
1985 – 1987
Resident in Medicine

Dartmouth Hitchcock Medical Center
1984 – 1985
Intern in Medicine

Certifications:

American Board of Internal Medicine, Added Qualifications in Interventional Cardiology
2001 - present

American Board of Internal Medicine, Cardiovascular Disease
1989 – present
Certificate #: 112769

American Board of Internal Medicine, Internal Medicine
1987 – present
Certificate #: 112769

American Board of Internal Medicine, Internal Medicine
present

EHSAN ANSARI, M.D.
CURRICULUM VITAE

HOME ADDRESS:

54 Watertown Rd
Middlebury, CT 06762
Cell Phone: (203) 577-2286
Email: eefea@msn.com

CITIZENSHIP: U.S.A.

ACADEMIC TRAINING:

MEDICAL SCHOOL:

Montpellier School of Medicine
Montpellier France, M.D. November 1991

INTERNSHIP:

Internal Medicine, Guthrie Clinic
1993- 1994

RESIDENCY:

Internal Medicine, Guthrie Clinic
1994-1996

FELLOWSHIP:

Cardiovascular disease, Tufts University
BMC Center, Massachusetts
2001-2004

Interventional Cardiology, Tufts University
BMC Center, Massachusetts
2004-Date

ACCREDITASTION and LICENSES:

Diplomat American Board of Cardiovascular Medicine
Diplomat American Board of Internal Medicine
CT Medical Board License
Board eligible in nuclear cardiology

PROFESSIONAL & MAJOR ADMINISTRATIVE RESPONSABILITIES:

Chief Fellow Tufts-Baystate 2003-2004
Clinical Associates Tufts University 2001-date
Associate in Internal Medicine Guthrie Clinic 1996-2001
Chief of Internal Medicine Tyler Memorial Hospital 1997-2001
Chairman Pharmacy Review Committee Tyler Hospital 2001
Member Utilization Review Committee Tyler Hospital 2001

ACADEMIC AWARDS:

High Award for MD degree, University of Montpellier 1991
French CROUS Scholarship for Medical School 1983
Award of Excellence Guthrie Clinic 1998-1999
Fellows Research Award Avantis Pharmaceutical ACC 2004

PROFESSIONAL SOCIETY:

Fellow American College of Physician (FACP)
American College of Cardiology Affiliate in Training
French Medical Society Member 1983-1991

PEPORT OF TEACHING:

Instructor of cardiology examination. Attending for two medical students Tufts University 2001-2004
Lecture series myocardial Infraction, Springfield College of Physician assistant 2001-2003

SPECIALITY INTERST:

Instent restenosis
Acute myocardial infarction
Coronary and peripheral interventions

REFERENCES:

Available upon request

BIBLIOGRAPHY:

Available upon request

Ehsan Ansari, MD

170 Eagle View Drive
Southbury, CT 06488
203-441-8436

RAGHURAMAN VIDUN, M.D.

Education:

Bachelor of Medicine and Bachelor of Surgery
Rajah Muthiah Medical College and Hospital
Chidambaram, India

Professional Experience:

Cardiology Associates of Waterbury
455 Chase Parkway
Waterbury, CT
2007- Present

Fellowship-Interventional Cardiology
Saint Vincent's Hospital
New York, NY
2006-2007

Fellowship-Cardiology
Saint Vincent's Catholic Medical Centers
New York, NY
2003-2006

Fellowship-Heart Failure
Mount Sinai School of Medicine and Bronx VA Hospital
New York, NY
2001-2003

Internship and Residency-Internal Medicine
Mount Sinai School of Medicine (Bronx VA) Program
Bronx, NY
1998-2001

House Officer-Department of Medicine
Murari Hospital
Madras, India
1995-1996

Rotating Internship
Rajah Muthiah Medical College and Hospital
Chidambaram, India
1994-1995

Dangas G, Mehran, R. Duvvuri, S. **Vidhun R**, Ambrose JA, Sharma SK. Directional coronary atherectomy in acute myocardial infarction. Cardiology 1998; 90(1): 63-66

Dangass G, Peters-Veluthamaningal C. Cocke TP, **Vidhun R,** Duvvuri, S, Marmur JD, Sharma SK, Histopathological correlates of early arterial Recoil following directional atherectomy. Cardiology 1998;90(1):32-36

Kini A, **Vidhun R,** Sharma S. Rotational Atherectomy: A new treatment Modality for ostial stenosis of "Stent Jailed" side branches. Case Report. J of Inv Cardiol 1998; 10 (3): 169-172

Cardiac Sarcoma-Case Report of an unusual presentation-submitted

Abstracts:

Sharma SK, Kini A, Kini S, **Vidhun R,** Dangas G, Duvurri S, Cooke TP, Ambrose JA, Marmur JD. Incidence of Creatine Kinase-MB Enzyme elevation after Coronary Intervention: Correlation with Device Type and Coronary Anatomy: AM J Cardiol 80 (7A): 23S, 1997.

Sharma SK, Devoir, S, Marmur, JD, **Vidhun R,** Cocke TP Kini A, Dangas G, Ambrose JA. Rotational Atherectomy: Improved procedural Outcome with Evolution of Technique. AM J Cardiol 80 (7A):53S, 1997

Sharma SK, Kini A, **Vidhun R,** Duvvuri S. Rotational Atherectomy for in-stent restenosis: acute and long term Results of first 100 cases. Indian Hear J 49:649, 1997

Sharma SK, Kini, A, Kini, S, **Vidhun R,** Dangas G, Duvvuri S Cocke TP, Marmur, JD, Ambrose JA. Creatine Kinase-MB enzyme elevation after coronary intervention with different devices. J AM Coll Cardiol 1998, 31:suppl A; 215A

Dangas G, Machac, J, Goldman ME, Henzola MJ, **Vidhun R,** Shao JH, Ambrose JA. Can recovery of ventricular function after Elective early post infarction revascularization of asymptomatic Patients be predicted by perfusion/metabolism SPECT radio nuclide Imaging or Dobutamine echocardiography? J AM Coll Cardiol 1998,31:suppl A; 300A

Sharma SK, Kini A, Duvvuri S, Sterling FD, Lozano I, Dangas, G **Vidhun R,** King T, Cocke TP, Marmur JD. Randomized trial of rotational atherectomy vs. balloon angioplasty for in-stent restenosis(ROSTER). J AM Coll Cardiol 1998, 31:suppl A; 142A

Sharma, SK, Kini A, Dangas G, **Vidhun R,** Rajawat Y,

Duvvuri S, Marmur, JD, Ambrose JA. Stenting with Abciximab (ReoPro) decreases target lesion revascularization J AM Coll Cardiol 1998; 31: suppl A: 237A

Sharma SK, Kini, A, Garapati A, Duvvuri S, Lozano I, Dangas G, **Vidhun R,** Marmur J, Ambrose JA. Randomized trial Of rotational atherectomy vs. balloon angioplasty for in-stent Restenosis. Eur Hear J 1998; 19:115

Sharma SK, Kini A, Dangas G, **Vidhun R,** Siddiqui S. Garapati A, Duvvuri S, Cooke TP, Marmur J. Predictors of restenosis after Rotational atherectomy for in-stent restenosis. Eur Heart J 1998;19 (suppl):396

Sharma SK, Duvvuri S, Kini A, King T, Garapati A, **Vidhun R,** Dangas G, Marmur J. Comparative mechanism of luminal Enlargement and early loss after PTCA vs. rotational atherectomy In in-stent restenosis. Circulation 1998, Suppl l; 1192

Sharma SK, Kini, A, Dangas G, **Vidhun R,** Duvvuri S, Marmur J. Predictors of restenosis after rotational atherectomy for in-stent Restenosis. Circulation 1998 Suppl 1; 3766

Sharma SK, Kini A, Duvvuri S, Sterling F, **Vidhun R,** Garapati A, Dangas G,Marmur J, King T,Cocke TP, Ambrose JA. Randomized trial of rotational atherectomy vs. balloon angioplasty for in-stent restenosis(ROSTER) interim analysis of 100 cases. Circulation 1998, Suppl 1: 2687

Dangas G, Ambrose JA, Smith DA, Unger AH, **Vidhun R,** Fallon JT, Badimon JJ, Feldman D. Similar reduction in thrombotic risk with Pravastatin therapy in hyperlipidemic men and women. A prospective study. J Am Coll Cardiol, 1999; 33(Suppl A):264A.

Professional Memberships: Fellow Society of Coronary Angiography and Interventions
Fellow in Training- American College of Cardiology
Member, American Association of Physicians of Indian Origin
Member, American Society of Echocardiography

Professional License:

New York State	236091
Connecticut	Active
California	Pending

Research Experience:

1996-1998 Research Associate-Interventional Cardiology
Department of Cardiology- Mount Sinai School of Medicine
Sub Investigator for ROSTER study, Study of Inflammatory markers in stable vs. unstable angina and device studies

Preceptor: Dr. Samin Sharma and Dr. John Ambrose

2001-2003 Fellow-Heart Failure
Mount Sinai School of Medicine and Bronx VA Medical Center
Sub Investigator for CHARM, OVERTURE, AQUAVIT, SPORTIF V, REVERT studies

Preceptor: Dr. Lawrence Baruch and Dr. Calvin Eng

Certifications: 2006 Board Eligible-Cardiology
2006 Board Certified- American Society of Echocardiography
2001 American Board of Internal Medicine (Diplomate Number 205686)
1998 Educational Council For Foreign Medical Graduate: 0-513-860-7
1997 United States Medical Licensing Examination (Step 1, 2 &3)

Publications:

Peer Reviewed Articles

Soma VR, Cavusoglu, **Vidhun R,** Frishman WH, Sharma, SK: Contrast associated Nephropathy. Heart disease 2002: 4(6)

Dangas G, Marmur JD, King TE, DeLeon J, Sharma SK, **Vidhun R,** Feldman D, Stoynov MY, Badimon JJ, Ambrose, JA. Effects of Platelet Glycoprotein 11b/111a inhibition with Ambcixmab on thrombin generation and activity during percutaneous coronary intervention. Am Heart J 1999; 138 (1):49-54

Yazdani, S Simon AD, **Vidhun R,** Gulotta C, Schwartz A, Rabbani LE Inflammatory profile in unstable angina vs. stable angina in patients undergoing percutaneous interventions. Am Heart J 1998;136(2):357-361

Suphichaya Muangman, MD
4 Hillview Lane
Woodbury, CT 06798
Home: 203-263-8483
Mobile: 978-399-4734
E-mail: mgnff1@gmail.com

Personal History:

Date of Birth:	July 10, 1969 (Bangkok, Thailand)
Marital Status:	Married, two daughters
Citizenship:	Thailand
Immigration Status:	Permanent Resident of US (Green Card)

Employment:

07/2005 to Present	Quality Cardiovascular Care, LLC 1389 West Main Street Waterbury, CT 06708 Clinical and Interventional Cardiologist

Hospital Affiliations:

07/2005 to Present:	Privileges in Internal Medicine and Cardiology, Waterbury Hospital, Waterbury, CT Privileges in Internal Medicine and Cardiology, Saint Mary's Hospital, Waterbury, CT

Education:

07/2004-06/2005	Lahey Clinic Medical Center, Tufts University, Burlington, MA Fellowship in Interventional Cardiology (Chief Fellow).
07/2001-06/2004	Lahey Clinic Medical Center, Tufts University, Burlington, MA Fellowship in Clinical Cardiology.
01/1999-04/2001	Brigham & Women Hospital, Harvard Medical School, Boston, MA Research Fellowship in Cardiovascular Medicine.
10/1995-10/1998	Pennsylvania Hospital, University of Pennsylvania, Philadelphia, PA Internship and Residency in Internal Medicine.
07/1991-09/1995	Thomas Jefferson Medical College, Philadelphia, PA M.D. degree.
07/1987-06/1991	University of Hawaii, Honolulu, HI B.A. in Biology, with distinction.

Experiences Research & Publications

Agrawal RS, Muangman, S, Layne MD, Melo L, Perrella MA, Lee RT, Zhang L, Lopez-Ilasca M, Dzau VJ.
Pre-emptive gene therapy using recombinant adeno-associated virus delivery of extracellular superoxide dismutase protects heart against ischemic reperfusion injury, improves ventricular function and prolongs survival. Gene Ther. 2004 June; 11(12):962-9

Lindsey ML, Yoshioka J, MacGillivray C, Muangman S, Gannon J, Verghese A, Aikawa M, Libby P, Krane SM, Lee RT.
Effect of a cleavage-resistant collagen mutation on left ventricular remodeling. Cir Res. 2003 Aug 8;93(3):238-45. Epub 2003 Jul 10.

Wang Y, De Keulaenaer GW, Weinberg EO, Muangman S, Gualberto A, Landschulz KT, Turi TG, Thompson JF, Lee RT
Direct biomechanical induction of endogenous calcineurin inhibitor Down Syndrome Critical Region-1 in cardiac myocytes.
Am J Physiol Heart Circ Physiol. 2002 Aug:283(2):H533-9

De Keulenaer GW, Wang Y, Feng Y, Muangman S, Yamamoto K, Thompson JF, Turi TG, Landschultz K, Lee RT
Identification of IEX-1 as a biomechanically controlled nuclear factor-kappaB target gene that inhibits cardiomyocyte hypertrophy. Cir Res. 2002 Apr 5;90(6):690-6

Technical Skills

Transthoracic and Transesophageal Echocardiogram.
Cardiac catheterization and percutaneous intervention.
Intracardiac device closure (PFO ASD).
Animal echocardiogram (mouse, rabbit, rat).
Animal left heart cath via right carotid artery (mouse).
Myocardial Infarction microsurgery in mouse and rabbit (left lateral Thoractomy with LAD ligation).
Noninvasive blood pressure measurement in mouse.
Image analysis with computer software.

Activities/Interests

Fluent in Windows and Macintosh operating systems

Paul L. Preissler, M.D.
85 Seymour Street
Hartford, Connecticut 06106
(860) 524-5905

Birthplace: Hartford, Connecticut
August 10, 1950

Home Address: 99 Spring Lane
West Hartford, Connecticut

Education:

Secondary School: Mount Hermon School
Northfield, Massachusetts
Graduated June, 1968

Undergraduate: Stanford University
Palo Alto, California
Graduated June, 1972 – B.S. Biology

Medical School: University of Connecticut School of Medicine
Farmington, Connecticut
Graduated May, 1976 – M.D.

Internship: Straight Surgery July 1, 1976 to June 30, 1977
Hartford Hospital, Hartford, Connecticut

Residencies: General Surgery July 1, 1977 to June 30, 1981
Hartford Hospital, Hartford, Connecticut

Thoracic and Cardiovascular Surgery July 1, 1981 to June 30, 1983
Medical College of Wisconsin Affiliated Hospitals
Milwaukee, Wisconsin
Lawrence Bonchek, M.D., Chief

Board Certification: National Board of Medical Examiners
Certification June, 1977

American Board of Surgery
Certificate 17898 – May 11, 1982

American Board of Thoracic Surgery
Certificate 4168 – May 26, 1984

American Board of Thoracic Surgery
Recertification 1994, 2004

Licensure:	State of Connecticut – 19578 Issued October 13, 1977
	State of Wisconsin – 23844 Issued July 1, 1981
Hospital Appointments:	Senior Staff, Cardiac and Thoracic Surgery Hartford Hospital, Hartford, Connecticut
	Courtesy Staff, Cardiothoracic Surgery St. Francis Hospital and Medical Center Hartford, Connecticut
	Clinical Associate Professor University of Connecticut School of Medicine Farmington, Connecticut
	Chief, Cardiac Surgery John Dempsey Hospital University of Connecticut Health Center Farmington, Connecticut
	Chief, Cardiac Surgery Waterbury Hospital Waterbury, Connecticut
	Chief, Cardiac Surgery St. Mary's Hospital Waterbury, Connecticut
Other Appointments:	Instructor, Thoracic Anatomy Basic Science Core Curriculum University of Connecticut School of Medicine Farmington, Connecticut
Professional Societies and Organizations:	Fellow, American College of Surgeons Active Member, American Medical Association Member, Hartford Medical Society Member, Hartford County Medical Association Member, Connecticut State Medical Society Member, Connecticut Chapter American Board of Surgeons Member, Society of Thoracic Surgeons

DANIEL S. FUSCO, MD

OFFICE ADDRESS

Connecticut Cardiothoracic Surgical Associates
85 Seymour Street, Suite 725
Hartford, CT 06106-5507
(860) 524-5905

Email dsfusco@cctsa.net

Citizenship United States

CURRENT POSITION

2005-present	**Connecticut Cardiothoracic Surgical Associates** Cardiac, Thoracic, and Aortic Surgery. Heart Transplantation.
2005-present	**University of Connecticut School of Medicine** Department of Surgery, Farmington, Connecticut Clinical Instructor

GRADUATE MEDICAL TRAINING

2004-2005	**Yale University School of Medicine,** Division of Cardiothoracic Surgery, New Haven, Connecticut Clinical Fellow
2002-2004	**Yale University School of Medicine,** Division of Cardiothoracic Surgery, New Haven, Connecticut Fellowship in Heart Transplantation and Aortic Surgery
2000-2002	**Virginia Commonwealth University**, Richmond, Virginia Thoracic Surgery Residency
1999-2000	**Baystate Medical Center/Tufts University School of Medicine,** General Surgery Chief Residency
1996-1999	**Baystate Medical Center/Tufts University School of Medicine,** General Surgery Residency
1995-1996	**Baystate Medical Center/Tufts University School of Medicine,** General Surgery Internship

EDUCATION

1991-1995	**University of Connecticut School of Medicine,** Farmington, Connecticut Doctor of Medicine
1990-1991	**University of Connecticut**, Storrs, Connecticut Post-baccalaureate Program
1988-1993	**Worcester Polytechnic Institute**, Worcester, Massachusetts Master of Science in Electrical Engineering Thesis: "An Investigative Study of the Bispectrum and its Application to Machine Vibration Analysis"
1983-1986	**University of Connecticut**, Storrs, Connecticut Bachelor of Science in Engineering. Completed 134 credit engineering program in three years

WORK HISTORY

1986-1990	**General Electric Company**, Edison Engineer Engineering Leadership Development Program
1987-1990	**General Electric Company**, Aircraft Instruments Division, Wilmington, MA Edison Engineer: Stealth Bomber and other secret clearance projects
1986-1987	**General Electric Company**, Military Electronic Systems, Syracuse, NY Underwater Warfare Systems Division Edison Engineer: Embedded microprocessor hardware and assembly language software design in secret clearance project

LICENSURE

Connecticut 040489

CERTIFICATION

American Board of Thoracic Surgery
American Board of Surgery
National Board of Medical Examiners

PROFESSIONAL AND SCIENTIFIC SOCIETIES

American College of Surgeons, Associate Fellow
American College of Cardiology
American Heart Association, Council on Cardiothoracic and Vascular Surgery
Society of Thoracic Surgeons, Candidate Member
Eta Kappa Nu National Electrical Engineering Honor Society
Tau Beta Pi National Engineering Honor Society

CLINICAL INTERESTS

Adult Cardiac Surgery
Heart Failure
Ventricular Restoration Procedures (TR3SVR)
Mechanical Circulatory Support (Thoratec, Novacor, Heartmate, Abiomed)
Heart Transplantation
Aortic Surgery
Mitral Valve Surgery
Technology and Medicine

COMMUNITY SERVICE

2004	**Enfield Montessori School**, Enfield, Connecticut School presentation of heart health and disease prevention
1998-1999	**Enfield Montessori School**, Enfield, Connecticut Elementary school chess coach
1991-1995	**South Park Inn Medical Clinic**, Hartford, CT: General Medical Clinic Performed history and physical examinations on homeless shelter patients
1990-1991	**Saint Francis Hospital and Medical Center**, Hartford, CT: Emergency Room Assisted with triage at an inner city hospital emergency room

OTHER HONORS

1991	**Hartford Hospital**, Department of Neurosurgery Designed, tested, and optimized Wavelet Transformation software for application to EEG waveform analysis

PRESENTATIONS

Fusco DS. *Cardiac Trauma*. Trauma Surgery Grand Rounds. Backus Hospital. Norwich, Connecticut. February 2, 2006

Fusco DS. *Thoracic Aortic Disease*. Surgery Grand Rounds. Waterbury Hospital. Waterbury, Connecticut. November 10, 2005.

Fusco DS and Elefteriades JA. *A Unique Insight into Aortic Disease*. Cardiology Grand Rounds. Yale University School of Medicine. May 21, 2004.

Fusco DS, Shaw RK, Tranquilli M, Kopf GS, and Elefteriades JA. *Need for Subclavian Artery Cannulation in Acute Aortic Dissection – A Fallacy*. Presented at The Society of Thoracic Surgery Annual Meeting. January 16, 2004. San Antonio, TX.

PAPERS

Rafferty TD, Passik CS, and **Fusco DS**. Modification of the Receiver Module Display Screen of a Prototype 2.4 GHz Wireless Monitoring System. Anesthesia and Analgesia Suppl. 2006. (In Press).

Rafferty TD, Passik CS, and **Fusco DS**. Modification of the Transmitter Module of a Prototype 2.4 GHz Wireless Monitoring System. Anesthesia and Analgesia Suppl. 2006. (In Press).

Rafferty TD, Passik CS, and **Fusco DS**. The Consumer Speaks: Conjoint Analysis Quantification of Physician-Consumer Preferences for Monitoring During Patient Transport – Wireless Versus Non-wireless. Anesthesiology Suppl. 2005 (In Press).

Achneck H, Modi B, Shaw C, Rizzo J, Albornoz G, **Fusco D**, and Elefteriades J. Ascending Thoracic Aneurysms are Associated with Decreased Systemic Atherosclerosis. Chest. 2005 (In Press).

Rafferty TD, Passik CS, and **Fusco DS**. Proposal for a Unique and Universally Applicable Wireless Interface System for Patient Monitoring During Transport. Anesthesia and Analgesia Suppl. 2005

Banerjee D, **Fusco D**, Green J, Eapen G, and Kasirajan V. Avoidable Errors in Cardiac Surgery: Anastomosis of the Left Internal Mammary Artery to a Vein. Annals of Thoracic Surgery. May 2005; Vol 79(6):1769-1771.

Fusco DS and Passik CS. A Simpler Solution for an Old Problem. Journal of Pacing and Clinical Electrophysiology. Oct 2004;Vol 27(10):1455.

Fusco DS, Shaw RK, Tranquilli M, Kopf GS, and Elefteriades JA. Femoral Cannulation is Safe for Type A Aortic Dissection. Annals of Thoracic Surgery. Oct 2004; Vol 78(4):1285-9

Munshi IA, **Fusco D**, Tashjian D, Kirkwood JR, Polga J, and Wait RB. Occlusion of an aberrant right hepatic artery, originating from the superior mesenteric artery, secondary to blunt trauma. J Trauma. 2000; 48(2):325-6.

Jonathan A. Hammond, Jr., M.D.
85 Seymour Street
Suite 725
Hartford, CT 06106
(860) 524-5905

Work Experience

Cardiothoracic Surgeon, July 1991 – present
Senior Attending, Department of Surgery, Section of Cardiothoracic Surgery, Hartford Hospital, Hartford, CT – with Connecticut Cardiothoracic Surgical Associates, L.L.C. (since August, 1995); previously with Hiroyoshi Takata, M.D., P.C.

Director, Division of Cardiovascular Surgery, Hartford Hospital, Hartford, CT
September 2005 – present

Director, Cardiac Transplant Program, Hartford Hospital, Hartford,CT

Assistant Clinical Professor of Surgery, University of Connecticut School of Medicine, Farmington, CT

Associate Staff, Department of Surgery, John Dempsey Hospital at the University of Connecticut Health Center, Farmington, CT

Board Certification

American Board of Thoracic Surgery

- Recertified 2002
- Certificate #5219, June 5, 1992
- Part I February 16, 1992 (95th percentile)
- Part II September 10, 1990

American Board of Surgery

- Certificate #35532, September 11, 1989 (98th percentile)
- Part I October 12, 1989
- Part II September 10, 1990

Internship and Residency

Resident in Cardiothoracic Surgery, July 1, 1989 – June 30, 1991
Medical College of Wisconsin, Milwaukee, WI

Resident in General Surgery, July 1, 1985 – June 30, 1989
Hartford Hospital/University of Connecticut Integrated General Surgery Residency Program, Hartford, CT

Education

Harvard Medical School Boston, MA 1980-1984

Williams College Williamstown, MA 1976-1980

- B.A., Chemistry, Magna Cum Laude
- Phi Beta Kappa, elected Junior Year
- Chemistry Department Teaching Assistant
- Varsity Squash
- Principal Clarinet, Berkshire Symphony Orchestra
  Council Rock High School Newtown, PA 1972-1976

- Class Valedictorian
- Varsity Tennis
- National High School Honors Band (Clarinet)

Committees and Activities

Editorial Board, International Society for Minimally Invasive Cardiac Surgery
Surgical Director, Heart Transplant Program, Hartford Hospital Mechanical Circulatory Support Service
Cardiac Value Enhancement Program Steering Committee working with LBA Consulting to improve efficiency of cardiac surgery services at Hartford Hospital
Transfusion Committee
Trauma Quality Assurance Committee
United Network for Organ Sharing – Thoracic Organ Transplantation Committee – Region I Representative
Department of Surgery Executive Committee, Hartford Hospital

Professional Societies

Society of Thoracic Surgeons
American College of Surgeons, Fellow
American Medical Association
Connecticut Society of American Board Surgeons
Connecticut State Medical Society
Hartford County Medical Association
International Society for Heart and Lung Transplantation
International Society for Minimally Invasive Cardiac Surgery

Medical Licensure

Connecticut #027604 (issued August 22, 1986)

Publications

Comparison of ON-PUMP vs. OFF-PUMP Coronary Artery Bypass Surgery Among Low, Intermediate and High-Risk Patients: The Hartford Hospital Experience. McKay, R., Mennett, R., Gallagher, R., Horowitz, L., Takata, H., Low, H.B.C., Hammond, J., Underhill, D., Preissler, P., Humphrey, C., Ellison, L., Boden, Wm. Connecticut Medicine Vol 65, No. 9, 515-521. September 2001.

Boden, W.E., Phinney, A.O., Low, H.B.C., Kluger, J., McLean, C., Shapiro, R., Hammond, J.A., Kiernan, F., Humphrey, C., Rossi, M.A., Fieldman, A., McKay, R., Gillam, L., Clyne, C.A., Heller, G.V., Thompson, P. Cardiologists and Cardiac Surgeons of Hartford Hospital. The Origins and Development of the Cardiovascular Program at Hartford Hospital. 150th Anniversary of Hartford Hospital. Connecticut Medicine. 68(5):259-68, May 2004.

Evaluating the Safety Implications of Aprotinin Use: the Retrospective Evaluation of Aprotinin in CardioThoracic Surgery (REACTS) Coleman, C., Rigali, V., Hammond, J., Kluger, J., Jeleniowski, K., White, K., Journal of Thoracic & Cardiovascular Surgery

CURRICULUM VITAE

Name:	David Joseph Underhill, M.D.
Address:	32 Lazy Valley Road Glastonbury, CT 06033
Office:	85 Seymour Street, Suite 725 Hartford, CT 06106 (860) 524-5905
Birthplace:	Baltimore, Maryland March 15, 1954
Spouse:	Kathleen P. Underhill
Children:	Kristen, Daniel, Candace, Joseph

EDUCATION

Undergraduate:	Providence College Magna Cum Laude, Biology	B.S. 1976
Graduate:	University of Vermont	M.D. 1980
Postgraduate:	New England Medical Center Tufts University Intern, General Surgery	1980-1981
	New England Medical Center Tufts University Resident, General Surgery	1981-1983
	National Heart-Lung Blood Institute National Institutes of Health Research Fellow, Cardiac Surgery	1983-1985
	New England Medical Center Tufts University Resident, General Surgery	1985-1986
	New England Medical Center Tufts University Chief Resident, General Surgery	1986-1987
	University of Michigan Resident, Thoracic Surgery	1987-1989

HONORS

Alpha Omega Alpha Resident Teaching Award New England Medical Center	1986 & 1987

APPOINTMENTS AND POSITIONS

Surgical Associates, Inc. Private practice of cardiothoracic and vascular surgery. Staff Surgeon, Lutheran Hospital, Parkview Memorial Hospital and St.Joseph Medical Center	1989
Hartford Thoracic & Cardiovascular Group, P.C. Private practice for cardiothoracic and vascular surgery. Staff Surgeon, Hartford Hospital and New Britain General Hospital	1992-1998
Connecticut Cardiothoracic Surgical Associates, L.L.C. Private practice for cardiothoracic and vascular surgery. Staff Surgeon, Hartford Hospital and John Dempsey Hospital	1998-present

CERTIFICATION AND LICENSURE

Certification:	National Board of Medical Examiners	#228672 - 1981
	American Board of Surgery	#33203 - 1988
	American Board of Thoracic Surgery	#5026 – 1990 - 2000 recertification
Licensure:	State of Michigan	#051562 – 1987
	State of Indiana	#01037644 – 1989
	State of Connecticut	#032227 – 1992

MEMBERSHIP IN PROFESSIONAL AND SCIENTIFIC SOCIETIES

Fellow, American College of Surgeons
Fellow, Society of Thoracic Surgeons
Fellow, American College of Chest Physicians
International Society for Heart and Lung Transplantation
John Alexander Society
Andrew C. Morrow Society for Cardiovascular Surgery
Ralph E. Deterling Society
American Medical Association
The Hartford Medical Society
Hartford County Medical Association

Curricula Vitae
Paul B. Langevin, M.D.

PRESENT APPOINTMENT

Associate Professor, Department of Anesthesiology, Yale University School of Medicine, New Haven, Connecticut, 2001 to present
Staff Physician, Anesthesiology, Critical Care, Echocardiology, VA CT Healthcare System, West Haven, Connecticut, 2001 to present

DATE OF BIRTH: April 1, 1954, New Haven, Connecticut

EDUCATION

B.S., Southern Connecticut State College, New Haven, Connecticut, 1977
M.S., Southern Connecticut State College, New Haven, Connecticut, 1978
M.D. (cum laude), University of Missouri School of Medicine, Columbia, Missouri, 1988
Internship, Department of Internal Medicine, S.U.N.Y. at Stony Brook, Stony Brook, New York, 1988-1989
Residency, Department of Internal Medicine, S.U.N.Y. at Stony Brook, Stony Brook, New York, 1989-1990
Residency, Department of Anesthesiology, University of Florida College of Medicine, Gainesville, Florida, 1990-1993
NASA Flight Surgeon Certification, Kennedy Space Center, Cape Canaveral, Florida, 1995
Fellowship, Critical Care Medicine, Dartmouth-Hitchcock Medical Center, New Hampshire, 2000-2001
Fellowship, Echocardiology Care Medicine, Dartmouth-Hitchcock Medical Center, New Hampshire, 2000-2001

APPOINTMENTS

Graduate Teaching Assistant, Department of Chemistry, Southern Connecticut State College, New Haven, Connecticut, 1976-1979
Instructor, Columbia College, Columbia, Missouri, 1979-1981
Graduate Teaching Assistant, University of Missouri, Department of Physiology, Columbia, Missouri, 1979-1986
Graduate Teaching Assistant, University of Missouri, Department of Anatomy, Columbia, Missouri, 1984-1986
Assistant Professor, Department of Anesthesiology, University of Florida College of Medicine, Gainesville, Florida, 1993-1999
Affiliate Assisatnt Professor, Department of Pharmacodynamics, University of Florida College of Pharmacy, Gainesville, Florida, 1998-1999
Associate Professor, Department of Anesthesiology, University of Florida College of Medicine, Gainesville, Florida, 1999 to 2001

APPOINTMENTS (cont.)

Affiliate Associate Professor, Department of Pharmacodynamics, University of Florida, College of Pharmacy, Gainesville, Florida, 1999 to 2001
Director, Postanesthesia Care Unit, Veterans Administration Medical Center, Gainesville, Florida, 1997 to 2000
Associate Professor, Department of Anesthesiology, Yale University School of Medicine, New Haven, Connecticut, 2001 to present
Staff Physician, Anesthesiology, Critical Care, Echocardiology, VA CT Healthcare System, West Haven, Connecticut, 2001 to present

MILITARY SERVICE

United States Army Medical Corps, Reserve Officer, 1984 - 1993

HONORS

American Society of Anesthesiologists,
Second Place for Art and Literature, ASA Art Exhibit, 1996
Gulf Atlantic Anesthesiology Residents' Conference,
Third Place for Original Research, 1992
Gulf Atlantic Anesthesiology Residents' Conference,
Second Place for Original Research, 1991
National Institutes of Health, Predoctoral Fellowship, 1981-1984
University of Florida College of Medicine
Howard Hughes Medical Institute Research Resources Award, $2,000, 1998-1999.
University of Missouri
Golden Key Award for Excellence in Teaching, 1986

BOARDS

American Board of Anesthesiology, Diplomate, 1994
National Board of Medical Examiners, Diplomate, 1991
Critical Care Medicine, Board eligible
Echocardiology Level II Certification
American Board of Internal Medicine, Board eligible, 2001

LICENSURE

Florida, ME 0064568, 1993
Connecticut, 042641

SOCIETY MEMBERSHIPS

Alachua County Medical Society, 1993 - 2001

SOCIETY MEMBERSHIPS (cont.)

American Heart Association, 1994
American Physiologic Society, 1994
American Society of Anesthesiology, 1994
American Society of Echocardiography, 1995 - 2002
Florida Medical Association, 1993 - present
International Obstetrical Anesthetists Association, 1993 - present
Society for Ambulatory Anesthesia, 1994
Society of Cardiovascular Anesthesiologists, 1994
Society of Neurosurgical Anesthesia, 1994
Society for Obstetric Anesthesia and Perinatology, 1994 - 2000

EDITORIAL BOARDS

Anesthesiology, Reviewer, 1997
Manuscript 199905072, May 1999
Anesthesia and Analgesia, Reviewer, 1996
Journal of Clinical Monitoring and Computing, Reviewer, 1998
Chest, Consulting Editor, 1999 – present
Reviewed 1 Manuscript, May 1999

PROFESSIONAL CONSULTATIONS

Medical Consultant for Zeneca Pharmaceuticals, 1999 – 2001
Medical Consultant for B. Braun 1998-2000

VISITING PROFESSORSHIPS

University of Massachusetts, Department of Anesthesiology, Boston, Massachusetts, 1993
University of Florida College of Pharmacy, Department of Pharmaceutics, November 1993
Yale University, Department of Anesthesiology and Critical Care Medicine, November 1997
St. Rapheal's Hospital, Department of Radiology and Critical Care Medicine, October 1998
State University of New York at Stonybrook, Department of Anesthesiology and Critical Care Medicine, December 1999
Dartmouth Hitchcock Hospital, Department of Cardiology, 2001

TEACHING ACTIVITIES

University of Florida College of Medicine
Department of Anesthesiology
Advisor for Residents
Glennon Brown, MD, 1997-1998

TEACHING ACTIVITIES (cont.)

Lisa W. Faberowski, MD, 1996-1997
Eric Loudermilk, MD, 1996-1997
Co-director, Difficult Airway Course, Lecture curriculum and practicum, 1996
Developed teaching curriculum for intraoperative training of housestaff, 1995
Developed teaching curriculum for conscious sedation, 1997
Coordinator of Anesthesiology Resident Research for Gulf-Atlantic Coast Anesthesiology Residents' Research Conference, 1994, 1995
Mentoring New Faculty
Caridad Bravo-Frenandez, MD, 1997-1998
Morning Conferences
Preoperative assessment, 1994
ASA Presentation, September 19, 1994
Aging processes, January 9, 1996
Anesthetic considerations with malignancies, February 27, 1996
Essentials of oxygenation and ventilation, July 24, 1996
Cardiovascular physiology, February 17, 1998
Cardiovascular pharmacology, February 18, 1998
Cardiovascular physiology, March 4, 1998
Mediastinal masses, April 15, 1998

Dartmouth University College of Medicine
Department of Critical Care Medicine
Utility of measuring gastric pH in the ICU, April 14, 2000
Pre-eclampsia, hypertensive mechanisms, September 8, 2000

Yale University College of Medicine
Department of Anesthesiology
Director of Resident education - Present
Airway Concerns, cyclical since February 2001
Preoperative evaluations and Consultations, Cyclical since February 2001
Echocardiographic principals of cardiac function, March 15, 2002
Cardiac Physiology, June 23, 2003
Post operative Nausea and Vomiting, October 17, 2003
Postoperative shaking January 19, 2004

COMMITTEE APPOINTMENTS

Yale University
College of Medicine
Resident Review Committee

COMMITTEE APPOINTMENTS (cont.)

West Haven VA Medical Center
IHI for Perioperative infections
National Institutes of Health
Consultant to NIH Study Section for Project Program Review, 1994
University of Florida
College of Medicine
Department of Anesthesiology
Gulf Atlantic Anesthesia Residents' Research Conference, Coordinating Committee, 1994, 1995
Medicare Billing Committee, 1996
We Care Program, 1994
University Senate, 1995-1996, 1999-2001
University of Missouri, Department of Physiology
Graduate Professional Council, Department Representative, 1981-1983
Southern Connecticut State University
President's Subcommittee on Mission Statement, 1976
Long-range Planning Committee, 1974-1977

SPECIAL SERVICES

University of Florida
Developed emergency airway system, 1994
Organized departmental journal club, 1994
Developed didactic and practical curriculum at VA Medical Center for residency training, 1995
Developed advanced training program for recovery room nurses, 1996
Yale University
Developed advanced training program for SICU and MICU nurses, 2002

Clinical Responsibilities

University of Florida 1991-2001
Cardiac anesthesia (adult) – all types of cardiac and thoracic anesthesia including transplant, trauma and cases requiring ventricular assist devices
Neuroanesthesia – anesthetic Management of all types of neurosurgical cases including those requiring, EEG, EP and TCD interpretation
General Anesthesia – primarily complex, adult ICU related cases.
Yale University/West Haven VA Medical Center
Department of Anesthesiology
General Anesthesia
Cardiac Anesthesia

P.B. Langevin

Neuroanesthesia

Clinical Responsibilities (cont.)

Teaching Attending in the MICU and SICU

Department of Cardiology

Echocardiology - performance and interpretation of intra-op, in patient and outpatient TTE, TEE, and stress echo

P.B. Langevin

BIBLIOGRAPHY

BOOKS, CONTRIBUTOR OF A CHAPTER

Langevin PB: Chemotherapeutic agents, in Atlee JJ (ed): Complications in Anesthesia. Philadelphia, WB Saunders, 1999, pp 103-107.

Langevin PB: Pulmonary consultation, in Kirby RR, Gravenstein N, Lobato EB (eds): Clinical Anesthesia Practice, ed 2. Philadelphia, WB Saunders. In press.

Hartmannsgruber MWB, Layon AJ, Langevin PB: Thermal injuries: pathophysiology and anesthetic considerations, in Kirby RR, Gravenstein N, Lobato EB (eds): Clinical Anesthesia Practice, ed 2. Philadelphia, WB Saunders. In press.

REFEREED PUBLICATIONS

Dostal DE, Johnson JA, Langevin PB, Abas N: Hyperresponsiveness of arterial rings induced by renal prehypertensive rabbit plasma. Am J Physiol 255:H272, 1988.

Langevin PB, Gravenstein N, Langevin SO, Gulig PA: Epidural catheter reconnection: safe and unsafe practice. Anesthesiology 85:883-888, 1996.

Euliano TY, White SE, Alexio L, Langevin PB: Sarcoidosis in a pregnant woman. J Clin Anesth 9:78-86, 1997.

Loudermilk EP, Hartmansgruber M, Stoltzfus DP, Langevin PB: A prospective study of the safety of tracheal extubation using a pediatric airway exchange catheter for patients with a known difficult airway. Chest 111:1660-1665, 1997.

Lampotang S, Cheung-Seekit C, Langevin P: Design, implementation and bench evaluation of a system for automatic synchronization of chest x-ray radiograph with peak lung inflation. Proceedings of the International Conference of the IEEE Engineering in Medicine and Biology Society 20(2):711-714, 1998.

Langevin PB, Rand KH, Layon AJ: The potential for dissemination of *Mycobacterium tuberculosis* through the anesthesia breathing circuit. Chest 115:1107-1114, 1999.

Langevin PB, Wood CE, James CF: Nitroglycerin and uterine muscle relaxation in pregnant sheep and post-partum rabbits. Anesth Analg. In press.

REFEREED PUBLICATIONS (cont.)

Langevin PB, Cheung-Seekit C, Lampotang S: A ventilator interface improves the quality of portable chest radiographs. Am J Respir Crit Care Med. In press.

Langevin PB, Gravenstein N, Doyle TJ, Roberts SA, Skinner S, Langevin SO, Gulig PA: Growth of *Staphylococcus aureus* in Diprivan and Intralipid: implications on the pathogenesis of infections. Anesthesiology. In press.

COMPETITIVE ABSTRACTS

Williams DO, Boatwright RB, Langevin PB, Griggs DM Jr: Metabolic versus neural control of resting coronary blood flow in conscious dogs, abstracted. Fed Proc 42:462, 1983.

Boatwright RB, Williams DO, Langevin PB, Griggs DM Jr: Heterogeneity of myocardial norepinephrine release in conscious dogs, abstracted. Fed Proc 42:483, 1983.

Williams DO, Boatwright RB, Langevin PB, Griggs DM Jr: Technique for assessing regional myocardial metabolic function in the conscious dog, abstracted. Fed Proc 483, 1983.

Langevin PB, Gulig PA, Gravenstein N: Epidural catheter disconnection: extent of contamination, abstracted. Anesthesiology 77:A1055, 1992.

Langevin PB, Gulig PA, Gravenstein N: Epidural catheter contamination: effect of catheter position and meniscus on extent of contamination, abstracted. Anesthesiology 77:A1041, 1992.

Langevin PB, Gulig PA, Gravenstein N, Bjoraker DG: Propofol: potentiation of infections, abstracted. Anesthesiology 79:A1098, 1993.

Langevin PB, James CF: Effectiveness of nitroglycerin for relaxation of uterine smooth muscle, abstracted. Anesthesiology 79:A994, 1993.

Langevin PB, Gravenstein N: Epidural catheter disconnection--final conclusions, abstracted. Anesthesiology 79:A975, 1993.

Langevin PG, Gulig PA, Gravenstein N: Intralipid alters LD50 of Staphylococcus aureus, abstracted. Can J Anaesth 41:A37, 1994.

Langevin PB, Boysen PG: Transtracheal jet ventilation with partial airway obstruction: an oversight of the algorithm, abstracted. Anesthesiology 81:A527, 1994.

Langevin PB, Faberowski LW, Gulig PA, Gravenstein N: Multiple use of monoject syringes,

abstracted. Anesthesiology 81:A527, 1994.

ABSTRACTS (cont.)

Langevin PB, Wood CE, James CF: Nitroglycerin and uterine muscle relaxation in pregnant sheep, abstracted. Anesthesiology 81:A1137, 1994.

Langevin PB, Gulig PA, Gravenstein N: A re-evaluation of the growth rate of Staphylococcus aureus in propofol and intralipid: implications on infection, abstracted. Anesth Analg 80:S263, 1995.

Langevin PB, Wood C, Langevin SO: Effect of nitroglycerin on uterine smooth muscle tone, fetal hemodynamics, and the fetal oxygen supply and demand relationship in sheep, abstracted. Anesth Analg 80:S264, 1995.

Langevin PB, Boysen PB: Transtracheal jet ventilation in the presence of a variable airway obstruction, abstracted. Anesthesiology 83:A495, 1995.

Langevin PB, Gulig PA, Gravenstein N: Growth characteristics of s. aureus in propofol and intralipid, abstracted. Anesthesiology 83:A1073, 1995.

Langevin PB, Gulig PA, Gravenstein N: Time to re-evaluate routine 24-hr syringe discard policy in the operating room, abstracted. Anesthesiology 83:A1037, 1995.

Langevin PB, James CF, Wood CE: Effect of sodium thiopental on fetal oxygen supply and demand in the term laboring ewe, abstracted. Anesthesiology 83:A930, 1995.

Langevin PB, James CF, Wood CE: A new on-line in vitro model for the study of fetal oxygen supply and demand in the term laboring ewe, abstracted. Anesthesiology 83:A980, 1995.

Langevin PB, Gulig PA, Gravenstein N: Misconceptions regarding growth rates for *Staphylococcus aureus* in intralipid, abstracted. Can J Anaesth 42:A26, 1995.

Langevin PB, Gulig PA, Gravenstein N: Opened but unused pressure transducers remain sterile longer than 24 hours, abstracted. Anesth Analg 82:S263, 1996.

Langevin PB, Brown MM, Boysen PG: Difficulties optimizing rate for transtracheal jet ventilation in the presence of an obstructed airway, abstracted. Anesthesiology 85:A1113, 1996.

Langevin PB, Katovich MJ, James CF: Uterine smooth muscle compliance: effect of nitroglycerine independent of a contractile mediator, abstracted. Anesthesiology 85:A885, 1996.

Layon AJ, Wathana S, Langevin PB, Rand KH: Further work on ventilator-associated infections

and their prevention, abstracted. Anesthesiology 85:A224, 1996.

ABSTRACTS (cont.)

James CF, Nelson EO, Langevin PB, Hawkins RK, Radson EA: Adding low doses of epidural nalbuphine to morphine for postcesarean analgesia, abstracted. Anesth Analg 84:S391, 1997.

Langevin PB, Brown MM: A simple, innocuous, and inexpensive treatment for postoperative nausea and vomiting, abstracted. Anesth Analg 84:S15, 1997.

Langevin PB, Brown MM: A simple, innocuous, and inexpensive treatment for postoperative nausea and vomiting, abstracted. Anesthesiology 87:A971, 1997.

Langevin PB, Katovich MJ, James CF, Langevin SO: The effect of nitroglycerin on the uterus: mechanisms of action, abstracted. Anesthesiology 87:A887, 1997.

Langevin PB, Learn RJ, Lobato EB: Adding albumin to pump prime during cardiopulmonary bypass (CPB) reduces crystalloid requirements, abstracted. Anesth Analg 86:S78, 1998.

Langevin PB, Katovich MJ, Beck K, Langevin SO: Vascular responsiveness to phenylephrine during labor, abstracted. Anesthesiology 89:A1044, 1998.

Langevin PB, Layon AJ, Rand KH, Banner MJ, Langevin SO: Dissemination of Mycobacterium tuberculosis through anesthesia breathing circuits, abstracted. Anesthesiology 89:A1174, 1998.

Langevin PB, Beck KR, Katovich MJ: Vascular responsiveness during pregnancy, abstracted. Anesth Analg 88:S255, 1999.

Lampotang S, Cheung-Seekit C, Langevin PB: Synchronization of chest x-ray imaging with peak lung inflation, abstracted. J Clin Monit Comput 15:239-240. 1999.

Langevin PB, Katovich MJ, Beck K, Langevin SO: Resting vascular tone during pregnancy, abstracted. Anesthesiology 91:A1094, 1999.

Langevin PB. Katovich MJ, Beck K: Vascular responsiveness during pregnancy, abstracted. Anesthesiology 91:A1088, 1999.

P.B. Langevin

EDITORIALS AND INVITED ARTICLES

Langevin PB: The practice of using nitroglycerin, letter to the editor. Anesthesiology 87:716-717, 1997.

Langevin PB: Propofol containing sulfite: potential for injury, letter to the editor. Chest.

Langevin PB: Risk of epidural infection and Abscess, Invited editorial, Regional Anesthesia, 1999.

PAPERS AND LECTURES PRESENTED

An experimental model of regional sympathectomy **and** Hyperresponsiveness in hypertensive rabbits. Seventeenth Annual Gulf-Atlantic Anesthesia Residents' Conference. Department of Anesthesiology, University of Kentucky College of Medicine, Lexington, Kentucky, May 1991.

Epidural catheter disconnection: extent of contamination (May 24). Eighteenth Annual Gulf Atlantic Anesthesia Residents' Conference. Department of Anesthesiology, Tulane University School of Medicine, New Orleans, Louisiana, May 22-24, 1992.

Epidural catheter disconnection: extent of contamination (October 19) **and** Epidural catheter contamination: effect of catheter position and meniscus on extent of contamination (October 20). Annual Meeting. American Society of Anesthesiologists, New Orleans, Louisiana, October 17-21, 1992.

Effectiveness of nitroglycerin for relaxation of uterine smooth muscle. Visiting Professor. Department of Anesthesia, University of Massachusetts, Boston, Massachusetts, 1993.

Effectiveness of nitroglycerin for relaxation of uterine smooth muscle. Annual Meeting. Obstetric Anaesthetist's Association, London, United Kingdom, September 24-25, 1993.

Propofol: potentiation of infections; Effectiveness of nitroglycerin for relaxation of uterine smooth muscle; **and** Epidural catheter disconnection--final conclusions. Annual Meeting. American Society of Anesthesiologists, Washington, DC, October 9-13, 1993.

Potentiation of infection by Intralipid. Visiting Professor. Department of Pharmaceutics, University of Florida College of Pharmacy, Gainesville, Florida November 10, 1993.

Pneumocephalus with epidural anesthesia: an unusual occurrence in a healthy pregnant woman **and** Nitroglycerin and uterine muscle relaxation in pregnant sheep. 26th Annual Meeting. Society for Obstetric Anesthesia and Perinatology, Philadelphia, Pennsylvania, May 11-14, 1994.

PAPERS AND LECTURES PRESENTED (cont.)

Intralipid alters LD50 of Staphylococcus aureus. 51st Annual Meeting. Canadian Anaesthetists' Society, Edmonton, Alberta, Canada, June 17-21, 1994.

Transtracheal jet ventilation with partial airway obstruction: an oversight of the algorithm **and** Nitroglycerin and uterine muscle relaxation in pregnant sheep (October 17) **and** Multiple use of monoject syringes (October 18). Annual Meeting. American Society of Anesthesiologists, San Francisco, California, October 15-19, 1994.

A re-evaluation of the growth rate of staphylococcus aureus in propofol and intralipid: implications on infection **and** Effect of nitroglycerin on uterine smooth muscle tone, fetal hemodynamics, and the fetal oxygen supply and demand relationship in sheep. 69th Clinical and Scientific Congress. International Anesthesia Research Society, Honolulu, Hawaii, March 10-14, 1995.

Effect of sodium thiopental on fetal oxygen supply and demand in the term laboring ewe. Annual Meeting. Society for Obstetric Anesthesia and Perinatology, Montreal, Quebec, Canada, May 16-21, 1995

Misconceptions regarding growth rates for *Staphylococcus aureus* in intralipid. 52nd Annual Meeting. Canadian Anaesthetists' Society, Ottawa, Ontario, Canada, June 23-27, 1995.

Induction doses of sodium thiopental and foetal oxygen supply and demand at term in the laboring ewe. What's New in Obstetric Anaesthesia. Obstetrical Anaesthetists Association, Basel, Switzerland, September 29-30, 1995.

Effect of sodium thiopental on fetal oxygen supply and demand in the term laboring ewe (October 23); A new on-line in vivo model for the study of fetal oxygen supply and demand in the term laboring ewe **and** Transtracheal jet ventilation in the presence of a variable airway obstruction (October 24); **and** Growth characteristics of S. aureus in propofol and intralipid **and** Time to re-evaluate routine 24-hour syringe discard policy in the operating room (October 25). 1995 Annual Meeting. American Society of Anesthesiologists, Atlanta, Georgia, October 21-25, 1995.

Opened but unused pressure transducers remain sterile longer than 24 hours. Annual Meeting. International Anesthesia Research Society, Washington, DC, March 7-13, 1996.

An alternative technique for securing the difficult airway **and** Pneumocephalus associated with small gas volumes following epidural anesthesia (April 17); **and** Methodology for quantitative collection of nebulized organisms (April 18). 11th World Congress of Anesthesiologists. Australian Society of Anaesthetists and the World Federation of Societies of Anaesthesiologists,

Sidney, Australia, April 14-20, 1996.

PAPERS AND LECTURES PRESENTED (cont.)

Difficulties optimizing rate for transtracheal jet ventilation in the presence of an obstructed airway (October 21) **and** Uterine smooth muscle compliance: effect of nitroglycerine independent of a contractile mediator (October 22). Annual Meeting. American Society of Anesthesiologists, New Orleans, Louisiana, October 21-24, 1996.

A simple, innocuous, and inexpensive treatment for postoperative nausea and vomiting. Annual Meeting. International Anesthesia Research Society, San Francisco, California, March 14-21, 1997.

The effect of nitroglycerin on the uterus: mechanism of action. OAA Annual Meeting. International Society for Obstetric Anesthesia, Guildford, Surrey, April 10-11, 1997.

The effect of nitroglycerin on the uterus: mechanism of action. Annual Meeting. Society for Obstetric Anesthesia and Perinatology, Bermuda, April 13-17, 1997.

A simple, innocuous, and inexpensive treatment for postoperative nausea and vomiting (October 20) **and** The effect of nitroglycerin on the uterus: mechanisms of action (October 21). Annual Meeting. American Society of Anesthesiologists, San Diego, California, October 18-22, 1997.

Adding albumin to pump prime during cardiopulmonary bypass (CPB) reduces crystalloid requirements. Annual Meeting. International Anesthesia Research Society, Orlando, Florida, March 7-12, 1998.

Vascular responsiveness during labor (April 30). Annual Meeting. Society for Obstetric Anesthesia and Perinatology, Vancouver, British Columbia, April 29-May 2, 1998.

Vascular responsiveness to phenylephrine during labor (October 19) **and** Dissemination of *Mycobacterium tuberculosis* through anesthesia breathing circuits. Annual Meeting. American Society of Anesthesiologists, Orlando, Florida, October 17-21, 1998.

Vascular responsiveness during pregnancy **and** Resting vascular tone during pregnancy (October 11). Annual Meeting. American Society of Anesthesiologists, Dallas, Texas, October 9-13, 1999.

CONTRACTS AND GRANTS

Langevin PB (principal investigator), Gulig PA, Gravenstein N (co-principal investigators): The effect of intralipid on the incidence and severity of staphylococcal infections. Department of Sponsored Research, $5,000, 1994-1995.

CONTRACTS AND GRANTS (cont.)

Langevin PB (principal investigator), Wood CE, James CF (co-principal investigators): Effect of nitroglycerin on uterine muscle in pregnant sheep and postpartum rabbits. UF Starter Grant, $5,000, 1994.

Langevin PB (principal investigator), Gulig PA, Gravenstein N (co-principal investigators): Effect of propofol on staphylococcus aureus infection. Stuart Pharmaceuticals, $2000, 1993-1994.

Layon AJ (principal investigator), Rand K, Banner MJ, Langevin PB (co-principal investigators): Evaluation of bacterial transmission from ventilators to patients. Pall Incorporated, $48,400, 1995.

Langevin PB (principal investigator), Lobato EB (co-principal investigator): Multicenter study of the effects of Tirilizad on the prevention of renal failure after cardiovascular surgery. Upjohn Pharmaceuticals, $300,000, 1998-1999.

Langevin PB (principal investigator): Vascular responsiveness in pregnancy and pre-eclampsia. International Anesthesia Research Society, $70,336, 1998.

Langevin PB, Sulek CA (co-principal investigators): In vitro effects of milrinone on human cerebral arteries. I. Heerman Anesthesia Foundation, $20,000, 1998-1999.

Layon AJ (principal investigator), Langevin PB, Rand K (co-principal investigators): Bacterial excretion from critically ill patients with pneumonia—a project to better understand the theoretical and practical aspects of ventilator associated pneumonia. Biomedical Engineering Seed Grant, $15,000, 1999.

PATENTS

Langevin PB: Chest tube colar, UF #1589.

Langevin PB: Contamination proof infusion systems, UF #1580.

Langevin PB: Infection resistant blood sampling system, UF #1570.

Langevin PB, Brown MM: Nausea-Rite, UF #1583.

Langevin PB, Lampotang S: A method and apparatus for triggering an event at a desired point in

the breathing cycle, UF #1633.

PATENTS (cont.)

Lampotang S, Langevin PB: A method and apparatus for coordinating an event to desired points in one or more physiological cycles.

CURRICULUM VITAE

RONALD E. BURT, M.D.
Chairman, Department of Anesthesiology
Eastern Connecticut Health Network
Manchester Memorial Hospital/Rockville General Hospital
Manchester, Connecticut
Partner, Milford Anesthesia Associates, P.C.
Board of Directors, Milford Anesthesia Associates, P.C.
Milford, Connecticut

Address: Five Wentworth Park
Farmington, Connecticut 06032

Social: Born: Columbia, Missouri, 08/06/1956
Married: 1992, Elizabeth (Sena)
Children: Eric Robert, b. 1995
Olivia Marie, b. 2000
Victoria Elizabeth, b. 2002

Current Positions: **March 1, 2007** - present
Chairman, Department of Anesthesiology
Eastern Connecticut Health Network
Manchester Memorial Hospital/Rockville General Hospital
Partner, Milford Anesthesia Associates, P.C.

January 15, 2008 - present
Attending Cardiac Anesthesiologist
Heart Center of Greater Waterbury
St. Mary's Hospital
Waterbury Hospital
Waterbury, Connecticut

Prior Positions: **August 11, 1986 – March 1, 2007**
Attending Anesthesiologist
St. Francis Hospital and Medical Center
Hartford, Connecticut

2002 – 2004 (term limit)
President, Medical and Dental Staff
St. Francis Hospital and Medical Center
Hartford, Connecticut

2000 - 2002
Vice President, Medical and Dental Staff
St. Francis Hospital and Medical Center
Hartford, Connecticut

2002 - 2006
Chairman, Department of Anesthesiology
St. Francis Hospital and Medical Center
Hartford, Connecticut

1989 - 2007
Partner, Woodland Anesthesiology Associates, P.C.
Hartford, Connecticut
President, Woodland Anesthesiology Associates, P.C.
December 2002 – March 2006
Vice President, Woodland Anesthesiology Associates, P.C.
October 1998 – December 2006
Board of Directors, Woodland Anesthesiology Associates, P.C.
October 1994 – March 2006

Academic Appointments/Educational Positions Held:

1989 - 2007
Assistant Professor of Clinical Anesthesiology
University of Connecticut School of Medicine

At St. Francis Hospital and Medical Center Integrated Clinical Site:
Core Faculty for Cardiac Anesthesia
Director, Ambulatory Anesthesia Clerkship
Resident Clinical Competency Committee

Clinical Training: **1985- 1986**
Fellow, Anesthesiology Advanced Clinical Track
University of Vermont School of Medicine
Medical Center Hospital of Vermont
Burlington, Vermont
Clinical Foci: Cardiac/Vascular/Thoracic Anesthesia

1983-1985
Resident, Anesthesiology
Tufts University School of Medicine
St. Elizabeth's Hospital of Boston
Brighton, Massachusetts
Chief Resident, 1985

1982-1983
Intern, Flexible (Internal Medicine, Surgery, Pediatrics)
St. Louis University School of Medicine
Deaconess Hospital
St. Louis, Missouri

Education:

1978-1982
University of Missouri-Columbia School of Medicine
Columbia, Missouri
Degree: **M.D.**
Class Representative to American Medical Student Association

1975-1978
Washington University
Saint Louis, Missouri
Degree: **B.S.**, Biology

Licensure: Connecticut (27196)

Certification: American Board of Anesthesiology (1986)

Professional Memberships/Activities:

Connecticut State Medical Society
Hartford County Medical Association
American Society of Anesthesiologists
International Anesthesia Research Society
New England Society of Anesthesiologists

At Eastern Connecticut Health Network:
Medical Executive Committee
Medical Peer review Committee
Quality Improvement Council
Surgical Leadership Executive Committee
Cancer Committee
Code Blue Committee

DAVID A. HEIMBINDER, M.D.

2433 Whitemarsh Way, Savannah, GA 31410
912-704-9494; dah75@jhu.edu

PROFILE

Experienced anesthesiologist specializing in adult cardiac cases and interventional pain management.

EXPERIENCE

Memorial Health Hospital, Savannah, GA: 2/2007 to present
- General anesthetic practice including adult hearts. Level 1 trauma facility

Central Maine Heart and Vascular Institute, Central Maine Medical Center, Lewiston, ME: November 2005 to 02/2007
- Adult cardiothoracic practice.
- Interventional pain management for trauma and CT patients.

St. Elizabeth Hospital, Appleton, WI: February 2001 to October 2005
- Section Chief cardiothoracic anesthesia in Level 3 Hospital.
- Duties included mix of OR and Interventional Pain Clinic patients: OR 3 days/wk and Pain Clinic 2 days per week.

Tobey Hospital, Wareham, MA: April 2000 to February 2001
- Staff Anesthesiologist in physician only practice. Cases limited to routine surgery.

St. Elizabeth Hospital, Appleton, WI: July 1998 to April 2000
- Staff Anesthesiologist in hospital employed anesthesiology group.
- 50% CRNA supervision
- All cases excluding tertiary pediatrics and transplants.

Union Memorial Hospital, Baltimore, MD: July 1986 to July 1998
- Extensive experience w/ regional anesthesia in Level 2 Hospital, a designated Regional Center for Upper Extremity Trauma in the Delmarva area.
- Adult cardiac cases, including OPCAB, MIDCAB, and HeartPort.
- Minimal CRNA supervision
- Outpatient surgery center coverage

EDUCATION/TRAINING

Fellowship- Critical Care Medicine, July 1985- June 1986
University of Maryland Hospital, Shock Trauma Unit, Baltimore MD

Residency- Anesthesiology, July 1983 to June 1985
Yale University/New Haven Hospital Dept. of Anesthesiology, New Haven, CT
Rotating internship- Hospital of St. Raphael, July 1982 to June 1983
New Haven, CT

M.D. - University of Brussels, Brussels Belgium, June 1982

B.A. in Biology, 1975
Johns Hopkins University, Baltimore, MD

PROFESSIONAL MEMBERSHIPS

American Society of Anesthesiologists
Society of Cardiovascular Anesthesiologists
American Society of Echocardiography
American Academy of Pain Medicine
American Society of Interventional Pain Physicians
International Spine Intervention Society
American Society of Regional Anesthesia
American Medical Association

CERTIFICATIONS

Diplomate, American Board of Anesthesiology
Diplomate, American Board of Pain Medicine
Diplomate, National Board of Echocardiography (Perioperative TEE)

LICENSES

Active: Georgia/Maine/Wisconsin
Inactive: Massachusetts/Maryland

CURRICULUM VITAE

Ricardo Cardenas, M.D.

Home Address:

125 Ridgewood Road
West Hartford, Connecticut 06107
Phone: 860-313-0429

Education:

1/1984-6/1990	**Pontificia Universidad Javeriana**, Bogotá, Colombia Doctor in Medicine

Post-degree and Continuing Education Training:

7/2002-12/2002	**McGill University School of Medicine** McGill University Health Center. Montreal, Quebec, Canada. Clinical Fellowship in Regional Anesthesiology.
1/2001-6/2002	**McGill University School of Medicine** McGill University Health Center. Montreal, Quebec, Canada. Clinical Fellowship in Cardiac Anesthesiology
1/1997-12/2000	**University of Nebraska School of Medicine** University of Nebraska Medical Center, Omaha, Nebraska Categorical Residency in Anesthesiology.
3/1996-11/1996	**University of Miami School of Medicine** Jackson Memorial Hospital, Miami, Florida. Voluntary Observership, Department of Anesthesiology.
2/1995-9/1995	**Stanley H. Kaplan Educational Institute.**Boston, Massachusetts. Basic/Clinical Science Course for USMLE Steps 1 and 2.
2/1993-12/1995	**Boston University School of Medicine** Boston VA Medical Center, Boston, Massachusetts. Vascular Research Laboratory. Research Assistant, (Voluntary).
9/1991-12/1992	**Georgia State University**, Atlanta, Georgia English as a Second Language

Professional Experience and Academic Appointments:

4/2008-Present	**Staff Anesthesiologist,** Milford Anesthesia Associates Milford, Connecticut
7/2007-3/2008	**Staff Anesthesiologist,** Narragansett Bay Anesthesia The Miriam Hospital Providence, Rhode Island
4/2006-6/2007	**Assistant Professor,** University of Nebraska Medical Center Department of Anesthesiology Omaha, Nebraska
1/2003-3/2006	**Instructor,** University of Nebraska Medical Center Department of Anesthesiology Omaha, Nebraska
9/1990-8/991	**Rural Medical Doctor**. Mandatory Social Service Hospital San Francisco Gacheta, Cundinamarca. Colombia.

Other Appointments:

1/2004-6/2007	**Director of Cardiovascular Anesthesia Service** University of Nebraska Medical Center Omaha, Nebraska.

Academic Honors:

7/1999-6/2000	**Chief Resident,** Department of Anesthesiology, University of Nebraska Medical Center, Omaha, Nebraska

Certifications:

Diplomate. Certificate No: 39095
American Board of Anesthesiology

Diplomate, Certificate No: 2002-6735
National Board of Echocardiography
Periopertive Transesophageal Echocardiography

ECFMG Certificate # 0-481-373-7

Licenses:

Connecticut Medical License #046243
Rhode Island Medical License #12359
Massachusetts Medical License #232988
Nebraska Medical License #21550

Memberships and Offices in Professional Societies:

American Society of Anesthesiologists
International Anesthesia Research Society
Society of Cardiovascular Anesthesiologists
American Society of Echocardiography

Publications, Abstracts, and Case Presentations:

Cardenas R; Schricker T; Moore A. **"Respiratory Depression after Anesthesia Premedication in Patients undergoing CABG: a Comparison between standard benzodiazepine/opioid and Clonidine Based premedication".** Poster Presentation at the Philip R Bromage Anesthesia Research Day, Montreal, QC. April 2002

Cardenas R; Lunn J; Hill G. **"Cardiovascular Stability During Carotid Endarterectomy".** Poster Presentation at the International Anesthesia Research Society Clinical Scientific Congress, Orlando, FL, March 1998, and Midwest Anesthesia Residents Conference, Minneapolis, MN, May 1998.

Watkins M.; Al-Badawi H.; Cardenas R.; Dubois E.' Larson D. **"Endogenous Reactive Oxygen Metabolites Mediate Sublethal Endothelial Cell Dysfunction during Reoxygenation".** JOURNAL OF VASCULAR SURERY. 23 (1): 95-103, 1996, Jan.

Professional Lectureship invitations:

Basics of TEE, Current Concepts in Anesthesia annual meeting, Omaha, Nebraska. March 2005, April 2006 and March 2007
TEE for the general anesthesiologist, Anesthesia grand rounds. Methodist Hospital, Des Moines, Iowa. November, 2005
Cardiovascular Assessment and TEE, Nebraska Society of Perfusionists annual meeting, Omaha, Nebraska. February 2005 and 2007

Hobbies: Bicycling, Model trains

David J. Rosinski M.S. LCP
106 North Beacon St
Hartford, Connecticut 06105
(860) 670-0486

Experience:

University of Connecticut Health Center April 2005 to present

Director of Cardiovascular Perfusion at UCHC and The Heart Center of Greater Waterbury

- Established two new perfusion programs in collaboration with the development of open heart surgery at two hospitals in Waterbury Connecticut, Waterbury Hospital and St. Mary's Hospital

Quinnipiac University September 2005 to present

- Faculty - Teach two full courses for the fall and spring Semesters of the perfusion education program

Hartford Hospital July 1991 to April 2005

University of Connecticut Health Center
Farmington, Connecticut November 1994 to Present

Clinical Chief, Department of Cardiovascular Perfusion

- Responsible for a staff of 8 perfusionists performing approximately 1000 open-heart procedures at two institutions.
- Established both the University of Connecticut Health Center and the Connecticut Children's Medical Center perfusion programs in collaboration with the establishment of open-heart surgery at each institution.
- Responsible for completion of operational budget / cost analysis and efficiency.

- Developed departmental policy and procedures.
- Implemented and maintain departmental quality assurance program.
- Chair, Mechanical Circulatory Support Committee.
- Active member of Hartford Hospital Ethics Committee.
- Active member of Hartford Hospital Transfusion Committee.
- Clinical instructor / coordinator for Quinnipiac University perfusion students at Hartford Hospital.

Connecticut Society of Perfusion President 1998 to Present

- Conduct annual educational forum to provide C.E.U. credit.
- Successfully passed legislation for the licensing of Connecticut perfusionists 2005
- Established journal club forum for Connecticut perfusionists.

Best Practice Perfusion Group
Co-founder of a team of clinicians involved in cardiac surgery establishing evidence based standards of practice for perfusion.

Lahey Clinic
Burlington, Massachusetts July 1990 to October 1991
Staff Perfusionist

Education:

Northeastern University
Boston, Massachusetts
Bachelor of Science Degree, Respiratory Therapy and Perfusion Technology
June 1990

University Of Nebraska Medical Center
Omaha, Nebraska
Master of Perfusion Science Degree, College of Medicine
May, 2008

Certificates and Professional Affiliations:

Certified Clinical Perfusionist
Certified in C.P.R.
Member, American Society of Extracorporeal Technology
Member, American Society of Law, Medicine and Ethics
Inducted, 1989 member of Who's Who in American Colleges and Universities
Inducted, 2006 member of Who's Who in American Medicine and Health Care

Member, International Consortium of Evidence Based Perfusion, Chair – Education sub-committee, Steering Committee

Professional Meeting Faculty:

October 2007 – AmSECT Best Practices meeting, Montreal Canada
October 2006 – AmSECT Best Practices Meeting, Seattle, Washington
May 2005 - The Outcomes Meeting, Key West, Florida
May 2004 - The Outcomes Meeting, Key West, Florida

Publications:

David Donofrio, CCP

71 Edwin Lane • Thomaston, CT 06787 ♡ (860) 283-4812 • daveccp1@yahoo.com

Work Experience

University of Connecticut Health Center, Farmington, Connecticut
Clinical Perfusionist
June 2005 - Present

Integral member of the perfusion team. Responsible for three heart institutions including Saint Mary's Hospital, the University of Connecticut Health Center, and Waterbury Hospital. Proficient in the operation of the heart-lung machine and related equipment used during cardiopulmonary bypass and non-cardiac procedures. Procedures include elective and emergent coronary artery bypass grafts, valve repairs and replacements, ascending and descending aortic aneurysms, and cell saving. Responsible for operating perfusion-related equipment including the Intra-aortic balloon pump. Perform point-of-care blood gas analysis. Perform quality control tests on point-of-care instruments. Instruct nurses and scrub technicians on various bypass procedures.

Yale-New Haven Hospital, New Haven, Connecticut
Clinical Perfusionist
December 1996 - June 2005

Responsibilities as described above including the following: Ascending and descending aortic aneurysms, heart and liver transplants, platelet-gel sequestration, isolated limb perfusion, and pediatric ECMO. Proficient with ventricular assist devices such as the Abiomed, Jarvik, and Novacor. Perform yearly Intra-aortic balloon pump competency reviews and training.

CBC Corporation, LLC, Thomaston, Connecticut
Plant Manager
June 1988 - December 1996

Operate a family owned metal finishing business. Oversee all aspects of daily plant operations. Responsible for sales and marketing of various automotive coatings. Designed an innovative coating process for the automotive industry.

Educational Background

Bachelor of Science in Health Science, Perfusion Certificate (1996)
Quinnipiac University, Hamden, Connecticut

Perfusion Clinical (1996)
Yale-New Haven Hospital, Bridgeport Hospital, Hospital of Saint Raphael's

Certifications

American Board of Cardiovascular Perfusion
Adult, child and infant CPR
Emergency Medical Technician, IV certified

Professional Organizations

Connecticut Society of Perfusion
December 1996 - Present

Thomaston Volunteer Ambulance Corps, Inc.
February 1994 - Present
Member in good standing; average 900 service hours annually. Member of the Scholarship Committee.

Thomaston Little League
Coach and Safety Officer - April 2005 - Present

Ronald A. Salonia

308 West Avon Road, Avon, CT (860) 404-8815 ron.salonia@comcast.net

Experience

Cardiovascular Perfusionist
June 2005 – present University of Connecticut Health Center, Farmington, CT

- Directly responsible for performing all aspects of cardiovascular perfusion services, including bypass, cell saving, Hemobag for UCHC, Waterbury Hospital and St. Mary's Hospital
- Development of standards and best practices
- Conduct Quality Assurance and Improvement activities

Cardiovascular Perfusionist
January 1994 – June 2005 Hartford Hospital, Hartford, CT

- Responsible for performing cardiovascular perfusion services
- Liaison for UCONN Medical Center Perfusion Services, managing and communicating best practices, monitoring clinical quality and reporting standards

Assistant Director of Respiratory Care Services
May 1990 – December 1993 Hospital for Special Care, New Britain, CT

- Responsible for the supervision of clinical supervisory staff, departmental goal setting, budget development, purchase and inventory management
- Member of the hospital Quality Assurance, Safety and Planning Committees

Medical Sales Representative
1988 - 1990 Grant Medical, Inc., Vernon, CT

- Product Specialist for Respiratory, Anesthesia, Critical Care Supplies and DME
- Consultant for over 40 hospitals in CT, NY and MA

Respiratory Care Supervisor
1982 - 1998 Hartford Hospital, Hartford, CT

- Supervision of over 30 clinical therapists, development protocols, policies for critical care, neonatal, emergency and routine respiratory care
- Chief Flight Respiratory Therapist for LIFE STAR, responsible for start up, development and oversight of the respiratory program

Education, Certification and License

Quinnipiac College, Hamden, CT
June 1991 – December 1993

- Cardiovascular Perfusion Certificate of Completion

Central Connecticut State University, New Britain, CT
May 1984

- Bachelor of Science in Business Management

State of Connecticut, Department of Public Health
Licensed Perfusionist 2008

Interests and Professional Affiliations

National Board of Cardiovascular Perfusion
Certified Cardiovascular Perfusionist
Society for the Advancement of Blood Management
Member of the National Ski Patrol

Ronald A. Salonia

308 West Avon Road, Avon, CT (860) 404-8815 ron.salonia@comcast.net

Experience

Cardiovascular Perfusionist
June 2005 – present University of Connecticut Health Center, Farmington, CT

- Directly responsible for performing all aspects of cardiovascular perfusion services, including bypass, cell saving, Hemobag for UCHC, Waterbury Hospital and St. Mary's Hospital
- Development of standards and best practices
- Conduct Quality Assurance and Improvement activities

Cardiovascular Perfusionist
January 1994 – June 2005 Hartford Hospital, Hartford, CT

- Responsible for performing cardiovascular perfusion services
- Liaison for UCONN Medical Center Perfusion Services, managing and communicating best practices, monitoring clinical quality and reporting standards

Assistant Director of Respiratory Care Services
May 1990 – December 1993 Hospital for Special Care, New Britain, CT

- Responsible for the supervision of clinical supervisory staff, departmental goal setting, budget development, purchase and inventory management
- Member of the hospital Quality Assurance, Safety and Planning Committees

Medical Sales Representative
1988 - 1990 Grant Medical, Inc., Vernon, CT

- Product Specialist for Respiratory, Anesthesia, Critical Care Supplies and DME
- Consultant for over 40 hospitals in CT, NY and MA

Respiratory Care Supervisor
1982 - 1998 Hartford Hospital, Hartford, CT

- Supervision of over 30 clinical therapists, development protocols, policies for critical care, neonatal, emergency and routine respiratory care
- Chief Flight Respiratory Therapist for LIFE STAR, responsible for start up, development and oversight of the respiratory program

Education, Certification and License

Quinnipiac College, Hamden, CT
June 1991 – December 1993

- Cardiovascular Perfusion Certificate of Completion

Central Connecticut State University, New Britain, CT
May 1984

- Bachelor of Science in Business Management

State of Connecticut, Department of Public Health
Licensed Perfusionist 2008

Interests and Professional Affiliations

National Board of Cardiovascular Perfusion
Certified Cardiovascular Perfusionist
Society for the Advancement of Blood Management
Member of the National Ski Patrol

PAUL A JAUREGUI CCP.

9 Metacom Dr.
Simsbury, CT. 06070
(860) 463-6902

OBJECTIVE: To use my educational background and professional experience to enhance a dynamic cardiovascular perfusion program.

EDUCATION: Quinnipiac University 8/94 - 12/95
Hamden CT.
Completion of Cardiovascular Perfusion Certificate Program

Stony Brook University 8/91 - 6/93
Stony Brook NY.
B.S. Cardiopulmonary Respiratory Therapy

ST. Johns University 1/85 - 6/89
Jamaica NY.
B.S. Biology

EXPERIENCE: UCHC. Medical Center, Farmington, CT
6/17/05-Present
Staff Perfusionist with Open Heart Surgical Team. Also practicing at Waterbury Hospital and St.Mary's Hospital cardiac programs.

Hartford Hospital , Hartford CT.
12/95 – 6/16/05
Staff Perfusionist at this high volume cardiac and trauma center. Averaging 800 cases per year. Experienced in cardiopulmonary support for adult CABG's, valve replacements, aortic arch aneurysm involving deep hypothermia and retrograde cerebral perfusion, along with redo-operations requiring assisted mechanical venous drainage. Other responsibilities include: Assembly and priming of ventricular assist devices including the Heartmate and Abiomed 5000. Management of VAD and ECMO patients. Assisting on pediatric and neonatal corrective procedures. Along with animal research studies and clinical education of perfusion students.

Good Samaritan Hospital, West Islip, NY.
6/92 -12/95
Night staff therapist for this 475 bed hospital. Providing car for critical ventilator dependent patients, neonatal care, emergency room and trauma patients along with long term care of end stage patients. Proficient in intubation techniques, arterial samples, ventilatory support, and diagnostic critical decision making.

CERTIFICATIONS: Certified Cardiovascular Perfusionist 1997
Registered Respiratory Therapist 1993
Licensed Perfusionist State of CT.

AFFILIATIONS : Member AMSECT 1995
Member Connecticut Society of Perfusion 1996

LANGUAGES: Fluent in English and Spanish.

REFERENCES: Furnished upon request.

APPENDIX 6.D.

TWH DPH License

TWH Fire Marshall Report

TWH JCAHO Certificate

SMH DPH License

SMH Fire Marshall Report

SMH JCAHO Certificate

JDH DPH License

JDH Fire Marshall Report

JDH JCAHO Certificate

STATE OF CONNECTICUT

Department of Public Health

LICENSE

License No. 0060

General Hospital

In accordance with the provisions of the General Statutes of Connecticut Section 19a-493:

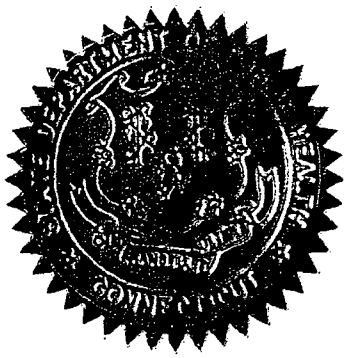
Waterbury Hospital of Waterbury, CT, d/b/a Waterbury Hospital is hereby licensed to maintain and operate a General Hospital.

Waterbury Hospital is located at 64 Robbins Street, Waterbury, CT 06721

The maximum number of beds shall not exceed at any time:
357 General Hospital beds
36 Bassinets

This license expires **September 30, 2009** and may be revoked for cause at any time.

Dated at Hartford, Connecticut, October 1, 2007. RENEWAL.



J Robert Galvin M.D., M.P.H.

J. Robert Galvin, M.D., M.P.H.,
Commissioner

Department of Public Safety
Division of Fire, Emergency & Building Services
Office of State Fire Marshal

STATE OF CONNECTICUT

On 6/29/2007, the Office of the Waterbury Fire Marshal conducted an inspection of Waterbury Hospital located at 64 Robbins Street in Waterbury to determine the degree of compliance with the fire safety requirements of Connecticut General Statutes Chapter 541 as authorized by Section 29-305 of the statutes. This facility was evaluated as a CHAPTER 19 EXISTING HEALTH CARE as classified by the *CONNECTICUT FIRE SAFETY CODE*. As a result of this inspection, the following conditions were found:

I. ☑ At the time of inspection, no code violations were identified. **Certificate of approval recommended.**

II. ☐ At the time of inspection, conditions were discovered to be contrary to the minimum requirements of these codes. An acceptable plan of correction was submitted. (*See attached information*) **Certificate of approval recommended.**

III. ☐ At the time of inspection, conditions were discovered to be contrary to the minimum requirements of these codes. No approved plan of correction was submitted. (*See attached information*) **Certificate of approval NOT recommended.**

IV. ☐ Based on the extreme hazard to public safety discovered at the time of this inspection, this office is currently seeking an injunction from the court through our Town/City Attorney for the purpose of closing or restricting usage of this facility by the public. (*See attached information*) **Certificate of approval NOT recommended.**

Fire Marshal

7-5-07
Date

City or Town: WATERBURY

The Joint Commission

September 14, 2007

John H. Tobin
President and Chief Excutive Officer
The Waterbury Hospital
64 Robbins Street
Waterbury, CT 06721

Joint Commission ID #: 5702
Accreditation Activity: Evidence of Standards Compliance
Accreditation Activity Completed: 9/14/2007

Dear Mr. Tobin:

The Joint Commission would like to thank your organization for participating in the Joint Commission's accreditation process. This process is designed to help your organization continuously provide safe, high-quality care, treatment, and services by identifying opportunities for improvement in your processes and helping you follow through on and implement these improvements. We encourage you to use the accreditation process as a continuous standards compliance and operational improvement tool.

The Joint Commission is granting your organization an accreditation decision of Accredited for all services surveyed under the applicable manual(s) noted below:

- Comprehensive Accreditation Manual for Behavioral Health Care
- Comprehensive Accreditation Manual for Hospitals.

This accreditation cycle is effective beginning May 11, 2007. The Joint Commission reserves the right to shorten or lengthen the duration of the cycle; however, the certificate and cycle are customarily valid for up to 39 months.

Please visit Quality Check® on the Joint Commission web site for updated information related to your accreditation decision.

We encourage you to share this accreditation decision with your organization's appropriate staff, leadership, and governing body. You may also want to inform the Centers for Medicare and Medicaid Services (CMS), state or regional regulatory services, and the public you serve of your organization's accreditation decision.

Please be assured that the Joint Commission will keep the report confidential, except as required by law. To ensure that the Joint Commission's information about your organization is always accurate and current, our policy requires that you inform us of any changes in the name or ownership of your organization or the health care services you provide.

Sincerely,

Linda S. Murphy-Knoll
Interim Executive Vice President
Division of Accreditation and Certification Operations

STATE OF CONNECTICUT

Department of Public Health

LICENSE

License No. 0055

General Hospital

In accordance with the provisions of the General Statutes of Connecticut Section 19a-493:

Saint Mary's Hospital, Inc. of Waterbury, CT, d/b/a Saint Mary's Hospital, Inc. is hereby licensed to maintain and operate a General Hospital.

Saint Mary's Hospital, Inc. is located at 56 Franklin Street, Waterbury, CT 06702

The maximum number of beds shall not exceed at any time:

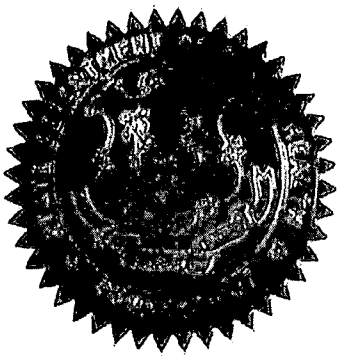
32 Bassinets
347 General Hospital beds

This license expires **December 31, 2008** and may be revoked for cause at any time.

Dated at Hartford, Connecticut, January 1, 2007.

Satellites

St. Mary's Dept. of Behavioral Health Care Services, 100 Jefferson Square, Waterbury, CT



J Robert Galvin M.D., M.P.H.

J. Robert Galvin, M.D., M.P.H.,
Commissioner

Department of Public Safety
Division of Fire, Emergency & Building Services
Office of State Fire Marshal

RECEIVED
NOV 28 2007

STATE OF CONNECTICUT

On **11/26/2007**, the Office of the Waterbury Fire Marshal conducted an inspection of St. Mary's Hospital - Slocum, Sacred Heart, Xavier located at 56 Franklin Street in Waterbury to determine the degree of compliance with the fire safety requirements of Connecticut General Statutes Chapter 541 as authorized by Section 29-305 of the statutes. This facility was evaluated as a CHAPTER 19 EXISTING HEALTH CARE as classified by the *CONNECTICUT FIRE SAFETY CODE*. As a result of this inspection, the following conditions were found:

I. ☑ At the time of inspection, no code violations were identified. **Certificate of approval recommended.**

II. ☐ At the time of inspection, conditions were discovered to be contrary to the minimum requirements of these codes. An acceptable plan of correction was submitted. (*See attached information*) **Certificate of approval recommended.**

III. ☐ At the time of inspection, conditions were discovered to be contrary to the minimum requirements of these codes. No approved plan of correction was submitted. (*See attached information*) **Certificate of approval NOT recommended.**

IV. ☐ Based on the extreme hazard to public safety discovered at the time of this inspection, this office is currently seeking an injunction from the court through our Town/City Attorney for the purpose of closing or restricting usage of this facility by the public. (*See attached information*) **Certificate of approval NOT recommended.**

Fire Marshal

11-28-07
Date

City or Town: WATERBURY

The Joint Commission

July 14, 2008

William Casey
Interim CEO
St. Mary's Hospital Corporation
56 Franklin Street
Waterbury, CT 06706

Joint Commission ID #: 5701
Accreditation Activity: Evidence of Standards Compliance
Accreditation Activity Completed: 7/14/2008

Dear Mr. Casey:

The Joint Commission would like to thank your organization for participating in the accreditation process. This process is designed to help your organization continuously provide safe, high-quality care, treatment, and services by identifying opportunities for improvement in your processes and helping you follow through on and implement these improvements. We encourage you to use the accreditation process as a continuous standards compliance and operational improvement tool.

The Joint Commission is granting your organization an accreditation decision of Accredited for all services surveyed under the applicable manual(s) noted below:

- Comprehensive Accreditation Manual for Behavioral Health Care
- Comprehensive Accreditation Manual for Hospitals

This accreditation cycle is effective beginning July 11, 2008. The Joint Commission reserves the right to shorten or lengthen the duration of the cycle; however, the certificate and cycle are customarily valid for up to 39 months.

Please visit Quality Check® on the Joint Commission web site for updated information related to your accreditation decision.

We encourage you to share this accreditation decision with your organization's appropriate staff, leadership, and governing body. You may also want to inform the Centers for Medicare and Medicaid Services (CMS), state or regional regulatory services, and the public you serve of your organization's accreditation decision.

Please be assured that the Joint Commission will keep the report confidential, except as required by law. To ensure that the Joint Commission's information about your organization is always accurate and current, our policy requires that you inform us of any changes in the name or ownership of your organization or the health care services you provide.

Sincerely,

Linda S. Murphy-Knoll
Interim Executive Vice President
Division of Accreditation and Certification Operations

STATE OF CONNECTICUT

Department of Public Health

LICENSE

License No. 0065

General Hospital

In accordance with the provisions of the General Statutes of Connecticut Section 19a-493:

University of Connecticut Health Center-John Dempsey Hospital of Farmington, CT, d/b/a John Dempsey Hospital of the University of Connecticut Health Center is hereby licensed to maintain and operate a General Hospital.

John Dempsey Hospital of the University of Connecticut Health Center is located at
263 Farmington Avenue, Farmington, CT 06032

The maximum number of beds shall not exceed at any time:
20 Bassinets
204 General Hospital beds

This license expires **December 31, 2008** and may be revoked for cause at any time.

Dated at Hartford, Connecticut, January 1, 2007. RENEWAL.

Satellites
10 Talcott Notch, 10 Talcott Notch, Farmington, CT

J Robert Galvin M.D., M.P.H.

J. Robert Galvin, M.D., M.P.H.,
Commissioner

Department of Public Safety
Division of Fire, Emergency & Building Services
Office of State Fire Marshal

STATE OF CONNECTICUT

On 12/19/07, the Office of the State Fire Marshal conducted an inspection of UCHC Hospital located at 263 Farmington Ave in Farmington to determine the degree of compliance with the fire safety requirements of Connecticut General Statutes Chapter 541 as authorized by Section 29-305 of the statutes. This facility was evaluated as a Existing Health Care as classified by the *CONNECTICUT FIRE SAFETY CODE*. As a result of this inspection, the following conditions were found:

I. ☒ At the time of inspection, no code violations were identified. **Certificate of approval recommended.**

II. ☐ At the time of inspection, conditions were discovered to be contrary to the minimum requirements of these codes. An acceptable plan of correction **Certificate of approval recommended.**

III. ☐ At the time of inspection, conditions were discovered to be contrary to the minimum requirements of these codes. No approved plan of correction was submitted. (*See attached information*) **Certificate of approval NOT recommended.**

IV. ☐ Based on the extreme hazard to public safety discovered at the time of this inspection, this office is currently seeking an injunction from the court through our Town/City Attorney for the purpose of closing or restricting usage of this facility by the public. (*See attached information*) **Certificate of approval NOT recommended.**

Fire Marshal

12/26/2007
Date

City or Town: OFFICE OF STATE FIRE MARSHAL

John Dempsey Hospital
University of Connecticut Health Center

Farmington, CT

has been Accredited by the



Joint Commission

on Accreditation of Healthcare Organizations

Which has surveyed this organization and found it to meet the requirements for accreditation.

September 16, 2006

Accreditation is customarily valid for up to 39 months.

Fred L. Brown
Chairman of the Board of Commissioners

5667
Organization ID #

Dennis S. O'Leary, M.D.
President

The Joint Commission on Accreditation of Healthcare Organizations is an independent, not-for-profit, national body that oversees the safety and quality of health care and other services provided in accredited organizations. Information about accredited organizations may be provided directly to the Joint Commission at 1-800-994-6610. Information regarding accreditation and the accreditation performance of individual organizations can be obtained through the Joint Commission's web site at www.jcaho.org.






0873
09/15/08

APPENDIX 6.E.

HCGW Quality Assurance Plan

Door To Balloon Alliance for Quality

WH Protocols for Service

SMH Protocols for Service



Heart Center of Greater Waterbury
Quality Management Plan

Organization Description:

The Heart Center of Greater Waterbury, Inc. (HCGW) is an organization that provides management and oversight services to the joint advanced cardiac care program offered through the collaboration of Waterbury Hospital, St. Mary's Hospital and the University of Connecticut Health. HCGW supports through the collaborative process the ability of these health care institutions to service the greater Waterbury area with exceptional cardiac care.

Quality Management Program Purpose:

The HCGW's Quality Management Program is in place to assist the partner organizations to effectively measure, report and improve patient outcomes through a defined process of:

- Data collection
- Data input
- Report generation
- Data analysis
- Communication of results
- Problem solving and action planning

The ultimate goal of the program is to promote the highest level of collaboration and communication which will ultimately lead to exceptional quality of care for the cardiac patients of the greater Waterbury area.

Policy:

The Heart Center of Greater Waterbury will provide oversight and coordination to the quality data process including collection, analysis, identification of trends, communication of results and submission of data to the Board of Directors, required regulatory agencies and registries.

Objectives of the Quality Management Program:

1. To be consistent with the purpose of the Heart Center of Greater Waterbury
2. To implement and maintain a computerized quality management data base system for the advanced cardiac care program
3. To assist each of the organizations involved in the joint advanced cardiac care program to collect and analyze necessary quality data for the purpose of performance improvement in each respective organization and at a Programmatic level
4. To maintain the integrity of the data by facilitating education, systems training and quality checks
5. To stay abreast of any registry revisions for the purpose of ongoing accuracy of all data collected
6. To adhere to regulatory requirements for reporting including annual reports to OHCA
7. To report data as required to the American College of Cardiologists National Cardiovascular Database Registry (ACC-NCDR), the Society of Thoracic Surgeons Database (STS-DB) and the OHCA CT Cardiac Registry.
8. To establish communication mechanisms for reporting quality information to each organization, HCGW Board of Directors and the HCGW Advisory Board

Leadership Roles and Responsibilities:

Board of Directors: The Board of Directors is comprised of Executive Leadership from Waterbury Hospital and Saint Mary's Hospital and as such is responsible for the quality of care provided at the two organizations.

Executive Director HCGW: The Executive Director serves in an oversight function of the Quality Management Program through a collaborative relationship with the clinical leaders at Waterbury Hospital and St. Mary's Hospital. The Executive Director is responsible to report quality information directly to the BOD of the Heart Center and is responsible for reporting required data to regulatory agencies.

Medical Director HCGW: Works directly with the Executive Director in the oversight to the Quality Management Program. The Medical Director participates in the evaluation of quality data and in the communication process to Waterbury Hospital and St. Mary's Hospital leadership.

Advisory Board HCGW: The Advisory Board is comprised of Executive Leadership and physicians from Waterbury Hospital, Saint Mary's Hospital and the University of Connecticut Health Center, community physicians and clinical leaders. The Advisory Board will review quality data and make recommendations as needed.

Clinical Leadership at Waterbury Hospital, St. Mary's Hospital and University of Connecticut Health Center: Works in collaboration with the HCGW in the review and analysis of quality data related to advanced cardiac care. Is responsible within the quality management infrastructure of each organization to demonstrate ongoing performance improvement as it relates to the quality data analysis.

Tuesday, September 09, 2008

You Are Here: .: What is D2B? :.

What is D2B?
Join D2B
Strategic Partners
Participating Hospitals
D2B Implementation Manual
Online Community
Newsroom
ABIM Certification & CME
90 Days to 90 Minutes
Webinars
Presentations & Slide Shows
Buy D2B Lapel Pins
FAQs
Contact Us

D2B Spotlight

Please Complete Your Follow Up Survey

By now all D2B Alliance hospitals should have received an email with the D2B Follow Up Survey link. We urge you to please complete your follow up online survey. It should take only about 20 minutes. This information will help us understand your institution's experience and improve future initiatives. Please help us achieve 100% participation!

For additional information, you can contact Matthew Fitzgerald at mfitzger@acc.org. Thank you for your time and consideration of this important initiative.

Print

What is D2B?

D2B: An Alliance for Quality™ is a new Guidelines Applied in Practice (GAP) program launched by the American College of Cardiology (ACC) to save time and save lives by reducing the door-to-balloon times in U.S. hospitals performing primary PCI. A growing list of other organizations, including the American Heart Association (AHA) and the National Heart Lung and Blood Institute, are partners in this effort.

National guidelines developed by the American College of Cardiology (ACC) and the American Heart Association (AHA) state that hospitals treating STEMI patients with emergency PCI should reliably achieve a door-to-balloon time of 90 minutes or less. However, accomplishing this level of performance is an organizational challenge.

The D2B Alliance™ was developed to make what is current extraordinary performance ordinary by providing hospitals with key evidence-based strategies and supporting tools needed to begin reducing their D2B™ times. More importantly, it provides an open, vibrant community for hospitals to share their findings and experiences and reward excellence.

The D2B Alliance™ offers something for all participants, whether a hospital is already well on its way to reducing D2B™ times or just beginning. Your hospital can join the community of over 1,000 hospitals already enrolled in D2B™!

Tuesday, September 09, 2008

You Are Here: .: FAQs :.

What is D2B?

Join D2B

Strategic Partners

Participating Hospitals

D2B Implementation Manual

Online Community

Newsroom

ABIM Certification & CME

90 Days to 90 Minutes

Webinars

Presentations & Slide Shows

Buy D2B Lapel Pins

FAQs

Contact Us

FAQs

Q. What is the D2B Alliance?

Q. What is the goal of the D2B: An Alliance for Quality?

A. D2B: An Alliance for Quality is a new campaign designed to provide hospitals with the key supporting tools they will need to begin reducing their door-to-balloon times. A web-based netw learning community hospitals can use to share their findings and experiences with others. The membership to achieve door-to-balloon times of <= 90 minutes for at least 75 percent of non-tr segment elevation myocardial infarction in all participating hospitals performing primary PCI.

Q. Why is reducing D2B time important?

Q. How can hospitals join D2B: An Alliance for Quality?

Q. What is expected of D2B participants?

Q. Am I required to submit data?

Q. How do I become a partner organization?

Q. What is the March 16, 2007 deadline all about?

Q. Can Physicians receive ABIM MOC-4 Certification Points or CME for participatior

Print

Copyright 2006-2008 American College of Cardiology Terms Of Use Privacy Statement

Tuesday, September 09, 2008

You Are Here: .: FAQs :.

What is D2B?

Join D2B

Strategic Partners

Participating Hospitals

D2B Implementation Manual

Online Community

Newsroom

ABIM Certification & CME

90 Days to 90 Minutes

Webinars

Presentations & Slide Shows

Buy D2B Lapel Pins

FAQs

Contact Us

FAQs

Q. What is the D2B Alliance?

Q. What is the goal of the D2B: An Alliance for Quality?

Q. Why is reducing D2B time important?

A. Each year nearly 400,000 patients are admitted to U.S. hospitals with STEMI and many ho patients with emergency percutaneous coronary intervention (PCI). National ACC/AHA guideli STEMI patients with emergency PCI should reliably achieve a door-to-balloon time of 90 minut demonstrated strong associations between time to primary PCI and in-hospital mortality risk. Ti process improvement, parallel processing and interdisciplinary cooperation and coordination, h their door-to-balloon times, and thus, dramatically improve patient outcomes.

Q. How can hospitals join D2B: An Alliance for Quality?

Q. What is expected of D2B participants?

Q. Am I required to submit data?

Q. How do I become a partner organization?

Q. What is the March 16, 2007 deadline all about?

Q. Can Physicians receive ABIM MOC-4 Certification Points or CME for participatior

Print

Copyright 2006-2008 American College of Cardiology Terms Of Use Privacy Statement

0880
09/15/08

CARE PATHWAYS - PCI INDEX

The Waterbury Hospital

- Scope of Services – Cardiac Catheterization Laboratory
- Patient Flows – Inpatient Interventions
- Patient Flows – Out Patient Elective
- Patient Flows – ED to Cath Lab
- Patient Flows – Emergency from Cath Lab to CVOR
- PCI – Pre-procedure orders
- PCI – Post-procedure orders
- PCI – Discharge orders from CVU
- Closure Device Policy
- Contrast Reaction Policy
- Hematoma Management
- Sheath Removal Policy
- Vasovagal Reaction Policy
- Radial/Brachial Artery Catheterization
- Coronary Stent Placement (see Angioplasty policy)
- IVUS System
- Pressure Flow Wire (see Radi Pressure Wire policy)
- Femstop
- Renal Prophylaxis (included in pre-catheterization order sheet)
- Roto Blade
- Angiojet

WATERBURY HOSPITAL HEALTH CENTER
CARDIOPULMONARY POLICY AND PROCEDURE MANUAL

Subject:	**Provisions of Patient Care Scope of Services**
Effective:	**7/02**
Reviewed:	**12/03; 2/05;5/05, 12/06**
Revised:	**2/05, 8/08**

PURPOSE:. To provide a plan for the provision of patient care scope of services

SCOPE: The Cardiopulmonary Department encompasses 6 individual laboratories and provides safe and effective diagnostic testing and rehabilitative services with high quality of care to all patients who are referred. The main population served consists of adolescent, adult, and older adult.

Cardiopulmonary is an ambulatory service department and provides diagnostic testing with hours of operation that are service specific.

The cath lab hours of operation are 6:30 am to 7:00pm Monday through Friday. A cath lab team will be on call from 7:00 pm to 6:30 am the following mornings, Monday through Friday. Weekend and holiday hours include 24/7 availability This will begin 7/05.

There are two stress laboratories available for testing. Currently, one stress lab is operational. Stress tests are performed Monday through Friday from 7 am to 3:30pm.

Cardiac Rehab is available from 6:30 am to 5:30pm Monday, Wednesday and Friday. Classes are also available on Tuesdays and Thursdays.

When the department laboratories are closed, the voice mail system has specific instructions are left for emergency coverage. This can be reached by calling the main department number 573-7264.

Physician orders are required for all elective laboratory services. Out patient testing is scheduled through central scheduling. Inpatients are scheduled directly through the Cardiopulmonary Department Assistants..

STAFFING:
There is an Assistant Director of Cardiopulmonary Services, who reports directly to The Director Of Outpatient Services. The Assistant Director is responsible for all laboratories daily operations. A designee is assigned when he or she is not available. Staffing is flexed to daily patient census for all laboratories. Cardiopulmonary Services is staffed with the requisite number of professional and technical personnel required to perform the number of tests scheduled. All staff members are annually validated on job specific competencies to assure delivery of safe, quality care. Staffing patterns by laboratory are dependant on volume.

One Cardiac Catheterization Laboratory:

- One registered nurse
- One scrub technician (RT,RN ,ICVT)
- One computer operator (RT,RN, ICVT)

Two Stress Laboratory:

- Each lab is staffed with:
  - One APRN
  - Two cardiology technicians
- One stress laboratory is currently in operation

Holter Laboratory:

- One cardiovascular technician and/or EKG editor

Echocardiography:

- Presently the department has the availability of two echo machines and two cardiac ultrasonographers

Cardiac Rehabilitation:

- Two Registered Nurses, two Exercise physiologists and two certified respiratory care practitioners. The patient ratio is 1:5 for phase II patients (this population is monitored by EKG) and 1:15 for phase III patients, (supervised but not monitored)

Pulmonary Function Laboratory:

- One certified respiratory technologist or certified pulmonary function technologist

EKG/Department Assistant:

- Two ekg editors and three Department Assistants

Assignments

- Staffing schedules, denoting laboratory assignments, are generated monthly. Daily assignments are made out by the Assistant Director or her designee, adjusting for increases or decreases in volume.

Basic requirements for staff members include, but not limited to:

- Registered Nurses:
  - Current CT State Licensure
  - ACLS certified
  - Current competencies including age specific
- All other technical staff:
  - BCLS-C certification
  - Certification according to classification
  - Current competencies including age specific
  - Graduates of specific program in discipline, i.e. human performance exercise physiology
  - ACLS as required for cardiac cath laboratory
- Department Assistants/EKG editors:
  - Clerical skill as defined in job description
  - Current competencies including age specific competences

Reviewed and Approved:

Joanne Borduas, RN,MSN, MBA
Director Outpatient Services

Monica Giacomi, RN
Assistant Director of
Cardiopulmonary Services

Waterbury Hospital REVISED 8/08

Inpatient Cardiac Cath Patient Flow

Patient seen by Cardiologist→decision made that patient needs cath:

- Cardiologist schedules cath *see below*
- Writes pre-procedure orders
- Obtains consent

Cath lab routine (hours 6:30am-7:00pm)

- Composes schedule in early AM
- Faxes cath lab schedule to: Telemetry, CVU, ICU, OR, One Day Surgery and Nursing Supervisors

Routine non-urgent case: Calls cath lab at 7264

- Cath lab obtains information for schedule
- Cath lab gives Cardiologist time slot
- Cath lab adds to next day schedule or same day
- After hours; Physician goes to department & writes pt. name and preferred time in scheduling book for next regular scheduled day, or leaves a message on voice mail (573-7264)
- Cath team confirms with cardiologist next day

Urgent case:

- **Days (**M-F; 6:30am -7:00pm)
- Calls cath lab & they rearrange schedule and call for patient ASAP
- **Afterhours;** cardiologist calls operator to have cath lab team called in *(team is circulator, monitor, scrub)*
- Cath lab comes in sets up lab and either calls nursing unit for patient or goes and gets patient.

Telemetry/Monitored Unit:

- If urgent case unit alerts nursing supervisor of situation
- Pre-procedure orders initiated and completed
- Pre-procedure labs and testing completed - if not available
- Calls cardiologist with abnormal results
- Pre-procedure checklist completed
- Completes patient teaching

Day of procedure:

- Initiates IV or confirms IV patency
- Pre-medicates as ordered
- Rechecks checklist

Patient transported to cath lab by transporter if non-monitored
Patient is transported with RN if monitor if ordered

Cath lab:

- Reviews chart and verifies allergies
- Patient ID and procedure verified → compared with armband
- Patient prepped
- Monitoring devices applied
- Patient assessed immediately prior to procedure
- **Time out** – final verification of correct patient and correct procedure
- Procedure done
- Staff calls bed control to coordinate bed placement if different bed is needed post procedure

Follow appropriate Outpatient Cardiac Cath Patient Flow - post procedure

Outpatient Elective Cardiac Cath/PCI Patient Flow
Waterbury Hospital revised 8/08

CARDIOLOGIST'S OFFICE
Patient is seen → needs a Cath/PCI
Cardiologist:
- Completes pre-procedure orders, H&P, and consent

Office:
- Schedules procedure by calling 573-7264
- Arranges for PAT appointment
- Obtains pre-certification
- Gives pre-procedure instructions and date & time of procedure and where to report
- Faxes to cath lab orders, consent and H&P to: 573-6733
- Central Scheduling:
- Scheduling calls patient with date of appointment and completes pre-registration

DAY OF PROCEDURE:
- Patient reports to Cardiology
- Patient taken back to holding area prep/admission

Holding:
- RN Reviews chart for completeness and verifies allergies
- RN Calls abnormal results to cardiologist, if not already done
- RN Verifies ID
- RNAssesses patient and documents in WITT
- RN/CVT completes patient prep
- RN/CVT transports patient into lab
- Family is directed to the Cardiology waiting area

Cath Lab
- **Time out**- Verifies ID and procedure with all members of team → compares to name band
- Monitoring devices applied
- Patient assessment completed immediately prior to procedure and documented in WITT
  Patient prepped and draped
- Procedure performed

NEGATIVE CATH:
Cath lab staff pulls sheaths
Patient returns to the observation area for immediate recovery if sheaths need to be pulled by LIP
If a closure device is used:
Patient taken to One Day Surgery for recovery and D/C

POSITIVE CATH PATIENT NEEDS:

Elective PCI (to be scheduled for a later date)
Cath lab pulls sheaths
Patient returns to Telemetry/CVU/One Day Surgery for recovery depending on when procedure is scheduled.
Elective intervention scheduled by Cardiologist office
Cardiologist's office obtains precert
Cardiologist obtains consent for procedure
Day of procedure:
Patient reports to Cardiology waiting then taken to holding area for prep.
Immediate PCI
PCI completed
CCL calls bed control for bed in CVU
Patient remains in Cardiology holding until bed ready
Patient transferred to CVU by Cath lab RN
Report given to receiving RN
CVU APN/ RN pulls sheath if closure device was not used
Elective CABG
Cath lab staff pulls sheath
CV surgeon called by cardiologist→informed of case
If patient to be discharged→ sent back to same bed if inpt. Or to One Day Surgery if outpatient.
If patient is to be admitted→CCL calls bed control for bed placement
Patient transferred to appropriate Unit

POSITIVE CATH, NEEDS EMERGENCY CABG

See Emergent cath to CVOR flow

Emergency Department to Cardiac Cath Lab/ STEMI Patient Flow

EMERGENCY DEPARTMENT

Patient presents to ED with acute symptoms:

- Initial evaluation completed (labs, EKG, etc.)
- ED physician evaluates pt→ identifies STEMI
- ED physician notifies interventionalist and in consultation with Interventionalist , decides to do cath
- Pt and family informed of need for cath by ED physician.
- Interventional Cardiologist notifies cath lab of emergent case during hours of operation
- After hours: ED Unit Clerk calls operator to activate Cath Lab team
- Unit clerk calls for old medical Calls bed control for CVU bed
- ED continues to treat patient and prepares patient for cath/PCI procedure (includes marking peripheral pulses, starting 2 peripheral IV's with one larger gauge,) until the CCL is prepared for pt
- Cardiologist sees patient/family, obtains consents (cath/PCI/OHS *and blood*) before case

CCL

Cath Lab Staff:

- Prepares lab for case
- Goes to ED to assist with patient transport or calls for patient when lab is ready

ED Staff:

- RN gives verbal report to CCL RN, and uses the faxed report sheet as guide
- Family accompanies patient and is taken to Cardiology waiting area

Cath Lab Staff:

- Reviews chart and verifies allergies
- Verifies patient ID compares with armband
- Preps patient
- Applies monitoring devices
- Assesses patient immediately prior to procedure and documents in WITT
- Time- out – final verification of correct patient and correct procedure
- Procedure completed
- Patient is transferred to Cardiology Recovery area

PCI completed:

- Patient transferred to CVU
- Transported by cath lab RN with O2 and monitor
- RN to RN report

Positive cath, for elective CABG

- Patient transferred to telemetry or CVU
- Surgeon schedules elective case

Follow Inpatient Open Heart Surgery Patient Flow

Emergency CABG

- Cardiologist notifies CV surgeon and talks with the family

Follow Emergency from Cardiac Cath lab to CVOR Patient Flow

WATERBURY HOSPITAL HEALTH CENTER

PHYSICIAN'S ORDER SHEET

ALLERGIES/DRUG SENSITIVITY (SPECIFY DRUGS)
PATIENT WEIGHT (Kg)

(PATIENT IDENTIFICATION)

ACUTE ST SEGMENT ELEVATION WITH DIRECT TRANSFER TO CATH LAB FOR CATHETERIZATION/PCI

Attending Physician: _____ Resident/Intern: _____

Code Status is: _____

PAIN MANAGEMENT/VASODILATION:

Select the appropriate nitroglycerin route of administration:

- ☐ **Nitroglycerin SL 0.4 mg** every 5 min. pm for chest pain. May repeat for maximum of 3 doses.
- ☐ **Nitroglycerin IV** 50 mg/250 mL D5W. Start infusion at 5 mcg/minute and increase 5-10 mcg/minute prn until pain free.
  - For any Nitroglycerin product, hold drug and notify MD if Systolic BP less than 90 mmHg.
- ☐ **Morphine Sulfate** _____ mg IV push every _____.

ANTIPLATELET/ANTICOAGULATION THERAPY:

- ☐ Aspirin _____mg taken prior to arrival or given by EMS personnel.
- ☐ Chewable baby aspirin 325 mg total (4 tabs of 81 mg) orally NOW if not previously taken by the pt at home or given by EMS. If pt intake was less than 325mg prior to arrival, supplement dose to reach 325mg.
- ☐ IV Heparin bolus and infusion. Follow IV porcine Heparin protocol. Adjust for weight and risk.
- ☐ Eptifibatide (Integrilin) 180 micrograms/Kg bolus followed by 2 mcg/Kg/min infusion. May co-administer with aspirin and weight adjusted Heparin. If CrCl is 25-50 mL give 180 mcg/Kg bolus followed by 1 mcg/Kg/min infusion.
- ☐ Repeat eptifibatide (Integrilin) bolus 10 minutes after first bolus.
- ☐ Other _____.

BETA BLOCKADE:

- ☐ Metoprolol 5 mg IV push every 5 minutes for total 3 doses (or 15 mg maximum).
  - Hold for heart rate less than 55 BPM, systolic BP less than 90 mHg, PR interval greater than 0.24 seconds or 2nd or 3rd degree heart block. Contact MD if medication has been held.

LABORATORY PANEL:

The following blood work has been drawn: (✓) labs drawn in ED.

☐ Tropinin I ☐ Pt/INR ☐ Type and crossmatch ☐ CK-MB ☐ K, BUN, Creatinine ☐ CBC

_____ _____ _____

MD Signature Date Time

Waterbury Hospital Patient Flow
Emergency Cath to CVOR

POSITIVE CATH/UNSUCCESSFULL PTCA NEEDS EMERGENCY CABG

- Cardiologist notifies CV surgeon
- Cardiologist talks to patient's family with staff member present
- Patient remains in CCL or transferred to PACU or CVU, depending on patient's acuity and CVOR availability

- Regular Operating Hours:
  - ▶Cath lab - notifies OR at 6155 of case (M-F; 7am-3pm)
  - ▶OR - notifies cardiac anesthesia, perfusion, PA, and CVOR staff of case
- Off shifts:
  - ▶CCL notifies operator of emergent case . Operator will notify CVOR on-call team
  - ▶Nursing supervisor – beeped with "911"
    -comes to cath lab to assist with family

- Cath lab staff:
  - ▶ initiates pre-op OHS orders and checklist
  - ▶ obtains pre-op labs such as T & C and any needed tests such as CXR
  - ▶ notifies blood bank & pharmacy
  - ▶ completes pre-op teaching as able
  - ▶ if able will insert temp tip Foley
  - ▶ notifies CVU of add on case
  - ▶ Calls security to assist with transport of pt
- CV surgeon comes to cath lab and obtains consents (OR) from family /patient
- Anesthesia comes to cath lab to assist with patient needs and obtains consent for anesthesia

Patient transport to CVOR: (when CVOR calls that room is ready)
- ▶ Security clears hallway and obtains elevator
- ▶ Cath lab RN, anesthesia, and perfusion if available, transport patient
- ▶ Cath lab RN may need to remain in CVOR, if IAPB has been inserted, until perfusion arrives
- ▶ Family may accompany patient to CVOR with them if condition allows
- ▶ Family directed to CVU waiting area.

- CVU staff:
  - ▶ Informs RT of add on case
  - ▶ Calls unit where patient originated from and get belongings and report

Revised 8/08

DOCTOR'S ORDER SHEET
WATERBURY HOSPITAL
Waterbury, Connecticut

ALLERGIES
PATIENT WEIGHT (Kg)

3 Hole 1/4 4 1/4 c-to-c

DATE	TIME	**Pre-Cardiac Catheterization/Angioplasty Orders**
		Diet: NPO except for meds
		Hold all Metformin products (i.e. Glucophage, Metaglip, Glucovance, Avandamet, Fortamet, Riomet, Actoplus Met)
		Hold Lasix for one dose the night before procedure
		Hold Lasix morning of procedure
		Insulin adjustments in a.m. of procedure
		Vital signs per protocol
		Activity: Continue with present activity until procedure
		May be transferred off cardiac monitor ❑ Yes ❑ No
		Diagnostic Testing: 12 lead EKG on chart
		12 lead EKG morning of procedure, if one is not available
		Laboratory:
		Estimated Creatinine Clearance
		If outpatient: Confirm all pre-admission testing is on chart
		If inpatient: Draw the following, the morning of procedure:
		❑ PT/INR ❑ PTT ❑ BMP ❑ CBC
		IV therapy: (Select one form of IV hydration from list below)
		❑ Time permitting: Sodium chloride 0.9% at 1ml/Kg/hr for 12 hours prior to procedure, then continue hydration at 1ml/Kg/hr for 12 hours after procedure.
		❑ 500ml Sodium chloride 0.9% over 4-6 hours prior to procedure, then continue hydration at 1ml/Kg/hr for 12 hours following the procedure.
		❑ Patients with *heart failure*: Sodium Chloride 0.9% at 0.5ml/Kg/hr for 12 hours prior to procedure, then continue hydration at this rate following the procedure while monitoring fluid status.
		***Emergent catheterization/angioplasty*:** ❑ Sodium chloride 0.9% at 3ml/Kg/hr for 1 hour prior to procedure, then continue hydration at 1ml/Kg/hr for 12 hours after procedure. ❑ Sodium Bicarbonate 3 amps (150mEq) in 850 ml D5W at 3 ml/kg//hour for 1 hour prior to procedure, then continue hydration at 1ml/kg/hour for 6 hours after procedure.
		❑ **Other Fluid Type**: Volume: run @ cc/hr
		❑ No hydration
		N-Acetylcysteine (Mucomyst): (Indicated along with hydration for patients with risk factors for developing RCIN who are to undergo cardiac catheterization, and for ALL patients – including those without risk factors for RCIN - who are to have angioplasty for ST segment elevation AMI)
		❑ Oral route: Mucomyst: 600mg orally twice daily for 2 doses the day before the procedure, a 600mg oral dose in the am prior to the procedure, and 600mg orally after the procedure.
		❑ IV route: Mucomyst 1200mg IV bolus before intervention (Dilute 6ml of the 200mg/ml solution in D5W and give over 15 min), followed by 1200mg **ORALLY** twice daily for 48 hours following the intervention.
		Time Licensed Independent Practitioner
		Date / /

3 Hole 1/4 4 1/4 c-to-c

DOCTOR'S ORDER SHEET
WATERBURY HOSPITAL
Waterbury, Connecticut

ALLERGIES
PATIENT WEIGHT (Kg)

DATE	TIME	
		Medication on call to Cath Lab:
		❑ Benadryl 25mg PO on call to Cath Lab
		❑ **Known allergy to Radiographic Contrast Media or shellfish:**
		Give Prednisone 40mg PO at 5:00 p.m. the night before the procedure
		Give Predinisone 40mg PO at 9:00 p.m. the night before the procedure
		In A.M. of procedure:
		❑ Give Solucortef 100mg IV x 1 or Decadron 4mg IV x1 if Solucortef not available 30 minutes before catheterization
		❑ Give Pepcid 20mg PO x 1 30 minutes before catheterization.
		Anticoagulation (select any of the following if applicable):

❑ Discontinue "therapeutic (e.g. 1 mg/kg)" enoxaparin (Lovenox) before catheterization (Recommended): At least 8 hours in patients with normal renal function).	❑ Continue Anticoagulation. ❑ Discontinue heparin before procedure. (Recommended at least 2 hours).	❑ Discontinue warfarin if INR > 1.5: ❑ Type, cross, and hold. Fresh frozen plasma _____units IV x 1. ❑ Vitamin K 1 mg po x 1 dose the day before Catheterization. ❑ Vitamin K 2.5 mg po x 1 dose the day before Catheterization. ❑ Vitamin K 5 mg po x 1 dose the day before Catheterization. Repeat INR at _____p.m._____a.m. **Call Cardiologist if INR greater than 1.5**

Time _____ Licensed Independent Practitioner _____
Date ____/____/____

cardiac department/pre-cardiac/angioplasty 5/25/05, 11/01/05, Revised: 5/25/06, 11/21/06

WATERBURY HOSPITAL
HEALTH • CENTER

PHYSICIAN ORDER SHEET

WATERBURY HOSPITAL
Waterbury, Connecticut

REPORT DRUG SENSITIVITY (SPECIFY DRUGS)	
WEIGHT (Kg)	HEIGHT (IN)

(PATIENT IDENTIFICATION LABEL)

DO NOT USE UNSAFE ABBREVIATIONS: QD, QOD, MGSO4, TIW, ZNSO4, AU, AD OR AS

DATE	TIME	
		Post-Cardiac Catheterization/Coronary Intervention **ADMIT TO:** **DR:** **DIAGNOSIS:**
		DIET: ☐Cardiac ☐Carbohydrate Controlled Calories_____
		Advance Diet as tolerated to previous
		ACTIVITY: May be transferred off monitor ☐ Yes ☐ No
		HOB may be elevated ☐ 30 degrees ☐ 45 degrees
		May be OOB at _____
		VITAL SIGNS per: ☐ Protocol A (early sheath removal) ☐ Protocol B (late sheath removal)
		☐ Post Catheterization Protocol
		Cardiac Rehab Referral Phase 1 and 2 ☐ **Dietary Consult**
		IV THERAPY: FluidType:_____ Volume:_____ run@_____cc/hr
		DIAGNOSTIC TESTING: ☐ EKG on return from lab
		☐ EKG in AM, STAT EKG with chest pain **OR** Rhythm Change
		LABS: ☐ CBC every 6 hours WHILE on Integrilin
		☐ CBC, BMP in am ☐ CK-MB, Troponin in am
		MEDICATIONS: ☐ Plavix 600 mg PO X 1 OR ☐ Plavix 300mg PO X 1 **if not given during procedure,** then ☐ Plavix 75mg PO Daily
		☐ Integrilin 180mcg/kg IV bolus then, ☐ Integrilin gtt at 2mcg/kg/min when Creatinine Clearance >50 **OR** ☐ Integrilin gtt at 1mcg/kg/min when Creatinine Clearance <50
		☐ Continue Integrilin gtt for_____hrs **OR** ☐ Continue Integrilin to end of bottle
		☐ Metoprolol _____**mg** PO q12h BID Hold for SBP<100 or HR<55
		☐ ECASA 325mg **OR** ☐ ECASA 81mg PO Daily
		☐ Nitropaste 1 inch Topically Q6hrs,
		☐ Nitropaste 1 inch to Keep SBP<140, Hold if SBP <100
		☐ NTG SL 0.4mg every 5 minutes X 3 until chest pain is relieved—if no relief call MD/APRN
		☐ NTG IV infusion 50mg/250ml D5W. Start at 5mcg/min & titrate to 25mcg/min within 15 minutes Increase by 5-10mcg/min q 5 to 15 minutes until pain free
		☐ Percocet 5/325mg 1-2 tablets PO Q6h PRN Pain
		☐ Pepcid 20mg PO q12h PRN Nausea
		☐ Ambien 5mg PO qHS PRN Insomnia
		☐ Tylenol 650mg PO q4hr PRN for Headache/Pain
		☐ Zofran 4mg PO/IV q12h PRN Nausea
		☐ Atropine 0.5mg IV IF Symptomatic Bradycardia
		IF ON RENAL PROTOCOL PRE-CATH: ☐ Sodium Chloride 0.9 % @ 1cc/kg/hr X 6hrs post procedure
		☐ Sodium Bicarbonate 3 Amps/850 cc D5W @ 1cc/kg/hr X 6 hrs post procedure
		OTHER: Statin:_____mg PO Daily

Signature_____ MD APRN 11/27/07

(PATIENT IDENTIFICATION LABEL)

HEART CENTER of Greater Waterbury

CARDIAC CATHERIZATION/ POST CORONARY INTERVENTION DISCHARGE PLAN & INSTRUCTIONS

Cardiac Cath Date: _____ Angioplasty Date: _____
# of Vessels: _____ # of Stents: _____ Type of Stent: ☐ Cypher ☐ Taxus _____ ☐ Bare Metal ____

III. Activity/Exercise

- No heavy lift for 48 hours.
- Other: _____

IV. Special Care Instructions

- Monitor catheterization site (groin or arm) for bleeding. If this occurs, lie flat and apply direct pressure for 20 minutes. If bleeding persists, call 911.
- Monitor catheterization site (groin or arm) for infection, redness, swelling, and temperature>101 F. Call your physician if these symptoms should occur.

☐ **Heart Failure patients: Weigh yourself daily or as directed by MD. If you should have a weight gain of 2 pounds over a period of 1 day and/or increase in shortness of breath, call your physician.**

V. Pain

- Pain intensity scale (0-10) upon discharge _____.
- Current pain medication: date, time, dose, effectiveness (use numeric scale) of most recent dose if in past 24 hours.

_____

_____

- Notify MD if pain is unrelieved by current pain meds or alternative treatments.

VI. Diet

☐ Regular ☐ Diet Explained ☐ Modified: _____

VII. Other Symptoms to be Reported:

_____

_____

VIII. Agency Referrals

☐ Home Care Services – Agency and Phone #: _____
☐ Transferred to facility _____
☐ W-10 Completed

IX. Appointment / Follow-up

☐ Dr. _____ When _____
☐ Dr. _____ When _____
* Please call Doctor's Office for specific date and time.
☐ Cardiac Rehabilitation at Waterbury Hospital is 203-573-7118. Referral from physician needed.
☑ **Smoking QuitLine 1-866-363-4224 (toll-free).**

I UNDERSTAND THIS DISCHARGE PLAN, WHICH MY PHYSICIAN AND CARE GIVERS HAVE DISCUSSED WITH ME.

_____ _____
Patient/or Representative RN/LPN

WORD/FORMS/CVUCARDIACCATHDCPLAN2; QI-DMS; 8/29/05, 9/20/06, 3/26/07, 4/19/07, 6/29/07

(PATIENT IDENTIFICATION LABEL)

HEART CENTER of Greater Waterbury

Cardiac Catheterization/ Post Coronary Intervention Discharge Plan and Instructions

Discharge Unit: CVU – Telephone: 203-573-7028

I. Medications:

Drug	Dose	Frequency	Purpose	New	Same as prior to admission	Change	Care Notes Given	Prescrip-tions Given
1. Aspirin								
2. Plavix								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								

Call you physician with questions on medications with (*)

II. Medications Discontinued Since Admission (DO NOT TAKE, THROW AWAY LEFT OVER PILLS)

Please bring this form to your next doctor's appointment.

WATERBURY HOSPITAL HEALTH CENTER
CARDIOPULMONARY POLICY AND PROCEDURE MANUAL

Subject:	**Guidelines for Use of Vascular Closure Devices PTCA/Cardiac Catheterization**
Effective:	**6/05**
Reviewed:	**5/05, 4/07**
Revised:	**8//08**

PURPOSE: To obtain hemostasis of arterial puncture sites following cardiac catheterization/PTCA procedures.

SKILL LEVEL: MD

SCOPE OF CARE: Timely and safe removal of arterial sheath with minimal patient discomfort.

GENERAL INFORMATION:

- Only licensed physicians who have gone through specific training can deploy vascular closure devices.
- When a venous sheath has been placed in the same leg, the venous sheath should be removed and hemostasis achieved after the use of a vascular closure device.
- The Vascular Closure Device utilized in the CCL is Angio-Seal, a collagen plug
- Vascular closure devices are deployed according to the manufacturer's recommendations.

INDICATIONS:

The use of vascular closure devices should be considered on the following patients:

- Same-day diagnostic cardiac catheterizations
- Aortic insufficiency
- Hypertension
- Obesity
- Patients who have coagulopathy or are receiving anticoagulant or antiplatelet agents.
- Patients who have undergone prior arterial punctures.
- Combative /uncooperative patients

COMPLICATIONS:

- Bleeding or hematoma
- AV fistula or pseudoaneurysm
- Thrombosis
- Embolism
- Device non-deployment
- Infection

POST CARE:

- A clear sterile dressing will be applied over the insertion site.
- Upon arrival to the receiving unit:
    a. Assess arterial puncture site.
    b. Assess presence and quality of distal pulses
    c. Obtain vital signs.
    d. Continue to assess vital signs, puncture site and pulses every 15 minutes x4, then every 30 minutes x4, then every1 hr x4.
    e. Document assessments in nursing notes.
- Routine use of sandbags, pressure dressings or compression devices is not necessary unless bleeding occurs.
- If oozing or bleeding occurs, apply firm but non-occlusive manual pressure for 15-20 minutes or until bleeding is controlled
- If bleeding persists or a raised ecchymotic area develops, apply heavy (occlusive) manual pressure above the puncture site for 10-15 minutes or until hemostasis is achieved.
- Notify the physician.
- Keep the puncture site clean and dry. Change soiled dressing, as needed using sterile technique and maintaining universal precautions.
- Ambulate the patient per the physician's order.
- Assess patient prior to ambulation for:
    a. Vital signs: should be within baseline limits for the patient.
    b. Puncture site: should have no bleeding or expanding accumulation of blood under the skin.
    c. Distal pulses: should be comparable to baseline.
    d. Pain: patient should not be experiencing chest or leg pain.
- Notify the physician, as necessary, of changes from the initial assessment.
- Instruct patient to do the following:
    a. Support the puncture site when coughing, straining or sneezing.
    b. Keep affected extremity straight and relaxed for the prescribed amount of time as per the physician's order.
    c. Discharge instructions:
        - Patient may shower after 24 hours.
        - No tub baths for 1 week.
        - Remove dressing the next day; gently clean the site with mild soap and water. Gently dry area. Cover site with a bandage, change dressing daily until skin heals, approximately 3-4 days.

DEFINITION OF TERM:

- Angio-Seal is composed of a collagen sponge and a specially designed absorbable polymer anchor that are connected by an absorbable suture. The device seals and sandwiches the arteriotomy between its primary members, the anchor and collagen sponge.

References:

- "The Interventional Cardiac Catheterization Handbook" 2nd edition by Morton J. Kern.

Reviewed and Approved:

Joanne Borduas, RN, MSN, MBA
Director Outpatient Services

Monica Giacomi, RN
Asst. Director, Cardiopulmonary Services

Dr Stephen Widman
Director of Interventional and
Invasive Cardiology

WATERBURY HOSPITAL HEALTH CENTER
CARDIOPULMONARY POLICY AND PROCEDURE MANUAL

Subject:	**Assessment and Treatment of Contrast Related Adverse Reactions in Cath Lab**
Effective:	**6/05**
Reviewed:	**5/05, 4/07**
Revised:	**8/08**

PURPOSE: Provides guidelines for the care of patients receiving (and potentially experiencing adverse reactions to) contrast media during a cardiac catheterization/PTCA procedure.

SKILL LEVEL: Licensed Independent Practitioner (L.I.P.)

SCOPE: Patients undergoing cardiac exams involving the utilization of contrast media need to be carefully assessed prior to their procedure, observed during the procedure and treated promptly in the event of an adverse reaction to administration of iodinated contrast agent.

POLICY:

Pre-procedure

The patient is assessed before the administration of contrast media using the Intravenous Contrast Check List for previous reactions. Any allergies must be documented on the checklist and will be documented in the WITT report. A known allergy to contrast media will be treated prophylactic ally per protocol (see Pre-cath Order sheet).

Notify the cardiologist or LIP if the patient presents with the following:

- History of any contrast allergy.
- History of asthma, renal disease, diabetes, CHF, allergy to seafood or shellfish, or previous CABG.
- Known allergy to peanuts or eggs.
- Elevation in BUN and/or Creatinine.
- Metformin (Glucophage) should be stopped as directed by the cardiologist.

During procedure

RN will observe the patient for any of the following reactions:

- **Anaphylactoid:** mimics severe allergic reactions, anaphylactic reaction and shock
- **Nonanaphylactoid:** chemo toxic, vasovagal or idiopathic.
- **Chemo toxic side effects:** include cardiac arrhythmia, EKG changes and may exhibit severe respiratory distress, hypotension, bradycardia or tachycardia.
  Vasovagal reactions: occurs as a result of increased vagal tone on the heart and blood vessels. They are manifested as a depressed sinoatrial and atrioventricular nodal conduction, inhibition of atrioventricular conduction and peripheral vasodilatation. The patient exhibits bradycardia, hypotension, confusion, apprehension, weakness, diaphoresis, unresponsiveness, and or loss of bowel and bladder control.
  Idiopathic: "other reactions" without chemo toxic or vasovagal basis.

- **Combined:** anaphylactoid and non-anaphylactoid reactions occurring simultaneously. This can create a complex life-threatening situation usually resulting with a patient in shock.

Notify Cardiologist if the patient exhibits any of the following symptoms:

- Respiratory: cough, dyspnea, bronco spasm (wheezing)
- Circulatory: pallor, diaphoresis, chest pain, hypotension
- Central Nervous System: headache, dizziness, slurred speech, anxiety, nausea, vomiting, abnormal cramps or/and diarrhea
- Integumentary and Digestive Reactions: rash, hives, nausea, vomiting.

Acute symptoms may include:

- Acute respiratory distress, laryngeal edema or apnea
- Cardiac arrhythmias, acute pulmonary edema or cardiac arrest
- Stupor, convulsions or coma

Assessments, treatments, response to treatment, outcomes and disposition of patient should be documented in the patient's medical record.

CATEGORIES OF REACTIONS

Mild

Nausea, vomiting	Altered taste	Sweating
Cough	Itching	Rash, Hives
Warmth	Pallor	Nasal stuffiness
Headache	Flushing	Swelling eyes/face
Dizziness	Chills	Anxiety
Shaking		

Moderate

Moderate degree of clinically evident focal or systemic signs and symptoms including but not limited to:

Tachycardia, bradycardia, hypotension	Bronchospasm, wheezing	Hypertension
Pronounced percutaneous reaction	Laryngeal edema	Dyspnea

Severe

Life threatening with more severe signs and symptoms,including but not limited to:

Laryngeal edema	Profound hypotension	Convulsions
Clinically manifested arrhythmias	Unresponsiveness	Cardiopulmonary arrest

Protocol

The following are guidelines for the treatment of contrast induced allergic reactions. Treatments will be prescribed and ordered by the LIP.

Angina

- Nitroglycerin 1/150 grain (0.4mg) sublingual, may repeat every 3 minutes up to 3 doses.
- Oxygen therapy.

Seizure

- Valium 5 mg IV slowly
- Oxygen therapy

Mild Vasomotor Symptoms

- Reassure patient, monitor vital signs and observe for progression.
- For mild cutaneous reactions, give Diphenhydramine (Benadryl) 25mg IV over 1 to 2 minutes.
- For severe cutaneous reaction:
    1. Stop injection of contrast media.
    2. Give Diphenhydramine (Benadryl) 25mg IV
    3. Famotidine (Pepcid) 20mg IV diluted in 10ml of normal saline.
    4. If severe edema and/or hypotension occurs, give Epinephrine 0.1-0.3mg IV of 1:10,000 solution slowly over 2-5 minutes. May repeat in 15 minutes, but not to exceed 1mg total dose.

Moderate Vasomotor Symptoms

Bronchospasm:

- Administer Oxygen
- Monitor Sp02
- Albuterol 2-3 puffs using deep slow breaths
- If no response to Albuterol, give low dose Epinephrine: 1ml of 1:10,000 solution(0.1mg/ml). May repeat every 15 min. up to total dose of 1mg.
- If no response to Epinephrine, may give patient Aminophylline 250mg IV in 100cc D5W over 10-20 minutes.
- For sever bronchospasm requiring intubation, call Code 3.

Severe Vasomotor Symptoms

- If hypotension develops, place patient in Trendelenberg position.
- Administer oxygen therapy.
- Give 0.9NS IV rapid fluid bolus
- Monitor Sp02, vital signs and cardiac rhythm.
- Administer low dose Epinephrine IV 1:10,000 solution (0.1mg/ml), give 1 ml over 2-5 minutes. Titrate to effect, not to exceed 1 mg total dose.
- If no response, call Code 3 and follow ACLS protocol.
- May give: Hydrocortisone 500mg IV and repeat 100mg IV in 6 hours or Decadron 20 mg IV, repeat 4mg IV in 6 hours.

Reviewed and Approved:

Director of Interventional and Invasive Cardiology

Assistant Director of Cardiopulmonary Services

Director of Outpatient Services

DEPARTMENT OF CARDIOLOGY INTRAVENOUS CONTRAST CHECK LIST

PLEASE COMPLETE **BEFORE** ADMINISTERING CONTRAST FOR DIAGNOSTIC IMAGING

PATIENT NAME **DATE**

EXAM **MR#**

Does the patient have any of the following contrast risk factors?	YES	NO
1) Previous contrast reaction (specified V14.8) ☐ (unspecified V14.9) ☐	☐	☐
2) Asthma history (493.90) ☐ Past history allergy medicinal V14.8 ☐ Past history allergy other than medicinal V15.09 ☐ Unspecified allergy (995.3) ☐	☐	☐
3) Hypertensive heart disease without CHF (402.10) ☐ Hypertensive heart disease with CHF (402.11) ☐ Acute myocardial infarction NOS or coronary occlusion NOS (410.92) ☐ Intermediate coronary syndrome (preinfarction or unstable angina) (411.1) ☐ Congestive heart failure (428.0) ☐ Cardiomegaly (429.3) ☐ Heart disease, unspecified (429.9) ☐	☐	☐
4) Critically ill and in shock (785.50)	☐	☐
5) Renal Failure Chronic (Creatinine over 1.4) (585) ☐ Unspecified Renal Failure (586) ☐	☐	☐
6) Diabetes (non insulin dependent) (250.90) Diabetes (insulin dependent) (250.91)	☐	☐
7) General severe debilitation (799.4)	☐	☐
8) Sickle cell anemia (282.60)	☐	☐
9) Multiple myeloma (203.00) ☐ Polycythemia (238.4) ☐ or Pheochromocytoma (227.0) ☐	☐	☐
10) Known brain tumor (239.6) ☐ or Metastases (199.1) ☐	☐	☐
11) Taking diabetic medication: metformin hydrochloride – such as: (Glucophage, Glucovance, Riomet, Actoplus Met, Avandamet, or Metformin or Metaglip)	☐	☐
12) Younger than six months old	☐	☐

If a risk factor is checked yes, an attending physician must decide whether to give contrast (old ionic, high osmolar or new low-osmolar "non-ionic") or to withhold contrast. This sheet is to accompany requisition.

Remarks: _____

_____ Cardiologist/Interventionalist

Cashared/Ndrive

WATERBURY HOSPITAL HEALTH CENTER
CARDIOPULMONARY POLICY AND PROCEDURE MANUAL

Subject:	**Management of Hematoma for PTCA/Cath Lab/CVU/Telemetry/ICU Manual Pressure**
Effective:	**6/05**
Reviewed:	**5/05, 4/07**
Revised:	**8/08**

PURPOSE: To provide guidelines for the care of patients suspected of developing hematoma or other complications from undergoing arterial access.

SKILL LEVEL: MD, APRN,PA

SCOPE: Patients undergoing cardiac exams requiring insertion of arterial sheaths.

PROCEDURE:

After sheath has been removed, assess the patient for the following:

- Vital signs as ordered by MD, APRN, PA and documented on post catheterization order sheet.
- Inspection and palpation of the puncture site.
- Palpation of the distal pulses.
- Report a decrease in blood pressure, increase in heart rate, abdominal pain, and confusion. These may be signs of blood loss.
- If obvious bleeding is noted, all dressings should be removed and manual pressure **MUST** be applied above the puncture site using universal precautions.
- If closure device is used and bleeding occurs, an occurrence report must be completed. The report is to include the device used, noting both serial number and lot number. Forward report to Risk Management.
- The site of bleeding should be visualized.
- Pressure should be held for 20 minutes or until hemostasis is accomplished. This may be done by either manual pressure, Femostop, or by reapplying the compressor.
- If hemostasis cannot be established, the cardiologist must be called.
- A vascular surgeon may be notified at the discretion of the cardiologist.
- If internal bleeding is suspected, the MD, APRN or PA may want to order a CT scan or ultrasound. To do so, call ext. 7330.
- Mark borders of any raised ecchymosed areas.
- Reassure patient and assess for pain using Numeric Pain Intensity Scale.

COMPLICATIONS OF ARTERIAL ACCESS:

Most common complications may include, but are not limited to the following:

- Localized raised ecchymosed area (this is the most common complication).
- Retroperitoneal hematoma
- pseudoaneurysm
- Arteriovenous fistula formation.
- Arterial thrombosis secondary to intimal dissection
- Stroke.

- Sepsis with or without abscess formation
- Cholesterol or air embolization
- Acute Renal Failure

FREQUENCY OF COMPLICATIONS:

- High-risk procedures
- Critically ill elderly patients
- Patient receiving anticoagulation, antiplatlet and fibrinolytic therapies
- NYHA class IV CAD or CHF
- Patients with Valvular Disease
- Insulin Dependent Diabetes Mellitus
- Peripheral Vascular Disease
- Cerebral Vascular Disease
- Renal Insufficiency

MECHANISM FOR REPORTING COMPLICATIONS:

- All complications need to be reported to Risk Management by filling out the hospital's occurrence report.

NURSING DOCUMENTATION:

- Record vital signs.
- Nurse's notes will reflect any changes in the patient condition.
- Cardiologist is to be notified of any changes in pt's condition.
- Document any treatments or interventions.
- Reassess pain level using pain scale.

Reviewed and Approved:

Dr. Steven Widman
Director of Interventional and
Invasive Cardiology

Monica Giacomi, RN
Assistant Director of Cardiopulmonary
Services

Joanne Borduas, MSN,MBA
Director Outpatient Services

WATERBURY HOSPITAL HEALTH CENTER

Subject: Hemostasis Protocol Following Arterial and/or Venous Sheath Removal using Protocol A or Protocol B

Effective: July 23, 2005

Reviewed: 04/05, 4/07, 8/08
Revised:8/08

POLICY :
Arterial and/or venous sheath removal is to be performed by MD, APRN, PA or specially trained and validated RN.

PURPOSE:
To ensure optimum patient safety and care during arterial/venous puncture site hemostasis status post cardiac catheterization/cardiac intervention procedure.

SCOPE:
MD, APRN, PA

CRITERIA:
1. Angioplasty patients will be assigned to either Protocol A or Protocol B as defined.

Protocol A – Early removal – sheath will be removed when ACT is equal to or below 180.

Protocol B – Late removal – Sheath will be removed 3 hours after heparin is discontinued.

PROCEDURE:
A. Arterial Sheath Site: Compression Procedure

1. When ACT is equal to or below 180, the sheath can be removed.

2. While the arterial sheath is being removed, firm pressure must be applied for 20 minuets or until hemostasis is achieved.

3. Monitor patient vital signs and peripheral circulation every 5 min. x3, every1/2hr. x3 then every hour until patient stable.

4. If systolic blood pressure is greater than 170, consider use of nitroglycerin as ordered by MD, APRN or PA.

B. Venous Sheath Site: Compression Procedure

1. Venous sheath site compression procedure is performed once arterial site hemostasis is achieved and the patient is stable.

2. Designated staff as indicated per policy performs sheath removal.

3. Firm manual pressure is applied over the puncture site.

4. Pressure will be held for 5-10 min. until hemostasis is achieved.

5. Monitor patient vital signs and peripheral circulation every 5 min. x3, every1/2hr. x3 then every hour until patient stable.

C. Post Hemostasis Achievement:

1. Apply transparent dressing over puncture site and apply soft restraint as necessary.

Reviewed and Approved:

Dr. Stephen Widman
Director of Interventional and
Invasive Cardiology

Monica Giacomi, RN
Assistant Director Cardiopulmonary
Services

Joanne Borduas, MSN,MBA
Director Outpatient Services

WATERBURY HOSPITAL HEALTH CENTECARDIOPULMONARY POLICY AND PROCEDURE MANUAL

Subject: Vasovagal Reactions in the Cath Lab

Revised: 5/05, 8/08
Effective: 5/05

PURPOSE: To ensure rapid and appropriate care of the patient demonstrating the signs and symptoms of a Vasovagal reaction.

SKILL LEVEL: LIP

DEFINITION: Within the Cath Lab, vasovagal reactions may be precipitated by but not limited to painful stimuli occurring during arterial access or during arterial sheath removal and application of pressure to the groin area.

SCOPE OF CARE: To provide care, treatment and support for patients experiencing the symptoms of a vasovagal reaction during a cardiac catheterization or angioplasty procedure in the Cath Lab.

PROCEDURE:

- Monitor vital signs and record in WITT
- Assess patient for decrease in heart rate, decrease in blood pressure, and symptoms of dizziness, pallor, nausea, or diaphoresis.
- Reassure patient and provide comfort
- If the reaction occurs while stabilizing the arterial access, decrease the pressure being applies while still maintaining hemostasis
- Place patient in Trendelenberg position or elevate the patient's legs approximately 30 degrees.
- Notify LIP
- Infuse normal saline 0.9% IV rapidly until signs and symptoms decrease as directed by the physician
- Administer Atropine 0.5-1.0 mg IV push per LIP order, (ACLS protocol). The dose may be repeated if necessary up to total dose of 3mg, per LIP order.
- Document assessment, interventions and evaluations of the treatment rendered in the WITT

Joanne Borduas, RN, MSN, MBA
Director Outpatient Services

Monica Giacomi, RN
Assistant Director Cardiopulmonary Services

Dr Stephen Widman
Director of Interventional and Invasive Cardiology

WATERBURY HOSPITAL HEATH CENTER
CARDIOPULMONARY POLICY AND PROCEDURE MANUAL

SUBJECT: **Brachial Artery Catheterization/PTCA**
EFFECTIVE: 7/00

REVIEWED: 6/05, 4/07
REVISED: 6/05

SCOPE: A Radial approach for the patients undergoing a Catheterization or PTCA.

PURPOSE: To provide guidelines for patients undergoing a radial approach for a catheterization or PTCA.

SKILL LEVEL: Cardiologist or Interventionalist, RN, ICVT,APRN

PROCEDURE;

- Perform Allen test (*Refer to policy for ALLEN TEST)*
- Position patient's arm on an arm board, hyperextend the patient's wrist and support it with towels
- If MD prefers a topical anesthetic may be applied
- The MD injects a local anesthetic
- A sheath is placed into the artery, this may be sutured in place as determined by MD
- The physician may want to administer intraarterial vasodilators (Nitroglycerine ,Verapamil) and/or Lidocaine. This would used to reduce the arterial spasms, that may occur
- MD or Interventionalist will then proceed with the left heart catheterization or PTCA. (*Refer to policy for PTCA and Left Heart Catheterization)*

Post procedure:

- The sheath is removed by the MD
- Hemostatis will be obtained by:
    - Manual pressure
    - MD may choose to use a Hemaband or another type of bracelet device
    - Asses patient's extremity for bleeding, also access the quality and strength of pulses, temperature and sensation
    - Bracelet device should be tight enough to obtain hemostatis but it should not occlude the pulse
    - A pressure dressing may be used, this is the preference of the MD
    - Pressure dressing should be removed in about 6 hours, this is at the desricion of the MD
    - The bracelet device may be loosened in about 1-2 hours and removed in 6 hours as directed by MD or APRN

Reviewed and Approved:

Director of Interventional and Invasive Cardiology

Assistant Director Cardiopulmonary Services

WATERBURY HOSPITAL HEALTH CENTER
CARDIOPULMONARY POLICY AND PROCEDURE MANUAL

Subject:	**Angioplasty**
Effective:	**6/2005**
Reviewed: 4/07	
Revised:	

PURPOSE: To provide guidelines for patients requiring revascularlization in the cardiac cath lab.

SKILL LEVEL: MD with assistance from RN, ICVT and/or RT.

POLICY: To review use of angioplasty using balloons, stents, cutters, laser, grinders, suckers, filters and other PTCA techniques,.

SCOPE OF CARE: The purpose of this policy is to provide care, treatment, and support for the patients undergoing PTCA in the cardiac catheterizations lab. The cath lab staff will include the interventional cardiologist, cath lab RN and two intervention technicians (or an RN trained to use the physiologic monitoring system.)

PROCEDURE:

- Prepare patient on cath table for diagnostic procedure.
- Vital signs, conscious sedation (including O_2 sat) are documented. Patient is shaved, draped and prepared for procedure (catheterization/ PTCA).
- MD gains arterial access via the femoral artery, brachial artery or radial artery. A sheath is then placed into the artery.
- The MD passes a "guiding catheter" which is seated in the coronary ostium.
- A guide wire is introduced into the coronary artery and positioned across the stenosis into the distal aspect of the artery.
- An angioplasty catheter is inserted through the guiding catheter and is positioned across the stenosis.
- Once in place, the PTCA interventional device catheter is inflated as necessary for periods lasting anywhere from 10 seconds to several minutes. The balloon is then deflated thereby restoring blood flow to the artery. The stent may be drug eluting
- Once the stent is expanded against the arterial wall, the balloon is deflated and the delivery
- catheter and guide wire are removed.
- The interventionalist will then assess the result of the dilation by angiography flow.

INTRA PROCEDURE:

- The RN and the cath lab staff will be continuously watching the patient's vital signs, EKG, and O_2 sats, assisting the physician as needed, and medicating the patient if warranted and approved by the interventionalist. Vital signs will be monitored and documented.

POST PROCEDURE CARE:

- The interventionalist will remove all catheters and guide wires for the final images.
- Femoral arteriography will be checked to determine the possibility of a closure device. Closure device may be used at this time.
- If a closure device is not utilized, the sheath may be sutured in place to be removed at a time determined by the physician.
- RN assesses patient's vital signs and will also assess patient's limb warmth, color, and peripheral pulses. Puncture site will be checked for any bleeding or hematoma.
- A clear dressing should be applied to the puncture site.
- RN is to transport patient to CVU, the patient will be on O_2 and a cardiac monitor. Report will be given to the CVU staff.

_____
Director of Interventional and Invasive Cardiology Services

_____
Director Outpatient Services

_____
Assistant Director Cardiopulmonary Services

WATERBURY HOSPITAL HEALTH CENTER
CARDIOPULMONARY POLICY AND PROCEDURE MANUL

Subject: PTCA by IVUS
Effective: 7/05

Reviewed: 4/07
Revised:

PURPOSE: To provide guidelines for the use of intravascular ultrasound for nonangiographic coronary lesion assessment.
Provides an adjunct to percutaneous coronary interventions.

SKILL LEVEL: Cardiologist (trained in used of IVUS),with assistance of RN and ICVT

DEFINITION:
Intravascular ultrasound (IVUS) is an approved technique for catheter tipped, real time, echocardiography imaging of the cardiovascular system. IVUS generates cross-sectional tomographic images of the peripheral and coronary arteries that reflect vessel histology.

INDICATIONS:
- Assessment of lesion
- Vessel dimensions
- Confirmation of atherosclerotic plaque
- Selection of device of interventional procedure.
- Assess stent deployment
- Adjunctive diagnostic modality during interventional coronary procedures.

PROCEDURE:
- Administer anticoagulant (heparin) per physician's order.
- Administer Nitroglycerine per physician's order.
- IVUS catheter is passed along the angioplasty wire, using a monorail technique, until the transducer is beyond the region of interest.
- The catheter is then pulled back to determine lesion length and for volumetric analyses.
- Ultrasound images are recorded.

Reviewed and Approved:

_____
Director of Interventional and Invasive Cardiology

_____
Assistant Director Cardiopulmonary Services

POLICY: Radi Pressure Wire	
CATEGORY:	ORIGINATED: 12/2007
PAGE (s): 2	REVIEWED:
OWNER: Monica Giacomi,RN Assistant Director, Cardiopulmonary Services	REVISED:
APPROVED BY:	RETIRED:

SCOPE: Use of the pressure wire in the Cardiac Cath Lab is indicated to direct a catheter thru a blood vessel & to measure physiological parameters in the coronary arteries.
PURPOSE: To measure physiological parameters in the coronary arteries.

POLICY:

- Set up system per manufacture's instructions
- Under the direction of Interventional Cardiologist
- Utilized via guiding catheter- 6fr sheath or larger
- Inspect and prepare device
- Remove torque device by loosening the screw and gently withdrawing it
- Carefully advance interventional device over male connector
- Pressure Wire proceed according to standard clinical practice
- Monitor carefully, simultaneous measuring the distal pressure with pressure wire and the proximal pressure through the guiding catheter
- The signals from the sensor can be used for measurements of intravascular BP & estimates of Fractional Flow Reserve (FFR)
- Frequently reexamine placement of wire under fluoroscopy if the wire has been moved or torqued
- Always advance wire or withdraw slowly
- Avoid excessive manipulation of wire while in vessel- excessive manipulation of wire may cause wire tip to bend or fracture

ADVERSE:

Same as all catheterization procedures: vessel dissection, occlusion, perforation, embolus, spasm, infection (systematic or local), MI, pneumothorax, arrhythmias or death

Approved: _____ _____
Dr S Widman, Director of Invasive Cardiology Date

Approved _____ Date_____
Joanne Borduas, Director of Outpatient Services

Approved: _____ Date_____
Monica Giacomi, Assistant Director Cardiology

Radi Pressure Wire

Approved: _____ _____
Date

Approved: _____ _____
Date

WATERBURY HOSPITAL HEALTH CENTER

Subject: Procedure for use of the Femostop Compressor Device.

Effective: June 01, 2005

Reviewed: 04/05
Revised:

POLICY :
The MD, PA, or APRN will request a Femostop for a patient when it is applicable. Femoral and/or venous sheaths will be removed by the MD, APRN, or PA and the Femostop applied by the RN, APRN, MD, or PA. An order from the physician must be obtained for use of the device.

PURPOSE:
To provide guidelines for the use of the Femostop Compression Arch and Pump when indicated for achieving and maintaining hemostasis following IABP removal, sheath removal, or prolonged bleeding.

SCOPE:
Validated APRN, PA, MD, Cardiovascular Unit RN, Cardiology Cath Laboratory RN, ICU and Telemetry RN.

EQUIPMENT:
The Femostop pressure arch, pressure tubing, belt and pump manometer.

PRECAUTIONS:
1. The initial inflation pressure should be 10-20 mm Hg above the systolic pressure, or higher if necessary to control the bleeding.

2. Tightening of the belt should be done cautiously, ensuring that the hard plastic rim around the pressure dome is not in forceful contact with patient tissues.

3. Once sheaths are removed, pressures higher than the initial pressure may be necessary to control the bleeding. Exceeding pressures above 200 mm Hg may indicate the need to secure the belt more snugly.

4. DO NOT leave the artery completely blocked for more than 2-3 minutes to avoid extended occlusion of the vessel.

5. DO NOT leave the device on the patient for inappropriately long compressions, as tissue damage may be produced. During longer compressions, a brief interruption at least every three hours is recommended.

6. Femostop system should only be used by or under the supervision of APRN'S, MD's, RN's or PA's trained in femoral artery or vein compression procedures.

7. Use of the femostop is not intended to replace careful monitoring of the patient. The patient should not be left completely unattended during the time of compression.

8. Femostop application for hematoma with indwelling catheter should not exceed 80 mm Hg.

PROCEDURE:

1. Remove the plastic arch from the package keeping center of dome sterile and inspect for any defect. Check that it holds adequate pressure, 120 mm of Hg for 10 minutes.

2. Place the belt under and around the patient's hips prior to inflation. Pull it up equally on both sides and directly in line with the puncture site. Placement of device may not be suitable on patient's with wide hips.

3. Pass the strap through either end of the sidearm locks by fully compressing the lever. Adjust the strap to a snug, but comfortable fit around the patient. The arch should be level and squarely across the groin area.

4. Attach male end of the connecting tubing to the manometer. Check connections to ensure a tight fit.

5. Place dome 1 cm superior and 1 cm medial to site.

6. Proceed to inflate the device while the MD, PA, or APRN simultaneously withdraws the sheath. The final pressure should be 10-20 mm Hg above systolic or higher as necessary to maintain initial hemostasis. Exceeding pressure above 200 mg Hg may indicate the need to secure the belt more snugly.

7. Once the catheters or sheaths are removed, increase dome pressure as needed to achieve hemostasis. Maintain hemostasis for 1-2 minutes.

8. Lower the pressure until a good pedal pulse is present, color of extremity is good, and hemostasis is maintained by using the manometer. Gradually lower the pressure by 20 mm Hg every 10 minutes until a pressure of 40 mm Hg is sustained.

9. The MD, APRN or PA will determine length of time to keep femostop in place, typically two hours after a pressure of 40 mm Hg is achieved.

10. When the device is to be removed, gradually lower the pressure and observe the site for 2-3 minutes. If the site is free of any bleeding, carefully remove the dome from the site as not to dislodge any clot formation at the site.

11. Apply a transparent dressing to the site.

NURSING CARE/DOCUMENTATION:

1. Assessment of vital signs, pulses, groin checks, circulation, motion and sensation to affected leg should be done per sheath removal protocol.

Reviewed and Approved:

_____ _____

WATERBURY HOSPITAL HEALTH CENTER
CARDIOPULMONARY POLICY AND PROCEDURE MANUAL

Subject:	**Angioplasty Utilizing Rotablader**
Effective:	**6/05**
Reviewed: 4/07	
Revised:	

PURPOSE: To provide guidelines for using alternative methods for PTCA.

SKILL LEVEL: MD, Assisted by RN, ICVT

SCOPE OF PRACTICE: These procedures will encompass only the cath lab staff. The purpose of this policy is to provide alternative methods for PTCA in the cath lab.

POLICY: To outline the alternative methods of PTCA as determined by the interventional cardiologist.

METHODS OF PTCA: These methods are in addition to standard balloons and stents.

Rotablader

- Removes atherosclerotic plaque from the artery.
- Olive shaped, diamond-studded steel tip on the front half of catheter, and is rotated at high speed through plaque.
- May be combined with balloon and stenting PTCA.
- This may be utilized (at the discretion of the interventionalist) for:
    - Single vessel atherosclerotic CAD with a calcified stenosis than can be crossed by a guide wire
    - Multivessel CAD
    - Native Vessel CAD of variable lengths
    - Undilatble lesion
    - Ostial lesion
- Temporary pacemaker may be inserted prior to procedure.
- The Rotoblator "cocktail" is as follows:

  1000ml Normal Saline
  5000U Heparin
  5mg Nitroglycerine
  20mg Cardizem
  6mg Adenosine
  20cc Rotoblator Lubricant
- ***REMEMBER TO DETERMINE IF PT IS ALLERGIC TO EGGS***
- Possible Complications:
    a. Access bleeding
    b. Intimal dissection
    c. Acute vessel closure
    d. Vessel perforation

e. Emergency CABG
f. MI
g. Death
h. Cardiac Tamponade
i. Distal embolization

- **Procedure:**
  Rotablator guidewire is positioned cross the lesion
  The infusion port on the advancer is connected to a one liter bagof pressurized saline and lubricant mixture, a macrodrip tubing is used, this is to ensurea steady infusion against arterial pressure. Recommended pressure is 200-300 mm Hg
- The saline mixture (see above) should flow through the advancer and sheath, this must be bubble free
- Roraglide lubricate is a mixture used to lubriate the drive shaft. (egg yoke/olive oil/ethylenediaminetetraacetic acid) This is mixed with saline and is compatible with antispasm drugs and adenosine
- The burr is advanced through the guide catheter and tested by MD
- The burr is positioned, and the system is activated and is advanced through the lesion

Reviewed and Approved:

Director of Interventional and Invasive Cardiology

Assistant Director Cardiopulmonary Services

Director of Outpatient Services

Subject: **PTCA Using Angiojet**
Effective: **7/05**

Reviewed: 4/07
Revised:

PURPOSE: To provide guidelines for patient undergoing PTCA utilizing Angiojet

SCOPE OF CARE: This procedure will encompass the cath lab staff, for the purpose of performing a PTCA

SKILL LEVEL: Interventionalist specially trained in the use of the Angiojet, with the assistance of a RN and or ICVT, RT

PRE-PROCEDURE:

Angiojet uses high-pressure water jets directed backward into the catheter creating a strong suction at the space near the tip. This is performed to evacuate the thrombus these either aspirate thrombus or pulverize it.

- Angiojet catheter is advanced through the suspected thrombus and is positioned distally. The catheter is pulled back slowly (this may need to be performed multiple times).
- The pump set drives saline in and out of the catheters and maintains a constant pressure in the artery
- Angiojet is used in acute MI, stent thrombosis, and SVG thrombosis.

Indications:

Removing thrombus in the coronary artery
Removing thrombus in SGV vessels $\geq$ 2.0mm in diameter prior to balloon angioplasties or stent placement

Procedure: A temporary pacemaker will be available and inserted as necessary with the use of the Angiojet.

- Mix 1000cc .9 Normal Saline with Heparin 5,000U of Heparin
- Load pump body into the drive unit
- Attach IV tubing into the IV bag being careful to close the IV clamp
- Push in the inflow tubing into the inflow bubble detector
- Spike IV bag
- Be sure to fill the whole drip chamber in the IV tubing
- Release the clamp and allow the saline to flow and prime pump
- *Hang collection bag (on the side of the machine)* Angiojet
- Angiojet catheter is advanced through the suspected thrombus and is positioned distally. The catheter is pulled back slowly (may need to be performed multiple times).

- Connect the tubing to the outflow tubing and place in the outflow roller pump

- Close roller pump
- Slide foot peddle to the MD
- The RN or the ICVT hands the sterile catheter to the MD
- The MD will give the assistant the high pressure tubing to attach to the unit
- The MD will completely submerge the catheter and will prime the catheter and the pump set
- The catheter is advance over the guide wore through the thrombolytic lesion
-

Contraindications:

Patients undergoing other intracoronary procedures
If the lesion can't be crossed with the guide wire

Possible adverse reactions:

- Operation of catheter may cause hemolysis
- Hemolysis indicator should be monitored if total time exceeds 10minutes
- If the operation in a flowing blood field exceeds 5 minutes
- Excessive hemolysis may require blood transfusions

Director of Interventional and Invasive Cardiology

Assistant Director of Cardiology Services

Director of Outpatient Services

CARE PATHWAYS – CVU ONE STOP POST-OP INDEX

The Waterbury Hospital

- Scope of Services – Cardiovascular Unit (CVU)
- General Admission Policy
- Ambulation Policy
- Electrolyte Replacement Protocol
- Intensive Insulin Therapy Protocol
- Ventilator Weaning Protocol

THE WATERBURY HOSPITAL
PLAN FOR PROVISION OF CARE

Cardiovascular Unit

SCOPE OF SERVICE PROVIDED:

The Cardiovascular Unit is an 8-bed unit that provides patient services to adult and geriatric patients requiring Cardiac Interventions and Open Heart Surgery. Further delineations of the population may be found in the General Admission Criteria for the Cardiovascular Unit (CVU). This unit will provide 24-hour care to patients that will include but not limited to intensive monitoring, observation/assessments and applicable therapies provided by a staff that has met core critical care/cardiovascular competencies, state licensure and hospital requirements. Patients receive care on this unit from admission to discharge.

CRITERIA OF ADMISSION:

Appropriate conditions for patients admitted to this unit would include post cardiac angioplasty or stenting, pre operative and post operative open heart surgery (CABG/Valve). See General Admission Policy to the CVU.

STAFFING PLAN/MIX:

There is a Director and Assistant Director of Nursing for the CVU who are responsible for the staffing plans, education/competencies, and compliance measures. Other responsibilities will include providing assistance and oversight for triage of patients from admission to discharge. During the off shifts and holidays there is an Administrative Supervisor available to assist in staffing plans and triage of patients.

There is a complement of Registered Nurses (RN), Clinical Information Associate (CIA), Patient Care Associate (PCA) and Nurse Practitioners (APRN). Staffing assignments for the Registered Nurses will be based upon the acuity of the patients. Registered nurses coordinate the care of the patient, collaborating with other disciplines such as Respiratory Therapy, Pharmacy, Case Management, Physical Therapy, Nutrition Services. A Clinical Instructor (CI) is available to provide education and oversight support to the RN, CIA and PCA staff.

The staffing plan and patient assignment for the Registered Nurses is based upon patient acuity. There is a charge nurse for each shift with a PCA and CIA for 8 hours a day. The charge nurse is responsible for the patient assignment. Medical Management is provided by the Attending Physicians with assistance from the Nurse Practitioners.

QUALIFICATION OF STAFF:

Nurse Practitioners:

- Current CT State RN and APRN Licensure
- ACLS Certification
- APRN Competency

Registered Nurses:

- Current CT State Licensure
- ACLS Certification
- Critical Care Competency
- Cardiovascular Competency
- Point of Care Competency
- Intra-aortic Balloon Pump Competency
- Age Specific Competency

Clinical Information Associate/Patient Care Associate:

- Skills outlined in job description
- Age Specific Competency

QUALITY IMPROVEMENT INITIATIVES:

The Cardiovascular Unit is committed to a Quality Improvement Process as part of the Hospital's Quality Improvement Program as well as through the Heart Center Joint Quality Committee. Data is collected and submitted to the American College of Cardiology and the Society for Thoracic Surgeons as applicable to the Cardiac interventions and Open Heart Surgery populations. Comparative data is reviewed and process improvement initiatives are undertaken in response to data. In addition to these indicators, the Cardiovascular Unit also participates in Hospitalwide Quality measurements including:

Patient Satisfaction
Patient Falls
Pneumovax and Flu Vaccine Compliance
Pressure Ulcer Prevention

WATERBURY HOSPITAL HEALTH CENTER
GENERAL ADMISSION POLICY TO THE CARDIOVASCULAR UNIT

Effective: 7/05
Reviewed: 7/08
Revised: 7/08

The Cardiovascular Unit (CVU) is primarily designed for the post cardiac intervention patients and post-operative cardiothoracic patients, whose attending staff has appointments in the Department of Surgery or in the Department of Cardiology. The Medical Directors of the CVU or their designee must approve other admissions. Transfer or admission to the CVU will be based on the patient meeting the criteria for admission to the CVU. Medical or surgical inpatients that require cardiac interventions will be transferred to the CVU for recovery however, post recovery the patient may be transferred to the medical or surgical service and specialty floor. If CVU bed space is inadequate in number, and a patient is in need of this specialty area, the Medical Directors of the CVU, Assistant Nursing Director for the CVU will assist in prioritizing or triaging of the patients.

Prioritization criteria for the CVU is based on the following general guidelines:

1. Post cardiac interventional (angioplasty, stents, rotoblations) patients requiring post procedure hemodynamic monitoring, IABP, intravenous drip titrations, IIb/IIa inhibitor
2. All post open heart surgery (CABG/ Valve combination procedure) patients
3. Preoperative open heart surgery patients
4. Pre-procedure cardiac interventional patients

The postoperative cardiac surgery patients will be transferred and admitted directly to the CVU from the Operating Room, bypassing the post anesthesia care unit. The post cardiac intervention patients will have stage I recovery completed in the cardiac catherization laboratory then transferred and admitted into the CVU for further recovery and care.

The intent of the CVU is to maintain the patient in a single unit setting, from admission through discharge, through multiple levels of care (CVU recovery, critical care, telemetry and floor). However, in the event that there are no available beds in the CVU, the Medical Director(s) of the CVU or their designee in conjunction with the Assistant Director of Nursing for the CVU will review the patients to determine patients who may be moved to another unit based on the following:

1. The post-operative open-heart surgery patient who does require further management of ongoing mechanical ventilation may be considered for transfer to another critical care unit for continued care.
2. The post cardiac intervention patient, who has recovered from their cardiac intervention however, does require further medical management may be considered for transfer to an appropriate unit providing the necessary level of care.

WATERBURY HOSPITAL HEALTH CENTER
AMBULATION POLICY FOR POST OPEN HEART

Effective: 7/05
Reviewed: 7/08
Revised: 7/08

Scope:
Registered Nurses caring for post open-heart surgery patients

Purpose:
To provide a guideline for ambulation for stable post open heart surgery patients

Policy:
The Registered Nurse and Physical Therapist will evaluate all post open-heart patients within 24 hours of their surgery. This evaluation should determine the need for specific assistive devices. All patients should remain monitored with oxygen administered as necessary with proper pain management.

Day of Surgery 1. Physical therapy evaluation 2. If the patient is stable and extubated they may dangle at the edge of the bed 3. Initiate Education to the patient and family on ambulation/exercise needs
POD#1 1. If the patient remains stable then they should ambulate to the chair at least twice 2. The patient should be assisted to ambulate BID as tolerated
POD#2 to 3 1. If the patient remains stable they should ambulate to the chair TID 2. The patient be assisted with ambulation TID as tolerated
POD#4 to discharge 1. If the patient remains stable the removal of monitoring and oxygen should be reviewed with ambulation continued QID 2. If the patient remains stable, prior to discharge, the patient should be ambulated in the stairway.

The Waterbury Hospital

PROTOCOL: Electrolyte Replacement Protocol

CATEGORY: Cardiovascular Unit

PAGE(S): 3

OWNER:
Director of Cardiovascular Unit
APPROVED BY:
Katherine Benson; Pharmacy & Therapeutics Committee

ORIGINATED: 5/05

LAST REVIEWED: 2/5/08

LAST REVISED: 2/5/08

RETIRED:

SCOPE: RN
PURPOSE: Electrolyte Replacement Post Cardiac Surgery and Cardiac Interventions

To initiate Protocol:

1. Must have an ordering/prescribing practitioner order that states electrolyte replacement protocol.
2. Can be used on patient's with exclusion criteria per ordering/prescribing practitioner discretion

Suggested exclusion criteria:

1. Patient with known or documented chronic or acute renal failure (**CABG patient may have CRI at baseline and still require electrolyte replacement in the immediate post-operative recovery period)
2. Serum creatinine >1.6
3. Patient's with creatinine clearance <25ml/min or urine output <25cc/hr over the previous 8 hour shift
4. Urine output <25cc/hr over the previous 8 hour shift

I.

Potassium (normal= 3.4-4.5 mmol/l)

K+ level (mmol/liter	**IV Replacement (VIA INFUSION PUMP ONLY)**
3.3-3.9	**Peripheral Line:** KCL 10mEq/100mL Sterile water x2 (each bag over 1 hour) **Central Line:** KCL 20mEq/100mL sterile water x1 (each bag over 1 hour)
3-3.2	**Peripheral Line:** KCL 10mEq/100mL Sterile water x3 (each bag over 1 hour) **Central Line:** KCL 20mEq/100mL sterile water (each bag over 1 hour) x1, then KCL 10mEq/100mL sterile water x1 (over 30 minutes)

<3 **(CALL MD)**	**AND:**	**Peripheral Line:** KCL 10mEq/100mL Sterile water x4 (each bag over 1 hour) **Central Line:** KCL 20mEq/100mL sterile water x2 (each bag over 1 hour)

K+ level	**Oral Replacement (space doses by 2 hours)**
3.5-3.9	KCL 20mEq x 2
3-3.4	KCL 20mEq x 4
<3 **(CALL MD) AND:**	KCL 20mEq x 5

Recheck K+ level 1-2 hours after infusion or after infusion or 4-6 hours after po dose. Suggested Maximum daily dose = 200mEq

II.

Calcium (normal = 1.17 – 1.33 mmol/liter)

Ca++ level (mmol/liter)	**Single Dose IV replacement (Peripheral or central line, via infusion pump)**
1.15-1.16	Calcium gluconate 1g/50mL D5W or NS over 30-60 minutes
1.1-1.14	Calcium gluconate 2g/100mL D5W or NS over 30-60 minutes
≤1.09 (CALL MD) AND:	Calcium gluconate 3g/150mL D5W or NS over 30-60 minutes

Check ionized serum calcium levels 1-2 hours after each single infusion. Single doses may be repeated up to a maximum of 3g calcium gluconate within 24 hours.

If you wish to continue with the protocol and additional calcium supplementation is required, it must be administered by continuous infusion via a central line. Any continuous infusion of calcium, either on or off the protocol, requires administration via a central line. Recommended dose for a continuous infusion is:

1. 0.5-1mg elemental calcium/kg/hour (via infusion pump)
(93 mg elemental calcium = 1g calcium gluconate)

OR

2. 3-4g calcium gluconate/ 500 mL D5W or NS (via infusion pump) over each eight hour period.

Check serum calcium levels every 4-6 hours during a continuous infusion.

Note: Calcium chloride should not be used if the gluconate is available since it can cause severe thrombophlebitis and tissue burs if extravasated.

Oral Supplement: Calcium carbonate (TUMS) 500mg po TID

III.

Magnesium (normal=1.6-2.7mg/dl)

Mg++ level (mg/dl)	**IV replacement (Peripheral or central line, via infusion pump)**
1.48 -1.89	MgSO4 1g/50mL D5W or NS over 30 minutes
1.2 – 1.47	MgSO4 2g/100mL D5W or NS over 30 minutes
≤1.1 **(CALL MD) AND:**	MgSO4 5g/500mL D5W or NS over 4 hours

Recheck magnesium level 4-6 hours after infusion. Suggested Maximum dose = 4-8g in 24 hours.

Oral supplement: Magnesium chloride (Slo-Mag) 1-2 tablets 2-4 times per day; OR magnesium gluconate 500 mg 1-2 tablets 2-4 times per day.

IV.

Phosphorous (normal = 2.7-4.5mg/dl)

Phosphate level (mg/dl)	**IV replacement (Peripheral or central line, via infusion pump)**
1.6-2	15 mmoles Na+ or K+ phosphate/ 250mL D5W or NS over 6 hours
<1.6 **(CALL MD) AND:**	30 mmoles Na+ or K+ phosphate/ 500ml D5W or NS over 6 hours
<1.6 **(CALL MD) AND:**	**Central Line Only (via infusion pump):** 30 mmoles Na+ or K+ phosphate/250mL D5W or NS over 6 hours

Recheck level 6 hours after infusion. Maximum dose = 45 mmols in 24 hours (to avoid hyperphosphatemia)

Oral supplement: Neutraphos 2 packets po BID

WATERBURY HOSPITAL
PATIENT CARE SERVICE

POLICY: Intensive Insulin Therapy in Critically Ill Patients	
CATEGORY:	ORIGINATED: 9/05
PAGE(S): 4	LAST REVIEWED:
OWNER: Medical Director, Critical Care	LAST REVISED: 8/08
APPROVED BY: J. Lawrason, M.D. Critical Care Committee	RETIRED:

SCOPE: Patients that are post-operative from Open Heart Surgery procedures
PURPOSE: To provide guidelines for the management of hyperglycemia in this patient population

Desired Range: Maintain blood glucose between 80-110mg/deciliter

Patient Population: Hyperglycemic patients in the CVU with a persistent glucose ≥140mg/dl for greater than 24 hours

Initiating Insulin Infusion: (To be activated by a physician's order)

1. Bolus the patient with 0.1 unit/Kg (obtain a physician's order for the bolus dose). The maximum bolus dose is 10 units IV. Therefore, a patient weighing more than 100kg will only receive a 10 unit bolus. Regular insulin should be used. Start the drip at 1 unit per hour if the blood glucose level is between 140 and 200mg/dl. Start the drip at 2 units per hour if the blood glucose is > 200mg/dl.

2. Blood glucose should be checked at 1-hour intervals for three hours following the start of the insulin infusion and following each change in infusion rate made thereafter. See the tables below for "ONGOING INSULIN INFUSIONS". The patient will receive a dose of insulin IVP and the drip will be increased by increments of 0.5-3 units per hour for persistent hyperglycemia. The size of the bolus and the incremental increase in infusion rate depends on the current infusion rate and the blood glucose reading.

3. Blood glucose monitoring should continue every hour until the patient has achieved a "stable" blood glucose within the target range (80-110mg/dl). Once the blood glucose is maintained within the target range for three consecutive blood glucose determinations, then the blood glucose should be monitored every 2-4 hours for at least the first 24 hours.

4. Once glycemic control is maintained for 24 hours, monitoring can be performed at 4-6 hour intervals. HOWEVER, if changes are made in insulin infusion rates, steroids are added or deleted or the dose is significantly changed, or changes are made in nutrition (significant increase or decrease in caloric intake). Then blood glucose should be monitored at 1-hour intervals again as stated in #2 above.

Precautions:

1. Patients on insulin infusions need to have a 24 hour continuous source of nutrition. Patients who are not on tube feed or TPN with blood sugars less than 200 should receive adequate glucose intake equal to 5 grams of dextrose per hour for the duration of the insulin infusion (D5W at 100cc/hour).
2. Blood glucose must be carefully monitored when steroids are added/deleted/ or a change in dose occurs. Blood glucose should also be carefully monitored when nutrition (caloric intake) is increased or decreased (as in #2 above). Other drugs that may increase plasma glucose concentration include: beta blockers, diazoxide (Hyperstat), diuretics, pentamidine, phenytoin, and sympathomimetics (epinephrine, norepinephrine, dopamine, dobutane, phyenylephrine).
3. Interruptions in nutritional supplementation require simultaneous interruption in the insulin drip. Any interruption in the drip may require re-bolusing prior to resuming the drip.
4. The use of "sliding scale" insulin in addition to the insulin drip is discouraged.
5. Patients should be monitored for symptoms of hypoglycemia (sweating, agitation, confusion, hypotension). Note, in many instances critically ill patients with hypoglycemia are asymptomatic.

ONGOING INSULIN INFUSIONS

Blood Glucose above desired range (80-110mg/dl):

Glucose Level	**Infusion Rate of 1-5 units/hr**	**Infusion rate of 6-10 units/hr**	**Infusion rate of 11-16 units/hr**
*111-139	Increase infusion by 0.5 unit/hr	Increase infusion 0.5 unit/hr	Increase infusion by 1 unit/hr
*140-200	Increase infusion by 0.5 unit/hr	Increase infusion by 1 unit/hr	Give 2 units insulin IVP and increase infusion by 2 units/hr
201-250	Give 2 units insulin IVP and increase infusion by 1 unit/hr	Give 3 units insulin IVP and increase infusion by 2 units/hr	Give 3 units insulin IVP and increase infusion by 3 units/ hr
251-300	Give 3units insulin IVP and increase infusion by 1 unit /hr	Give 5 units insulin IVP and increase infusion by 2 units /hr	Give 5 units insulin IVP and increase infusion by 3 units/ hr
301-350	Give 6 units insulin IVP and increase infusion by 1 units/ hr	Give 8 units insulin IVP and increase infusion by 2 units/hr	Give 8 units insulin IVP and increase infusion by 3 units/hr
351-400	Give 10 units insulin IVP and increase infusion by 1 unit/hr	Give 10 units insulin IVP and increase infusion by 2 units/hr	Give 10 units insulin IVP and increase infusion by 3 units/hr
>400 or infusion rate >16 units/hr	Call physician for new orders		

***Note: For a rapidly decreasing blood glucose**: If the BG drops by 80 points or more in any one hour period, call physician.*

***When the blood glucose is steadily declining and has decreased to the range of approximately 200mg/dl or less, the following steps should be taken:**

a) If the BG decreases from a level of approximately 200mg/dl to a level between 140 to 160 mg/dl within a 1hour period, decrease the infusion rate by 25%. For example, if the current rate of infusion is 4 units/hr, multiply (4 units/hr)(0.25)=1unit/hr. The new infusion rate is 3 units/hr.

b) If the BG decreases from a level of approximately 200mg/dl to a level between 120 to 140mg/dl within a 1 hour period, decrease the rate by 50%.

c) If the BG drops from a level of approximately 200mg/dl to a level ≤120 (or an 80 point drop within one hour), call physician and turn off insulin drip.

Monitoring: The blood glucose must be monitored every hour until the patient has achieved a "stable" blood glucose within the target range (80-110mg/dl). When the patient remains within the target range for three consecutive blood glucose determinations, then the blood glucose should be monitored every 2-4 hours.

Blood Glucose in desired range (80-110mg/dl):

A. For infusion rates of 1-9 units/hour: No changes now. If blood continues to decrease within the desired range over 3 consecutive hours decrease rate by 0.5 to 1 unit/hour.

B. For infusion rates of 10 to >16 units/hour: No changes now. If blood glucose continues to decrease within the desired range over 3 consecutive hours, decrease the rate by 2 units/hour.

Blood Glucose below desired range (80-110mg/dl):

<table>
<tr><th>Glucose Level</th><th>Infusion rate 1-3 units/hr</th><th>Infusion rate 4-6 units/hr</th><th>Infusion rate 7-9 units/hr</th><th>Infusion rate 10-12 units/hr</th><th>Infusion rate 13-16 units/hr</th><th>Infusion rate >16 units/hr</th></tr>
<tr><td><40</td><td colspan="6">1. Call physician.
2. D/C insulin infusion and give 25 gram intravenous dextrose.
3. Assure adequate glucose intake and check blood glucose level every 30 minutes until >80 mg/dl. Once >80mg/dl, re-start infusion but decrease rate by 50% of previous rate. Check BG in 30 minutes.
❑ If BG <40, repeat steps 1,2, and 3. If BG 40-60, or 61-70, or 71-79, refer to the appropriate blocks below.
❑ If BG>80, repeat BG in 30 min then every hour until BG is maintained with the target range for four consecutive BG determinations.</td></tr>
<tr><td>40-60</td><td colspan="6">1. Call physician.
2. D/C insulin infusion and assure adequate baseline glucose intake.
3. Check blood glucose level every 30 minutes until >80mg/dl. Once >80mg/dl, re-start infusion but decrease rate by 50%of previous rate. Check BG in 30 minutes.
❑ If BG 40-60, repeat steps 1,2, and 3. If BG 61-70 or 71-79, refer to the blocks below.
❑ If BG>80, repeat BG in 30 minutes then every hour until BG is maintained within the target range for four consecutive BG determinations.</td></tr>
<tr><td>61-70</td><td colspan="2">D/C infusion and check blood glucose in 1 hour. If >80mg/dl, restart infusion but decrease rate by 25% of the previous rate.</td><td colspan="2">Decrease infusion rate by 50% of the previous rate. Check blood glucose in 30 minutes. If BG still 61-70 repeat BG in 30 minutes.</td><td colspan="2">Decrease infusion rate by 50% of previous rate. Check blood glucose in 1 hour. If BG still 61-70 repeat BG in 1 hour</td></tr>
<tr><td>71-79</td><td colspan="2">Decrease infusion rate by 0.5-1 unit per hour and check blood glucose in 1 hour.</td><td colspan="2">Decrease infusion rate by 2-3 units/hour and check blood glucose in 1 hour.</td><td colspan="2">Decrease infusion rate by 4-5 units/hour and check blood glucose in 1 hour.</td></tr>
</table>

Discontinuing insulin infusion: The insulin drip must be discontinued prior to transfer to a medical/surgical floor. Consider using a longer-acting insulin [NPH, insulin glargine (Lantus)] along with short-acting insulin coverage as soon as possible.

References:

1. Van denBerghe, G et al. Outcome benefit of intensive insulin therapy in the critically ill: Insulin dose versus glycemic control. Crit Care Med 2003; 31(2) 359-66
2. Van den Berghe, G et al. Intensive Insulin Therapy in Critically Ill Patients. NEJM 2001; 345(19):1359-67
3. Brown, G and Dodek, P. Intravenous insulin nomogram improves blood glucose control in critically ill. Crit Care Med 2001; 29(9) 1714-19

Waterbury Hospital
Respiratory Therapy Department
CVU Weaning Protocol

Purpose:

To define the care/sequence of events required to wean post-open heart surgical patients from mechanical ventilation.

Goal:

Extubation, if possible, in 6-8 hours post-op.

Assessment:

1. RN and RT will assess patient jointly.
2. Baseline ABG will be drawn within first hour of patient's arrival in CVU.
3. Patient is awake and breathing spontaneously above set ventilator rate, but <30bpm.
4. Pain is managed.
5. O2 saturation > 91% on FIO2 < or equal to 40%.
6. Assess breath sounds and work of breathing.
7. Heart rate, rhythm, and blood pressure stable.

Weaning:

1. Place patient on CPAP 5, continuing to monitor physiologic and cardiopulmonary parameters. (Add PS if patient is not tolerating CPAP.)
2. Obtain ABG after 1 hour.
3. Continue to assess patient's comfort and tolerance. (If patient is on PS, decrease to CPAP as tolerated.)
4. If there is an increased work of breathing, poor ABG's, or a significant change in the patient's parameters, change back to SIMV and try again in 2 hours.
5. If patient tolerates CPAP, proceed to extubation.
6. If patient fails CPAP > 24 hours, consider an intensivist consult.

Extubation:

1. Assessment made by RN and RT.
2. The following criteria should be met on CPAP 5:
    - RR > 10, but < 30
    - Minute volume > 5 lpm, but < 12 lpm.
    - Hemodynamics and cardiac rhythm stable.
    - ABG's in normal range.
    - Patient awake and cooperative.
3. If the above criteria are met and all team members agree, then extubate.
4. Obtain ABG after 1 hour.
5. Use Incentive Spirometer Q2 hours.

Effective: 6/05

Revised:

Approved by: _____ Date: _____

Approved by: _____ Date: _____

CARE PATHWAYS – OHS INDEX

The Waterbury Hospital

- Scope of Services – Operating Room
- Patient Flows – Inpatient OHS
- Patient Flows – Perioperative OHS
- Patient Flows – Out Patient OHS
- Patient Flows – Emergent OHS
- OHS Pre-operative orders
- OHS Post-operative orders
- OHS Patient Discharge Instructions

THE WATERBURY HOSPITAL
PLAN FOR PROVISION OF CARE

OPERATING ROOM

SCOPE OF SERVICES PROVIDED:

The Operating Room provides a safe and comfortable environment for both patients and staff in order to provide optimum assistance to provide optimum assistance to the surgeons in meeting the emergency, preventative and restorative health needs of the patients. The Operating Room staff provides quality-conscious, competent cost-effective care with respect for life and dignity. The Operating Room accommodates all outpatient and inpatient surgical procedures preformed at Waterbury Hospital. The American College of Surgeons Committee on Trauma and the State of Connecticut has certified Waterbury Hospital as a Level II Trauma Center. The populations served are infants, children, adolescents, adults and older adults. Surgery and procedures are performed in the following specialties: Cardiac, Vascular, Thoracic, General, Orthopedics, otorhinolaryngological (ENT), Podiatry, Plastics, Urology, Gynecological, Neurosurgery, Spinal, Cardiology, Pain Management, and other invasive procedures. The OR is divided into two (2) sections. The Main OR consists of ten (10) OR suites and one (1) Cystoscopy room. The Reed OR consists of seven (7) OR suites, one (1) Cardiovascular OR suite and perfusion room for performing open heart surgery. The Operating Room is available and staffed on a 24 hour basis seven days per week.

CRITERIA OF ADMISSION:

The patients are scheduled by the surgeon and assessed by anesthesia. The patient must meet the hospital preoperative screening criteria, e.g. laboratory work, EKG, etc. as developed by the surgical services committee. All patients require a surgical consent within 30 days of surgery and a history and physical 30 days old or less and be updated within 24 hours of the procedure. (reference - Preoperative Requirements, Surgical Consent and History & Physical policy).

STAFFING PLAN/MIX:

In collaboration, the Director of Surgical Services and two Assistant Directors of the OR are responsible for and assures the delivery of patient care services in the Operating Room on a 24/7 basis. Monday-Friday 6:30am-5:00pm and at least one available on call after hours. There will be at least one Assistant Director or their designee (charge nurse) managing the OR schedule and managing the Inner Core at all times.

The current staff is composed of Registered Nurses who may assume charge, circulator, and scrub responsibilities, Licensed Practical Nurses and Certified Surgical Technologists, who assume scrub responsibilities and may assist the circulators under the supervision of a Licensed Registered Professional Nurse. An OR team consists of one RN circulator and one scrub (RN trained to scrub, LPN or CST). There will be at least one RN responsible for supervising and/or managing patient care in each of the operating rooms. During the week Monday-Friday on day shift 7:00-3:30pm there is an average of 2.5 staff assigned to most rooms. A 24 hour second call team is present on site Monday-Friday from 9:00am-5:30pm for emergencies, relief and

late cases (past 3:30pm). At 2:30pm an evening OR team arrives and finishes the days cases, does urgent and emergent add on cases, and assigned responsibilities to include preparing for the next days cases until 11:00pm. The evening shift remains in house overnight (can retire to on call rooms) available to do cases till 7:00am the next morning. The second call team leaves at 5:30pm but is available on call from home till 9:00am the next morning for trauma emergencies or a disaster. On weekends (Saturday-Sunday), and holidays the OR is staffed with one team from 7:00am-3:30pm and one team 3:00pm-10:30pm who them remains in house overnight on call. A second call team is on home call 24 hours day on weekends and holidays. There is a separate cardiac OR call team consisting a specially trained RN and scrub in cardiac surgery available on home call Monday-Friday 3:30pm-7:00am and on 24 hour call on weekends (Saturday-Sunday), and holidays.

From 6:00am-11:00pm there are varying numbers (shifts and amount of staff staggered to meet volume and acuity) of Surgical Assistants to provide assistance to the OR teams and patients. There is one Radiological Technologist available in the OR Monday-Friday 7:15am-3:45pm to provide imaging support and assistance, the Radiology Department provides an additional Radiology Technologists as needed to meet the OR's imaging needs/volume. After hours and on weekends and holidays a Radiology Technologists is provided by the Radiology Department as needed.

Customer Services Associates provide clerical support 6:45am-5:30pm Monday-Friday, this includes the OR scheduling office and front desk.

QUALIFICATION OF STAFF:

- Registered Nurses – graduate from an accredited nursing school, required to be currently licensed by the State of Connecticut, current BLS certification. An RN who is specially trained to participate in the administration of conscious (moderate) sedation must be ACLS certified and have completed a conscious sedation competency. An RN working in the CVOR is required to be ACLS certified and have completed a cardiac surgical education and training program.
- Licensed Practical Nurses – graduate from an accredited LPN program, required to be currently licensed by the State of Connecticut, current BLS certification.
- Certified Surgical Technologists – graduate from a surgical tech program, current certification as a surgical technician is preferred, current BLS certification. A Surgical technician working in the CVOR must have completed a special cardiac surgical education and training program.
- Surgical Assistants – high school graduate or equivalent, successful completion of Certified Nursing Assistant Program, current BLS certification.
- Customer Service Associates - high school graduate or equivalent, secretary experience, medical terminology, computer skills, and customer service experience and skills.
- Radiology Technologist – graduate of an accredited radiology technologist school, currently licensed by the State of Connecticut.

QUALITY IMPROVEMENT INITIATIVES:

- Time out
- 7:30am start delays
- Infection Control/EOC compliance
- National Patient Safety Goals
- Fire Safety in the OR
- Hypothermia post colon surgery
- SCIP – antibiotic timing and appropriateness

Revised April 15, 2008

WATERBURY HOSPITAL

Waterbury Hospital
Inpatient Cardiac Surgery Patient Flow
Revised 4/08

INPATIENT, DETERMINED SURGERY INDICATED:

- PCP consults surgeon
- Calls OR front desk to schedule the patient (if after hours, calls same number and gives information to the charge nurse)
- Completes H&P, if not done
- Surgeon visits patient
- Writes pre-op orders and progress note

Anesthesia:

- Assesses and evaluates patient
- Lists medications patient should take prior to surgery
- Writes any appropriate pre-op orders

Nursing Staff:

- Transcribes pre-op orders
- Pastoral care notified
- Initiated pre-op checklist
- Any additional testing completed, abnormal results called to surgeon

Pre-Op Education:

- Pre-op teaching completed by CV nursing staff member (once patient in CVU)

Case Management will become involved and follow patient from this point forward

OR:

- OR scheduler obtains information, schedules case and notifies:
- Anesthesia
- CVU
- Patient's current nursing unit if not in CVU
- Blood Bank

IF PATIENT NOT CURENTLY IN CVU:

- Unit calls CVU and arranges for transfer
- Report given to CVU
- Places a transfer request
- Bed control and CVU determine bed placement
- Patient transferred to CVU

Evening Before Surgery:

- Pre-op checklist reviewed, updated
- Presence of H&P and pre-op note on chart confirmed
- Family given approximate time to be at hospital next day
- Hibiclens shower completed

Day of Surgery:

- Hibiclens shower completed
- Chart reviewed for completeness – test results, consents, and H&P, verify T&C acceptable
- Belongings secured
- Patient weight obtained
- Any additional orders entered
- Clip prep to be completed
- All orders implemented as appropriate (IV, medications, etc.)
- Family directed to CVU waiting room
- Surgeon may see patient prior to transfer to OR
- Lines inserted in OR
- Pre-op checklist completed
- Family waits in private waiting room
- CVU will wait for call from OR verifying patient is ready
- Patient transporter and unit RN to transport patient to OR in patient bed with monitor

Waterbury Hospital

Perioperative Patient Flow

CVOR Circulator RN goes to CVU (or Telemetry) to do a pre-op interview, assessment and report from floor nurse prior to transport
Patient transported to CVOR by Cardiac Anesthesiologist, Cardiac Anesthesia RN and unit staff in CVU bed (stretcher if on Telemetry) with CVOR O2 tank and monitor if ordered
Patient is taken directly into the operating room
Bed remains outside of OR room

- Circulator RN reviews chart for appropriate pre-op documents including H&P and consent
- Patient ID verified with name and medical record #→compared to arm band
- Lines inserted by Anesthesia and antibiotic given
- Surgeon notified by anesthesia when they are ready to anesthetize the patient
- CVOR staff will prep and drape patient
- Time-out – final verification of correct patient and correct procedure conducted.
- Surgery Started

↓

COMMUNICATION WITH FAMILY and CVU

CVOR:

- Surgical Assistant obtains CVU bed if patient not received in a CVU bed
- Circulator RN notifies CVU ½ hour before ready to leave the operating room
- Circulator RN calls CVU with brief report → procedure done, ventilator settings, drips, any problems etc, when off pump or when closing for off pump cases
- Circulator RN will call CVU to get family if needed by surgeon while patient is in CVOR
- Circulator RN calls main OR desk and asks them to have Surgical Assistant obtain elevator key and hold elevator for transport of patient to CVU
- Patient transported to CVU (see below)

CVU:

- When notified by CVOR ½ hour before → calls:
    1. Respiratory care sets up ventilator in room and awaits patient
    2. Radiology will be notified when patient arrives in unit

↓

Patient transport to CVU:

- Anesthesia, Cardiac Anesthesia RN, perfusion (if IABP) and in attendance
- Bedside report given by anesthesia to primary nurse
- 2nd RN begins to admit patient
- RT begins to connects to vent and confirms breath sounds
- Cardiac Anesthesia RN takes CVU IV pumps back to CVOR leaves IV pumps that patient is using in CVU
- If patient is connected to portable pacer anesthesia will take a CVU AV pacer back to CVOR and leaves one on patient
- Cardiac Anesthesia RN will take CVOR monitor and O2 tank back to CVOR
- First assessment started
- When patient is settled and stable in CVU, surgeon will go to the waiting room and speak with the family.
- Family in for first visit 20 minutes to 1 hour after patient arrival in CVU, if stable

Outpatient Cardiac Surgery Patient Flow

Surgeon's Office:
- Obtains basic demographic information
- Obtains insurance information
- Obtains pre-certification
- Calls 6188 booking office to schedule case, (open M-F 8am to 4:30pm, after-hours leaves message on OR Scheduler's voice mail
- Fax order to OR scheduler's office and central registration
- Fax Pre-operative orders, consents and other information to CVU
- Surgeon to dictate H&P, completes pre-op testing orders, surgical consent and blood consents
- Patient given script for labs and testing
- Tells patient that they will be called for PAT appointment

Central Scheduling:
- Receives reservation form
- Calls patient to schedule PAT appointment for afternoon starting at 1pm.
- Pre registers patient
- If patient has labs completed elsewhere they will be informed to bring copies with them.
- Informs patient where and when to report for PAT

Day of Surgery:
- CVU clerk or staff processes admission forms
- Patient to CVU with family
- RN assesses patient
- Chart reviewed for completeness - test results, consents, and H &P, verify T&C acceptable redraws if > 72 hours
- A complete set of vital signs and pulse ox reading, are obtained and abnormals called to surgeon
- Patient weight obtained
- Approximately an hour before scheduled surgery an OR Surgical Assistant will perform the clip prep
- Removes dirty linens and places warm blankets on patient when completed.
- Notify surgeon if the patient has chest pain
- Anesthesia, Cardiac Anesthesia RN and the CVU staff transports patient to CVOR
- Family taken to the CVU waiting area
- Family communication will be with CVU staff

Pre-admission Visit:
- Patient arrives to Pat Lab
- Registration is confirmed
- Patient signs in
- APRN in CVU notified of pt. arrival
- Orders are entered (need to be flagged for ASAP)
- Blood work drawn labeled as STAT
- Diagnostic testing completed
- PAT staff provides pt. with Hibiclens and Bactroban to take home

APN:
- Completes pre-op assessment of pt.; H&P form
- Completes pre-op teaching to include → incentive spirotomy teaching - documents baseline volume on admission form, skin prep instructions
- Patient taken to CVU for tour
- Instructs patient to return to hospital at 5:30 am the day of surgery and to pull up to front circle for valet or park in main lot and use the front door of hospital
- Informs patient of which medication to withhold the morning of surgery. If patient is taking Beta Blockers, patient is instructed to take the morning of surgery with sip of water
- Notifies surgeon of any abnormal findings/results

Anesthesia: will see patient the patient in Cardiac diagnostic assessment area
- Completes assessment and evaluation
- Writes pre-op orders

Emergent Return to CVOR from CVU - Patient Flow

POST-OP PATIENT PRESENTS WITH ACUTE SYMPTOMS:

- Surgeon paged using beeper,
- Surgeon evaluates patient → decides patient need to return to OR
- Surgeon calls 6155 (7am-3pm) and operator after hours to alert CVOR staff of case
- Surgeon talks to family to inform of a change in patient condition
- CVU continues to prepare patient for CVOR

Sequence if situation turns to an open arrest:

CVU staff:

- Will pull open arrest, crash cart and light source to room and follows protocol
- Calls OR to ask for assistance from surgical tech, anesthesia (1st is to have CVOR staff if not available general in-house OR staff)
- If patient arrests calls for code team
- Follows guidelines of open arrest; preparing suction, preps skin, drapes patient
- CVU continues to assist surgeon and prepares to return to CVOR if needed

DAY SHIFT (7am to 3pm)

OR notifies: surgeon informs at 6155

- CVOR team (Cardiac Anesthesia, Surgical Tech, Circulator)
- Perfusion may not be needed, ask surgeon if they need to be called in

CVU clerk will call:

- Blood bank to check on blood availability

AFTER HOURS (3pm-7am)

CVU calls for assistant manager and nursing supervisor to assist them in unit

Assistant Manager/ Supervisor:

- Calls blood bank to check on blood availability
- Assists with support of family
- Calls operator to inform of case
- Asks that In-house OR call (if not in case) to begin CVOR room setup
- May need to pull clerk to unit to assist with orders

Operator: After confirmed by surgeon

- Calls CVOR team (Cardiac Anesthesia, Surgical Tech, Circulator)
- Perfusion, if instructed by surgeon as needed

CVOR calls CVU when ready

Patient transported to OR by:

- Surgeon if he has not gone ahead to scrub
- Aesthesia, Cardiac Anesthesia RN, CVU RN and others as needed
- Respiratory Therapy

Family directed back to CVU waiting area after they see patient

WATERBURY HOSPITAL
HEALTH • CENTER

OPEN HEART PRE-OPERATIVE PHYSICIAN ORDER SHEET

REPORT DRUG SENSITIVITY (SPECIFIC DRUGS)

PATIENT WEIGHT (Kg)

Date/Time	**DO NOT USE UNSAFE ABBREVIATIONS: QD,QOD, U,MS, MGS04, TIW, ZNS04,AU, AD, or AS**
	Admit to _____, Attending _____
	☐ Cardiology Consult
	Diagnosis: _____
	Allergies: _____
	Diet: NPO after midnight except for meds
	Vital Signs per protocol
	12 Lead EKG the Day of surgery
	Labs & Tests: HgA1C, CBC with differential, PT/INR, CMP, ABG, Urinalysis, CXRAY PA & LAT DX: Pre-op **(IF NOT PREVIOUSLY DONE)**
	Verify Type &Cross and set-up TWO units for the OR
	Additional Tests or Labs:
	If an outpatient: Verify Hibiclens shower from the prior evening and morning of surgery
	If an inpatient: Hibiclens shower the night before and morning of the surgery
	Place IV Heplock #18 Jelco please
	Medications: Bactroban 2% Ointment. Apply to each nare with a separate Qtip BID.

Signature_____ **MD APRN** 02/29/08 jh

WATERBURY HOSPITAL
64 Robbins Street
Waterbury, CT 06706

OPEN HEART POST-OPERATIVE PHYSICIAN ORDER SHEET

REPORT DRUG SENSITIVITY (SPECIFIC DRUGS)

WEIGHT (Kg) HEIGHT (IN)

(PATIENT IDENTIFICATION LABEL)

DATE	TIME	DO NOT USE UNSAFE ABBREVIATIONS: QD, QOD, U, MS, MGS04, TIW, ZNS04, AU, AD, or AS
GENERAL ADMISSION		
		Admit to CVU, Attending _____
		Diagnosis _____
		Allergies _____
		Diet: Advance as tolerated to _____
		Activity: Bed Rest then Ambulation protocol
		Vital Signs per protocol
		Notify MD/APRN if temp> 101.5F, SBP<90 or >150, initiation of pacing
		Or AR< or > , CI< 2.0, or CT drainage > cc in one hour
		Warming Blanket or Bair Hugger for Temp <97F
		Chest tubes to 20cm. Wall Suction
		Pacemaker setting at _____
		Ace bandages to _____
		NGT/OGT to low continuous suction, irrigate q2 hours with 30cc Normal Saline
		Foley to gravity drainage
		Hourly intake and output
		Post extubation Incentive Spirometry q1 hour, TV at 700cc at least
		A line to flush system **(NS 500cc for line patency)**
		Swan Ganz to flush system **(NS 500cc for line patency)**
		Change Chest DSG in AM and PRN if staining. **IF NO DERMABOND**, Hibiclens wash to suture line BID, start in AM
		Daily Weight
		Cardiac Rehab Consult
		Knee-high TEDS -apply to non-operative leg immediately, apply to operative leg in AM
LABS/DIAGNOSTIC TESTS		
		ECG/CXR upon arrival to ICU and in AM (No EKG if paced)
		Thrombin Time, ICal, Mg on arrival, CBC, BMP 6 hours after arrival
		CBC, BMP, Ionized Calcium, Magnesium, Phosphorous in AM
		Type & Screen (if elective out patient admission) in AM
		Fingerstick Blood Sugar q4 hours. Notify MD/APRN if 2 consecutive BS are >150 and Initiate the Insulin gtt Protocol ☐ Initiate Insulin gtt without D5W Change fingersticks to AC and HS when taking PO
RESPIRATORY		
		Ventilator setting: TV_____ MODE:_____ Rate_____ PEEP_____
		FiO2 80% wean as tolerated for sp02≥ 95% Change patient to pressure support when breathing spontaneously with a tidal volume ≥ 600cc titrate not to exceed 30cm H20
		Wean per ICU Weaning Protocol, ABG's per protocol. ☐ If sp02 <90% & Resp. distress STAT ABG AND Call MD/APRN
PHARMACY		
		IV Infusion _____ ☐ 5% Albumin 500cc IV X one if SBP <80 AND Call MD/APRN ☐ Nitroprusside 50mg/250ccD5W start at 0.3mcg/kg/min to keep SBP<140,Hold if SBP<100

Signature_____ **MD APRN** 8/30/08

WATERBURY HOSPITAL
64 Robbins Street
Waterbury, CT 06708

OPEN HEART POST-OPERATIVE PHYSICIAN ORDER SHEET

REPORT DRUG SENSITIVITY (SPECIFIC DRUGS)

WEIGHT (Kg)	HEIGHT (IN)

(PATIENT IDENTIFICATION LABEL)

DATE	TIME	DO NOT USE UNSAFE ABBREVIATIONS: QD, QOD, U, MS, MGS04, TIW, ZNS04, AU, AD, or AS
PHARMACY CONTINUED		
		☐ Nitroglycerin 50mg/ 250cc D5W, Start @ 1 mcg/kg/min Hold if SBP< _____ ☐ Cardizem 100mg/100cc D5W @_____mg/hr ☐ Amiodarone Drip per protocol Use Bolus ☐
		Pain Control/ Anxiety: _____ _____mg IV q_____hr PRN pain, For pain scale 5-10/10 _____ _____mg IV q_____hr PRN pain, For pain scale 0-4/10 _____ _____mg IV q_____hr PRN anxiety
		Post extubation when tolerating PO: _____ _____mg PO q_____hr PRN pain, For pain scale 5-10/10 _____ _____mg PO q_____hr PRN pain, For pain scale 0-4/10 _____ _____mg PO q_____hr PRN anxiety
		Antibiotic Coverage: ☐ Cefazolin 1 GM IV q 8hrs times 48 hours, then DC ☐ Vancomycin_____mg IV q_____hrs times 48 hours, then DC **PLEASE Check rational for Vancomycin use below:** ☐ Beta-lactam Allergy ☐ Documented known colonization with MRSA ☐ Patient is high-risk for MRSA due to acute in-hospitalization w/in last year ☐ Patient is high-risk for MRSA due to extended care facility setting w/in last year ☐ Increased MRSA rate either facility wide or operation specific ☐ Chronic wound care OR Dialysis ☐ Continuous in-patient stay more than 24 hours prior to the principal procedure ☐ Other:_____
		☐ Tylenol 650mg PO/PR q4hr PRN for pain or Temp>101.5
		☐ Aspirin 650mg PO/PR//OGT one dose when Chest Tube output <100cc/hr for two hours ☐ ECASA 325mg PO Daily start_____
		☐ Zofran 4mg IV q8 hours PRN nausea/ vomiting
		☐ Sulcrafate 1gram via NGT/ OGT q6hours while intubated, D/C when extubated
		☐ Metoprolol _____mg PO q_____ post extubation, hold if SBP<90
		☐ Heparin 5000 units subcutaneous q 8 hr, start _____
		Electrolyte Replacement Protocol
		☐ Begin Apidra Insulin Sliding Scale for FS glucoses AC & HS on_____as follows: <80 Call MD/APRN, 80 to 150= 0 units _____to_____ = _____ units,_____ to_____ = _____units _____to_____ = _____ units,_____ to_____ = _____units _____to_____ = _____ units, >_____Call MD/APRN
		☐ Colace 100 mg PO BID start_____
		☐ Dulcolax Supp one PR Daily PRN for constipation start_____
		☐ Prilosec 40 mg PO Daily start_____
		☐ Statin:_____mg PO Daily start_____
		☐ Senna One Tab PO Daily start_____

Signature_____ **MD APRN** 8/30/08

(PATIENT IDENTIFICATION LABEL)

HEART CENTER of Greater Waterbury

POST CARDIAC SURGERY
DISCHARGE PLAN AND INSTRUCTIONS
DISCHARGE UNIT: **CVU** - TELEPHONE: **573-7028**

I. Medications:

Drug	Dose	Frequency	Purpose	New	Same as prior to admission	Change	Care Notes Given	Prescrip-tions Given
1.								
2.								
3.								
4.								
5.								
7.								
8.								
9.								
10.								

Call you physician with questions on medications with (*)

II. Medications Discontinued Since Admission
(DO NOT TAKE, THROW AWAY LEFT OVER PILLS)

Please bring this form to your next doctor's appointment.



WATERBURY HOSPITAL HEALTH CENTER

Waterbury Hospital Health Center
Medication and Dosage Schedule at Discharge

Name:_____

Date:_____

NAME OF MY MEDICATION & DOSE	MY MEDICATION TIME SCHEDULE				3 IF PRN OR AS NEEDED	NOTES/SPECIAL INSTRUCTIONS
	MORNING	NOON	EVENING	BEDTIME		

ORD/FORMS/MEDDOSESCHED; QI DEPT- 11/11/04

(PATIENT IDENTIFICATION LABEL)

HEART CENTER of Greater Waterbury

DISCHARGE PLAN AND INSTRUCTIC.. POST-CARDIAC SURGERY

III. Activity/Exercise

- No driving for one month
- No lifting > 10 pounds for one month
- Other

IV. Special Care Instructions

- Incentive Spirometer every 4 hours while awake.
- Wash any wounds with antibacterial soap and water daily. Keep wounds clean and dry.

_____

_____

_____

V. Pain

- Pain intensity scale (0-10) upon discharge:____
- Current pain medication: date, time, dose, effectiveness (use numeric scale) of most recent dose if in past 24 hours.

_____

_____

_____

- Notify MD if pain is unrelieved by current pain meds or alternative treatments.

VI. Diet

☐ Regular
☐ Diet Explained
☐ Modified _____

VII. Symptoms to be Reported

- Call Dr. _____ for:
  - ➢ Temperature > 101 degrees F
  - ➢ Difficulty with breathing
  - ➢ Chest pain different from incisional pain
  - ➢ Any drainage, redness, or tenderness from chest, leg, or arm wounds
  - ➢ Weight gain of 3 pounds over 3 days

VIII. Agency Referrals

☐ Home Care Services
Agency and Phone #:_____

_____

☐ Transferred to facility:_____
☐ W-10 also completed

IX. Appointment/Follow-up

Notify Cardiologist, Dr. _____ and Primary Care, Dr. _____ of discharge.
*Please call Doctor's Office for specific date and time.
☐ Other: _____
☐ Cardiac Rehabilitation 203-573-7118
☑ **Smoking QuitLine 1-866-363-4224 (toll-free)**

I UNDERSTAND THIS DISCHARGE PLAN, WHICH MY PHYSICIAN AND CAREGIVERS HAVE HAVE DISCUSSED WITH ME.

_____ | _____
Patient/or Representative | RN/LPN

Discharge Summary
IV Discontinued: ☐ Yes ☐ No
Instructions reviewed with:
☐ Patient
☐ Family member (specify) _____
☐ Other (specify) _____
Discharged via: ☐ Wheelchair ☐ Other _____
To: ☐ Home ☐ Other _____
Accompanied by: ☐ Family Date: _____
☐ Other Date: _____

Discharge Assessment (Patient abilities and needs: Physical, Emotional, Education, Safety)

Signature RN:

CARE PATHWAYS
Cardiac Rehabilitation
INDEX

The Waterbury Hospital

- Scope of Services – Cardiac Rehabilitation
- Levels of Program

WATERBURY HOSPITAL HEALTH CENTER
CARDIOPULMONARY REHABILITATION POLICY AND PROCEDURE MANUAL

Subject:	Personnel for Cardiopulmonary Rehabilitation Services/Scope of Practice
Effective:	1/13/92
Reviewed:	1/13/92, 1/5/95, 12/3/97, 11/23/1999, 9/28/00, 11/26/01, 2/4/05
Revised:	12/3/97, 11/2003, 01/07/04, 2/9/05, 8/08

PURPOSE: To establish guidelines for personnel to provide services and strategies for successful rehabilitation of the cardiac and pulmonary client.

POLICY: The collective skills of the staff must reflect the multidisciplinary nature of cardiopulmonary rehabilitation, in accordance with each Cardiopulmonary Department Job Description. Depending on individual client needs, personnel must possess the competencies needed to guide interventions aimed at restoring functional capacity and effect favorable modification of coronary heart disease and pulmonary disease risk factors. Staff utilization must assure safe and appropriate monitoring , instruction, and progress review for each intervention applied in the individualized plan of care.

Cardiac Rehabilitation requires a physician written order:
Phase I Rehab is conducted while the patient is in the hospital. An order is faxed to Cardiopulmonary, and a member of the staff visits the patients in Telemetry, CVU or ICU speaking to the patient and leaving informational literature.
Phase II Rehab is a structured program consisting of monitored exercise sessions, risk modifications, dietary consultations, and is outcomes based.
Phase III Rehab is self pay supervised but unmonitored sessions, the patients can exercise 5 days per week
Hours of Operation:
Cardiac Rehab is available from 6:30 am to 5:30pm Monday, Wednesday and Friday. Classes are also available on Tuesdays and Thursdays

The following responsibilities are in addition to each *Cardiopulmonary Department Job Description* and are associated with the day-to-day operation of cardiopulmonary rehabilitation.

Staff to Patient Ratio: Phase II---1 to 5
Phase III---1 to 15

Cardiopulmonary Medical Director:
Reviews and signs all client progress records.
Supports and consults with rehab staff as needed.

Registered Nurse:

- CT State Licensure: 2 RNs assigned to oversee Cardiopulmonary Rehab sessions, both monitored (Phase II) and supervised (Phase III).
- Conduct initial client evaluation including physical evaluation, risk factor
- Patient Assessment, establish goals and review with client, using case management assignment.
- Select the intervention strategies most appropriate to achieving the treatment goals for each client.
- Evaluate progress, adjusting strategies and treatment modalities to optimize outcomes.
- Provide reports and recommendations to the primary care physician and Cardiologist regarding client progress and discharge, as well as consult with the physician as needed throughout the client's participation in cardiopulmonary rehabilitation.

Cardiopulmonary Rehabilitation Therapist:

- CT State Licensed Respiratory Therapist.
- Conducts initial assessment of pulmonary client, including physical evaluation, risk factor assessment
- Under direction of the Registered nurse, sets goals and reviews with client; selects interventional strategies most appropriate to achieving the treatment goals for each client.
- Provide pulmonary client reports to primary care physician and Pulmonologist regarding client progress and discharge, as well as consult with the physician throughout the client's participation in Cardiopulmonary Rehab.

Cardiopulmonary Rehabilitation Clinician

- Bachelor of Science Degree in Physical Education &/ or Bachelor of Science Degree in Exercise Physiology.
- Conducts fitness assessments on all pulmonary clients.
- Under the direction of the Registered Nurse, develops an exercise program to accommodate individual functional status using case management assignment.
- Consult with rehab team to evaluate progress, adjust strategies and treatment modalities to optimize outcomes.

Reviewed and Approved:

_____ _____

Director Non-Invasive Cardiology Services Director Outpatient Services

_____

Assistant Director Cardiopulmonary Services

CARE PATHWAYS - PCI
INDEX

Saint Mary's Hospital

- Scope of Services – Cardiac Catheterization Laboratory
- Patient Flows – Inpatient Interventions
- Patient Flows – Out Patient Elective
- Patient Flows – ED to Cath Lab
- Patient Flows – Emergency from Cath Lab to CVOR
- PCI – Pre-procedure orders
- PCI – Post-procedure orders
- PCI – Discharge orders from CVU
- Closure Device Policy
- Contrast Reaction Policy
- Hematoma Management
- Sheath Removal Policy
- Vasovagal Reaction Policy
- Radial/Brachial Artery Catheterization
- Coronary Stent Placement
- IVUS System
- Pressure Flow Wire
- Femstop
- Renal Prophylaxis
- Roto Blade
- Angiojet

Saint Mary's Hospital

Cardiac Catheterization Laboratory

Scope of Practice

Scope of Services:

The Cardiac Catheterization Laboratory provides diagnostic cardiac catheterization services to patients with medical conditions such as suspected coronary artery disease, angina, and heart failure Interventional services are provided for patients with acute and/or significant coronary artery vessel obstruction.

Types and Age of Patients Served:

Service is available to both elective and urgent patients Monday through Friday 7 a.m. to 5:00 p.m. The services are provided to adult and geriatric patients. Emergency services are available 7 days per week, 24 hours a day.

Scope and Complexity of Patient Care Needs:

The Cardiac Catheterization Laboratory provides a safe and comfortable environment for both patients and personnel in order to provide optimum assistance to the physician in meeting the emergency, preventive and restorative health needs of the patient undergoing a diagnostic invasive cardiac procedure. Services provided include left heart catheterization, right heart catheterization, combined heart catheterization, temporary pacemaker insertion, permanent pacemaker insertion, pericardiocentesis, and intra-aortic balloon pump insertion. Interventional services include coronary angioplasty and stenting.
The Cardiac Catheterization Laboratory is located on the 2nd floor of the Sacred Heart building, adjacent to the O'Brien building.

Level of Care

The patient's physical, psychological and social needs are assessed initially on the Nursing Units and are reassessed on admission to the Cardiac Catheterization Laboratory, with a plan of care developed and revised as necessary. Patients are continually reassessed throughout the pre-, intra- and post-procedure periods. Modifications of the plan of care are based on reassessment of the patient. In the immediate post-procedure phase, the patient is under the direct supervision of the performing physician who maintains responsibility for the needs of the patient until the patient is discharged from the Cardiac Catheterization Laboratory.
Cardiology nurses and cardiovascular technicians interact with the patient throughout the continuum of patient care.

Department/Unit Staffing

Physicians board certified in cardiology that have had additional training in cardiac catheterization/intervention and have met the hospital credentialing/privileging process for cardiac catheterization performs cardiac catheterizations/interventions.

The Cardiac Catheterization Laboratory is staffed during procedures with a minimum of three staff members of which one must be a Registered Nurse. In cases where conscious sedation is administered, the policy, procedure and standards related to conscious sedation are followed.

The basic requirements for R.N. staff and Cardiovascular Technicians include BCLS Certification, ACLS Certification and annual competencies. RN's are licensed by the state of Connecticut.

An ongoing program of in-service education and periodic clinical skills evaluation for all staff members is maintained to ensure that the quality of care provided is kept current.

Methods Used to Assess and Meet Patient's Care Needs

Standard of practice are based on the American College of Cardiology and American Heart Association Guidelines for Cardiac Catheterization Laboratories, institutional standards, policies, procedures, protocols, and regulatory agencies. These standards and recommended practices serve as a basis for performance improvement and evaluation.

Collaboration

The nurse's partnership with the patient and other healthcare providers is to work in a collaborative, coordinated manner throughout the process of caring for a patient requiring an invasive cardiac procedure. The involvement of the patient, family, or significant other is paramount. An appropriate degree of participation is expected of the patient, family or other healthcare providers and is determined by the clinical environment and the patient's situation.

Original: 6/94
Reviewed: 6/96, 6/98, 6/2000
Revised: 6/2002, 2/2005, 2/2008

ST. Mary's Hospital

PCI Inpatient Flow

Approved 4/21/05
Revised 8/3/08

Inpatient Unit:
- Patient exhibits symptoms of STEMI/ACS
- EKG completed (reviewed by PCP, resident or available cardiologist)

If routine/non-urgent PCI indicated:
- Cardiologist determines PCI for that day or next day
- Cardiologists/PCP determine if patient needs transferred to a monitored unit if not currently on a monitored unit
- Call initiated to Cardiology to add to schedule
- Orders and consent completed
- Patient education completed
- Unit reviews labs, calls any abnormals
- Day of procedure:
  - Immediate preprocedure orders implemented
  - Family to second floor waiting room
  - CCL tech assists in transporting to cath lab

If urgent/emergency PCI indicated:
- PCP or resident that reviewed EKG, will call interventionalist
- Unit calls CCL to notify of emergency case
- **If after hours or weekend:** Unit calls supervisor to notify of emergency cath
  - Supervisor alerts operator to call in cath lab on call team and diverts resources to the unit to assist if needed
  - Unit or supervisor notifies patient's family
- **In every situation:**
  - Unit initiates any preprocedure orders
  - Unit enters bed request if patient not in CVU
  - CCL calls when ready and CCL tech comes to unit to assist in transport
  - Family to 2nd floor waiting room

Cath Lab
- Cath lab will routinely have one tray prepared for emergencies prior to leaving for the day
- **If daylight Mon. through Fri. during operational hours**, cath lab will let working cardiologist know about emergency procedure and case on table with be either completed (if PCI or cath near completion), or removed from table (if early in diagnostic and floor is ready)
  - CCL will turnover room ASAP, enter any available patient data and call for patient as soon as ready
  - CCL will send one person to assist with transport
- **If after hours or weekend**, once cath lab staff arrives, equipment will be set up, any available data entered and will call for patient as soon as ready, one CCL staff member will assist with transport
- Consent will be completed in the cath lab
- Family will be directed to waiting room on second floor
- Once in the lab, patient ID verified with two identifiers
- Patient assessment completed immediately prior to procedure, reviews chart, verifies allergies and consents
- Monitoring devices applied, patient prep and drape completed, time out completed
- Procedure preformed along with associated activities
- Immediate post procedure patient is stabilized (closure device or sheath may remain in), instructions given
- Post procedure instructions reviewed with patient
- Physician goes to waiting room to talk with family
- CCL transports patient to CVU with CCL RN and monitor

CVU:
- Report given to CVU RN by CCL at bedside
- CVU performs patient assessment, implements post procedure orders and reinforces post procedure instructions, family in to see patient

St. Mary's Hospital

Outpatient Elective PCI Patient Flow **Approved 4/21/05**
Revised 8/08

CARDIOLOGIST'S OFFICE
Patient is identified to need an elective PCI
Cardiologist:
- Completes pre-procedure orders, H&P, and consent

Office:
- Schedules procedure by calling SMH Cardiology secretary (who will check the schedule and determine the time slot)
- Obtains pre-certification
- Gives pre-procedure instructions including date & time of PCI
- Completes CCL/PAT scheduling form trifax to 203-578-xxxx **(?)** (admitting, OSTD and CCL), consent **preprocedure orders** and H&P are faxed to OS TD
- Office provides educational materials to patient

One Stop Testing:
- Completes pre-reg form
- Performs testing when patient comes in (walk ins)
- Faxes lab results to PCP and ordering physician
- Maintains the HC record
- Has chart available for CCL pick up day prior to procedure

CCL:
- Cardiology will enter scheduled patient information into scheduler
- Receives tri-fax
- Pick up chart day prior from OSTD
- Compile chart
- Reviews chart and begins entry into CCL data management system
- Calls patient day prior to procedure to confirm arrival time (2 hours prior) to hospital
- Takes CCL packet to SDS for PCI patients and for diagnostic cath patients

Patient Access and Pre-Registration: Complete patient registration processes

SDS:
- Gets completed CCL/PAT scheduling form
- Receives chart from CCL, reviews chart

Day of Procedure Patient Arrives:
Second Floor Registration:
- Roll over the registration
- Obtains: consent for treatment, HIPAA, sign consents, validates insurance, applies ID band, etc.
- Calls SDS to notify that patient/family is on the way to unit
- Customer care representative to escort patient and family to SDS

SDS (Same Day Surgery):
- Verifies ID
- Family directed to waiting area and given beeper with instructions (will be permitted to see patient prior to patient going to lab)
- Performs admission assessment, reviews chart completeness and verifies allergies
- Completes pre-procedure checklist any patient prep and implements any pre op orders
- Preops patient upon phone call notification from CCL
- CCL tech will come to unit to transport patient to cath lab

Cath Lab
- Verifies patient ID by using two identifiers
- Patient assessment completed immediately prior to procedure, reviews chart and consents, allergy verification

St. Mary's Hospital

Outpatient Elective PCI Patient Flow –pg.2

Approved 4/21/05
Revised 8/8

Day of Procedure (Continued):

Cath Lab

- Time out performed
- Procedure patient care activities performed
- Intra procedure activities performed
- Immediate post procedure patient is stabilized (closure device or sheath may remain in), instructions given
- Post procedure instructions reviewed with patient
- Physician goes to waiting room to talk with family
- CCL transports patient to CVU with CCL RN and monitor

CVU:

- Report given to CVU RN by CCL at bedside
- CVU performs patient assessment, implements post procedure orders and reinforces post procedure instructions

Saint Mary's Hospital

Emergency ED to CCL Patient Flow

Approved 4/21/05
Revised 8/3/08

Patient arrives in the ED (either walk in or ambulance)

- EKG obtained stat and immediately given to ED physician
- ED physician interprets EKG, evaluates patient →identifies STEMI
- ED clerical coordinator will initiate Acute MI with ST elevation QI data Flow Sheet
- ED physician calls interventionalist who will make the decision regarding need for immediate intervention
- ED clerical coordinator and/or interventionalist will notify the cath lab of an emergent case during hours of operation.
- After hours the ED clerical coordinator will use 1*1 to activate cath lab team
- Operator will activate Cath Lab Beepers using the Alpha Pager software located in the switchboard and text message "Cath Team Activation".
- Operator will call Cath Lab RN cell phone to activate Cath Lab Team Leader.
- Operator will page cardiac anesthesiologist and perfusionist (see call list).
- ED physician will speak with the patient and family informing them of the need for the procedure. (Patient education materials may be utilized)
- ED physician will initiate Acute Coronary Syndrome ED Physician Order Sheet
- ED clerical coordinator will book ED Cardiac Cath Lab panel, cardiac cath requisition and schedule the patient for a CVU bed.
- ED notifies PCP (if daylight hours that patient is going to CCL).
- ED continues to treat patient and prepares patient for cath/PCI procedure (includes marking peripheral pulses, initiating IV lines, ASA, NTG,Plavix, Heparin and Integrelin if indicated)
- The ED clerical Coordinator upon receiving notification that the cath lab is ready immediately notify the nurse caring for the patient and page PCA stat to assist with the transfer.
- ED RN will accompany the patient to the cath lab and provide verbal report.
- Family accompanies patient and is taken to the waiting area outside cath lab.

↓

Cath Lab

- Cath lab will routinely have one tray prepared for emergencies prior to leaving for the day
- **If daylight Mon. through Fri. during operational hours**, cath lab will let working cardiologist know about emergency procedure and case on table with be either completed (if PCI or cath near completion), or removed from table (if early in diagnostic and ED is ready)
    - CCL will turnover room ASAP, enter any available patient data and call for patient as soon as ready
    - CCL will send one person to assist with transport
- **If after hours or weekend**, once cath lab staff arrives, equipment will be set up, any available data entered and will call for patient as soon as ready, one CCL staff member will assist with transport
- Consent will be completed in the cath lab
- Family will be directed to waiting room on second floor
- Once in the lab, patient ID verified with two identifiers
- Patient assessment completed immediately prior to procedure, reviews chart and consents
- Monitoring devices applied, patient prep and drape completed, time out completed
- Procedure preformed along with associated activities
- Immediate post procedure patient is stabilized (closure device or sheath may remain in), instructions given

Cath Lab cont..

- Post procedure instructions reviewed with patient
- Physician goes to waiting room to talk with family
- CCL transports patient to CVU with CCL RN and monitor

CVU:

- Report given to CVU RN by CCL at bedside
- CVU performs patient assessment, implements post procedure orders and reinforces post procedure instructions, family in to see patient, notifies PCP if not completed in ED

St. Mary's Hospital
Cath Lab to CVOR Emergency Patient Flow

Approved 4/21/05
Revised 8/08

POSITIVE CATH (TVD or LM) → NEEDS EMERGENCY CABG:

- Cardiologist notifies CV surgeon, and updates patient's family

Cardiac Cath Lab Staff:

- At all time the OR is notified and they inform CVOR team
- If off hours, cath lab calls the nursing supervisor to notify of emergency procedure.
- CCL enters bed request (unless patient originated in CVU)
- CCL calls sending unit to notify of impending surgery
- CCL notifies PCP (if daylight hours)
- Pre OHS (modified) orders are initiated, obtaining any needed pre-op lab/tests
  - Verification that type and cross match is completed
  - Verify if antibiotics to be administered or send to be given in OR
- Begins basic pre-op teaching to patient and family as able
- Begins to prepare patient for surgery → (IABP insertion)

CV surgeon: (will not hold up patient transport to OR if OR ready)

- Assesses patient if in house
- Discusses procedure with family /patient, obtains consents

Anesthesia: (will not hold up patient transport to OR if OR ready)

- assesses patient and assists with stabilization

Patient transport to CVOR : (when CVOR calls that room is ready)

- Cath lab staff and any needed ancillary transport patient
- Cath lab RN may need to remain in CVOR, if IAPB has been inserted, until perfusion arrives
- Family directed to OR or CVU waiting area

CVU:

- Notifies Respiratory of add on case and arranges staffing and bed
  Once patient arrives post op, PCP notified if not completed in cath lab
-
-

OR Day Shift

- OR notifies team (anesthesia, perfusion and OR room staff)
- OR made ready for patient, preferably Room 1

OR After Hours

- Determine from surgeon if perfusion is also needed.
- Nursing supervisor may call for clerk or PCA to be pulled to assist with phone calls, etc. in either CCL or OR
- First call team gets OR ready for patient
- Operator notifies on call team hearts including perfusion if surgeon directed **(call directly or group page, and process to verify all received call)**

- OR calls CCL when ready for patient and patient is transported to OR (CCL staff and respiratory to assist with transport)
- In the event that the OR is occupied or a delay, the patient may be taken to CVU to await the OR

Follow Patient Flow
Peri-Operative

Saint Mary's HOSPITAL
56 Franklin Street, Waterbury, CT 06708

PRE-CARDIAC CATHETERIZATION / CORONARY INTERVENTION
PHYSICIAN'S ORDERS

DO NOT USE THE FOLLOWING ABBREVIATIONS/ACRONYMS/SYMBOLS

U *(for unit)*	**Q.O.D.** *(for every other day)*
I U *(for international unit)*	**X.0** mg *(trailing zero)*
Q. D. *(for once daily)*	**.X** mg *(lack of leading zero)*
AU, AD, AS *(each ear, right ear, left ear)*	**T1W** *(three times a week)*
$ZnSO_4$ *(zinc sulfate)*	
MS, MSO_4, $MgSO_4$ *(for morphine sulfate or magnesium sulfate)*	

REMINDER: PLEASE INCLUDE INDICATIONS WHEN ORDERING DIAGNOSTIC TESTS

DATE / TIME	ORDER NO.	ENTERED BY	ORDER
			PRE-CARDIAC CATHETERIZATION / CORONARY INTERVENTION ORDERS
			Diet: NPO except for meds
			Hold all Metformin products (i.e. Glucophage, Metaglip, Glucovance, Avandamet)
			Hold Lasix for one dose the night before procedure
			Hold Lasix morning of procedure
			For serum Creatinine levels of 1.5 or greater and/or Creatinine Clearance less than 50 ml/min, follow Renal Prophylaxis Protocol
			Vital Signs per protocol
			Activity: Continue with present activity until procedure
			May be transferred off cardiac monitor ☐ Yes ☐ No
			Diagnostic Testing: 12 lead EKG on chart
			12 lead EKG morning of procedure, if one is not available
			Laboratory:
			If outpatient: Confirm all pre-admission testing is on chart
			If inpatient: Draw morning of procedure:
			Fluid Type _____ Volume _____ run@ _____ ml/hr
			Other:
			Medication:
			Valium 10mg PO on call to Cath Lab
			Benadryl 25mg PO on call to Cath Lab
			IF KNOWN ALLERGY TO RADIOGRAPHIC CONTRAST MEDIA OR SHELLFISH:
			In PM: Give Prednisone 40mg at 5:00p.m. the night before the procedure
			Give Prednisone 40mg at 9:00p.m. the night before the procedure
			In AM of procedure:
			Give ☐ Solucortef 100mg IV x 1 or ☐ Decadron 4mg IV x 1
			Give Pepcid 20mg PO x 1

TIME	DATE	SIGNATURE	M.D.

7316 10/03/06

***** DRUG SENSITIVITY (SPECIFY DRUGS)**

DISPENSED IN ACCORD WITH THE HOSPITAL FORMULARY SYSTEM. If not desirous of the exact equivalent, **draw a line through the permissive statement and indicate drug.**

DRUGS -- NO SUBSTITUTIONS:	ORDERS ENTERED BY			
	INIT	SIGNATURE	INIT	SIGNATURE

Saint Mary's HOSPITAL
56 Franklin St. Waterbury, CT 06706

POST-CARDIAC CATHETERIZATION/ CORONARY INTERVENTION PHYSICIAN'S ORDERS

DO NOT USE THE FOLLOWING ABBREVIATIONS/ACRONYMS/SYMBOLS

U *(for unit)*	**Q.O.D.** *(for every other day)*
IU *(for international unit)*	**X.0 mg** *(trailing zero)*
Q.D. *(for once daily)*	**.X mg** *(lack of leading zero)*
AU, AD, AS *(each ear, right ear, left ear)*	**TIW** *(three times a week)*
$ZnSO_4$ *(zinc sulfate)*	
MS, MSO_4, $MgSO_4$ *(for morphine sulfate or magnesium sulfate)*	

REMINDER: PLEASE INCLUDE INDICATIONS WHEN ORDERING DIAGNOSTIC TESTS

DATE / TIME	ORDER NO.	ENTERED BY	ORDER

POST-CARDIAC CATHETERIZATION / CORONARY INTERVENTION ORDERS

Diet: ☐ CCU ☐ Diabetic

Activity: Bedrest until _____

HOB may be elevated ☐ 30 degrees ☐ 45 degrees

Vital Signs per routine

IV Fluids: _____ @ _____ ml/hr

- **EKG on return from lab**
- **EKG in AM**
- **EKG with chest pain**

☐ **Echocardiogram M mode 2D**

Labs:

☐ **CBC, BMP in AM**
☐ **HgA1C in AM**
☐ **CPK, MB, Troponin every 8 hours x 2**
☐ **Lipid panel in AM**
☐ **CBC every 6 hours for duration of infusion**
☐ **LFTs in AM**

Medication:

☐ **Plavix 600mg PO x 1 then 75 mg PO daily**
☐ **Plavix 300mg PO x 1 then 75 mg PO daily**
☐ **Integrilin 180 mcg/Kg IV bolus x 2, 1 0 minutes apart.**
Begin Integrilin infusion immediately after first bolus at _____ **ml/hour to be infused for** ☐ _____ **hours or** ☐ **until current bottle infused**
☐ **Aspirin** _____ **mg PO daily**
☐ **Beta-Blocker:**
☐ **Statin:**
☐ **Ace-inhibitor:**
☐ **Nexium 40 mg PO daily**
☐ **Nitroglycerin 1/150th grain SL: 1 tablet every 5 minutes X 3 PRN chest pain**
☐ **Percocet 5/325mg 1 tab PO every 6 hours PRN pain**
☐ **Zofran 4 mg IV/PO every 8 hours PRN nausea**
☐ **Ambien 5mg PO at bedtime PRN insomnia**

Other Meds:

TIME	DATE	SIGNATURE M.D.

***** DRUG SENSITIVITY (SPECIFY DRUGS) *****

DISPENSED IN ACCORD WITH THE HOSPITAL FORMULARY SYSTEM. If not desirous of the exact equivalent, draw a line through the permissive statement and indicate drug.

DRUGS - NO SUBSTITUTIONS	ORDERS ENTERED BY			
	INIT	SIGNATURE	INIT	SIGNATURE

Saint Mary's HOSPITAL

56 Franklin Street, Waterbury, CT 06706

CARDIAC CATHETERIZATION/ POST CORONARY INTERVENTION DISCHARGE INSTRUCTION SHEET

NAME
MED REC NO
DR
HOSP. NO
ADM. DATE

Nursing Unit: _____ **Ext:** _____

Doctor: _____ **Phone:** _____

1. **General Instructions:**
   a. **Monitor catheterization site (groin or arm) for bleeding. If this occurs, lie flat and apply direct pressure for 20 minutes. If bleeding persists call 911.**
   b. **Monitor catheterization site (groin or arm) for infection, redness, swelling, or numbness of extremity. Monitor temperature for reading greater than 101 degrees F. If these symptoms should occur call your physician.**
   c. **CHF patient: Weigh yourself daily or as directed by MD. If you should have a weight gain of 3 pounds over a period of 3 days, call your physician.**

2. **Diet:** ☐ **Low saturated fat, Low cholesterol** ☐ **Low Sodium** ☐ _____ **cal ADA**
3. **Activity Level:** **No heavy lifting for 48 hours**
4. **Return Appointment With:** _____ **Phone #** _____
5. **Cardiac Rehabilitation:** ☐ **Yes** ☐ **No**

For your health we recommend you stop smoking. CALL 1-866-363-4224 for HELP/SUPPORT

6. **MEDICATIONS / General Reminders:**
   a) Take the exact amount prescribed unless otherwise instructed by your doctor
   b) Take pills at about the prescribed time each day.
   c) Keep medicines in their original bottles
   d) Keep a written list of your medications and bring the list to each doctor's appointment
   e) Inform your doctor if you start new medication
   f) If you feel a medicine is making you sick, CALL YOUR DOCTOR

**** TAKE ONLY THE MEDICATIONS LISTED BELOW. Call your doctor before taking any other medications; including over the counter medications and/or herbal supplements.**

DRUG (name/strength)	INSTRUCTIONS	DRUG (name/strength)	INSTRUCTIONS
Aspirin			
Plavix			
Nitroglycerin - gr 1/150	**Place 1 tablet under tongue**		
For heart symptoms, may repeat every 5 minutes for 2 more doses, if no relief call 911			

**** If you have any questions or concerns, call your doctor * ****

Discharge Date: _____ Discharged At: _____ am/pm With: _____

Discharge To: ☐ Home ☐ ECF ☐ Other: _____

Discharged with equipment: ☐ Yes ☐ No Patient/Family/S.O. understands equipment given: ☐ Yes ☐ N/A

Patient/Family/S.O. Understand the Food/Drug Interaction of Medications Prescribed: ☐ Yes ☐ N/A

Any Educational Pamphlets given (list pamphlet): **Care Notes, Krames**

Patient/Family/S.O. Understands Continuing Care Needs After Discharge: ☐ Yes ☐ N/A

Patient/Family Educated on Pain Management Plan: ☐ Yes ☐ N/A

Signatures: R.N.: _____ R.N.: _____ M.D. _____

I Have Reviewed & Understand Instructions and Agree With The Discharge Plan:

Signature: _____ Relationship to Patient: _____

Saint Mary's
HOSPITAL

Cardiac Catherization Laboratory
Guidelines for Use of Vascular Closure Devices

PURPOSE:

To obtain hemostasis of arterial puncture sites following cardiac catherization/PCI procedures.

SCOPE OF CARE:

Timely and safe removal of arterial sheath with minimal patient discomfort.

GENERAL INFORMATION:

- Licensed physicians who have been trained on the use of the device deploy vascular closure devices.
- When a venous sheath has been placed in the same leg, the venous sheath should be removed and hemostasis achieved after the use of a vascular closure device.
- Vascular closure devices may include collagen seal (Angio-Seal), collagen plug (Vaso-Seal), thrombin injection (Duett), or suture devices (Perclose).
- Vascular closure devices are deployed according to the manufacturer's recommendations.
- The following guidelines are relevant to all devices. Each individual device may have specific indications and precautions.

INDICATIONS:

The use of vascular closure devices should be considered on the following patients:

- Same-day diagnostic cardiac catherizations
- Aortic insufficiency
- Hypertension
- Obesity
- Patient who have coagulopathy or are receiving anticoagulant or antiplatelet agents.
- Patients who have undergone prior arterial punctures.
- Combative/uncooperative patients

COMPLICATIONS:

- Bleeding or hematoma
- AV fistula or pseydoaneurysm
- Thrombosis
- Embolism
- Device non-deployment
- Infection

POST CARE:

- A clear sterile dressing will be applied over the insertion site.
- Upon arrival to the receiving unit:
    a. Assessment of arterial puncture site.
    b. Presence and quality of distal pulses.
    c. Vital signs.
    d. Continued assessment q 15 minutes x 4, then q 30 minutes x4, then q1 hr x4.

- Routine use of sandbags, pressure dressings or compression devices is not necessary, unless bleeding occurs.

  If oozing or bleeding occurs, apply firm but non-occlusive manual pressure (as if holding and I.V. site for 2-3 minutes.

  If bleeding persists or a hematoma develops, apply heavy (occlusive) manual pressure above the puncture site for 10-15 minutes or until hemostasis is achieved.

  Notify the physician.

- Keep the puncture site clean and dry. Change soiled dressing, as needed using sterile technique and maintaining universal precautions.

- Ambulate the patient per the physician's order.

- Assess patient prior to ambulation:

    a. Vital signs should be within historical limits for the patient.
    b. Puncture site should have no bleeding or expanding hematoma.
    c. Distal pulses should be comparable to baseline.
    d. Pain, patient should be free of chest and leg pain.

  Assist patient to side of bed to dangle legs and assess for orthostatic decrease in blood pressure. If not significant drop in blood pressure, assist the patient to a standing position. Assess the groin site. If no bleeding, ambulate a short distance (i.e., to the bathroom).

- Document assessments and reassessments and interventions taken in the medical record.

- Notify the physician, as necessary, of changes from the initial assessment.

- Patient teaching:
    a. Support the puncture site when coughing, straining or sneezing.
    b. Keep affected extremity straight and relaxed for the prescribed amount of time as per the physician's order.
    c. Discharge instructions:
        - Patient may shower after 24 hours.
        - No tub baths for 1 week.
        - Remove dressing the next day; gently clean the site with mild soap and water. Gently dry area. Cover site with a bandage, change dressing daily until skin heals, approximately 3-4 days.

DEFINITION OF TERMS:

- Angio-Seal is composed of a collagen sponge and a specially designed absorbable polymer anchor that are connected by an absorbable suture. The device seals and sandwiches the arteriotomy between its primary members, the anchor and collagen sponge.

- Vaso-Seal is a collagen plug that utilizes an intravascular positioning device but no elements are left intra-arterially once completed. The positioning device is expected to position the collagen plug immediately outside the arterial wall. Collagen is inserted while occlusive pressure is applied to the vessel. Once injected, pressure is released slowly to allow the blood and collagen to co-mingle and create a hemostatic plug.

- Perclose is a suture based device employing differing numbers of sutures with two nitinol needles attached to each suture creating a "purse-string" method of pulling the sides of the arteriotomy together. A slipknot is tied manually or automatically, allowing the physician to pull the knot down to the artery and cinch the edges of the arteriotomy together.

- Duett utilizes the indwelling sheath. A special balloon catheter is inserted into the preexisting sheath and a small balloon is inflated and pulled back against the inside of the arterial wall. The sheath is then retracted until just outside the arterial lumen and a solution containing thrombin and collagen is mixed and injected through the side-port of the sheath at various stages. Manual pressure is maintained over the site for 5 minutes post injection.

References:

- Manufacturer's recommendations
- "The Interventional Cardiac Catheterization Handbook" 2nd edition by Morton J. Kern.

Effective: 4/05
Reviewed: 8/08

St Mary's Hospital
Waterbury, Connecticut

Treatment of Contrast Reactions

Purpose: Guidelines for health care providers administering or caring for patients receiving contrast media. Treatment will be rendered within the scope of practice for each health care provider/

Definition: A contrast reaction is defined as a patient's adverse response following the administration of a contrast agent.

Pre Procedure:

- Assess the patient for previous history of reactions to contrast agents
- Notify the performing physician of any:
  - ✓ History of contrast allergy
  - ✓ History of asthma, renal disease or diabetes
  - ✓ Allergies to shellfish, peanuts and/or eggs
  - ✓ Elevations in BUN and/or creatinine

Policy:

- The R.N. will monitor and assess the patient for signs or symptoms of contrast induced reactions
- Notify the physician/APRN/PA if the patient develops signs or symptoms of possible contrast induced reactions
- Monitor and assess vital signs including heart rate, BP, respirations, O2 saturations and ECG monitor
- Document assessments, symptoms, interventions, response to interventions and outcomes in the patient chart.
- Report any new reactions to the pharmacy department and on the patient chart

Protocol: The following are guidelines for the treatment of contrast induced allergic reactions. The physician/APRN/PA will direct and order all treatments.

- **Angina**
  - ✓ Nitroglycerine 1/150 gr sl, may repeat every 3 minutes up to 3 doses
  - ✓ Oxygen therapy

- **Siezure**
  - ✓ Medication therapy as per the physician order
  - ✓ Oxygen therapy
- **Mild vasomotor symptoms**: nausea, vomiting or warmth
  - ✓ Reassure patient, observe for progression of symptoms
  - ✓ Report to the physician

- **Mild cutaneous reaction**: hives or local erythema
  - ✓ No treatment is necessary in most cases, however observe for any progression to more serious reaction
  - ✓ If symptoms are bothersome to the patient, Diphenhydramine (Benadryl) may be administered as per the physician order.

- **Severe cutaneous reaction**: erythema, urticaria
  - ✓ Stop the injection of the contrast
  - ✓ Diphenhydramine (Benadryl) as per the physician order intraveneously
  - ✓ Famotidine (Pepcid) 20 mg diluted in normal saline 10 cc
  - ✓ If severe edema and/or hypotension:
    - Epinephrine IV 0.1-0.3 mg of 1:10,000 solution slowly over 2 –5 minutes
    - May repeat every 15 min not to exceed 1mg total dose

- **Bronchospasm: w**heezing and shortness of breath
  - ✓ Mild
    - Oxygen
    - Monitor SpO2, vital signs, and cardiac monitor
    - Beta-agonist metered dose inhaler (Albuterol) 2 – 3 slow deep breaths

✓ Moderate to Severe
  - Oxygen
  - Monitor SpO2, vital signs and cardiac monitor
    - ➢ Drugs (use only if unsatisfactory response to Inhaler)
    - ➢ Low dose Epinephrine 1ml of 1:10,000 solution (0.1 mg/ml). Repeat every 15 minutes up to 1 mg.
    - ➢ If patient does not respond to Beta-angonist inhaler and Epinephrine proceed to Aminophylline 250 mg IV in 100 cc d5w over 10 – 20 min
    - ➢ Call Code 3 and initiate ACLS protocol for severe Bronchospasm requiring intubation.

- Facial/Laryngeal edema – stridor, hoarseness
  - ✓ Evaluate airway
  - ✓ Oxygen therapy
  - ✓ Monitor SpO2, vital signs, and cardiac monitor
  - ✓ Low dose Epinephrine IV 1:10,000 solution (0.1 mg/ml), give 1 ml over 2 – 5 minutes which equals 20 – 50 mcg/min. every 15 minutes. Not to eceed 1 mg total dose.
  - ✓ Call Code 3 and initiate ACLS protocol for severe laryngeal edema requiring intubation

- Severe hypotension, tachycardia
  - ✓ Trendelenburg position
  - ✓ Oxygen therapy
  - ✓ 0.9 NS IV rapid fluid bolus
  - ✓ Monitor SpO2, vital signs and cardiac monitor
  - ✓ Low dose Epinephrine: IV 1:10,000 solution (0.1 mg/ml), give 1 ml over 2 – 5 minutes which equals 20 – 50 mcg/min. titrate to effect. Not to exceed 1 mg total dose.
  - ✓ If patient does not respond, call Code 3 and initiate ACLS protocol
  - ✓ Dopamine 2-20 ug/kg/min IV;alternatively can use Epinephrine drip
  - ✓ Decadron 20 mg IV, may repeat 4 mg IV in 6 hours

- Vagal reaction – hypotension with bradycardia
  - ✓ Trendelenburg position
  - ✓ Oxygen therapy
  - ✓ 0.9 NS IV rapid fluid bolus
  - ✓ Monitor SpO2, vital signs and cardiac monitor
  - ✓ Atropine 0.5 mg to 1 mg IV. May repeat every 3 – 5 minutes to a total of 0.03 to 0.04 mg/kg. Total cumulative dose should not exceed 3 mg.

04/05
revised 08/07

St. Mary's Hospital
Waterbury, Connecticut

Management of Peripheral Vascular Complications Post Cardiac Catheterization and PCI

Purpose: To provide guidelines for the care and management of vascular access site complication after cardiac catheterization and percutaneous coronary interventions.

Scope of care: Patients undergoing diagnostic and interventional cardiac catheterization procedures requiring the insertion of arterial and/or venous sheaths.

Risk Factors:

- Females
- Elderly over 65 years of age
- Peripheral Vascular Disease
- Obesity
- Low Platelet count
- Multiple Procedures
- Use of Anticoagulants/IIb/IIIa inhibitors
- Sheath placement in the arterial and venous system

Procedure: Refer to the "Femoral Sheath Removal" policy for post sheath removal vital signs and vascular access site assessment.
When a peripheral vascular complication is suspected the following steps should be taken:

- Access the vascular site
- Access vital signs and vascular status of the affected extremity
- Mark the distal pulses
- Maintain Standard Precautions when removing soiled dressings and applying manual pressure.
- Apply manual pressure by locating the femoral pulse proximally to the access site. Place finger parallel to the artery ¼ to ½ inch above the access site. Enough pressure must be applied to occlude the distal pulse, and stop bleeding.
- Manual or mechanical compression may be used
- Reassure the patient
- Assess the pain level 0/10
- Administer pain medication for pain per the physician order
- After 10 minutes access the progress of hemostasis
  - ✓ If obtained, release pressure slowly and apply clear dressing to the site. Notify the Physician/APRN/PA.
- If unresolved, continue with pressure until hemostasis is obtained. Notify the Physician/APRN/PA.
- Mark the borders of the ecchymotic area
- If there is a hematoma mark the firm edges of the site.
- Continue to monitor vital signs and assess the condition of the access site, quality and strength of peripheral pulses, color, temperature, sensation and movement of the extremity.

Documentation:

- Vital Signs per protocol
- Size of ecchymotic or raised area of hematoma
- Quality of peripheral pulse
- Color of extremity
- Other signs or symptoms
- Interventions taken

- Physician/APRN/PA notification

Definitions:

- **Ecchymosis** is caused by the oozing of blood at the site of sheath insertion, which may occur during or following cardiac catheterization/PCI. Signs and symptoms may include:
  - ✓ Pain or focal discomfort
  - ✓ Discoloration/bruising
- **Hematoma** is a focal extravasation of blood, which is usually clotted or partially clotted which is situated within an organ or a soft tissue space, such as within a muscle. Signs and symptoms may include:
  - ✓ 10 cm femoral access
  - ✓ 2 cm radial access
  - ✓ 5 cm brachial access
  - ✓ 3.0 gmdl decrease in hemoglobin
  - ✓ pain or focal discomfort
  - ✓ discoloration/bruising
- **Retroperitoneal bleeding** is usually associated with arterial puncture above the inguinal ligament. Bleeding is internal. Signs or symptoms may include:
  - ✓ Unexplained hypotension
  - ✓ Tachycardia
  - ✓ Flank, abdominal or back pain
  - ✓ Unexplained drop in Hematocrit

  Confirm by CT scan or Ultrasound if CT is unavailable
- Femoral Pseudoaneurysm is a blood filled cavity resulting from a communication between the femoral artery and the overlying fibromuscular tissue. Signs and symptoms may include:
  - ✓ Groin tenderness
  - ✓ Palpable pulsatile mass
  - ✓ Bruit in the groin
  - ✓ Expanding hematoma

  Confirm diagnosis by Color Flow Doppler Ultrasound
- Access site occlusion is defined as total occlusion of the artery usually by thrombus (but may have other causes). May require surgical repair. Signs and symptoms may include:
  - ✓ Absence of palpable pulse
  - ✓ Absence of doppler pulse
- Transferring RN will give verbal and site check in report to receiving RN regarding hematoma management and orders.
- Consider repeating hemaglobin with hematomas over 6cm.

Effective 04/02
Revised 01/05,04/05,08/07

St. Mary's Hospital
Waterbury, Connecticut

Femoral Sheath Removal
Manual Compression

Statement of Purpose: To obtain Hemostasis of an arterial or venous puncture site following Cardiac Catheterization or Percutaneous Angioplasty.

Equipment:

- Sterile 4 x 4 sponges
- Sterile gloves
- Protective eyewear
- Transparent occlusive dressing or Band-Aid
- Dressing per physician preference
- Doppler and transmission gel
- Crash Cart
- Cardiac Monitor

Procedure:

- Performing Cardiologist identifies the method of hemostasis management.
- For Angioplasty patients the Cardiologist orders Protocol A or Protocol B
  - ✓ **Protocol A:** is early sheath removal.
    - ♦ Sheath will be removed when the ACT is equal to or below 180
    - ♦ Sheath is removed in the Cath Lab
  - ✓ **Protocol B:** Late sheath removal
    - ♦ Sheath will be removed three to four hours after anticoagulant or antiplatelet therapy is discontinued.
    - ♦ Sheath removal is done at the bedside in the nursing unit.
- Assess the following parameters prior to sheath removal.
  - ✓ Appropriate laboratory values
    - ♦ ACT less than or equal to 180 seconds or
    - ♦ PTT less than 50 seconds or
    - ♦ PT less than 14 seconds or
    - ♦ INR less than 1.5
  - ✓ Cardiac Monitor
  - ✓ Vital signs, if systolic BP is greater than 180mmhg, notify the physician
  - ✓ R.N. assesses the extremity distal to the sheath for quality and strength of pulses, color, temperature, sensation, and movement.
  - ✓ Mark pulses if not already done.
  - ✓ Explain procedure to the patient; assess the patient's understanding.
  - ✓ Maintain standard precautions.
  - ✓ Lower the head of the bed to supine or less than 15 degrees.
  - ✓ Turn off any intravenous or intra arterial fluids to the sheath.

- ✓ Remove the dressing. Observe the site for raised ecchymotic area or hematoma. If present, outline the firm border with a skin marker.

Removal of the arterial or venous sheath:

- **Arterial sheath** (Arterial sheath is the most lateral)
  - ✓ The arterial sheath should be the first to be removed in the event that both sheaths are in place.
  - ✓ Palpate femoral pulse proximal to the sheath insertion site. Place fingers parallel to the artery along the pulse ¼ to ½ inch above the access site.
  - ✓ Gently remove the arterial sheath with smooth, steady motion during patient exhalation. If resistance is encountered, stop and call the physician.
  - ✓ Allow the blood to flow for 1-2 heartbeats, and then apply pressure.
  - ✓ Apply enough pressure for three minutes for complete occlusion, and for 10 minutes of partial occlusion of the distal blood flow.
  - ✓ Gradually release pressure in small increments.
  - ✓ Patients undergoing angiography who have not received anticoagulants or antiplatelet agents will typically achieve hemostasis within 15 – 20 minutes from the time the sheath is removed.
  - ✓ Patients undergoing PCI and are receiving anticoagulant or antiplatelet agents will take longer to achieve hemostasis, even though the ACT is within the acceptable range.
  - ✓ Duration of manual compression is also dependant on the sheath size, ACT, BP, and body habitus.

- **Venous sheath** (most medial)
  - ✓ The Venous sheath should be the last to be removed if both sheaths are present.
  - ✓ Place fingers over the sheath site, remove the sheath in smooth gentle motion.
  - ✓ Apply firm pressure over the insertion site for 5-10 minutes or until hemostasis is achieved.
  - ✓ Avoid prolonged pressure on the femoral vein.

While maintaining hemostasis:

- Observe color of the extremity and check pulse. Pulse may be diminished, but should not be completely obliterated during manual compression.
- Palpate area surrounding the site for raised ecchymotic area or hematoma formation. Observe for overt signs of bleeding. The site should be soft and pliable.
- Monitor vital signs, (BP, HR, and rhythm). Observe for vasovagal response (hypotension, bradycardia, nausea, dizziness, and diaphoresis).

Once hemostasis is achieved, apply sterile dressing to the site.
Apply sandbag to the site per the physician order.
Notify the APRN/PA, when indicated of changes in the initial assessment.

The R.N. reassesses and documents q15 min x4, q30 min x4, and q 1 hr till stable.

- Vital signs and cardiac rhythm
- Site appearance including raised ecchymotic area, or hematoma.
- Extremity appearance (color, temperature, sensation, and movement).
- Pulse presence and quality in distal extremity.
- Patient tolerance of the procedure.
- Pre and post procedure patient education and instruction.
- Notification of physician of changes in the clinical assessment.

The cardiac catheterization R.N. and the receiving R.N., upon the patient arrival to the nursing unit will perform an assessment of the access site.

Patient teaching:

- Preprocedure:
  - ✓ Explain the procedure to the patient
  - ✓ Instruct the patient/family to report dizziness, diaphoresis, lightheadedness, or nausea during the manual compression.
- Post procedure:
  - ✓ Instruct the patient/family of the need for frequent assessment and vital signs.
  - ✓ Bed rest per the physician order. Head of bed may be elevated 30 degrees.
  - ✓ Instruct the patient to keep the affected extremity immobile. No flexion at the access site.
  - ✓ Instruct the patient to notify nursing personnel if there is bleeding at the access site or there is any unusual discomfort.

Original 01/05
Revised 05/05, 07/07

Saint Mary's
HOSPITAL

Cardiac Catherization Laboratory
Vasovagal Reactions

PURPOSE:

To ensure quick and appropriate care of the patient demonstrating the signs and symptoms of a vasovagal reactions.

SCOPE OF CARE:

The purpose of this policy is to provide care, treatment, and support for the patients experiencing the symptoms of a vasovagal reaction during cardiac catheterization or PCI procedures.

DEFINITION:

Vasovagal reactions more commonly are precipitated by painful stimuli occurring during arterial access or during arterial sheath removal and application of pressure to the groin area.

PROCEDURE:

- Monitor vital signs.
- Assess patient for decrease in heart rate, drop in blood pressure and symptoms of dizziness, pallor, nausea, or diaphoresis.
- If the vasovagal reaction occurs while stabilizing the arterial access site, decrease the pressure being applied while maintaining hemostasis.
- Reassure patient and provide comfort measures.
- Place patient if possible in a Trendelenburg position or elevate the patient's legs to approximately 30 degrees.
- Notify the Cardiologist.
- Infuse normal saline IV rapidly until vital signs improve and symptoms decrease per M.D. order.
- Administer Atropine 0.5 to 1 mg IV push per M.D. order. The dose may be repeated if necessary up to a total dose of 3 mg per M.D. order.
- Document in the medical record the assessment, interventions and evaluation of treatment rendered.

Original: 4/02
Revised: 3/05
Reviewed: 8/08

St. Mary's Hospital
Waterbury, Connecticut

Radial Artery Catheterization

Purpose: To provide guidelines for patients undergoing radial artery catheterization for diagnostic and interventional evaluation.

Scope of Care: The radial approach improves patient comfort, offers the physician easier accessibility facilitates hemostasis with minimal ancillary structure involvement.

Skill Level: M.D. with the assistance of R.N., ICVT and/or RT.

Procedure:

- Perform Allen Test prior to the procedure to assess Ulnar blood flow.
  - ✓ Radial and Ulnar arteries are occluded spontaneously while the patient is asked to make a fist.
  - ✓ When the patient is asked to open hand, it should appear blanched.
  - ✓ Release of the Ulnar artery should result in return of hand color within 8-10 seconds.
  - ✓ Pulse oximetry can be used to access Ulnar flow.
- Position patients arm on an arm board by abducting the arm at a 70-degree angle. A roll of towels should be used to support the hyperextended wrist.
- Sedation as indicated per physician order.
- The physician administers local anesthetic to the appropriate site.
- To reduce arterial spasm and improve patient comfort, an intraarterial injections of vasodilators (Nitroglycerine, Verapamil) and/or Heparin may be administered by the physician.
- See policy "Cardiac Catheterization: Right and /or Left Heart Catheterization with Coronary Angiography".

Care of Patient Post Procedure:

- The physician removes the sheath.
- Hemostasis is obtained by manual compression followed by a pressure dressing or the application of a Hemoband.
- Assess the extremity for quality and strength of pulses, color, temperature, sensation, and motion.
- Check for bleeding
- Reassess the extremity per the physician order.
- Pressure dressing or Hemoband should be tight enough to ensure hemostasis but not to occlude blood flow to the hand.
- Pressure dressing or Hemoband may be loosened after 1-2 hours and may be removed after 6 hours or per the physician order.

Effective 04/05
Revised 07/07

St Mary's Hospital
Waterbury, Connecticut

Coronary Stent Placement

Purpose: To provide guidelines for stent placement in the Cardiac Catheterization Laboratory.

Procedure description: A coronary stent is a flexible metallic tubular structure that is implanted into a coronary artery for the purpose of maintaining arterial integrity in the presence of coronary artery disease, dissection, or abrupt closure of a vessel during and interventional procedure. Stents may or may not have inert or active coatings or biodegradable coatings and/or drug delivery systems.

Skill Level: Cardiologist with assistance from R.N., ICVT, and/or RT.

Scope of Care: This procedure will encompass only the cardiac catheterization laboratory staff. The purpose of this procedure is to provide care, treatment and support for patients undergoing stent placement during percutaneous coronary interventions.

Procedure:

- See procedure for Angioplasty.
- Stents are placed after plaque modification is performed. Coronary plaque modification techniques include PTCA, Cutting Balloon, or rotational/directional atherectomy.
- The coronary stent delivery system is guided to the site of the lesion.
- When using a balloon expandable stent, position it within the lesion. By inflating the balloon the stent expands compressing the plaque against the arterial wall.
- Examination of the deployed stent is done via fluoroscopy and/or the use of intravascular ultrasound (IVUS).
- Once the desired stent expansion has been achieved, the balloon catheter is deflated and the balloon catheter and guide wires are removed.

Complications:

- Delivery failure
- Expansion failure
- Loss of access to the stent
- Malpositioned or embolized stent
- Stent perforation of the artery
- Stent-related dissection, thrombosis and ischemia
- Ruptured or tethered balloon

Documentation:

- Document stent information
  - ✓ Size (diameter and length)
  - ✓ Manufacturer
  - ✓ Model number
  - ✓ Lot number

Original 04/05
Revised 07/07

St. Mary's Hospital
Waterbury, Connecticut

IVUS Imaging System

Purpose: To provide intracoronary ultrasound for the assessment of coronary lesions. Provides an adjunct to percutaneous coronary interventions.

Procedure Description: Intravascular ultrasound (IVUS) is an approved technique for catheter tipped, real time, echo imaging of the cardiovascular system. IVUS generates cross-sectional tomographic images of the peripheral and coronary arteries, which reflect the vessel histology.

Skill Level: Cardiologist (trained in IVUS) assisted by R.N., ICVT, and/or RT

Indications:

- Suspected Left Main disease
- Suspected coronary ostial lesions
- Coronary artery stenosis of uncertain hemodynamic significance
- Evaluation of coronary artery after stent placement
- Diagnosis of vascular disease (chronic rejection, accelerated atherosclerosis) after heart transplant
- Evaluation and diagnosis of coronary artery aneurysms
- Suspected aortic an/or peripheral vessel dissection

Contraindications: Luminal dimensions less than the imaging catheter (presently less than 1.1mm). In such instances, predilatation with a balloon catheter will often permit imaging.

Procedure:

- Patients are anticoagulated according to the physician orders.
- The ultrasound catheter is inserted by the physician under fluoroscopy. The catheter's positions are recorded on the video track of the ultrasonograph.
- If coronary spasm occurs, intracoronary Nitroglycerine is given per the physician order.
- Ultrasound images are recorded continuously on CD
- Images are stored in the Ivus
- Hard copy of images are made from the IVUS and attached to the patient chart.
- Calculation of vessel diameter and sizes are recorded in the physician report.

Original 04/05
Revised 08/07

St. Mary's Hospital
Waterbury, Connecticut
Pressure Flow Wire

Purpose: To measure physiological parameters in the coronary and peripheral blood vessels.

Procedure description: A Pressure Flow Wire is a specialized guide wire with a high fidelity sensor located just proximal to the 3 cm radiopaque shapeable tip. At the physician direction the pressure wire is advanced to the target vessel and with the appropriate dosage of intravenous therapy measurements are taken to determine the necessity of intervention. The measurement generated is labeled Fractional Flow Reserve (FFR)

Skill Level: Cardiologist with the assistance from R.N., ICVT, and/or RT.

Scope of Care: This procedure will encompass only the cardiac catheterization laboratory staff. The purpose of this procedure is to provide care, treatment and support for patients undergoing diagnostic cardiac catheterization with a question of the need for PCI.

Procedure:

- The flow wire is set up between the Witt system and the Radi system as described on separate sheet. (See attached).
- Adenosine is administered as per the physician order (by drip or intracoronary injection)
- If Adenosine is administered by drip method, it should be run in a central line or a large peripheral IV line.
- The flow wire is positioned distal to the lesion in question
- Functional significance of a lesion is dependent upon obtaining maximum hyperemic stimulus with Adenosine dosage.
- Multiple measurements will be taken to make the optimal measurement and qualify lesion significance.
- Adenosine is discontinued when measurements are finished.
- The pressure wire may be used as a guide wire.
- Measurements less than 0.75 FFR are considered indicative of a treatable lesion.

Complications:

- Access site bleeding
- Distal embolization
- Intimal dissection
- Vessel perforation or tear
- MI
- Cardiac tamponade

Documentation:

- Concentration of Adenosine Injection IC
- Concentration of Adenosine drip with rate
- IV site of Adenosine drip
- FFR measurements each time across the lesion in question
- Termination of Adenosine drip.

Original 07/05 Reviewed 08/07

St Mary's Hospital
Waterbury, Connecticut

Procedure for the use of Femostop

Purpose: To obtain/assure hemostasis following Cardiac Catheterization / PCI

Procedure description: The Femostop provides an alternative to manual pressure and other external methods of achieving femoral artery hemostasis, while allowing the practitioner clear visibility of the access site.

Skill level: Femostop should be applied and monitored by personnel trained in the use of the device.

Procedure:

The Femostop should be applied prior to sheath removal

- Obtain baseline blood pressure
- Check and mark baseline pedal pulses
  (Use doppler if necessary)
- Patient should void prior to application if needed.
- Patient should be lying flat
- Patient may lift bending the unaffected leg, keeping the affected leg straight
- Position belt in line with the puncture site, equal on both sides (ensure that the belt lies flat under the patient)
- Remove the sterile protective lid from the dome
- While maintaining sterility, rest the dome on the puncture site and withdraw the sheath approx. 2cm (enough to clear the dome)
- Position the dome slightly superior and medial to the insertion site. Tighten the belt in a snug and comfortable position. Do not tighten using the belt.
- If a venous sheath is in place, remove the venous sheath first @20-30 mmhg x 5 minutes (decreases the incidence of A-V fistula) then proceed to remove the arterial sheath.

OPEN STOPCOCK WITH INFLATION AND DEFLATION

- Attach gauge to femostop and inflate dome between 60-80 mm Hg, remove sheath. Continue to inflate until you are 10-20 mm Hg above your systolic pressure or greater if necessary to maintain hemostasis.
- **NEVER ATTACH GAUGE TO SHEATH SIDE PORT.**
- **PEDAL PULSE WILL SHOULD BE OCCLUDED**

- Maintain this pressure for 3 minutes then ***SLOWLY*** lower pressure to mean arterial pressure, until baseline pedal pulse is restored. Maintain X 15 min, then reduce pressure by 10 – 20 mmhg every few minutes.
- Leave in place at 0 mmhg X 10 min to assure hemostasis
- Do not leave on skin more than 3 hrs (may cause skin breakdown). If more than 3 hours is necessary, remove briefly and cleanse skin to let skin breath. Than replace.
- Remove dome by gently rotating dome of puncture site.

CONTINUE MAINTENANCE PRESSURE ACCORDING TO MD ORDERS

Contraindications:

- PVD
- limb ischemia
- skin necrosis or infection
- arterial injuries above or near the inguinal ligament
- leg edema, femoral nerve compression or arterial obst.
- inability to adequately compress due to; marked obesity large hematomas, or excessive pain
- femoral artery or vein graft due to the risk of damage
- ultrasound guided compression repair of infected femoral pseudoaneurysms

Original 04/05
Revised 08/07

St. Mary's Hospital
Waterbury, Connecticut

Renal Prophylaxis for patient's requiring Radiocontrast Procedures

Purpose: To minimize the incidence of Renal Nephropathy in "at risk" patients, with the appropriate pretreatment.

Scope of Practice: These procedures will encompass only the patients who have been identified by the physician who are at risk for contrast induced nephropathy. Consideration should be given to patients with:

- Serum Creatinine = or >1.5
- Creatinine Clearance < 50 ml/min

Procedure: Per the Physician order:

- If the patient is not volume overloaded administer:
  - ✓ Mucomyst (Acetylcystine) 600 mg PO every 12 hours the day before and the day of the procedure (600 mg PO q12 hrs X 2 days for a total of 4 doses).
  - ✓ If the patient is absolutely NPO consult a Neprologist.
    - ♦ Intravenous administration of Mucomyst (Acetadote):
      - ➢ 600 to 1200 mg IV in 100 cc of 0.9 Normal Saline over 30 minutes prior to the procedure followed by an oral regimen.
- One hour before administration of radiocontrast begin NaHCO3 infusion:
  - ✓ NaHCO3 infusion: 1 liter D5W with 3 Ampules of NaHCO3 per liter at 3ml/kg/hr for one hour (maximum of 300mls/hr). Then decrease the rate to 1ml/kg/hr X 6 hours (maximum 100 mls/hour).

Important Notes:

- Follow the patient volume status
- For patients with serum CO2>32 mmol/l or an arterial pH>7.45, normal saline should be substituted for the D5W/NaHCO3 based solution and administered at the same rate/amount as noted above.

Original 05/05
Revised 08/07

St Mary's Hospital
Waterbury, Connecticut

Rotational Atherectomy (Rotablader)

Purpose: To provide ancillary methodologies to PCI.

Procedure description: The Rotablader is a tiny football-shaped tip coated with microscopic diamond crystals that rotates on the end of a catheter. It rotates at very high speed and is able to pulverize the plaque into microscopic particles that are removed by the body's retiiculoendothelial system.

Skill Level: Cardiologist with the assistance of R.N., ICVT, and/or RT.

Scope of Practice: These procedures will encompass only the Cardiac Catheterization laboratory staff. The purpose of this procedure is to provide care, treatment and support for patients undergoing complex PCI.

Procedure: At the direction of the Cardiologist

- The rotablader mix is prepared (attached).
- The infusion port on the advancer is connected to the pressurized mix
- Rotablader is attached to the CO2
- Catheter and pedal are given to the physician.
- Catheter is connected to the console.
- The catheter and the console are tested outside the patient
  - ✓ The saline mix should flow through the advancer and sheath and exit from the sheath tip running bubble free.
  - ✓ For speed of burr
- The burr is passed across the lesion by the physician
- Time and speed is called out and recorded in the patient log.
- The physician removes the burr.

Complications:

- Access site bleeding
- Distal embolization
- Intimal dissection
- Acute vessel closure
- Vessel perforation or tear
- Emergency Bypass surgery
- MI
- Cardiac tamponade
- Death

Documentation:

- Size (diameter and Length
- Duration of runs
- Speed of runs
- Number of runs

Original 04/05
Revised 07/07

St. Mary's Hospital
Waterbury, Connecticut

Thrombus Aspiration System (Angiojet)

Purpose: To provide adjunct therapies for facilitation of PCI.

Procedure description: The Angiojet thrombectomy system that is designed to remove thrombus with the Venturi-Bernoulli effect, with multiple high-velocity, high pressure saline jets which are introduced through the orifices in the distal tip of the catheter to create a localized low pressure zone, resulting in a vaccum effect with the entrainment and dissociation of bulky thrombus.

Skill level: Cardiologist with the assistance from R.N., ICVT, and/or RT.

Scope of Care: This procedure will encompass only the cardiac catheterization laboratory staff. The purpose of this procedure is to provide care, treatment and support for patients in the setting of AMI.

Procedure:

- The pump is set up and primed with Heparinized Saline.
- The Angiojet catheter is advanced through the suspected thrombus and postitioned distally by the physician.
- The pump of the angiojet is activated, delivering a saline solution under high pressure out through the pump jets, into the artery, breaking up the clot
- The clot pieces are removed out through the catheter and returned to the pump
- Multiple runs may be made with the catheter at the descretion of the physician
- The Angiojet catheter is then removed and the physician proceeds to PCI if necessary.

Complications:

- Temporary cardiac rhythm disturbances
  - ✓ Bradycardia
  - ✓ Heart block
- ST Twave changes

- Cerebral embolism
- Peripheral embolism

Documentation:

- Time of run
- CC's per run
- Adverse reactions as noted above

Original 04/05
Revised 07/07

CARE PATHWAYS – CVU ONE STOP POST-OP INDEX

Saint Mary's Hospital

- Scope of Services – Cardiovascular Unit (CVU)
- General Admission Policy
- Ambulation Policy
- Electrolyte Replacement Protocol
- Intensive Insulin Therapy Protocol
- Ventilator Weaning Protocol

St. Mary's Hospital
Department of Nursing

Cardiovascular Unit (CVU)

Scope of Practice:

Critical Care/Progressive Care Services are provided on an 8 bed unit, located on the third floor of the O'Brien building.

The unit consists of 7 rooms, 1 of which is a semi-private room. Each room is equipped with oxygen outlets, suction outlets, compressed air outlets, a Code 3 button, grounding outlets and cardiac monitors. Central monitoring capabilities are located at the nurses' station. There is 1 isolation room with negative pressure capability.

The Cardiovascular Unit provides continuous monitoring, observation, and highly skilled care on a 24-hour basis to adults and geriatric patients. Primary examples of appropriate conditions for patients requiring admission to the Cardiovascular Unit include: pre and post cardiac interventional, pre-operative and post-operative open heart surgery (CABG/Valve).

Special Services provided include:

- Continuous arterial venous hemofiltration
- Hemodynamic monitoring
- Continuous cardiac monitoring
- Ventilator support
- Thrombolytic administration
- IIb/IIIa Inhibitor admisistration
- Cardioversion
- Temporary pacing - invasive/non-invasive
- Intra-aortic balloon pumping

Patient-centered care is the model for the delivery of nursing care. Patient care is coordinated by the RN as he/she integrates the care through utilization of the support services: continuing care, social service, dietary, pharmacy, physical therapy, and respiratory therapy.

Basic Requirements for Staff:

Requirements for all RN Staff include:

Current state licensure
Critical Care experience (1 yr minimum)
ACLS
Cardiovascular Course

The Cardiovascular Unit nurse receives education in cardiovascular disease and critical care nursing principles as related to the care of the post-cardiac interventional patients and care of the open heart surgical patient. Ongoing education is provided continuously throughout the year by the Clinical Educator and/or APRN's.

Staffing:

There is a Division Director for Cardiopulmonary/Critical Care Services who is responsible for the oversight of the CVU. A Clinical Manager and Lead RN are on duty five days a week during the day. The manager has 24 hour accountability for the unit. On weekends, evenings and nights, there is a charge nurse on duty with a nursing Supervisor available as a resource.

A Patient Care Assistant and Clerical Coordinator are staff support on each shift, seven days a week.

A Critical Care Educator supports the educational needs of the CVU staff. Staffing is adjusted according to patient acuity and the foal of a 2:1 patient/nurse ratio.

Assignments:

Assignment of patient care is done for each shift by the LEAD RN or charge nurse. Assignments are reflective of the degree of supervision needed by the individual staff member, the patient's needs, the technology used and the geography of the unit. The registered nurse responsible for making the assignments will be familiar with the respective policies and procedures and will review them as necessary to keep his/her information current.

Examples of patients who may fall into the 1:1 patient/nurse category are:

- Immediate post-op patient that has undergone CABG, valve repair or any procedure requiring CPB
- Any patient requiring IABP therapy for hemodynamic stability
- Any patient requiring re-exploration in the CVU or with an open cardiotomy incision

- Any patient deemed to be hemodynamically unstable to the point that it would be deemed unsafe to have an additional patient assignment (determined by the Clinical Manager/designee in collaboration with the nurse caring for the patient.

Examples of patients who may fall into the 2:1 patient/nurse category are:

- A hemodynamically stable post-op day one patient who has undergone CABG, valve repair, or any procedure requiring CPB
- A patient requiring mechanical ventilation
- A patient receiving IABP therapy who is not balloon dependent and is extubated
- A patient immediately post-op that has undergone a surgical procedure other than CABG, valve replacement or re-exploration (examples: thoracotomy, CEA, AFB, and AAA repair)

Examples of patients who may fall into the 3:1 patient/nurse category are:

- Patients considered hemodynamically stable for a minimum of 24 hours; these patients should not be on IV infusions requiring active titration nor should they be dependent on temporary pacemakers

Patients in this category will not require vital signs or neurological assessments more frequently than every 4 hours

Original: April 2005
Revised: February 2008

CVU
Master Staffing Plan

STAFFING PATTERN									
FY'08									
ADC	5	5	5	5	5	5	5		5
RN	SUN	MON	TUE	WED	THR	FRI	SAT	HOURS	FTES
DAYS	2	3	3	3	2	3	2	144	3.6
EVENINGS	2	3	3	3	2	3	2	144	3.6
NIGHTS	2	2	2	2	2	2	2	112	2.8
TOTAL ALL SHIFTS	6	8	8	8	6	8	6	400	10
PATIENT CARE ASSISTANT									
DAYS	0	1	1	1	1	1	0	40	1
EVENINGS	0	0.5	0.5	0.5	0	0.5	0	16	0.4
NIGHTS	0	0	0	0	0	0	0	0	0
TOTAL ALL SHIFTS	0	0	0	0	1	0	0	56	1.4
DIRECT CAREGIVER	6	8	8	8	7	8	6	456	11.4
CLERICAL COORDINATORS									
DAYS	1	1	1	1	1	1	1	56	1.4
EVENINGS	0	0.5	0.5	0.5	0	0.5	0	16	0.4
NIGHTS	0	0	0	0	0	0	0	0	0
TOTAL ALL SHIFTS	1	1.5	1.5	1.5	1	1.5	1	72	1.8
TOTAL ALL ROLES	7	9.5	9.5	9.5	8	9.5	7	528	13.2
Hours Worked per Day	56	76	76	76	64	76	56		105.6
Total Wrked per Pt Day	11.20	15.20	15.20	15.20	12.80	15.20	11.20		15.09
Direct Caregivr Wrked per Pt Day	9.60	12.80	12.80	12.80	11.20	12.80	9.60		13.03

Admission/Discharge to the Cardiovascular Unit

The Cardiovascular Unit (CVU) is primarily designed to care for patients who undergo invasive cardiac intervention or cardiothoracic surgery. The Nursing Director in collaboration with the Medical Directors will approve other admissions. If CVU bed space is inadequate and a patient is in need of this specialty area, the Clinical Manager of the CVU will prioritize patients for this admission.

Admission Criteria:

1. All post open heart patients
2. All post cardiac intervention patients requiring post procedure hemodynamic monitoring, IABP, intravenous drip titrations
3. Preoperative open heart surgery patients
4. Pre-procedure cardiac interventional patients

The postoperative cardiac surgery patients will be transferred and admitted directly to the CVU from the Operation room, bypassing the post anesthesia care unit. The post cardiac intervention patient will have stage I recovery completed in the cardiac catherization laboratory before transfer and admission into the CVU for further recovery and care.

The philosophy of care for the CVU is based on the one-stop model. The patient is cared for by one expert, dedicated staff from admission through discharge. In the event that there are no available beds in the CVU, the Clinical Nurse Manager in collaboration with the appropriate Medical Director for the CVU will determine who may be moved to another unit based on the following:

Discharge Criteria:

1. The post-operative open-heart surgery patient who requires further management of ongoing mechanical ventilation may be considered for transfer to the critical care unit for continued care.
2. The post cardiac intervention patient, who has stable vital signs, no EKG changes, no signs of bleeding and no complaints of chest pain may be considered for transfer to Telemetry.

May 2005
Revised: 3/2008

Saint Mary's
HOSPITAL

SUBJECT: Ambulation Policy for Post Open Heart
Last Revised Date: August 2008
Last Reviewed Date: August 18, 2008

Scope: Registered Nurses caring for post open-heart surgery patients

Purpose: To provide a guideline for ambulation for stable post open heart surgery patients

Policy: The Registered Nurse and Physical Therapist will evaluate all post open-heart patients within 24 hours of their surgery. This evaluation should determine the need for specific assistive devices. All patients should remain monitored with oxygen administered as necessary with proper pain management.

Day of Surgery

1. If the patient is stable and extubated they may dangle at the edge of the bed
2. Initiate Education to the patient and family on ambulation/exercise needs

POD#1

1. If the patient remains stable then they should ambulate to the chair at least twice
2. The patient should be assisted to ambulate BID as tolerated

POD#2 to 3

1. If the patient remains stable they should ambulate to the chair TID
2. The patient be assisted with ambulation TID as tolerated

POD#4 to discharge

1. If the patient remains stable the removal of monitoring and oxygen should be reviewed with ambulation continued QID

Saint Mary's
HOSPITAL
CVU

Electrolyte Replacement Protocol for Post Open Heart Surgery Patients

To Initiate Protocol:
Must have a physician/APRN/PA. order.

Medication	**Dosage**
Potassium Level (normal=3.4-4.5 mmol/	
	IV Replacement
Potassium Level (mmol/liter)	**(VIA INFUSION PUMP ONLY)**
3.3-3.8	**Peripheral Line:** KCL 10mEq/100ml Sterile water x2 (each bag over 1 hour) **Central Line:** KCL 20mEq/100ml sterile water x1 (each bag over 1 hour)
3-3.2	**Peripheral Line:** KCL 10 mEq/100ml Sterile water x3 (each bag over 1 hour) **Central Line:** KCL 20 mEq/100ml sterile water (each bag over 1hour) x1, Then KCL 10mEq/100ml sterile water x1 (over 30 mins)
<3 (CALL MD) AND:	**Peripheral Line:** KCL 10mEq/100ml sterile water x4 (each bag over 1 hour) **Central Line:** KCL 20 mEq/100ml sterile water x2 (each bag over 1hour)
Potassium Level	**Oral Replacement (space doses by 2 hours)**
3.5-3.8	KCL 20mEq x2
3-3.4	KCL 20mEq x4
<3 (CALL MD) AND:	KCL 20 mEq x5
Recheck Potassium level 1-2 hours after infusion or 4-6 hours after po dose. Suggested maximum daily =200mEq	

Original 5/2005
Reviewed 3/2008

Electrolyte Replacement Protocol for Post Open Heart Surgery

III

Magnesium (normal = 1.6-2.7mg/dl)

Mg++ level (mg/dl)	IV replacement (Peripheral or central line, via infusion pump)
1.48-1.59	Magnesium Sulfate 1g/50ml D5W or NS over 30 min
1.2-1.47	Magnesium Sulfate 2g/100ml D5W or NS over 30 min
<=1.1 (CALL MD) AND	Magnesium Sulfate 5g/500ml D5W or NS over 4 hours

Recheck magnesium level 4-6 hours after infusion. Suggested maximum dose = 4-8g in 24 hours.

Oral supplement: Mag oxide 400mg 1-2 tabs 2-4 times per day

IV.

Phosphorus (normal = 2.7-4.5mg/dl)

Phosphate Level (mg/dl)	IV replacement (peripheral or central line, via infusion pump)
1.6-2	15 mmoles Na+ or K+ phosphate/250ml D5W or NS over 6hr
<1.6 (CALL MD) AND	30 mmoles Na+ or K+ phosphate/500ml D5W or Ns over 6hr
<1.6 (CALL MD) AND	Central Line Only (via infusion pump): 30 mmoles na+ or K+ phosphate/250 ml D5W or NS over 6h

Recheck level 6 hours after infusion. Maximum dose = 45 mmoles in 24 hours (to avoid hyperphosphatemia)

Oral supplement: Neutraphos 2 packets po BID

Original 5/2005

II.

Calcium (normal = 1.17-1.33 mmol/liter

Ca++ Level (mmol/liter)	**Single Dose IV Replacement (Peripheral or central line, via infusion pump)**
1.15-1.16	Calcium Gluconate 1g/50ml D5W or NS over 30-60 mins. 1 amp = 1 gram
1.1-1.14	Calcium Gluconate 2g/100ml D5W or NS over 30-60 mins 1 amp = 1 gram
<=1.09 (CALL MD) AND:	Calcium Gluconate 3g/150ml D5W or NS over 30-60 mins. 1 amp = 1 gram

Check ionized serum calcium levels 1-2 hours after each single infusion. Single doses may be repeated up to a maximum of 3g calcium gluconate within 24 hours.

If you wish to continue with the protocol and addition calcium supplementation is required, it must be administered by continuous infusion via a central line. Any continuous infusion of calcium, either on or off the protocol, requires administration via a central line. Recommended dose for a continuous infusion is:

1. 0.5-1mg elemental calcium/kg/hour (via infusion pump)
   (93 mg elemental calcium = 1g calcium gluconate)

   OR

2. 3-4g calcium gluconate/ 500ml D5W or NS (via infusion pump) over each eight hour period.

Check serum calcium levels every 4-6 hours during a continuous infusion.

Oral Supplement: Calcium Carbonate (TUMS) 500mg po TID

Saint Mary's
HOSPITAL

CVU

Intensive Insulin Therapy in Critically Ill Patients

Desired Range: Maintain blood glucose between 80-110mg/deciliter

Patient Population: Hyperglycemic patients with a persistent glucose ≥140mg/dl for greater than 24 hours.

Initiating Insulin Infusion: (To be activated by a physician's order)

1. Bolus the patient with 0.1 unit/Kg (obtain a physician's order for the bolus dose). The maximum bolus dose is 10 units IV. Therefore, a patient weighing more than 100 Kg will only receive a 10 unit bolus. Note: Insulin Aspart (Novolog) or Lispro (Humalog) regular insulin should be used for all boluses in this protocol. Start the drip at 1 unit per hour if the blood glucose level is between 140 and 200 mg/dl. Start the drip at 2 units per hour if the blood glucose is >200 mg/dl. Note: Regular Human Insulin (Humulin R) should be used to make up drip.

2. Blood glucose should be checked at 1-hour intervals for three hours following the start of the insulin infusion and following each change in infusion rate made thereafter. Then check every 2-4 hours as needed for at least the first 24 hours.

3. Once glycemic control is reached (80-110mg/dl), monitoring can be performed at 4-6 hour intervals. HOWEVER, if changes are made in insulin infusion rates, steroids are added or deleted or the steroid dose significantly changed, or changes are made in nutrition (significant increase of decrease in caloric intake), then blood glucose should be monitored as in #2 above.

4. The drip can be increased by increments of 0.5 – 2 units per hour for persistent hyperglycemia (see "Ongoing Insulin Infusion" table below). For patients requiring high infusion rates [see column 4 in the table below (11-16 units/hr)], the drip may be increased by 3 units/hour for blood glucose >200mg/dl.

Precautions:

1. Patients on insulin infusions need to have a 24-hour continuous source of nutrition. Patients who are not on tube feed or TPN with blood sugars less than 200 should receive adequate glucose intake equal to 5 grams of dextrose per hour for the duration of the insulin infusion (D5W at 100cc/hour).
2. Blood glucose must be carefully monitored when steroids are added/deleted/or a change in dose occurs. Blood glucose should also be carefully monitored when nutrition (caloric intake) is increased or decreased. See #2 above. Other drugs that may increase plasma glucose concentration include: beta-blockers, diazoxide (Hyperstat), diuretics, pentamidine, phenytoin, and sympathomimetics (epinephrine, norepinephrine, dopamine, dobutamine, phenylephrine).
3. Interruptions in nutritional supplementation require simultaneous interruption in the insulin drip. Any interruption in the drip may require re-bolusing prior to resuming the drip.
4. The use of "sliding scale" insulin in addition to the insulin drip is discouraged.
5. Patients should be monitored for symptoms of hypoglycemia such as sweating, agitation, confusion, and hypotension. Note, in many instances critically ill patients with hypoglycemia are asymptomatic.

ONGOING INSULIN INFUSIONS

Blood Glucose above desired range (80-110 mg/dl):

Glucose Level	Infusion Rate of 1-5 units/hr	Infusion Rate of 6-10 units/hr	Infusion Rate of 11-16 units/hr
111-139	Give 1 unit insulin IVP and Increase infusion by 0.5 unit/hr	Give 1 unit insulin IVP and Increase infusion by 1 unit/hr	Give 2 units insulin IVP and Increase infusion by 1 unit/hr
140-200	Give 1 unit Insulin IVP and Increase infusion by 1 unit/hr	Give 1 unit insulin IVP and Increase infusion by 1-2 units/hr	Give 2 units insulin IVP and Increase infusion by 3 units/hr
201-250	Give 2 units insulin IVP and Increase infusion by 1 unit/hr	Give 3 units insulin IVP and Increase infusion by 2 units/hr	Give 3 units insulin IVP and Increase infusion by 3 units/hr
251-300	Give 3 units insulin IVP and Increase infusion by 1 unit/hr	Give 5 units insulin IVP and Increase infusion by 2 units/hr	Give 5 units insulin IVP and Increase infusion by 3 units/hr
301-350	Give 8 units insulin IVP and Increase infusion by 1 unit/hr.	Give 8 units insulin IVP and Increase infusion by 2 units/hr	Give 8 units insulin IVP and Increase infusion 3 units/hr
351-400	Give 10 units insulin IVP and Increase infusion 1 unit/hr	Give 10 units insulin IVP and Increase infusion by 2 units/hr	Give 10 units insulin IVP and Increase infusion by 3 units/hr
>400 or Infusion rate of >16 units/hr	Call Physician for new orders		

Blood Glucose below desired range (80-110 mg/dl):

Glucose Level	Infusion Rate 1-3 units/hr	Infusion Rate 4-6 units/hr	Infusion Rate 7-9 units/hr	Infusion Rate 10-12 units/hr	Infusion Rate 13-16 units/hr	Infusion Rate >16 units/hr
<40	1. Call Physician. 2. D/C Infusion and give 25g intravenous dextrose. 3. Assure adequate glucose intake and check blood glucose level within the next hour.					
40-60	1. Call Physician. 2. D/C Infusion and assure adequate baseline glucose intake. 3. Check blood glucose level within the next hour.					
61-70	D/C Infusion and check blood glucose in 1 hour. If >80, re-start but decrease rate by 0.5 – unit/hour		Decrease infusion rate by 4-5 units/hour and check blood glucose in 1 hour.		Decrease infusion rate by 6-8 units/hour and check a blood glucose in 1 hour.	
71-79	Decrease infusion rate by 0.5 unit per hour and check blood glucose in 1 hour.		Decrease infusion rate by 2-3 units/hour and check blood glucose in 1 hour.		Decrease infusion rate by 4-5 units/hour and check blood glucose in 1 hour.	

Blood glucose in Desired range (80-110 mg/dl):

A. <u>For infusion rates of 1 to 9 units/hour:</u> No Changes Now. If glucose continues to decrease within the desired range over 3 consecutive hours, decrease rate by 0.5 to 1 unit/hour
B. <u>For infusion rates of 10 to >16 units/hour:</u> No Change Now. If glucose continues to decrease within the desired range over 3 consecutive hours, decrease the rate by 2 units/hour.

Reviewed: 3/2008

Saint Mary's
HOSPITAL

CVU

PROTOCOL FOR:	Weaning: Ventilator Weaning Post-Open Heart Surgery
PURPOSE:	To define the care/sequence of events required to wean post-open heart surgical patients from mechanical ventilator.
POLICIES:	1. Patients that have demonstrated the requirement of PEEP (positive/expiratory pressure) >5cm, should not be considered candidates for the protocol. 2. The patient must demonstrate hemodynamic stability as evidenced by a. Free of new onset dysrhythmias b. Able to maintain an adequate cardiac index (>2 L/min/m^2), mean blood pressure >60 mmHg and c. Urine output (>30cc/hr) 3. The patient must be on a pulse oximeter with reliable readings. 4. Once physiologic stability is established, the MD/LIP can write the order "Wean per CVU Protocol", acknowledging the RN's and therapist's ability to accomplish the protocol. Documentation of the order allows a range of 2-4 arterial blood gas (ABG's) to be drawn during weaning process. 5. Respiratory Therapy will validate all ventilator changes. 6. Patients that have been medically treated for COPD should be reviewed by the MD/LIP prior to enrollment in the weaning protocol.

SUPPORTIVE DATA:	Collaboration between the covering physician, RN, and respiratory therapist is necessary to successfully implement this protocol. Team discussion should include the following areas: 1. Patient's pre-operation pulmonary and cardiac function 2. Specific perioperative information: Anesthesia – drugs used, any complications, and airway considerations, intra-op minute ventilation (VE) and ABG result. 3. Hemodynamic stability When the decision is made to initiate the protocol, the RN and respiratory therapist will progress the patient as his/her status warrants. Upon successfully meeting the established criteria, the patient will be extubated to ventimask or nasal cannual.
DESIRED PATIENT OUTCOME:	Patient will achieve successful extubation from mechanical ventilation to ventimask or nasal cannual, therefore allowing spontaneous respirations, gas exchange, verbal communication and a means for oral nutrition to be resumed.
ASSOCIATED STANDARDS:	Protcol for : Ventilator: Care of Patient on a Ventilator.
ASSESSMENT:	1. RN, mid-level practitioner and respiratory therapist will assess the patient collaboratively. 2. Verify that a baseline ABG was drawn with 1st hour of arrival to ICU. 3. Awake – open eyes, moves spontaneously and follows commands. 4. Determine patient's need for narcotics for pain control. Assess dosages, frequency, and evaluate the effectiveness. 5. $ETCO_2$ <40mmHg. 6. FIO_2<0.5.

	7. PT/Ventilator rate (sum of the two) <30 breaths/minute >10 breaths/minute Hemodynamically stable: HR<120/min with no new dysrhythmia Bp>100 systolic CI>2L/min CT<100ml/hr
WEANING PROTOCOL:	1. Titrate FiO2 until an FiO2 of 40% is reached, and the patient is maintaining an O2 saturation of ≥ 92%. 2. Decrease IMV rate by 2 breaths/minute. If patient is stable 15-30 minutes after the IMV rate is changed, continue with IMV by 2 breaths every 15-30 minutes as long as the patient's $SpO_2 \geq 92\%$, $ETCO_2$ <40, and hemodynamics remain stable. STOP when IMV rate equals 4 breaths/minute. 3. If the patient is receiving PEEP of more than 5cm H_2O, decrease PEEP by 5 cm H_2O every 30 minutes until PEEP is equal to 5cm H_2O, as long as the patient's SpO_2 is ≥ 92%. 4. Obtain ABG analysis as needed and notify MD/LIP if the patient's SpO_2 falls below 92% or $ETCO_2$ rises above 40 mmHg or if patient shows any signs of agitation or distress. 5. Discontinue weaning if the patient can't maintain acceptable hemodynamic, neurologic, or respiratory parameters. Return to previous ventilator settings and notify MD/LIP.
PREPARING FOR EXTUBATION:	1. When the IMV rate equals 2 breaths/min, obtain an ABG analysis and correlate the results with the patient's SpO_2 and $ETCO_2$ values.

	2. Obtain lung function tests: - The patient's tidal volume should be greater than 5cc/kg. - Spontaneous rate between 8 and 30 breaths/minute. - Vital capacity greater than 15cc/kg. - Minute ventilation less than 10L/meter.
	3. If readiness to wean criteria, hemodynamics and lung mechanics are met, place patient on CPAP of 5. Pressure support of 5cm may be added if patient is dyspneic or not tolerating CPAP alone. 4. If patient tolerates breathing trial for 30 minutes with acceptable neurologic, hemodynamic and respiratory parameters, prepare to extubate.

Original: 8/2005
Revised: 3/2008

CARE PATHWAYS – OHS INDEX

Saint Mary's Hospital

- Scope of Services – Operating Room
- Patient Flows – Inpatient OHS
- Patient Flows – Perioperative OHS (see IP Patient Flow)
- Patient Flows – Out Patient OHS
- Patient Flows – Emergent OHS
- OHS Pre-operative orders
- OHS Post-operative orders
- OHS Patient Discharge Instructions

Saint Mary's Hospital

Operating Room

Scope and Philosophy for Perioperative Nursing Practice

Scope of Practice

The Operating Room is located on the 2nd floor of the Kenny building. It is made up of 10 surgical suites, 1 of which is committed to open heart surgery and one dedicated cystoscopy suite. Service is provided for patients of all ages ranging from pediatrics to geriatrics who are undergoing operative or other invasive procedures. Indications for surgical or invasive procedures may be for diagnostic, curative, restorative, or palliative reasons. The cases scheduled are ranked as elective, urgent, emergent, or trauma, and categorized as same day admissions, same day surgery and in-house patients. Trauma cases originate in the emergency room. The surgical specialties available are:

- Bariatric
- Cardiac; Open Heart (CABG/Valve)
- Ear, Nose and Throat
- General
- Genitourology
- Gynecology
- Neuro Surgery
- Ophthalmology
- Oral Surgery
- Organ Procurement
- Orthopedic
- Plastic
- Podiatry
- Thoracic
- Vascular

Perioperative team members involved in surgical procedures include, surgeons; anesthesiologists; certified nurse anesthetists; perfusionists (open heart); residents; physician assistants; registered nurses; and operating room technicians. Other supportive staff includes, Secretaries, unlicensed assistive personnel (PCA's; CNA's), Clinical Engineering Technicians, and Radiology Technicians and. The operating room is staffed with in-house personnel 24/7, 365 days a year. An on-call team is also available off routine hours. The goal of the perioperative team is to assist patients, their families, and significant others to achieve a level of wellness equal to or greater than that which they had prior to the procedure.

Basic Requirements for Staff
Requirements for all RN Staff include:

- Current state licensure
- BCLS certification
- Prefer Perioperative nursing experience or Completion of an OR orientation program
- Successful completion of general orientation and annual competencies
- Independently circulate on surgical procedures; may also scrub on procedures.

Additional requirements for Cardiac OR RN include:

- Successful completion of CVOR orientation-Didactic and Clinical
- Independently scrub or circulate on CABG and Valve surgeries

Basic Requirements for all Surgical Technicians include:

- Graduation from an accredited surgical technology program.
- Successful completion of general orientation and annual competencies
- Independently scrub on surgical procedures

Additional requirements for Cardiac Surgical Technicians include:

- Successful completion of CV orientation-Didactic and Clinical
- Independently scrub on CABG and Valve Surgeries

Administrative Responsibility

The operating room is under the direction of the Division Director of Perioperative and Invasive Services. The chairman of the Department of Surgery provides medical direction. Any problems or questions related to Anesthesia are referred immediately to the Chairman of the Department of Anesthesia or his designate. Other Section Chief Physicians are consulted as appropriate.

Staffing

There is one Operating Room Clinical Manager and a Perioperative Nurse Educator on five days a week during the day. The Clinical Manager assumes 24-hour accountability for the department. In addition during the day, there is a Charge Nurse who is responsible for the smooth daily operation of the surgery caseload and the monitoring of quality patient outcomes. On evenings, nights, weekends and holidays, there is a Charge Nurse on each shift. Two teams (2 RN's or an RN and Surgical Technologist) are available on non-routine hours. The process for assessing and acting on positive and negative staffing variances is one of balancing the number of OR rooms needed for a particular caseload, clinical competence, and staffing availability. Staffing patterns are based on AORN recommendations but can fluctuate based on daily case load and intensity of service. There is a minimum of 1 circulating RN and 1 Surgical Technician or RN in attendance for every case. Additional RN's and Surgical Technicians are provided as needed.

Staff Assignments

The unit Clinical manager or the charge nurse does assignment of patient care. Clinical assignments are based on patient needs, technology needed for the procedure, the identified competence of the staff and the level of supervision required.

Philosophy of Perioperative Nursing Care

The Patient who experiences the prospect or performance of an operative or other invasive procedure is the focus of perioperative nursing. Perioperative nursing practice addresses resulting patient needs amenable to nursing intervention. While basic life-sustaining needs may be of the highest priority, the perioperative nurse is concerned with all physiological, psychological, sociological, and spiritual dimensions of the patient's human responses.

Perioperative nurses provide care designed to meet individual patient needs through use of the nursing process. Perioperative nursing occurs within a social setting characterized by rapidly changing technological, economic, and cultural forces that require continuous adaptation by professional practitioners. The complexity of knowledge and skill required to effectively care for recipients of perioperative nursing compels nurses to be well educated and to continue their education beyond generic nursing programs.

Perioperative nursing practice includes providing direct care, coordinating comprehensive care, educating recipients of perioperative nursing, and generating perioperative nursing knowledge in a variety of settings. The perioperative nurse uses substantial knowledge, judgment, and skill based on the principles of biological, physiological, behavioral, social, and nursing sciences. Knowledge and skills acquired by the nurse are used to implement the nursing process and the "Standards of (perioperative) nursing practice." In this context, the perioperative nurse works with the patient to make decisions regarding the patient's needs and to assist and support the patient.

The perioperative nurse also works in collaboration with other health professionals to meet patients' needs. The perioperative nurse has primary responsibility and accountability for the nursing care of patients who are experiencing operative and other invasive procedures.

Nursing care must be individualized to meet a particular patient's unique needs and situation. This care should be provided in the context of disease or injury prevention, health promotion, health restoration, health maintenance, or palliative care. The cultural, racial, and ethnic diversity of the patient must always be taken into account in providing nursing services.

The nurse must respect the patient's goals and preferences in developing and implementing a plan of care. One of the nurse's primary responsibilities is patient education; therefore, nurses should provide patients with appropriate information to make informed decisions regarding their care and treatment.

The perioperative nurse also works in collaboration with other health professionals to meet patients' needs. The perioperative nurse has primary responsibility and accountability for the nursing care of patients who are experiencing operative and other invasive procedures.

Definition of Recipients of Perioperative Care

Recipients of care are patients, their families, and significant others who vary in age, degree of wellness, and socioeconomic and educational status. Patients are those whose protective reflexes and/or self-care abilities are potentially diminished by the prospect or performance of an operative or other invasive procedure.

Recipients have widely diverse knowledge levels and capabilities for self-care. They have both predictable and unique needs caused by these procedures. Some needs can be predicted based on the nurse's knowledge of the procedure and the technology used; others are unique to the individual.

Goals of Perioperative Nursing Practice

The goal of perioperative nursing practice is to assist patients, their families, and significant others to achieve a level of wellness equal to or greater than that which they had prior to the procedure.

Scope of Perioperative Nursing Practice

Perioperative nursing practice begins with the prospect of an operative or other invasive procedure and is completed by evaluating the extent to which the recipient's needs have been met. Perioperative nurses interact with both the patient and/or the patient's significant others throughout the continuum of patient care. Perioperative nursing takes place in the patient's environment and includes, but is not limited to, surgical suites, ambulatory care settings, clinics, physicians' offices, communities, and homes.

The management of the recipient's needs, both unique and predictable, may be through direct or indirect interventions. These interventions are planned to assist the recipient in meeting the projected outcome in an appropriate manner. Perioperative nursing care is implemented by register nurses who strive to assist the patient to meet projected outcomes by functioning in various roles-clinical practitioner, manager, educator, and researcher.

Perioperative nursing varies and may include, but is not limited to,

- peer education and patient/family teaching,
- support and reassurance,
- advocacy,
- control of environment,
- efficient provision of resources,
- maintenance of asepsis,
- monitoring physiologic and psychological status,
- management of aggregate patient needs,
- supervision of ancillary personnel,
- perioperative exploration and validation of current and future practices,
- integration and coordination of care across settings and among disciplines, and
- collaboration and consultation.

These activities are based on using the problem-solving approach in practice, management, education, and research.
The standards used for Patient Care within the Perioperative setting are based on AORN, JCAHO, OSHA, the State of Connecticut and other regulatory body statutes, laws and requirements.

Resources: AORN: "Standards, Recommended Practices, and Guidelines" 2008

Original: 5/1978
Reviewed: 5/79, 4/80, 4/81, 4/84, 4/85, 6/87, 6/02, 12/04, 3/08
Revised: 7/87, 6/90, 4/99, 3/05

St. Mary's Hospital

Inpatient Cardiac Surgery Patient Flow Page 1 Approved 8/08

INPATIENT, DETERMINED SURGERY INDICATED:

- PCP consults surgeon
- Surgeon visits patient
- Calls OR front desk to schedule the patient (if after hours, calls same number and gives information to the charge nurse)
- Completes H&P, if not done
- Writes pre-op orders and progress note

Anesthesia:

- Assesses and evaluates patient
- Lists medications patient should take prior to surgery
- Writes any appropriate pre-op orders

Nursing Staff:

- Transcribes pre-op orders
- Pastoral care notified
- Initiates pre-op checklist
- Any additional testing completed, abnormal results called to surgeon

Pre-op Education:

- Pre-op teaching completed by CV nursing staff member (once patient in CVU)

Case Management will become involved and follow patient from this point

OR:

- OR scheduler obtains information, schedules in PHS.

IF PATIENT NOT CURRENTLY IN CVU:

- Unit calls CVU and arranges for transfer
- Report given to CVU
- Places a transfer request
- Patient access and CVU determines bed placement
- Patient transferred to CVU

Evening Before Surgery:

- Pre op checklist reviewed, updated
- Presence of H&P and pre-op note on chart confirmed
- Family given approximate time to be at hospital next day
- Hibiclens shower completed

Day of Surgery:

- Hibiclens shower completed
- Chart reviewed for completeness - test results, consents, and H &P, verify T&C acceptable
- Belongings secured
- Patient weight obtained
- Any additional orders entered
- Clip prep to be completed
- All orders implemented as appropriate (IV, medications, etc.)
- Family directed to CVU waiting room
- Surgeon to see patient if not already done
- Anesthesia to see patient (if not seen in PAT)
- A-line inserted in CVU. Other central lines inserted in OR
- Pre op checklist completed
- CVU gives family beeper for notifications while in waiting
- CVU will wait for call from OR verifying patient is ready
- Anesthesia transports patient to OR in patient bed with monitor

St. Mary's Hospital

Inpatient Cardiac Surgery Patient Flow (PAGE 2) Approved 8/08

Operating Room:

- Patient transported directly to OR #1
- Circulator RN confirms chart, consents, obtains report from Anesthesiologist.
- Patient ID verified with name and medical record #→compared to arm band
- Lines inserted by Anesthesia
- Surgeon notified by anesthesia when they are ready to anesthetize the patient
- Patient prepped and draped by Surgeon, PA and CVOR staff.
- Time-out – final verification of correct patient and correct procedure
- Surgery Started
- Circulator RN calls CVU with brief report → procedure done, ventilator settings, drips, any problems etc, when off pump or when closing for off pump cases
- Family may call into OR for updated patient information Once case completed, OR team transports patient in bed to CVU
- Surgeon talks with family
- Blood not used in OR is returned to Blood Bank

CVU:

- OR call prompts CVU to notify Respiratory Therapy
- CVU makes final check that all equipment and supplies are in room and set up

CVU:

- Patient arrives with OR team members
- Report given at bedside
- Equipment exchanged as appropriate (pumps, pacer box, etc.)
- Patient assessment and admission to CVU completed as per CVU policy
- Once initial assessment and evaluation is completed, family permitted in to see patient

St. Mary's Hospital

Outpatient Cardiac Surgery Patient Flow PAGE 1 Approved 8/08

Physician Office:
- Obtains demographic information
- Obtains insurance information
- Obtains pre-certification
- Surgeon dictates H&P(into SMH dictation system), completes pre-op testing orders, surgical consent
- Office does a group fax surgical schedule request and PAT form, to: Operating Room, Patient Access, Pre Registration and One Stop Testing; orders to One Stop Testing
- Patient education materials give to patient/family

Patient Access/Pre Registration:
- Verifies insurance, precert., preauthorization, co-pays, etc.
- Starts the PAT chart
- Pre Registration calls the patient and verifies information, pre registers the patient
- Keeps the access file until PAT day

One Stop Testing:
- Contacts Cardiac Anesthesia group for PAT date
- Contacts patient and sets up PAT appointment.
- Notifies CVU & Cardiology of PAT appointment date.
- Initiates the Medical Record.

Operating Room:
- Reviews information for pre op diagnosis, surgery time element, insurance, demographics
- Begins scheduling process in PHS system
- Schedule coordinator calls surgeon's office and CVU and verifies date of surgery
- Time for patient arrival confirmed the day prior with surgeon's office (office to notify patient)

Pre-admission Visit:
- Patient goes to first floor registration
- Once registration is completed, directed to One Stop Testing
- Labs, CXR and EKG completed as appropriate (PFT and Carotid dopplers, if required, attempted to be scheduled at same PAT visit)
- Patient teaching, day of surgery instruction completed (including hebiclens shower)and nursing history completed by CVU nurses and documented in hospital information system (nursing history to be reviewed and validated on day of admission)
- Discharge planning screen completed
- Anesthesia sees patient and performs assessment/evaluation
- PAT collects all results and compiles chart
- Abnormal lab result critical values reported as per hospital policy; surgeon specific abnormal results called to surgeon (once results reported)
- One Stop Testing delivers completed medical record to CVU.

Day of Surgery:
- Patient reports to Central Waiting Area on 2nd Floor
  - Patient activated, bracelet applied, consent to treat signed, co-pays collected
  - CVU notified that patient arrived and customer care representative escorts patient to CVU
- Chart reviewed for completeness - test results, consents, and H &P, verify T&C acceptable
- Patient changed into hospital gown, belongings secured
- Patient assessment completed and nursing history validated
- Patient weight obtained
- Any additional orders entered
- Clip prep completed
- All orders implemented as appropriate (IV, medications, etc.)

Outpatient Cardiac Surgery Patient Flow (PAGE 2) Approved 8/08

Day of Surgery (continued):

- Family directed to CVU waiting room
- Surgeon to see patient if not already seen
- Anesthesia to see patient (if not seen in PAT)
- Pre op checklist completed
- Pastoral care notified
- CVU gives family beeper for notifications while in waiting
- Anesthesiology/CVU will wait for call from OR verifying patient is ready

Operating Room:

- Patient transported directly to OR #1
- Circulator RN confirms chart, consents, obtains report from Anesthesiologist.
- Patient ID verified with name and medical record #→compared to arm band
- Lines inserted by Anesthesia in OR
- Surgeon notified by anesthesia when they are ready to anesthetize the patient
- Patient prepped and draped by surgeon, PA and CVOR staff.
- Time-out – final verification of correct patient and correct procedure
- Surgery Started
- Circulator RN calls CVU with brief report → procedure done, ventilator settings, drips, any problems etc, when off pump or when closing for off pump cases
- Once case completed, OR team transports patient in bed to CVU
- Surgeon talks with family
- Blood not used in OR is returned to Blood Bank

CVU:

- OR call prompts CVU to notify Respiratory Therapy
- CVU makes final check that all equipment and supplies are in room and set up

CVU:

- Patient arrives with OR team members
- Report given at bedside
- Equipment exchanged as appropriate (pumps, pacer box, etc.)
- Patient assessment and admission to CVU completed as per CVU policy
- Once initial assessment and evaluation is completed, family permitted in to see patient

St. Mary's Hospital

CABG Crash with Emergent Return to CVOR **Approved 8/08**

Post-op patient presents with acute symptoms

- Surgeon called
- Surgeon evaluates patient and decides to return to OR
- Staff bring open arrest cart and crash cart to room
- OR notified (24 hours per day) **See OR flow below**
- CVU notifies:
  - Nursing supervisor (may call for clerk or PCA to assist with phone calls in either CVU or OR)
  - Respiratory care
  - Blood Bank (if new use of blood products, may be aware if pt. has been using products)
  - Family
  - Pastoral care (per family request)
- CVU provides ongoing patient support and prepares patient for return to OR
- CVU obtains consents, if possible
- **If chest is to be opened in CVU:**
  - Call CVOR for assist if possible; call OR for in house OR staff support.
  - Continue care of patient and stabilization until patient can be taken to OR for closing

OR Day Shift

- OR notifies team (cardiac anesthesia, perfusion and OR room staff)
- First available OR made ready for patient (Room 1 preferred)

OR After Hours

- Determine from surgeon if perfusion is also needed.
- Nursing supervisor may call for clerk or PCA to be pulled to assist with phone calls, etc. in either CVU or OR
- First call team gets OR ready for patient (including anesthesia)
- Operator notifies on call team hearts including perfusion if surgeon directed **(call directly or group page, and process to verify all received call)**

- OR calls unit when ready for patient and sends someone to assist with transport (unit staff and respiratory to assist with transport)
- Family to remain in CVU waiting room

Follow CVOR Intraoperative Flow

Saint Mary's HOSPITAL
56 Franklin Street, Waterbury, CT 06708

OPEN HEART PRE-OPERATIVE PHYSICIAN'S ORDERS

DO NOT USE THE FOLLOWING ABBREVIATIONS/ACRONYMS/SYMBOLS

U *(for unit)*	**Q.O.D.** *(for every other day)*
IU *(for international unit)*	**X.0 mg** *(trailing zero)*
Q.D. *(for once daily)*	**.X mg** *(lack of leading zero)*
AU, AD, AS *(each ear, right ear, left ear)*	**TIW** *(three times a week)*
$ZnSO_4$ *(zinc sulfate)*	
MS, MSO_4, $MgSO_4$ *(for morphine sulfate or magnesium sulfate)*	

REMINDER: PLEASE INCLUDE INDICATIONS WHEN ORDERING DIAGNOSTIC TESTS

DATE / TIME	ORDER NO.	ENTERED BY	ORDER

OPEN HEART PRE-OPERATIVE ORDERS

Admit to CVU, Attending MD _____

Diagnosis:

Allergies:

Vital signs per protocol

NPO except meds

Activity:

EKG on admission

Pre Admission Testing: ☐ EKG
☐ CXR
☐ Anesthesia Consult

Labs: Type and Screen at pre-op visit
Type and Cross four units packed RBC's
PT, PTT, Thrombin time, Fibrinogen, CBC with differential,
Electrolytes, BUN, Creatinine, glucose
Urinalysis
☐ ABGs

If an outpatient: Verify Hibiclens shower

If an inpatient: Hibiclens shower the night before and morning of surgery
Clipping: as per defined standard for Coronary Artery Bypass and Valve patients

Place IV Heplock - #16 gauge peripheral IV
If unable to insert 16 gauge, insert an 18 gauge peripheral IV

Antibiotic Prophylaxis:
☐ Cefazolin (Ancef, Kefzol) 1gram IV X 1 at time of induction of anesthesia
or
☐ Cefuroxine (Zinacef) 1.5 grams IV X 1 at time of induction of anesthesia
or
☐ Vancomycin (Vancocin) 1 gram IV to start 1/2 hour prior to surgery and infuse over 1 hour.

IV Fluids:
Fluid Type_____ Volume_____ run@_____ ml/hr

TIME	DATE	SIGNATURE	M.D.

***** DRUG SENSITIVITY (SPECIFY DRUGS) *****

DISPENSED IN ACCORD WITH THE HOSPITAL FORMULARY SYSTEM. If not desirous of the exact equivalent, draw a line through the permissive statement and indicate drug.

DRUGS - NO SUBSTITUTIONS:	ORDERS ENTERED BY			
	INIT	SIGNATURE	INIT	SIGNATURE

FORM NO. 7318 11/07/06

Saint Mary's HOSPITAL
56 Franklin Street, Waterbury, CT 06706

OPEN HEART POST-OPERATIVE PHYSICIAN'S ORDERS

DO NOT USE THE FOLLOWING ABBREVIATIONS/ACRONYMS/SYMBOLS

U *(for unit)*	Q.O.D. *(for every other day)*
IU *(for international unit)*	X.0 mg *(trailing zero)*
Q.D. *(for once daily)*	.X mg *(lack of leading zero)*
AU, AD, AS *(each ear, right ear, left ear)*	TIW *(three times a week)*
$ZnSO_4$ *(zinc sulfate)*	
MS, MSO_4, $MgSO_4$ *(for morphine sulfate or magnesium sulfate)*	

REMINDER: PLEASE INCLUDE INDICATIONS WHEN ORDERING DIAGNOSTIC TESTS

DATE / TIME	ORDER NO.	ENTERED BY	ORDER

OPEN HEART POST-OPERATIVE ORDERS

Admit to CVU: Dr. _____

Diagnosis:

Allergies:

Diet: NPO while intubated; once extubated advance to:

☐ CCU ☐ Diabetic ☐ Other _____

Activity: Bed Rest, Keep HOB @ 30 degrees

OOB with assistance BID - start POD #1

Nursing: Vital Signs per protocol

- Hemodynamics per protocol
- Pacemaker @ rate of _____
- Tranducer A-line
- I & O every 1 hour
- Foley to gravity
- NGT / OGT to LIWS
- Chest Tubes to 20cm Suction
- May milk chest tube every 15 minutes until chest tube < 100 ml / hour x 2 hours
- Hemovac drain to self suction
- Fingerstick blood sugar every 4 hours
- Warming Blanket or Bair Hugger for temp <97° F
- Ace bandage to _____

Diagnostics: EKG on arrival and in A.M. POD #1

CXR on arrival and in A.M. POD #1

TIME	DATE	SIGNATURE	M.D.

***** DRUG SENSITIVITY (SPECIFY DRUGS) *****

DISPENSED IN ACCORD WITH THE HOSPITAL FORMULARY SYSTEM. If not desirous of the exact equivalent, draw a line through the permissive statement and indicate drug.

DRUGS — NO SUBSTITUTIONS:	ORDERS ENTERED BY			
	INIT	SIGNATURE	INIT	SIGNATURE

Saint Mary's HOSPITAL
56 Franklin Street, Waterbury, CT 06706

OPEN HEART POST-OPERATIVE PHYSICIAN'S ORDERS

DO NOT USE THE FOLLOWING ABBREVIATIONS/ACRONYMS/SYMBOLS

U *(for unit)*	Q.O.D. *(for every other day)*
IU *(for international unit)*	X.0 mg *(trailing zero)*
Q.D. *(for once daily)*	.X mg *(lack of leading zero)*
AU, AD, AS *(each ear, right ear, left ear)*	TIW *(three times a week)*
$ZnSO_4$ *(zinc sulfate)*	
MS, MSO_4, $MgSO_4$ *(for morphine sulfate or magnesium sulfate)*	

REMINDER: PLEASE INCLUDE INDICATIONS WHEN ORDERING DIAGNOSTIC TESTS

DATE / TIME	ORDER NO.	ENTERED BY	ORDER

OPEN HEART POST-OPERATIVE ORDERS

Labs in am: HCT, K+, Glucose 6 hours after arrival
CBC, BMP, Magnesium in A.M. POD #1

IV Drips:
Fluid Type _____ Volume _____ run@ _____ ml/hr
Fluid Type _____ Volume _____ run@ _____ ml/hr
Fluid Type _____ Volume _____ run@ _____ ml/hr
Fluid Type _____ Volume _____ run@ _____ ml/hr

Medications:
Pain Control/Anxiety
_____ _____ mg IV every _____ hr PRN for pain 1-5
_____ _____ mg IV every _____ hr PRN for pain 6-10
_____ _____ mg IV every _____ hr PRN for anxiety
post extubation when tolerating PO
_____ _____ mg PO every _____ hr PRN for pain 1-5
_____ _____ mg PO every _____ hr PRN for pain 6-10
☐ Electrolyte IV replacement protocols ~~antibiotic:~~
Antibiotic: _____ IV every _____ hr x _____ dose then D/C
Aspirin 650 mg PO/PR/NGT/OGT x 1 dose when CT drainage is <100 ml/hr for 2 hrs

TIME	DATE	SIGNATURE	M.D.

***** DRUG SENSITIVITY (SPECIFY DRUGS) *****

DISPENSED IN ACCORD WITH THE HOSPITAL FORMULARY SYSTEM. If not desirous of the exact equivalent, draw a line through the permissive statement and indicate drug.

DRUGS — NO SUBSTITUTIONS:	ORDERS ENTERED BY			
	INIT	SIGNATURE	INIT	SIGNATURE

Saint Mary's HOSPITAL
56 Franklin Street, Waterbury, CT 06706

OPEN HEART POST-OPERATIVE PHYSICIAN'S ORDERS

DO NOT USE THE FOLLOWING ABBREVIATIONS/ACRONYMS/SYMBOLS

U *(for unit)*	Q.O.D. *(for every other day)*
IU *(for international unit)*	X.0 mg *(trailing zero)*
Q.D. *(for once daily)*	.X mg *(lack of leading zero)*
AU, AD, AS *(each ear, right ear, left ear)*	TIW *(three times a week)*
$ZnSO_4$ *(zinc sulfate)*	
MS, MSO_4, $MgSO_4$ *(for morphine sulfate or magnesium sulfate)*	

REMINDER: PLEASE INCLUDE INDICATIONS WHEN ORDERING DIAGNOSTIC TESTS

DATE / TIME	ORDER NO.	ENTERED BY	ORDER
			OPEN HEART POST-OPERATIVE ORDERS
			☐ Zofran 4mg IV every 6 hrs PRN for Nausea/Vomiting
			☐ Sulcrafate 1 GM via NGT/OGT every 6 hrs while intubated, D/C once extubated
			☐ Metoprolol _____ mg PO every _____ hour post extubation, hold for SBP<95
			☐ Heparin 5000 units subcutaneous every _____ hrs, start _____
			Respiratory Orders - Post Extubation
			Incentive Spirometry at least 10 breaths hourly
			Aerosolized Bronchodilators:
			☐ Atrovent 0.5 mg every _____
			☐ Albuterol 2.5 mg every _____
			☐ Xopenex ☐ 0.63 mg or ☐ 1.25 mg every _____
			☐ DuoNeb every _____
			☐ EZ PAP every _____
			☐ Other: _____

TIME	DATE	SIGNATURE	M.D.

***** DRUG SENSITIVITY (SPECIFY DRUGS) *****

DISPENSED IN ACCORD WITH THE HOSPITAL FORMULARY SYSTEM. If not desirous of the exact equivalent, draw a line through the permissive statement and indicate drug.

DRUGS — NO SUBSTITUTIONS:	ORDERS ENTERED BY			
	INIT	SIGNATURE	INIT	SIGNATURE

7319 REL R 6/04/08

Saint Mary's HOSPITAL

56 Franklin Street, Waterbury, CT 06706

ADDRESSOGRAPH

NAME

ROOM NO

OR

HOSP NO.

ADM. DATE

PATIENT DISCHARGE INSTRUCTIONS POST CARDIAC SURGERY

Discharge Medications: *(please print, do not use medical abbreviations the patient may not understand)*

Medication/Dose	Amount to Take	How Often	For What
(Beta-blocker)			Heart rate control
(Statin)			Lowers cholesterol
			Antiplatelet
			Pain control

☐ Coumadin dose _____ last INR _____ next labwork due _____

Activity Limits:
- DO NOT push, pull or lift more than 10 pounds, including your own body weight for 6 weeks.
- DO NOT drive for 2 weeks, until you see MD.
- Walk 5 minutes every day, increase by 5 minutes every week to goal of 30 minutes every day.

Diet Restrictions: _____

Special Instructions/Treatments:
- Shower daily and wash your incision with soap.
- Bring this form with you to your next doctor's appointment.
- Weigh yourself daily, call doctor if up 3 pounds in 3 days.

For your health we recommend you stop smoking. CALL 1-866-363-4224 for HELP/SUPPORT

Referrals: Cardiac Rehab: ☐ Yes ☐ No

Special Equip.: *(specify)* _____

Signs and Symptoms to be reported to MD: *(Recurrent symptoms similar to admission symptoms as listed below)*

a. Fever over 100.4 °F or unexplained chills or sweating
b. Increasing pain not controlled with medication
c. Swelling, redness, oozing or cloudy discharge at the incision sites
d. Unexplained bruising or bleeding
e. Excessive clicking sounds in your breast bone
f. Symptoms of angina

If you have questions, concerns or symptoms other than those listed above, please contact your doctor promptly.

NAME OF DOCTOR	PLEASE CONTACT YOUR PHYSICIAN FOR A FOLLOW-UP APPOINTMENT, IF NOT ALREADY SCHEDULED

I have participated in the development and understand the Discharge Plan.
PATIENT OR RESPONSIBLE PARTY: DATE

☐ CARE NOTES/CARDIAC SURGERY BOOKLET GIVEN

NURSING SIGNATURE DATE / /

7320 REL R11/30/05 **WHITE COPY - CHART** **YELLOW COPY - PATIENT** **PINK COPY - PHYSICIAN'S COPY**

1019
09/15/08

CARE PATHWAYS
Cardiac Rehabilitation
INDEX

Saint Mary's Hospital

- Scope of Services – Cardiac Rehabilitation
- Levels of Program

Saint Mary's Hospital

Cardiac Rehabilitation

Scope of Services:

The Cardiac rehabilitation program provides services to individuals who have experienced a cardiovascular event/disease, undergone open heart surgery or coronary artery intervention, pulmonary disease and those who wish to develop a healthier lifestyle through exercise and education.

Goals of Service:

The goals of the cardiac rehabilitation program are to provide progressive exercise and education with medical supervision. Individualized nursing care is provided to assist the participant in achieving his/her optimal personal level of physical, psychological, vocational and social health. As health care professionals we are concerned with the prevention of disease, promotion of health, as well as rehabilitation.

Types and Age of Participants Served:

Service is provided by appointment Monday through Friday, 7:30 am to 4:00 pm to persons with myocardial infarction within preceding 12 months, coronary artery bypass surgery within preceding 6 months, stable angina, arrhythmia (associated with MI, CABG, or angina), hypertension, and others that may be included under certain circumstances: severe left ventricular dysfunction, heart transplant, diabetes, and peripheral artery disease. A physician referral initiates the program. Age group consists of young adults to geriatrics.

Scope and Complexity of Participant Care Needs

Cardiac Rehabilitation department provides a safe and comfortable environment for participants and staff in order to assist the participant in achieving optimum physical strength and exercise endurance as well as meeting educational needs.

The participant's physical, psychological, and social needs are assessed during initial interview and exercise session. Continual reassessment is maintained during program and plan of care is based on initial assessment and reassessment.

Services provided include instruction on telemetry application, instruction and guidance with equipment use, (treadmill, bike, airdyne bike, rower, arm egrometer, hand held weights and therabands), warm-up and cooldown/stretches and relaxation.

Weekly educational programs include but are not limited to lectures on coronary artery disease, lifestyle changes, risk factor modification, low fat/sodium diets, stress management, exercise guidelines, medications, and cardiac testing.

Department/Unit Staffing

Medical Director – board certified cardiologist who has me the hospital's credentialing/privileging process and provides direct physician supervision for the cardiac rehabilitation program. The Cardiopulmonary Clinical Manager is responsible for the staffing adjustments related to participant census, department budget, and staff evaluations. The basic requirements for the RN include current state license, BLS certification, ACLS certification, and completion of annual competencies. The Cardiac Rehabilitation Registered Nurse will provide direct participant supervision, instruct participants in warm-up exercises, proper equipment use, use of therabands and hand held weights, cooldown stretching and relaxation.

An ongoing program of inservice education and periodic clinical skills evaluation for staff members is maintained to ensure that quality of care provided is kept current.

Methods used to Assess and Meet Participant's Care Needs

Standards of practice are based on the Guidelines for Cardiac Rehabilitation and Secondary Prevention Programs of the American Association of Cardiovascular and Pulmonary Rehabilitation and the American Heart Association Guidelines. These standards and recommended practices serve as a basis for performance improvement and evaluation.

Collaboration

The RN staff partner with other healthcare providers to work in a collaborative, coordinated manner throughout the process of caring for the participant requiring cardiac rehabilitation. The involvement of the patient, family, or significant other is encouraged.

Revised: 3/05, 2/08

Saint Mary's
HOSPITAL

Cardiac Rehabilitation Program

Phase I – Inpatient : The cardiac rehabilitation program for hospitalized patients includes participant and family information regarding the out patient cardiac rehabilitation program. This phase begins during the hospital admission and ends when the patient is discharged.

Phase II – Outpatient : The cardiac rehabilitation/conditioning program is optimally initiated shortly after hospital discharge, or, possibly, if complications were present, may not begin for up to 12 months following hospital discharge. It most commonly lasts 12 weeks (3 sessions/weekly) or 36 sessions. Phase II provides participant and family education and support concerning coronary artery disease, MI, risk factor modification, nutrition and diet modification, stress management, and emotional support through a multidisciplinary approach, combined with an individualized, progressive exercise regimen geared toward gradually increasing the participant's duration and intensity of exercise. MET levels are approximately 4 or greater. The participants are closely supervised by registered nurses, utilizing continuous telemetry monitoring to evaluate response to exercise. Discussions regarding goal review and level of progress are held periodically between participant and staff members.

Wellness Program – This is a conditioning program for participants who have completed the Phase II program, or for persons with increased risk factors for CAD who are referred by their physician. The participant is not monitored with telemetry, but must be able to monitor their pulse and know their target heart rate range. The ongoing interaction and supervision by nursing, medical, and other multidisciplinary roles continue. The participants are encourage to continue healthy lifestyle choices and risk factor identification/modification.

APPENDIX 9.a.

Memorandum of Understanding

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding is entered into as of this 22nd day of December, 2003 among **Waterbury Area Heart Center, Inc., St. Mary's Hospital, Waterbury Hospital** and the **University of Connecticut Health Center**, and Connecticut **Cardiothoracic Surgical Associates, LLC** ("CCSA"), and summarizes the intent of the parties with respect to the establishment of a joint interventional cardiology and open heart surgery program by St. Mary's Hospital and Waterbury Hospital in the City of Waterbury ("Program") and the collaboration and services to be provided by University of Connecticut Health Center and CCSA in connection with the establishment of that Program (sometimes the signators are referred to as a "Party" or collectively the "Parties"); and

WHEREAS, the Program would be provided by a two-site program utilizing existing cath lab capacity and cardiac operating rooms to be constructed at St. Mary's Hospital and Waterbury Hospital; and

WHEREAS, the University of Connecticut Health Center is an academic health center that incorporates the School of Medicine ("SOM"), its faculty practice plan UConn Medical Group ("UMG"), and an acute care general hospital John Dempsey Hospital (JDH); and

WHEREAS, JDH and UMG are existing providers of a full array of cardiology and cardiothoracic services; and

WHEREAS, CCSA surgeons are members of the faculty of SOM; and

WHEREAS, the University of Connecticut Health Center and CCSA have agreed to provide services to the Program in Waterbury and to become members of the advisory board established in connection with the Program ("Advisory Board"); and

WHEREAS, St. Mary's Hospital and Waterbury Hospital shall establish the Waterbury Area Heart Center, Inc. ("WAHC"), a non-stock corporation which will be separately organized and which shall serve as a management services organization to oversee the joint heart program providing programmatic, quality, training, marketing and community wellness coordination; and

WHEREAS, St. Mary's Hospital, Waterbury Hospital and University of Connecticut Health Center administration, together with clinical leaders and physicians, will constitute the members of an Advisory Board which provides strategic direction to WAHC; and

WHEREAS, the sole members of the Waterbury Area Heart Center shall be St. Mary's Hospital and Waterbury Hospital; and

WHEREAS, cardiac surgery will be provided by physicians of CCSA, or UMG as the case may be, who are credentialed at JDH and also credentialed at St. Mary's Hospital and Waterbury Hospital; and

WHEREAS, JDH shall provide or arrange for the provision of perfusion services; and

WHEREAS, all of the parties acknowledge that no later than December 23, 2003, St. Mary's Hospital and Waterbury Hospital will submit a Certificate of Need Application concerning the Program and including in the application a description of the services to be provided by the University of Connecticut Health Center and CCSA with respect to the Program; and

WHEREAS, the parties have agreed to execute this Memorandum of Understanding so as to more clearly set forth the responsibilities and services to be provided by the University of Connecticut Health Center and CCSA to the Program;

NOW, THEREFORE, in consideration of the mutual promises, covenants and agreements contained herein, receipt of which is hereby acknowledged, the parties agree as follows:

Conflicting Arrangements

Each of the parties represents and warrants with the other parties that it has no commitments, understandings or arrangements with any party other than the signators that might adversely affect their respective ability to participate in the Program as described in this Agreement.

Services To Be Provided by University of Connecticut Health Center

WAHC, St. Mary's Hospital, Waterbury Hospital and University of Connecticut Health Center will work together to create a definitive agreement among the WAHC, St. Mary's Hospital, Waterbury Hospital and the University of Connecticut Health Center which will provide for the support by the University of Connecticut Health Center and JDH in the manner defined in this Memorandum of Understanding and, in particular, attached **Schedule A**. The collaboration by the University of Connecticut Health Center will include, without limitation, University of Connecticut Health Center providing support for the CON Application for the Program, including pre- and post-file testimony. This Memorandum of Understanding shall be effective as among the parties; however, it is expected that a definitive agreement among WAHC, St. Mary's Hospital, Waterbury Hospital and the University of Connecticut Health Center will be executed and delivered.

Services To Be Provided by CCSA

WAHC, St. Mary's Hospital, Waterbury Hospital, and CCSA will work together to create a definitive agreement among them which will provide for the support by CCSA in the manner defined in this Memorandum of Understanding and, in particular, attached **Schedule B**. The collaboration by CCSA will include CCSA providing support for the CON Application for the Program, including pre-file and post-file testimony. This Memorandum of Understanding shall be effective among WAHC, St. Mary's Hospital, Waterbury Hospital and CCSA; however, it is expected that a definitive agreement among WAHC, St. Mary's Hospital, Waterbury Hospital and CCSA will be executed and delivered.

Confidentiality

(a) "Proprietary Information" shall include all tangible and intangible information which is related in any way to the Program and is of a confidential or proprietary nature, including but not limited to, analyses, business or strategic plans, compilations, financial statements, proposals, studies, patient revenue, gross charges, payor mix, employment or compensation models or other information relating to the business of a Party or any of its corporate affiliates related to the Program. Any discussions with respect to the Program shall also constitute Proprietary Information.

(b) "Representatives" shall include any Party's directors, officers, employees, attorneys, accountants, accountants, consultants, agents and representatives involved in any discussions related to the Program.

(c) Each Party shall treat as confidential the Proprietary Information of the other Party and shall each use its best efforts to hold the Proprietary Information of the other Party in strict confidence.

(d) A Party shall only disclose Proprietary Information received from the other Party to its Representatives who need to know the Proprietary Information for the purpose of the Program, who are informed of the confidential nature of the Proprietary Information, and who agree to be bound by the terms of this Agreement. Each Party receiving Proprietary Information shall use due care to prevent its Representatives from disclosing the Proprietary Information and shall be liable to the other Party for any damages caused by the breach of this provision by its Representatives. However, no party shall be liable for the disclosure of Proprietary Information if said disclosure is required by law or order of an appropriate administrative agency.

(e) No Party shall disclose to a third party the Proprietary Information of the other Party, in whole or in part, without the express written consent of the Party that furnished the Proprietary Information, which consent may be withheld at the furnishing Party's sole discretion.

(f) Each Party and its Representatives shall use the Proprietary Information of the other Party solely for the purpose of the Discussions and for no other purpose.

(g) If a Party or a Party's Representative is requested or required by any governmental authority to disclose the Proprietary Information of any other Party, it shall provide the Party that furnished the Proprietary Information with prompt written notice of the request or demand, so the Party that furnished the Proprietary Information may seek an appropriate protective order.

Conditions to Parties' Participation

The Parties recognize that this Memorandum of Understanding, the definitive agreement referenced above, and the parties' full and final participation in the Program is subject to the issuance of a Certificate of Need by the Office of Health Care Access of the State of Connecticut acceptable to St. Mary's Hospital and Waterbury Hospital as well as final approval of their respective Boards of Directors, and also acceptable to the University of Connecticut Health Center and CCSA.

Nature of This Memorandum of Understanding

It is understood that the provisions of this Memorandum of Understanding concerning confidentiality shall survive any participant's withdrawal from participation in the Program. This Memorandum of Understanding indicates a willingness on the part of each of parties to participate as contemplated above and as shall be more definitively provided for in final agreements among the parties.

Applicable Law

This Agreement shall be construed and enforced in accordance with the laws of the State of Connecticut

Legal Constraints

The parties recognize that their efforts to develop the Program as described in this Memorandum of Understanding will be constrained by various legal requirements. The parties recognize that the Program will be structured and any activities undertaken pursuant to the Memorandum of Understanding will be carried out so as to assure that at all times no federal or state statute, rules or regulations are violated.

Public Announcement

No public announcement regarding this Memorandum of Understanding shall be made unless the parties have mutually agreed in writing on the content and timing of such announcement. The parties recognize, however, that the substance of this Memorandum of Understanding may, in fact, be disclosed to the Office of Health Care Access as part of the Certificate of Need Application in connection with the Program.

IN WITNESS WHEREOF, this Memorandum of Understanding has been executed by The Waterbury Area Heart Center, Inc., St. Mary's Hospital, Waterbury Hospital, the University of Connecticut Health Center and Connecticut Cardiothoracic Surgical Associates, LLC.

THE WATERBURY AREA HEART CENTER, INC.

By _____
John H. Tobin

and

By _____
Robert P. Ritz

Its Co-Presidents

ST. MARY'S HOSPITAL

By _____
Robert P. Ritz
Its President

THE WATERBURY HOSPITAL

By _____
John H. Tobin
Its President

UNIVERSITY OF CONNECTICUT
HEALTH CENTER

By _____
Peter J. Deckers, M.D.
Dean, School of Medicine

THE CONNECTICUT
CARDIOTHORACIC SURGICAL
ASSOCIATES, LLC

By _____
Paul L. Preissler, M.D.
Its Managing Member

SCHEDULE A

University of Connecticut Health Center
John Dempsey Hospital

Proposed Support to the
Advanced Cardiac Services Program

1. **Pre-Program Support:**

   A. Provide support for the CON Application process including pre- and post-file testimony

   B. Provide staff educational programs for angioplasty and open heart surgery care

      - Training and instruction at John Dempsey Hospital
      - Surgical Staff
        - ICU Staff (Nurses, PA's, Clinical Techs)
        - Cath Lab Staff (Nurses, PA's, Cardiovascular Techs)
        - Inpatient Cardiac Nursing Unit Staff (Nurses, Cardiovascular Techs)
        - Cardiac Rehab Staff (Nurses, Exercise Therapists)
        - Respiratory (Respiratory Therapists)
      - Rotation of John Dempsey Hospital Staff to Waterbury and St. Mary's Hospitals to provide on-site supervision and education of staff in support of the cardiac program
      - Provide access to John Dempsey Hospital's Cardiac Cath Lab and Surgical Suites for Waterbury /St. Mary's staff for training and education in support of the cardiac program

   C. Consult on the development of clinical standards of care, nursing protocols, admission and discharge criteria, and continuing education requirements

   D. Assist with the recruitment and selection of cardiac support staff (e.g. Nurses, PA's, Cardiovascular Techs, etc.)

E. Assist as requested in the evaluation and selection of capital equipment and supplies needed in support of the cardiac program

F. Design, in collaboration with Physicians and Staff of Waterbury and St. Mary's Hospitals, a Quality Improvement System for a cardiac program

2. **Program Initiation:**

A. Assist as requested in vendor negotiations for purchase of equipment and supplies

B. Provide assistance with marketing and promotion of the Waterbury/St. Mary's heart program.

3. **Program Management**

Assist in development, implementation and coordination of a Quality Improvement program

- Train Waterbury/St. Mary's staff in implementing a process for data collection and compilation
- Assist in development of an outcomes data base
- Provide National, State and John Dempsey Hospital benchmarking data for program comparison and quality improvement
- Arrange for University of Connecticut Health Center physicians and administrators to collaborate as members of the Waterbury Area Heart Center Advisory Board

SCHEDULE B

Connecticut Cardiothoracic Surgical Associates, LLC

Proposed Support to the
Advanced Cardiac Services Program

- 24/7 cardiothoracic surgical team coverage for all cardiac surgical procedures required by the Program at the Hospitals
- Assistance with the selection of ancillary support team services, including perfusion capabilities and others to be defined
- Coordination of cardiac surgery services with medical cardiology services, actively working with the Hospitals and WAHC to fully develop an integrated cardiology program
- Completion of the necessary credentialing for medical staff privileges at the Hospitals
- Participation in all cardiac-related quality management activities in cooperation with the Hospitals for cardiac surgery services
- Provision of expertise for the development and oversight of practice guidelines, policies, processes, protocols, clinical pathways, clinical trials and protocols for the Program
- Participation in the evaluation of purchased equipment and supplies, making recommendations for necessary or desirable improvements or replacements
- Participation in medical staff education through grand rounds, CEUs, both on-sight and via satellite
- Providing support for the Certificate of Need application process, including pre- and post-file testimony

APPENDIX 9.b.

Clinical Oversight Agreement

Affiliation Agreement

Perfusion Contract

CLINICAL OVERSIGHT AGREEMENT

This Agreement is made as of the 21st day of April, 2007, by and among **Heart Center of Greater Waterbury** (referred to herein as "HCGW"), **The Waterbury Hospital** ("WH"), **Saint Mary's Hospital** ("SMH"), and **University of Connecticut Health Center Finance Corporation** ("UCHCFC"), (sometimes the signatories are referred to as "Party" or collectively as "Parties").

Recitals

WHEREAS, The Waterbury Hospital ("WH") and St. Mary's Hospital ("SMH') have established a joint percutaneous coronary intervention ("PCI") and open heart surgery program ("Program"); and

WHEREAS, UCHC wishes to provide services in accordance with the terms and conditions set forth herein; and

WHEREAS, UCHC has agreed to provide services to the Program in Waterbury, Connecticut and to become a member of the advisory board established in connection with the Program ("Advisory Board"); and

WHEREAS, SMH, WH and UCHC's administration, together with clinical leaders and physicians, will constitute the members of HCGW's Advisory Board which provides strategic direction to HCGW; and

WHEREAS, the sole members of HCGW are SMH and WH; and

WHEREAS, cardiac surgery will be provided by physicians of Cardiothoracic Surgical Associates, LLC (CCSA), or UMG as the case may be, with medical privileges at JDH and also credentialed at SMH and WH through the coordination of UCHC; and

WHEREAS, JDH has agreed to provide or arrange for the provision of perfusion services in support to the Program; and

WHEREAS, all of the parties acknowledge that on December 23, 2003, SMH and WH submitted a Certificate of Need Application ("CON") concerning the Program and including in the application a description of the services to be provided by UCHC with respect to the Program; and

WHEREAS, the parties wish to clearly set forth the responsibilities and services to be provided by UCHC to HCGW and as appropriate WH and SMH;

NOW, THEREFORE, in consideration of the mutual promises, covenants and agreements

contained herein, receipt of which is hereby acknowledged, the parties agree as follows:

1. **Conflicting Arrangements**

Each of HCGW, WH, SMH, and UCHC represents and warrants to the other that it has no commitments, understandings or arrangements with any party other than the signators to this Agreement that might adversely affect their respective ability to participate in the Program as described in this Agreement.

2. **Operations**

UCHC responsibilities shall include, without limitation, the duties set forth on **Schedule A**; coordination of cardiac surgery services provided by physicians of Cardiothoracic Surgical Associates, LLC (CCSA), or UMG as the case may be, by virtue of UCHC's agreement with physician practices which agreement(s) are attached as **Schedule A-1**; and provision of perfusion services as needed to address the needs of the open heart surgery patients. The agreement referenced in **Schedule A-1** contains certain representations and covenants by CCSA concerning, among other things, licensure, training, insurance, compliance with applicable federal and state laws and regulations by CCSA. CCSA has acknowledged in that agreement that HCGW, WH and SMH are third parties beneficiary to such representations and covenants who are entitled directly to rely on such representations and covenants. UCHC has no reason to believe that such representations or covenants are not correct. CCSA's physicians will maintain active privileges at JDH and also be credentialed at WH and SMH. The collaboration by UCHC will include, without limitation, UCHC providing support for the CON modification for the Program, including pre-and post-file testimony. HCGW, WH and SMH agree that during the Term UCHC shall be their exclusive provider of the services described in this Agreement.

The parties recognize and agree that it is desirable to establish a clinical oversight relationship; cooperate in the ongoing development of policies, procedures and protocols; and facilitate the training of WH and SMH staff.

3. **Documentation and Confidentiality**

UCHC shall make available its existing proprietary information and management systems to HCGW, WH and SMH for use in credentialing, certification and administration of the open heart surgery program in the cardiovascular operating room, patient care areas and any supporting departments (i.e. cardiac rehabilitation, cardiac catheterization lab, nursing education), as may be needed in the ongoing program development. This proprietary documentation ("UCHC Proprietary Information") includes:

a. Quality assurance information;
b. Credentialing requirements;
c. Personnel documentation;
d. Regulatory requirements;
e. Emergency transport plan;

f. Patient education materials.

Copies of the UCHC Proprietary Information shall be delivered to HCGW, WH and SMH, as appropriate by UCHC upon the request of HCGW which shall facilitate those requests. UCHC shall work with WH and SMH to revise such documentation, so as to be applicable to their respective needs.

"WH and SMH Proprietary Information" shall include all tangible and intangible information which is related in any way to the Program and is of a confidential or proprietary nature, including but not limited to, analyses, business or strategic plans, compilations, financial statements, proposals, studies, patient revenue, gross charges, payor mix, employment or compensation models or other information relating to the business of a Party or any of its corporate affiliates related to the Program. Any discussions with respect to the Program shall also constitute Proprietary Information. UCHC Proprietary Information and WH and SMH Proprietary Information are sometimes referred to as "Proprietary Information".

"Representatives" shall include any Party's directors, officers, employees, attorneys, accountants, consultants, agents and representatives involved in any discussions related to the Program.

Each Party shall treat as confidential the UCHC Proprietary Information and the WH and SMH Proprietary Information, as the case may be and shall use its best efforts to hold the Proprietary Information of the other Party in strict confidence.

A Party shall only disclose Proprietary Information received from any other Party to its Representatives who need to know the Proprietary Information for the purpose of the Discussions, who are informed of the confidential nature of the Proprietary Information, and who agree to be bound by the terms of this Agreement. Each Party receiving Proprietary Information from any other Party shall use due care to prevent its Representatives from disclosing such Proprietary Information and shall be liable to the other Party for any damages caused by the breach of this provision by its Representatives.

No Party shall disclose to a third party the Proprietary Information of the other Party, in whole or in part, without the express written consent of the Party that furnished the Proprietary Information, which consent may be withheld at the furnishing Party's sole discretion.

Each Party and its Representatives shall use the Proprietary Information of the other Party solely for the purpose of advancing the Program and for no other purpose.

If a Party or a Party's Representative is requested or required by any governmental authority to disclose the Proprietary Information of any other Party, it shall provide the Party that furnished the Proprietary Information with prompt written notice of the request or demand, so the Party that furnished the Proprietary Information may seek an

appropriate protective order.

4. Further Consultation

UCHC shall continue to be a resource, as needed, to HCGW, WH and SMH as appropriate with respect to the organization, construction and continuation of the open heart surgery and coronary PCI programs of WH and SMH. Available services include: equipment and supply selection; purchasing information; facility and space planning and design; inventory management systems; budget development; project management and oversight; reimbursement and medical record coding information; patient education; continuing education programming; marketing support and consultation; licensure and inspection; development of policies, procedures, protocols and clinical pathways, and other regulatory approvals. Further UCHC agrees to supply physicians in relevant specialties to participate in Morbidity and Mortality (M&M) Conferences at WH and SMH as appropriate.

5. Training

UCHC shall provide training at the facilities of WH, SMH and UCHC, as appropriate, as set forth in Schedule A for registered nurses and technicians employed by each of WH and SMH to staff the areas within the Program. All orientation and training plans will be subject to review and approval by the nursing administration of each of WH and SMH.

6. Consulting Fee

As compensation for the services provided in this Agreement, HCGW shall reimburse UCHC a consulting fee payable in accordance with the terms of **Schedule B**.

Notwithstanding the forgoing, the parties agree that the perfusion services described herein are not included in the compensation schedule and will be included in an agreement relative to perfusion services.

7. Contacts of the Parties

Each of HCGW, WH, SMH and UCHC shall identify their respective designated contacts who shall be responsible for day-to-day management of UCHC obligations under this Agreement.

8. Privileges

This Agreement does not confer credentialing on any physician. The parties agree that the grant, renewal or any other action with respect to credentialing is vested in the governing bodies of, and governed by the credentialing process in effect from time to time at each of WH and SMH.

9. Employment

Each of WH and SMH hospital shall be responsible for the employment, discipline, and compensation of any and all of their respective employees or contractors who may be involved from time to time in providing services to the Program.

10. Term

This Agreement shall be effective April 21, 2007 and shall terminate two (2) years following its effective date, unless the Program is not continued or unless sooner terminated as hereinafter provided ("Term"). The parties may be willing to consider an extension of the terms of the Agreement provided that they are able to reach agreement upon the length, fees and other terms and conditions of the extended term prior to the expiration of the Term.

11. General Prohibition Concerning UCHC Employees

HCGW, WH and SMH agree that during the term of this Agreement and for a period of one year following its expiration none of them shall, without the prior knowledge and consent of UCHC actively recruit, retain, employ or otherwise engage any employee of UCHC who may perform any work in connection with the Program except that HCGW, WH and SMH may recruit and hire employees of UCHC who retire from UCHC. Should HCGW, WH and SMH violate this provision, UCHCFC shall be entitled to damages in an amount equal three times the annual salary of the UCHC employee.

12. Insurance Coverage

Each of UCHC, HCGW, WH and SMH agrees that, for its own employees, and at its own cost and expense, it will procure and continue in force, throughout the term of this Agreement, adequate insurance coverages through programs of self-insurance or otherwise in amount and scope that are consistent with industry practice and acceptable to the other parties to this Agreement, for any and all claims for injuries to persons and property as each of them deems necessary or adequate. Each party shall furnish the other party with evidence concerning the insurance discussed in this paragraph 12. Each party shall provide at least 30 days prior written notice of the cancellation or termination of the insurance discussed in this paragraph 12.

13. Indemnification by the Parties

HCGW, WH and SMH herby agree to indemnify and hold harmless UCHC, JDH, its officers, employees and representatives, from any and all claims, demands or actions of any and every kind and nature whatsoever (excluding attorneys' fees) caused by the participation of WH and SMH staff in activities on the UCHC campus as described herein.

UCHCFC hereby agrees to indemnify and hold harmless HCGW, WH and SMH, its officers, employees and representatives, from any and all claims, demands or actions of any and every kind and nature whatsoever (excluding attorneys' fees) incurred by HCGW, WH or SMH as a result of the failure by UCHC, JDH or CCSA to provide the services described in this Agreement with respect to the Program.

14. Nature of Relationship

UCHC, HCGW, SMH and WH are independent contractors with respect to the services provided pursuant to this Agreement and nothing in this Agreement shall be construed as creating a joint venture, partnership or agency relationship among HCGW, WH, SMH on the one hand and UCHC on the other hand with respect to those services. In furtherance of this intent, each Party agrees that it shall not in its advertisements, correspondence, professional listings, stationary or other public representation state that the other Party is its partner or agent, or that the other Party constitutes a unit of the Party making the representation.

15. Governmental Action

This Agreement is subject to and subordinate to the requirements of any governmental agency having jurisdiction. Notwithstanding any other provision of this Agreement, in the event that any governmental agency, or private entity acting on behalf of or under contract with any governmental agency, having jurisdiction , including OHCA, takes any other action inconsistent with the terms of this Agreement or the intended operation and effect hereof, the party affected shall have the right, after consultations with the other parties, to suggest a modification of any of the terms of this Agreement to the extent and in the manner reasonably necessary or desirable to accommodate such governmental action. The other parties shall be afforded a reasonable opportunity to contest any governmental action which might result in a modification of this Agreement.

The parties specifically agree to comply with Connecticut Sate Statutes and Executive Orders detailed in Schedule C which consists of eleven (11) pages in the aggregate.

16. Prior Approval of Public Materials

No advertisement or other publicly distributed materials which mentions any party to this Agreement in the context of the Program will be used without the prior consent of all parties to this Agreement prior to its public announcement. No public announcement regarding this Agreement shall be made unless the Parties have mutually agreed in writing on the content and timing of such announcement. The Parties recognize, however, that the substance of this Agreement will, in fact, be disclosed to the Office of Health Care Access as part of the Certificate of Need Application in connection with the Program.

17. Covenants Not to Compete

During the term of this Agreement and any extension thereof and for a period of two (2) years following the termination of this Agreement, UCHCFC and any subsidiaries, parent or sister corporations of UCHCFC, will not joint venture, contract with or otherwise undertake services as part of a cardiac surgery and PCI program: (i) separately either with WH or SMH or any of their respective subsidiaries, parent corporation or sister corporations in the service area identified for the Program in the CON or (ii) with Danbury Hospital, its subsidiaries, parent corporation or any sister corporations.

18. Notices

Any notice required or permitted to be given by the parties hereto shall be given in writing and unless otherwise required under this Agreement, shall be sufficiently given or made if delivered personally to the person named below or mailed to such person by fax to the parties listed below c/o their respective designee's respective facsimile numbers. Any party may change the person who is to receive notice under this Agreement in accordance with the provisions of this Section.

If to HCGW:

P. O. Box 2153
Waterbury, CT 06722
Attention: Ms. Loraine Shea, Executive Director

If to SMH:

56 Franklin Street
Waterbury, CT 06706
Attention: Mr. Robert P. Ritz, President and CEO

If to WH:

64 Robbins Street
Waterbury, CT 06721
Attention: Mr. John H. Tobin, President and CEO

If to UCHCFC:

263 Farmington Avenue
Farmington, CT 06030-3802
Attention: Dan Upton, CFO

19. Termination

The Agreement may be terminated at any time only by the mutual agreement of all of the Parties. HCGW, WH and SMH may terminate this Agreement for cause as to UCHCFC and UCHCFC may terminate this Agreement for cause as to HCGW, WH and SMH by giving the other Party thirty (30) days' (hereinafter "cure period") written notice identifying the breach of this Agreement and providing an opportunity to cure such breach. If the said breach is not cured within the cure period, this Agreement shall automatically terminate, without need for further notice. For purposes of this paragraph, "for cause" shall mean the following:

a. A decision during the term of this Agreement, by HCGW, WH and SMH to discontinue the Program.

b. Changes which affect this Agreement in the rules or regulations adopted by Medicare, Medicaid or any other third-party payor which has contractual agreements with the Parties following the completion by the parties of the process defined in this paragraph 19 b. If at any time during the term hereof any new legislation is enacted by the federal government or any state government, or if any governmental agency (or its representative, or any other payor or any other federal, Connecticut or local governmental agency passes, issues or promulgates any law, rule, regulation, standard or interpretation which would render this Agreement illegal, or which could cause significant and material legal and/or economic consequences for any party hereto (hereinafter referred to as "Legislative or Regulatory Change"), such party may give to the other parties notice of intent to amend this Agreement in order to achieve the least burdensome alternative for the parties which still manages to bring this Agreement into compliance with such Legislative or Regulatory Changes and alleviate such legal or financial consequences. If this Agreement is not so amended in writing within ninety (90) days after said notice is given, this Agreement shall terminate as of midnight of the 90th day after said notice is given.

c. Material breach by UCHCFC on the one hand or HCGW, WH and SMH on the other hand of any of their respective obligations under this Agreement.

d. Discontinuation of the Program by OHCA.

This Agreement may not be terminated other than for cause, or as otherwise permitted by this Agreement. If this Agreement is terminated by HCGW, WH and SMH for other than cause, then they shall continue to pay the Fees as set forth in Schedule B in recognition of the substantial commitment of time and resources made by UCHC.

20. Integration

This Agreement constitutes the entire understanding of the parties with respect to the subject matter hereof and supersedes all prior agreements and negotiations between them.

21. Amendment

This Agreement may be modified or amended at any time in whole or in part only by an instrument in writing signed by all parties.

22. Headings

The headings in this Agreement are inserted for convenience of reference only and are not to be used in construing or interpreting any of the provisions of this Agreement.

23. Governing Law

This Agreement shall be construed and enforced in accordance with the laws of the State of Connecticut.

24. Legal Effect

This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns.

25. Counterparts

This Agreement may be executed in two or more counterparts, each of which shall be deemed to be an original but all of which together shall be deemed to be one and the same instrument.

26. Severability

The invalidity or unenforceability of any particular provisions of this Agreement shall not affect its other provisions, an this Agreement shall be construed in all aspects as if such invalid or unenforceable provisions were omitted. The failure of any party to meet its obligations under any one or more of the provisions herein shall in no way avoid or alter the remaining obligations of the parties.

27. Waiver

Any waiver, permission, consent or approval of any kind or character by any party hereto of any breach or default under this Agreement or any waiver of any provision or condition of this Agreement by any party must be in writing and shall by effective only in the specific instance and for the specific purpose set forth and shall not operate or be construed as a waiver of any subsequent breach, default, provision or condition of this Agreement by any party.

28. Assignment

This Agreement may not be assigned by any party without the prior written consent of all of the other parties.

29. Access to Records

Until the expiration of four (4) years after the furnishing of the services provided under this Agreement, the parties will make available to the Secretary, U.S. Department of Health and Human Services and the U.S. Comptroller General, and their representatives, this Agreement and all books, documents, and records necessary to certify the nature and extent of the costs of those services. If either party hereto carries out the duties of this Agreement through a subcontract worth TEN THOUSAND ($10,000) DOLLARS or more over a twelve-month period with a related organization, the subcontract will also contain an access clause to permit access by the secretary, Comptroller General, and their representatives, to the related organization's books and records.

The parties recognize and agree that they will afford to the other parties to this Agreement access to their respective records dealing with their performance under this Agreement in circumstances where such access and review is reasonable and necessary for a party to provide a defense to a lawsuit brought by a party which is not subject to the terms of this Agreement. Any access to records under this paragraph shall be compliant at all times with the provisions of Paragraph 31 of this Agreement and shall be conducted in such a manner as to not only preserve the confidentiality of such records but also not subject any party to any claimed waiver of safeguards available in accordance with applicable law.

30. Legal Constraints

The Parties recognize that their efforts to develop the Program as described in this Agreement will be constrained by various legal requirements. The Parties recognize that the Program will be structured and any activities undertaken pursuant to this Agreement will be

carried out so as to assure that at all times no federal or state statute, rules or regulations are violated.

31. HIPAA

a. The purpose of this clause is to establish the permitted and required uses and disclosures by the PARTIES of Personal Health Information or Electronic Information ("PHI") it may possess by reason of the Agreement.

b. Definitions. The following terms shall have the meaning ascribed to them in this Section. Other capitalized terms shall have the meaning ascribed to them in the context in which they first appear.

   i. HHS Privacy Regulations shall mean the Code of Federal Regulations ("C.F.R.") at Title 45, Section 160 and 164.

   ii. HHS Security Regulations shall mean the Code of Federal Regulations ("C.F.R.") at Title 45, Sections 160, 162, and 164.

   iii. Individual shall mean the person who is the subject of the PHI, and has the same meaning as the term "individual" as defined by 45 C.F.R. section 164.501.

   iv. Information shall mean any "health information" provided and/or made available by a PARTY to a PARTY, and has the same meaning as the term "health information" as defined by 45 C.F.R. Section 160.102.

   v. Electronic Information shall mean any "electronic protected health information" provided and/or made available by a PARTY to the other PARTY, or otherwise created, maintained or transmitted on behalf of the PARTIES and has the same meaning as the term "electronic protected health information" as defined by 45 C.F.R

   vi. Parties shall mean the PARTY or the PARTIES.

   vii. PHI means "Information" or "Electronic Information"

   viii. Secretary shall mean the Secretary of the Department of Health and Human Services ("HHS") and any other officer or employee of HHS to whom the authority involved has been delegated.

c. Limits on Use and Disclosure Established by Terms of Agreement or Law. Each PARTY hereby agrees that it shall not use or disclose the PHI provided or made available by the other PARTY for any purpose other than as permitted by this Agreement or required by law. The PARTIES shall not use or disclose PHI in a manner that would violate HHS Privacy or Security Regulations.

d. Permitted Uses and Disclosures of PHI by the PARTIES. Each PARTY shall be permitted to use and/or disclose PHI provided or made available from the other PARTY for the purposes stated in the existing Agreement.

e. Use or Disclosure of PHI for Management, Administration of Business, and Legal Responsibilities. The PARTIES may use PHI if necessary for the proper management and administration of the PARTIES; to carry out legal responsibilities of the PARTIES; and to provide data aggregation services

relating to the health care operations of the PARTIES. A PARTY may also disclose PHI provided if:

i. The law requires the disclosure; and/or

ii. The PARTY obtains reasonable assurances from the person to whom the PHI is disclosed that it will be held confidentially and used or further disclosed only as required by law or for the purposes for which it was disclosed to the person; and the person promptly notified the PARTY of any instances of which it is aware that the confidentiality of the PHI has been breached; and/or.

iii. the PARTY obtains reasonable assurances from the person to whom the PHI is disclosed (to include subcontractors or any other agents of the PARTY) that reasonable and appropriate safeguards have been implemented.

f. Administrative, Physical, and Technical Safeguards. The PARTIES will implement administrative, physical, and technical safeguards that reasonably and appropriately protect the confidentiality, integrity, and availability of PHI that it creates, receives, maintains, or transmits on behalf of the other PARTY.

g. Obligations of the PARTIES.

i. Appropriate Safeguards. The PARTIES will use appropriate safeguard to prevent use or disclosure of PHI other than as provided for by this Addendum.

ii. Reporting Security Incidents. A PARTY will report to the other PARTY any security incident of which it becomes aware. Report shall be made within 24 hours of identification of incident by the PARTY.

iii. Reporting Improper Use or Disclosure. A PARTY will report to the other PARTY any use or disclosure of PHI not provided by this Addendum of which it becomes aware.

iv. Mitigation of Improper Use or Disclosure. Each PARTY will mitigate to the extent practicable, any harmful effect that is known to the PARTY of a use or disclosure in violation of the requirements of this Addendum.

v. Agents and Subcontractors. The PARTIES shall ensure by subcontract that any agents or subcontractors to whom it provides or makes available PHI, will be bound by the same restrictions and conditions on the use of PHI that apply to the PARTIES and that are contained in this Agreement.

vi. Individuals' Rights of Access to PHI. Within ten (10) days of receiving a written request from a PARTY, the other PARTY shall make available PHI in accordance with Individual's right to access such PHI in accordance with 45 C.F.R. section 164.524.

vii. Amendments to Individuals' PHI. Within fifteen (15) days of receiving a written request from a PARTY, the other PARTY shall make PHI available for amendment and incorporation of amendments to PHI in accordance with 45 C.F.R. section 164.526.

viii. Accountings of Disclosure. Within fifteen (15) days of receiving a written request from a PARTY, a PARTY shall make PHI available as required to provide an accounting of disclosures made of PHI in accordance with 45 C.F.R. section 164. 528.

ix. Access to Books and Records. Each PARTY shall made its internal practices, books and records relating to the use or disclosure of PHI from, or created or received by, a PARTY on behalf of the other PARTY, available to the Secretary for purposes of determining compliance with HHS Privacy Regulations.

x. Return or Destruction of Information. At termination of Agreement, a PARTY will return or destroy all PHI received from, or created or received by a PARTY on behalf of the other PARTY. The returning PARTY shall not retain copies of such information upon termination of Agreement. If returning or destroying PHI at termination of Agreement is not feasible, the returning PARTY will extend the PHI protections of this Addendum and limit further uses and disclosures to those purposes that make the return or destruction of PHI infeasible.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed as of the date first above written.

WITNESS

HEART CENTER OF GREATER WATERBURY

By: _____
Loraine Shea
Executive Director

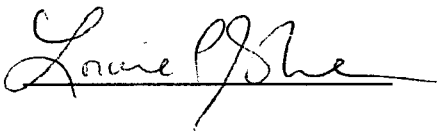
WITNESS

_____

UNIVERSITY OF CONNECTICUT HEALTH CENTER FINANCE CORPORATION

By: _____
Daniel L. Upton
Chief Financial Officer

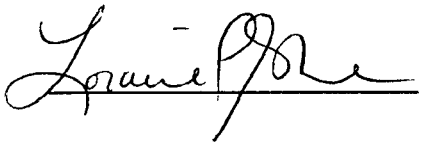
WITNESS



THE WATERBURY HOSPITAL

By: _____
John H. Tobin
President and CEO

WITNESS



SAINT MARY'S HOSPITAL

By: _____
Robert P. Ritz
President and CEO

SCHEDULE A

CLINICAL OVERSIGHT AGREEMENT

Period April 21, 2007 – April 20, 2009

University of Connecticut Health Center
Support to Waterbury / St. Mary's Hospitals
Joint PCI and Open Heart Program

1. Provide staff educational oversight and programming for PCI and open heart surgery care.

   A. Rotation of University of Connecticut Health Center Staff to Waterbury and St. Mary's Hospitals to provide on-site education and training support upon request for Surgical, Inpatient Nursing and Cath Lab staff (1-3 mo as mutually agreed).

2. Consult on the refinement of clinical standards of care and creation of competency development programs.

3. Continuing education:

   - Upon request, provide educational lectures on site at the Waterbury hospitals (up to 3 total for the year).

   - UConn hosted cardiac educational symposium. Objective to provide the most current evidence based practice / research to clinicians in an interactive forum.

4. Provide UCHC physicians to serve on the Heart Center of Greater Waterbury Advisory Board and provide consultation on the quality management program.

5. Coordinate cardiac surgery services in the manner described in Paragraph 2 of the Agreement to which this Schedule is attached. Coordinate perfusion services in the manner described in the Perfusion contract dated March 30, 2005.

SCHEDULE A-1

SCHEDULE A-1

AGREEMENT BETWEEN THE UNIVERSITY OF CONNECTICUT HEALTH CENTER FINANCE CORPORATION AND CONNECTICUT CARDIOTHORACIC SURGICAL ASSOCIATES, LLC

THIS AGREEMENT is made by and between Connecticut Cardiothoracic Surgical Associates, LLC ("CCSA") and the University of Connecticut Health Center Finance Corporation ("UCHCFC") on behalf of the clinical enterprises of the University of Connecticut Health Center ("UCHC") including John Dempsey Hospital ("JDH") and UConn Medical Group ("UMG").

WHEREAS, the University of Connecticut Health Center is an academic health center that incorporates the School of Medicine ("SOM"), its faculty practice plan UConn Medical Group ("UMG"), and an acute care general hospital John Dempsey Hospital (JDH); and

WHEREAS, CCSA constitutes a group of cardiothoracic surgeons who are members of the faculty of SOM and who provide services in as members of UMG and as members of the JDH medical staff; and

WHEREAS, the parties, the Heart Center of Greater Waterbury (HCGW), St. Mary's Hospital (SMH), Waterbury Hospital (WH) and the University of Connecticut Health Center, and Connecticut Cardiothoracic Surgical Associates, LLC ("CCSA"), have established a joint interventional cardiology and open heart surgery program with St. Mary's Hospital and Waterbury Hospital in the City of Waterbury ('Program') and the collaboration and wish to continue said services provided by UCHC and CCSA in connection with the continuation of that Program; and

WHEREAS, UCHCFC has entered into a Clinical Oversight agreement with the Heart Center of Greater Waterbury (HCGW), SMH and WH which includes among other things responsibility for coordinating cardiothoracic surgical services in association with the Program.

WHEREAS, the University of Connecticut Health Center and CCSA have agreed to provide services to the Program in Waterbury and to become members of the advisory board established in connection with the Program ("Advisory Board"); and

WHEREAS, the parties hereto wish to continue the terms under which they will collaborate in the provision of services to the Waterbury Program; and

WHEREAS, each party is properly authorized to enter into this Agreement.

NOW THEREFORE, in consideration of the promises and mutual covenants herein contained, the parties agree as follows:

1. **Duties of CCSA**

1.1 CCSA shall cooperate with UCHC in activities related to ongoing clinical operations for cardiothoracic surgery services in support of the Program, including but not limited to meetings with physicians, administrators, and clinical teams for the purpose of quality and program review associated with St. Mary's Hospital and Waterbury Hospital, and consultation regarding policies, procedures and protocols.

1.2 CCSA agrees to cooperate and comply with the terms of the Clinical Oversight Agreement between UCHCFC and Heart Center of Greater Waterbury, Inc., St. Mary's Hospital, Waterbury Hospital both incorporated herein and presented in Exhibit A.

1.3 CCSA will provide cardiothoracic surgery services on site at both St. Mary's Hospital and Waterbury Hospital as required to support the Program.

1.4 CCSA agrees that its physicians will maintain active clinical privileges at St. Mary's Hospital and Waterbury Hospital.

1.5 CCSA warrants that its physicians:

1.5.1 Are duly licensed and registered, in good standing, to practice his profession in the State of Connecticut, which license shall not be revoked, suspended or restricted in any manner;

1.5.2 Have current controlled substances registrations issued by the appropriate federal and state governmental agencies, which registrations shall not be suspended, revoked or restricted in any manner;

1.5.3 Participate in the Medicare and Medicaid programs;

1.5.4 Are Faculty members at the University of Connecticut SOM;

1.5.5 Are members in good standing of John Dempsey Hospital's active staff, having clinical privileges commensurate with his duties hereunder;

1.5.6 Are Board certified in or eligible for Board certification in cardiothoracic surgery.

2. Duties of UMG

2.1 UMG shall coordinate the provision of clinical oversight services for the Heart Center of Greater Waterbury, Inc., St. Mary's Hospital, and Waterbury Hospital including surgical and other services as described in the Agreement and in Schedule A.

2.2 UMG will provide administrative support reasonably requested by CCSA in support of their duties hereunder.

3. Compensation

3.1 CCSA, in cooperation with UMG, agrees to seek compensation for patient care services directly from patients or patients' health plans in accordance with applicable industry standards.

4. Relationship of Parties

4.1 The relationship among CCSA and UMG and Physicians is that of independent contractors. Nothing contained in this Agreement is intended to create or shall be construed to create an agency, partnership, employer/employee or joint venture relationship among the parties. Each party shall remain solely liable for its own debts, obligations or liabilities without, however, in any way modifying the obligations each party has assumed herein.

4.2 It is specifically acknowledged and agreed by the parties hereto that the provision of services by Physicians to UMG and the payments made by UMG to CCSA pursuant to this Agreement will not in any way require or be contingent upon the referral of patients by either party to the other.

5. Term and Termination

5.1 This Agreement shall be effective April 21, 2007 and shall terminate two (2) years following its effective date, unless sooner terminated as hereinafter provided ("Term"). The parties may be willing to consider an extension of the terms of the Agreement provided that they are able to reach agreement upon the length, fees and other terms and conditions of the extended term prior to the expiration of the Term.

5.2 Termination of this Agreement shall not release or discharge either party from any obligation, debt, or liability which shall have previously accrued and remains to be performed upon the date of termination.

5.3 Either party shall have the right to terminate this Agreement upon written notice in the event the other party fails to keep, observe or perform any term or provision of this Agreement to be kept, observed or performed and such default shall continue for a period of thirty (30) days after written notice thereof to the other party.

6. HIPAA

6.1. The purpose of this clause is to establish the permitted and required uses and disclosures by the PARTIES of Personal Health Information or Electronic Information ("PHI") it may possess by reason of the Agreement.

6.2. Definitions. The following terms shall have the meaning ascribed to them in this Section. Other capitalized terms shall have the meaning ascribed to them in the context in which they first appear.

6.2.1. HHS Privacy Regulations shall mean the Code of Federal Regulations ("C.F.R.") at Title 45, Section 160 and 164.

6.2.2. HHS Security Regulations shall mean the Code of Federal Regulations ("C.F.R.") at Title 45, Sections 160, 162, and 164.

6.2.3. Individual shall mean the person who is the subject of the PHI, and has the same meaning as the term "individual" as defined by 45 C.F.R. section 164.501.

6.2.4. Information shall mean any "health information" provided and/or made available by a PARTY to a PARTY, and has the same meaning as the term "health information" as defined by 45 C.F.R. Section 160.102.

6.2.5. Electronic Information shall mean any "electronic protected health information" provided and/or made available by a PARTY to the other PARTY, or otherwise created, maintained or transmitted on behalf of the PARTIES and has the same meaning as the term "electronic protected health information" as defined by 45 C.F.R

6.2.6. Parties shall mean the PARTY or the PARTIES.

6.2.7. PHI means "Information" or "Electronic Information"

6.2.8. Secretary shall mean the Secretary of the Department of Health and Human Services ("HHS") and any other officer or employee of HHS to whom the authority involved has been delegated.

6.3. Limits on Use and Disclosure Established by Terms of Agreement or Law. Each PARTY hereby agrees that it shall not use or disclose the PHI provided or made available by the other PARTY for any purpose other than as permitted by this Agreement or required by law. The PARTIES shall not use or disclose PHI in a manner that would violate HHS Privacy or Security Regulations.

6.4. Permitted Uses and Disclosures of PHI by the PARTIES. Each PARTY shall be permitted to use and/or disclose PHI provided or made available from the other PARTY for the purposes stated in the existing Agreement.

6.5. Use or Disclosure of PHI for Management, Administration of Business, and Legal Responsibilities. The PARTIES may use PHI if necessary for the proper management and administration of the PARTIES; to carry out legal responsibilities of the PARTIES; and to provide data aggregation services relating to the health care operations of the PARTIES. A PARTY may also disclose PHI provided if:

6.5.1. The law requires the disclosure; and/or

6.5.2. The PARTY obtains reasonable assurances from the person to whom the PHI is disclosed that it will be held confidentially and used or further disclosed only as required by law or for the purposes for which it was disclosed to the person; and the person promptly notified the PARTY of any instances of which it is aware that the confidentiality of the PHI has been breached; and/or.

6.5.3. the PARTY obtains reasonable assurances from the person to whom the PHI is disclosed (to include subcontractors or any other agents of the PARTY) that reasonable and appropriate safeguards have been implemented.

6.6. Administrative, Physical, and Technical Safeguards. The PARTIES will implement administrative, physical, and technical safeguards that reasonably and appropriately protect the confidentiality, integrity, and availability of PHI that it creates, receives, maintains, or transmits on behalf of the other PARTY.

6.7. Obligations of the PARTIES.

6.7.1. Appropriate Safeguards. The PARTIES will use appropriate safeguard to prevent use or disclosure of PHI other than as provided for by this Addendum.

6.7.2. Reporting Security Incidents. A PARTY will report to the other PARTY any security incident of which it becomes aware.

Report shall be made within 24 hours of identification of incident by the PARTY.

6.7.3. Reporting Improper Use or Disclosure. A PARTY will report to the other PARTY any use or disclosure of PHI not provided by this Addendum of which it becomes aware.

6.7.4. Mitigation of Improper Use or Disclosure. Each PARTY will mitigate to the extent practicable, any harmful effect that is known to the PARTY of a use or disclosure in violation of the requirements of this Addendum.

6.7.5. Agents and Subcontractors. The PARTIES shall ensure by subcontract that any agents or subcontractors to whom it provides or makes available PHI, will be bound by the same restrictions and conditions on the use of PHI that apply to the PARTIES and that are contained in this Agreement.

6.7.6. Individuals' Rights of Access to PHI. Within ten (10) days of receiving a written request from a PARTY, the other PARTY shall make available PHI in accordance with Individual's right to access such PHI in accordance with 45 C.F.R. section 164.524.

6.7.7. Amendments to Individuals' PHI. Within fifteen (15) days of receiving a written request from a PARTY, the other PARTY shall make PHI available for amendment and incorporation of amendments to PHI in accordance with 45 C.F.R. section 164.526.

6.7.8. Accountings of Disclosure. Within fifteen (15) days of receiving a written request from a PARTY, a PARTY shall make PHI available as required to provide an accounting of disclosures made of PHI in accordance with 45 C.F.R. section 164. 528.

6.7.9. Access to Books and Records. Each PARTY shall made its internal practices, books and records relating to the use or disclosure of PHI from, or created or received by, a PARTY on behalf of the other PARTY, available to the Secretary for purposes of determining compliance with HHS Privacy Regulations.

6.7.10. Return or Destruction of Information. At termination of Agreement, a PARTY will return or destroy all PHI received from, or created or received by a PARTY on behalf of the other PARTY. The returning PARTY shall not retain copies of such information upon termination of Agreement. If returning or destroying PHI at termination of Agreement is not feasible, the returning PARTY will extend the PHI protections of this Addendum and limit further uses and disclosures to those purposes that make the return or destruction of PHI infeasible.

7. **Miscellaneous Provisions**

7.1 The parties agree to comply with state orders described in Exhibit B hereto.

7.2 Either party shall not differentiate or discriminate in any way in the provision of covered services on the basis of race, sex, age, religion, place of residence, health status or source of payment.

7.3 During the term of and following termination of this Agreement, each party shall keep strictly confidential any proprietary information regarding the other party. All information which is reasonably treated by any party as being proprietary, shall be presumed to be proprietary. Each party shall take necessary reasonable precautions to prevent unauthorized disclosure of proprietary information and shall require all of its officers, employees and other personnel to whom it is necessary to disclose the same, or to whom the same has been disclosed, to keep such proprietary information confidential. Upon termination of this Agreement, each party agrees to return to the other, within ten (10) days of the termination of this Agreement, all proprietary information of the other party in such party's possession.

7.4 No failure by either party to exercise, and no delay in exercising any right, power or privilege under this Agreement shall constitute a waiver thereof, nor shall any single or partial exercise of any right, power or privilege hereunder preclude any other or further exercise of any right, power or privilege. The rights and remedies provided herein are cumulative and not exclusive of any rights or remedies provided by law or otherwise.

7.5 This Agreement constitutes the entire agreement between the parties and contains all the agreements between the parties with respect to the subject matter hereof.

7.6 Neither this Agreement nor any of its provisions may be waived, altered, amended or supplemented in any manner except by a writing signed by the parties hereto. In the event any licensing, certifying or accrediting body requires or recommends that this Agreement include any provision not included herein, the parties agree to amend this Agreement to include such provision.

7.7 Neither this Agreement nor any right or interest hereunder may be assigned, in whole or in part, nor may any obligation hereunder be delegated, by CCSA without the prior written consent of UMG.

7.8 This Agreement shall be binding upon and shall inure to the benefit of the parties hereto and their respective successors and permitted assigns.

7.9 If any provision of this Agreement is held to be invalid or unenforceable, such invalidity or unenforceability shall not affect any other provision of this Agreement that can be given effect without the invalid provision. In such event, all parties agree that the court making such determination shall have the power to alter or amend such provision so that it shall be enforceable to an extent which is consistent with the intention of the parties.

7.10 This Agreement shall be governed by and construed in accordance with the laws of the State of Connecticut.

7.11 The parties agree that this HCGW, WH and SMH are third party beneficiaries to this agreement.

7.12 Nothing in this Agreement shall be construed as creating or giving rise to any rights in any third parties or any persons other than the parties hereto.

7.13 If: (i) in the opinion of nationally recognized health care counsel jointly selected by the parties (the "Opinion"), it is determined that it is more likely than not that applicable legislation, regulations, rules or procedures (collectively referred to herein as the "Law) in effect (or to become effective as of a date certain), or (ii) either of the parties receives notice (the "Notice") of an actual or threatened decision, finding or action by any governmental or private agency or court (collectively referred to herein as an "Action"), which Law or Action, if or when implemented, would have the effect of subjecting either party to civil or criminal prosecution under state and/or federal laws; then the parties shall attempt in good faith to amend this Agreement to the minimum extent necessary in order to comply with such law or to avoid the Action, as applicable, and shall utilize mutually agreed upon joint legal counsel to the extent practicable. If, within thirty (30) days the parties either are unable to mutually agree upon and make amendments or alterations to this Agreement to meet the requirements in question or determine in good faith that compliance with such requirements is impossible or unfeasible, then this Agreement shall be terminated without penalty, charge or continuing liability, except as otherwise set forth in Section 8.(d) of this Agreement, upon the earlier of: (x) sixty (60) days subsequent to the date the parties became aware of this matter or (y) the effective date upon which the Law or Action prohibits the relationship of the parties pursuant to this Agreement.

7.14 All notices required or which may be given hereunder shall be mailed to:

UMG
James S. Thibeault
Director, Clinical Planning
University of Connecticut Health Center
263 Farmington Avenue
Farmington, CT 06030-3802

CCSA
Connecticut Cardiothoracic Surgical Associates, LLC
80 Seymour St. Suite 725
Hartford, CT 06106

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed by their duly authorized representatives as of the date set forth below.

CONNECTICUT CARDIOTHORACIC SURGICAL ASSOCIATES, LLC	**UNIVERSITY OF CONNECTICUT HEALTH CENTER FINANCE CORPORATION**
_____	_____
_____	_____
_____	_____
Date	Date

SCHEDULE A

CLINICAL OVERSIGHT AGREEMENT

Period April 21, 2007 – April 20, 2009

University of Connecticut Health Center
Support to Waterbury / St. Mary's Hospitals
Joint PCI and Open Heart Program

1. Provide staff educational oversight and programming for PCI and open heart surgery care.

   A. Rotation of University of Connecticut Health Center Staff to Waterbury and St. Mary's Hospitals to provide on-site education and training support upon request for Surgical, Inpatient Nursing and Cath Lab staff (1-3 mo as mutually agreed).

2. Consult on the refinement of clinical standards of care and creation of competency development programs.

3. Continuing education:

   - Upon request, provide educational lectures on site at the Waterbury hospitals (up to 3 total for the year).

   - UConn hosted cardiac educational symposium. Objective to provide the most current evidence based practice / research to clinicians in an interactive forum.

4. Provide UCHC physicians to serve on the Heart Center of Greater Waterbury Advisory Board and provide consultation on the quality management program.

5. Coordinate cardiac surgery services in the manner described in Paragraph 2 of the Agreement to which this Schedule is attached. Coordinate perfusion services in the manner described in the Perfusion contract dated March 30, 2005.

SCHEDULE B

CLINICAL OVERSIGHT AGREEMENT
Consulting Fee

Period April 21, 2007 – April 20, 2009

University of Connecticut Health Center
Support to Waterbury / St. Mary's Hospitals
Joint PCI and Open Heart Program

Base Consulting Fee for Schedule A: 2, 4,& 5

Payable by Saint Mary's Hospital and Waterbury Hospital at a rate of $625 per hospital per month for 12 months. Payments are due by the 20th of each month. The total amount per hospital per year is $7,500.

"Additional Consulting" Fee for Schedule A: 1A &3 Billed at UConn Cost

Invoices for "Additional Consulting" to be sent to the following contacts at Saint Mary's Hospital and Waterbury Hospital:

Sandra Roosa, Vice President, Saint Mary's Hospital, 56 Franklin Street, Waterbury, CT 06706

Sandra Iadarola, Administrative Director, Waterbury Hospital, 64 Robbins Street, Waterbury, CT 06721

Consulting Fees Payable to:

University of Connecticut Health Center Finance Corporation, 263 Farmington Avenue, Farmington, CT 06030-3802 Attn: James Thibeault

The fees identified in this Schedule B are for services described in Schedule A. If the parties mutually determine that they wish to expand services provided by this agreement, fees for such expanded services shall be addressed accordingly by the parties.

SCHEDULE C

Compliance with State Orders

Sec. 4a-60. (Formerly Sec. 4-114a). Nondiscrimination and affirmative action provisions in contracts of the state and political subdivisions other than municipalities.

(a) Every contract to which the state or any political subdivision of the state other than a municipality is a party shall contain the following provisions: (1) The contractor agrees and warrants that in the performance of the contract such contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the state of Connecticut. The contractor further agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation, or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved; (2) the contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the commission; (3) the contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the commission advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (4) the contractor agrees to comply with each provision of this section and sections 46a-68e and 46a-68f and with each regulation or relevant order issued by said commission pursuant to sections 46a-56, 46a-68e and 46a-68f; (5) the contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the contractor as relate to the provisions of this section and section 46a-56. If the contract is a public works contract, the contractor agrees and warrants that he will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works project.

(b) For the purposes of this section, "minority business enterprise" means any small contractor or supplier of materials fifty-one per cent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) Who are active in the daily affairs of the enterprise, (2) who have the power to direct the management and policies of the enterprise and (3) who are members of a minority, as such term is defined in subsection (a) of section 32-9n; and "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations. "Good faith efforts" shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements.

(c) Determination of the contractor's good faith efforts shall include but shall not be limited to the

following factors: The contractor's employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training; technical assistance activities and such other reasonable activities or efforts as the commission may prescribe that are designed to ensure the participation of minority business enterprises in public works projects.
(d) The contractor shall develop and maintain adequate documentation, in a manner prescribed by the commission, of its good faith efforts.
(e) The contractor shall include the provisions of subsection (a) of this section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the state and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the commission. The contractor shall take such action with respect to any such subcontract or purchase order as the commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with section 46a-56; provided, if such contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the commission, the contractor may request the state of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the state and the state may so enter.

Sec. 4a-60a. Contracts of the state and political subdivisions, other than municipalities, to contain provisions re nondiscrimination on the basis of sexual orientation.
(a) Every contract to which the state or any political subdivision of the state other than a municipality is a party shall contain the following provisions: (1) The contractor agrees and warrants that in the performance of the contract such contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or of the state of Connecticut, and that employees are treated when employed without regard to their sexual orientation; (2) the contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (3) the contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said commission pursuant to section 46a-56; (4) the contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the contractor which relate to the provisions of this section and section 46a-56.
(b) The contractor shall include the provisions of subsection (a) of this section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the state and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the commission. The contractor shall take such action with respect to any such subcontract or purchase order as the commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with section 46a-56; provided, if such contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the commission, the contractor may

request the state of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the state and the state may so enter.

Executive Order No. Three

WHEREAS, sections 4-61d(b) and 4-114a of the 1969 supplement to the general statutes require nondiscrimination clauses in state contracts and subcontracts for construction on public buildings, other public works and goods and services, and

WHEREAS, section 4-61e(c) of the 1969 supplement to the general statutes requires the labor department to encourage and enforce compliance with this policy by both employers and labor unions, and to promote equal employment opportunities, and

WHEREAS, the government of this state recognizes the duty and desirability of its leadership in providing equal employment opportunity, by implementing these laws,

NOW, THEREFORE, I, THOMAS J. MESKILL, Governor of the State of Connecticut, acting by virtue of the authority vested in me under section twelve of article fourth of the constitution of the state, as supplemented by section 3-1 of the general statutes, do hereby ORDER and DIRECT, as follows, by this Executive Order:

I. The labor commissioner shall be responsible for the administration of this Order and shall adopt such regulations as he deems necessary and appropriate to achieve the purposes of this Order. Upon the promulgation of this Order, the commissioner of finance and control shall issue a directive forthwith to all state agencies, that henceforth all state contracts and subcontracts for construction on public buildings, other public works and goods and services shall contain a provision rendering such contract or subcontract subject to this Order, and that such contract or subcontract may be cancelled, terminated or suspended by the labor commissioner for violation of or noncompliance with this Order or state or federal laws concerning nondiscrimination, notwithstanding that the labor commissioner is not a party to such contract or subcontract.

II. Each contractor having a contract containing the provisions prescribed in section 4-114a of the 1969 supplement to the general statutes, shall file, and shall cause each of his subcontractors to file, compliance reports with the contracting agency or the labor commissioner, as may be directed. Such reports shall be filed within such times and shall contain such information as to employment policies and statistics of the contractor and each subcontractor, and shall be in such form as the labor commissioner may prescribe. Bidders or prospective contractors or subcontractors may be required to state whether they have participated in any previous contract subject to the provisions of this Order or any preceding similar Order, and in that event to submit on behalf of themselves and their proposed subcontractors compliance reports prior to or as an initial part of their bid or negotiation of a contract.

III. Whenever the contractor or subcontractor has a collective bargaining agreement or other contract or understanding with a labor organization or employment agency as defined in section 31-122 of the general statutes, the compliance report shall identify the said organization or agency and the contracting agency or the labor commissioner may require a compliance report to be filed with the contracting agency or the labor commissioner, as may be directed, by such organization or agency, signed by an authorized officer or agent of such organization or agency, with supporting information, to the effect that the signer's

practices and policies, including but not limited to matters concerning personnel, training, apprenticeship, membership, grievance and representation, and upgrading, do not discriminate on grounds of race, color, religious creed, age, sex or national origin, or ancestry of any individual, and that the signer will either affirmatively cooperate in the implementation of the policy and provisions of this Order, or that it consents and agrees that recruitment, employment and the terms and conditions of employment under the proposed contract shall be in accordance with the purposes and provisions of the Order.

IV. The labor commissioner may by regulation exempt certain classes of contracts, subcontracts or purchase orders from the implementation of this Order, for standard commercial supplies or raw materials, for less than specified amounts of money or numbers of workers or for subcontractors below a specified tier. The labor commissioner may also provide by regulation for the exemption of facilities of a contractor which are in all respects separate and distinct from activities of the contractor related to the performance of the state contract, provided only that such exemption will not interfere with or impede the implementation of this Order, and provided further, that in the absence of such an exemption, all facilities shall be covered by the provisions of this Order.

V. Each contracting agency shall be primarily responsible for obtaining compliance with the regulations of the labor commissioner with respect to contracts entered into by such agency or its contractors. All contracting agencies shall comply with the regulations of the labor commissioner in discharging their primary responsibility for securing compliance with the provisions of contracts and otherwise with the terms of this Order and of the regulations of the labor commissioner issued pursuant to this Order. They are directed to cooperate with the labor commissioner and to furnish the labor commissioner such information and assistance as he may require in the performance of his functions under this Order. They are further directed to appoint or designate from among the personnel of each agency, compliance officers, whose duty shall be to seek compliance with the objectives of this Order by conference, conciliation, mediation, or persuasion.

VI. The labor commissioner may investigate the employment practices and procedures of any state contractor or subcontractor and the practices and policies of any labor organization or employment agency hereinabove described, relating to employment under the state contract, as concerns nondiscrimination by such organization or agency as hereinabove described, or the labor commissioner may initiate such investigation by the appropriate contract agency, to determine whether or not the contractual provisions hereinabove specified or statutes of the state respecting them have been violated. Such investigation shall be conducted in accordance with the procedures established by the labor commissioner and the investigating agency shall report to the labor commissioner any action taken or recommended.

VII. The labor commissioner shall receive and investigate or cause to be investigated complaints by employees or prospective employees of a state contractor or subcontractor or members or applicants for membership or apprenticeship or training in a labor organization or employment agency hereinabove described, which allege discrimination contrary to the contractual provisions specified hereinabove or state statutes requiring

nondiscrimination in employment opportunity. If this investigation is conducted for the labor commissioner by a contracting agency, that agency shall report to the labor commissioner what action has been taken or is recommended with regard to such complaints.

VIII. The labor commissioner shall use his best efforts, directly and through contracting agencies, other interested federal, state and local agencies, contractors and all other available instrumentalities, including the commission on human rights and opportunities, the executive committee on human rights and opportunities, ad the apprenticeship council under its mandate to provide advice and counsel to the labor commissioner in providing equal employment opportunities to all apprentices and to provide training, employment and upgrading opportunities for disadvantages workers, in accordance with section 31-51(d) of the 1969 supplement to the general statutes, to cause any labor organization or any employment agency whose members are engaged in work under government contracts or referring workers or providing supervising apprenticeship or training for or in the course of work under a state contract or subcontract to cooperate in the implementation of the purposes of this Order. The labor commissioner shall in appropriate cases notify the commission on human rights and opportunities or other appropriate state or federal agencies whenever it has reason to believe that the practices of any such organization or agency violate equal employment opportunity requirements of state or federal law.

IX. The labor commissioner or any agency officer or employee in the executive branch designated by regulation of the labor commissioner may hold such hearings, public or private, as the labor commissioner may deem advisable for compliance, enforcement or educational purposes under this Order.

X. (a) The labor commissioner may hold or cause to be held hearings, prior to imposing ordering or recommending the imposition of penalties and sanctions under this Order. No order for disbarment of any contractor from further state contracts shall be made without affording the contractor an opportunity for a hearing. In accordance with such regulations as the labor commissioner may adopt, the commissioner or the appropriate contracting agency may

1. Publish or cause to be published the names of contractors or labor organizations or employment agencies as hereinabove described which it has concluded have complied or failed to comply with the provisions of this Order or the regulations of the labor commissioner in implementing this Order.

2. Recommend to the commission on human rights and opportunities that in cases in which there is substantial or material violation or threat thereof of the contractual provision or related state statutes concerned herein, appropriate proceedings be brought to enforce them, including proceedings by the commission on its own motion under chapter 563 of the general statutes and the enjoining, within the limitations of applicable law, of organizations, individuals or groups who prevent directly or indirectly compliance with the provisions of this Order.

3. Recommend that criminal proceedings be brought under chapter 939 of the general statutes.

4. Cancel, terminate, suspend or cause to be cancelled, terminated, or suspended in accordance with law any contract or any portion or portions thereof for failure of the contractor or subcontractor to comply with the nondiscrimination provisions of the contract. Contracts may be cancelled, terminated, suspended absolutely or their continuance conditioned upon a program for future compliance approved by the contracting agency.

5. Provide that any contracting agency shall refrain from entering into any further contracts or extensions or modifications of existing contracts with any contractor until he has satisfied the labor commissioner that he has established and will carry out personnel and employment policies compliant with this Order.

6. Under regulations prescribed by the labor commissioner each contracting agency shall make reasonable efforts with a reasonable period of time to secure compliance with the contract provisions of this Order by methods of conference, conciliation, mediation or persuasion, before other proceedings shall be instituted under this Order or before a state contract shall be cancelled or terminated in whole or in part for failure of the contractor or subcontractor to comply with the contract provisions of state statute and this Order.

(b) Any contracting agency taking any action authorized by this Order, whether on its own motion or as directed by the labor commissioner or pursuant to his regulations shall promptly notify him of such action. Whenever the labor commissioner makes a determination under this Order, he shall promptly notify the appropriate contracting agency and other interested federal, state and local agencies of the action recommended. The state and local agency or agencies shall take such action and shall report the results thereof to the labor commissioner within such time as he shall specify.

XI. If the labor commissioner shall so direct, contracting agencies shall not enter into contracts with any bidder or prospective contractor unless he has satisfactorily complied with the provisions of this Order, or submits a program for compliance acceptable to the labor commissioner, or if the labor commissioner so authorizes, to the contracting agency.

XII. Whenever a contracting agency cancels or terminates a contract, or a contractor has been disbarred from further government contracts because of noncompliance with the contract provisions with regard to nondiscrimination, the labor commissioner or the contracting agency shall rescind such disbarment, upon the satisfaction of the labor commissioner that the contractor has purged himself of such noncompliance and will thenceforth carry out personnel and employment policies of nondiscrimination in compliance with the provision of this Order.

XIII. The labor commissioner may delegate to any officer; agency or employee in the executive branch any function or duty of the labor commissioner under this Order except authority to promulgate regulations of a general nature.

XIV. This Executive Order supplements the Executive Order issued on September 28, 1967. All regulations, orders, instructions, designations and other directives issued heretofore in these premises, including those issued by the heads of various departments or agencies under or pursuant to prior order or statute, shall remain in full force and effect, unless and until revoked or superceded by appropriate authority, to the extent that they are not inconsistent with this Order.

Dated at Hartford, Connecticut, this 16th day of June, 1971.

Thomas J. Meskill, Governor

Executive Order No. Seventeen

WHEREAS, Section 31-237 of the General Statutes of Connecticut as amended requires the maintaining of the established free services of the Connecticut State Employment Service to both employers and prospective employees and

WHEREAS, Section 31-5 of the General Statutes of Connecticut requires that no compensation or fee shall be charged or received directly or indirectly for the services of the Connecticut State Employment Service and

WHEREAS, large numbers of our citizens who have served in the Armed Forces of our nation are returning to civilian life in our state and seeking employment in civilian occupations and

WHEREAS, we owe a duty as well as gratitude to these returning veterans including the duty to find suitable employment for them and

WHEREAS, many of our handicapped citizens are fully capable of employment and are entitled to be placed in suitable employment and

WHEREAS, many of the citizens of our state who are unemployed are unaware of the job openings and employment opportunities which do in fact exist in our state and

WHEREAS, notwithstanding the free services of the Connecticut State Employment Service, many of our Connecticut employers do not use its free services or do not avail themselves fully of all the services offered,

NOW, THEREFORE, I, THOMAS J. MESKILL, Governor of the State of Connecticut, acting by virtue of the authority vested in me under the fourth article of the Constitution of the State and in accordance with Section 3-1 of the General Statutes, do hereby ORDER and direct, as follows, by this Executive Order:

I. The Labor Commissioner shall be responsible for the administration of this Order and shall do all acts necessary and appropriate to achieve its purpose. Upon promulgation of this Order, the Commissioner of Finance and Control shall issue a directive forthwith to all state agencies, that henceforth all state contracts and subcontracts for construction on public buildings, other public works and goods and services shall contain a provision rendering such contract or subcontract subject to this Order, and that such contract or

subcontract may be cancelled, terminated or suspended by the Labor Commissioner for violation of or noncompliance with this Order, notwithstanding that the Labor Commissioner is not a party to such contract or subcontract.

II. Every contractor and subcontractor having a contract with the state or any of its agencies, boards, commissions, or departments, every individual partnership, corporation, or business entity having business with the state or who or which seeks to do business with the state, and every bidder or prospective bidder who submits a bid or replies to an invitation to bid on any state contract shall list all employment openings with the office of the Connecticut State Employment Service in the area where the work is to be performed or where the services are to be rendered.

III. All state contracts shall contain a clause which shall be a condition of the contract that the contractor and any subcontractor holding a contract directly under the contractor shall list al employment openings with the Connecticut State Employment Service. The Labor Commissioner may allow exceptions to listings of employment openings which the contractor proposes to fill from within its organization from employees on the rolls of the contractor on the date of publication of the invitation to bid or the date on which the public announcement was published or promulgated advising of the Program concerned.

IV. Each contracting agency of the state shall be primarily responsible for obtaining compliance with this Executive Order. Each contracting agency shall appoint or designate from among its personnel one or more persons who shall be responsible for compliance with the objectives of this Order.

V. The Labor Commissioner shall be and is hereby empowered to inspect the books, records, payroll and personnel data of each individual or business entity subject to this Executive Order and may hold hearings or conferences, formal or informal, in pursuance of the duties and responsibilities hereunto delegated to the Labor Commissioner.

VI. The Labor Commissioner or any agency officer or employee in the executive branch designated by regulation of the Labor Commissioner may hold such hearings, public or private, as the Labor Commissioner may deem advisable for compliance, enforcement or educational purposes under this Order.

VII. (a) The Labor Commissioner may hold or cause to be held hearings, prior to imposing, ordering, or recommending the imposition of penalties and sanctions under this Order. In accordance herewith, the Commissioner or the appropriate contracting agency may suspend, cancel, terminate, or cause to be suspended, cancelled, or terminated in accordance with law any contract or portion or portions thereof for failure of the contractor or subcontractor to comply with the listing provisions of the contract. Contracts may be cancelled, terminated, suspended absolutely or their continuance conditioned upon a program for future compliance approved by the contracting agency.

(b) Any contracting agency taking any action authorized by this Order, whether on its own motion or as directed by the Labor Commissioner, shall promptly notify him of such action. Whenever the Labor Commissioner makes a determination under this Order, he

shall promptly notify the appropriate contracting agency of the action recommended. The agency shall report the results to the Labor Commissioner promptly.

VIII. If the Labor Commissioner shall so direct, contracting agencies shall not enter into contracts with any bidder or prospective contractor unless he has satisfactorily complied with the provisions of this Order.

Dated at Hartford, Connecticut, this 15th day of February 1973.

Thomas J. Meskill, Governor

Executive Order No. Sixteen

WHEREAS, the State of Connecticut recognizes that workplace violence is a growing problem that must be addressed; and

WHEREAS, the State is committed to providing its employees a reasonably safe and healthy working environment, free from intimidation, harassment, threats, and/or violent acts; and

WHEREAS, violence or the threat of violence by or against any employee of the State of Connecticut or member of the public in the workplace is unacceptable and will subject the perpetrator to serious disciplinary action up to and including discharge and criminal penalties.

NOW, THEREFORE, I, John G. Rowland, Governor of the State of Connecticut, acting by virtue of the authority vested in me by the Constitution and by the statutes of this state, do hereby ORDER and DIRECT:

1. That all state agency personnel, contractors, subcontractors, and vendors comply with the following **Violence in the Workplace Prevention Policy**:

   The State of Connecticut adopts a statewide zero tolerance policy for workplace violence.

   Therefore, except as may be required as a condition of employment:

   - No employee shall bring into any state worksite any weapon or dangerous instrument as defined herein.
   - No employee shall use, attempt to use, or threaten to use any such weapon or dangerous instrument in a state worksite.
   - No employee shall cause or threaten to cause death or physical injury to any individual in a state worksite.

   Weapon means any firearm, including a BB gun, whether loaded or unloaded, any knife (excluding a small pen or pocket knife), including a switchblade or other knife having an automatic spring release device, a stiletto, any police baton or nightstick or any martial arts weapon or electronic defense weapon.

   Dangerous instrument means any instrument, article, or substance that, under the circumstances, is capable of causing death or serious physical injury.

   Violation of the above reasonable work rules shall subject the employee to disciplinary action up to and including discharge.
2. That each agency must prominently post this policy and that all managers and supervisors must clearly communicate this policy to all state employees.
3. That all managers and supervisors are expected to enforce this policy fairly and uniformly.
4. That any employee who feels subjected to or witnesses violent, threatening, harassing, or intimidating behavior in the workplace immediately report the incident or statement to their supervisor, manager, or human resources office.

5. That any employee who believes that there is a serious threat to their safety or the safety of others that requires immediate attention notify proper law enforcement authorities and his or her manager or supervisor.
6. That any manager or supervisor receiving such a report shall immediately contact their human resources office to evaluate, investigate and take appropriate action.
7. That all parties must cooperate fully when questioned regarding violations of this policy.
8. That all parties be advised that any weapon or dangerous instrument at the worksite will be confiscated and that there is no reasonable expectation of privacy with respect to such items in the workplace.
9. That this order applies to all state employees in the executive branch.
10. That each agency will monitor the effective implementation of this policy.
11. That this order shall take effect immediately.

Dated at Hartford, Connecticut this 4th day of August 1999.

John G. Rowland, Governor

Executive Order Number 7C

This Contract is subject to **Executive Order No. 7C of Governor M. Jodi Rell, promulgated on July 13, 2006.** The Parties to this Contract, as part of the consideration hereof, agree that:

a. The State Contracting Standards Board ("Board") may review this contract and recommend to the state contracting agency termination of this contract for cause. The State contracting agency shall consider the recommendations and act as required or permitted in accordance with the contract and applicable law. The Board shall provide the results of its review, together with its recommendations, to the state contracting agency and any other affected party in accordance with the notice provisions in the contract not later than fifteen (15) days after the Board finalizes its recommendation. For the purposes of this Section, "for cause" means:

(1) a violation of the State Ethics Code (Chapter 10 of the general statutes) or section 4a-100 of the general statutes or

(2) wanton or reckless disregard of any state contracting and procurement process by any person substantially involved in such contract or state contracting agency.

b. For purposes of this Section, "contract" shall not include real property transactions involving less than a fee simple interest or financial assistance comprised of state or federal funds, the form of which may include

but is not limited to grants, loans, loan guarantees, and participation interests in loans, equity investments and tax credit programs. Notwithstanding the foregoing, the Board shall not have any authority to recommend the termination of a contract for the sale or purchase of a fee simple interest in real property following transfer of title.

c. Notwithstanding the contract value listed in sections 4-250 and 4-252 of the Connecticut General Statutes and section 8 of Executive Order Number 1, all State Contracts between state agencies and private entities with a value of $50,000 (fifty thousand dollars) or more in a calendar or fiscal year shall comply with the gift and campaign contribution certification requirements of section 4-252 of the
Connecticut General Statutes and section 8 of Executive Order Number 1. For purposes of this section, the term "certification" shall include the campaign contribution and annual gift affidavits required by section 8 of Executive Order Number 1.

Dated at Hartford, Connecticut this 13th day of July 2006

M. Jodi Rell, Governor

AFFILIATION AGREEMENT

This Affiliation Agreement is entered into on the 22nd day of December, 2003, by and between **The Waterbury Hospital** ("WH" or "Waterbury Hospital") and **St. Mary's Hospital** ("SMH" or "St. Mary's Hospital") and collectively, "hospitals" or "parties".

RECITALS

WHEREAS, WH and SMH intend to establish a joint percutaneous coronary intervention ("PCI") and open heart surgery program ("Program"); and

WHEREAS, the Program would be provided by a two-site program utilizing existing cath lab capacity and cardiac operating rooms to be constructed at St. Mary's Hospital and Waterbury Hospital; and

WHEREAS, the University of Connecticut Health Center is an academic health center that incorporates the School of Medicine ("SOM"), its faculty practice plan UConn Medical Group ("UMG"), and an acute care general hospital John Dempsey Hospital (JDH); and

WHEREAS, JDH and UMG are existing providers of a full array of cardiology and cardiothoracic services; and

WHEREAS, Cardiothoracic Surgical Associates, LLC ("CCSA") surgeons are members of the faculty of SOM; and

WHEREAS, the University of Connecticut Health Center and CCSA have agreed to provide services to the Program in Waterbury and to become members of the advisory board established in connection with the Program ("Advisory Board"); and

WHEREAS, St. Mary's Hospital and Waterbury Hospital shall establish the Waterbury Area Heart Center, Inc. ("WAHC"), a non-stock corporation which will be separately organized and which shall serve as a management services organization to oversee the joint heart program providing programmatic, quality, training, marketing and community wellness coordination; and

WHEREAS, St. Mary's Hospital, Waterbury Hospital and University of Connecticut Health Center administration, together with clinical leaders and physicians, will constitute the members of an Advisory Board which provides strategic direction to WAHC; and

WHEREAS, the sole members of the Waterbury Area Heart Center, Inc. shall be St. Mary's Hospital and Waterbury Hospital; and

WHEREAS, cardiac surgery will be provided by physicians of CCSA, or UMG as the case may be, who are credentialed at JDH and also credentialed at St. Mary's Hospital and Waterbury Hospital; and

WHEREAS, JDH shall provide or arrange for the provision of perfusion services; and

WHEREAS, all of the parties acknowledge that no later than December 23, 2003, St. Mary's Hospital and Waterbury Hospital will submit a Certificate of Need Application concerning the Program and including in the application a description of the services to be provided by the University of Connecticut Health Center and CCSA with respect to the Program which will be detailed in a Memorandum of Understanding with the University of Connecticut Health Center ("UConn MOU"); and

WHEREAS, the parties wish to clearly set forth the responsibilities of WH and SMH in this affiliation and in their operation of the Program;

NOW, THEREFORE, in consideration of the mutual promises, covenants and agreements contained herein, receipt of which is hereby acknowledged, the parties agree as follows:

1. Program To Be Established

Contemporaneously with the signing of this Agreement, WH and SMH are signing a Certificate of Need Application which seeks the approval by the Office of Health Care Access ("OHCA") of two sites utilizing existing cath lab capacity and cardiac operating rooms to be constructed at each of WH and SMH. The parties have established Waterbury Area Heart Center, Inc. ("WAHC") as part of this affiliation for the Program of which WH and SMH shall be the sole members. The members shall operate WAHC in accordance with its Certificate of Incorporation, By-Laws and a Members' Agreement signed by the parties of even date ("WAHC Organizational Agreements"). WH and SMH, as part of the establishment of WAHC, have also established an Advisory Board consisting of representatives of WH, SMH and University of Connecticut Health Center and CCSA. The organizational structure of WAHC is identified on the chart attached as **Schedule A**. WAHC shall serve as a management services organization with respect to the Program and work with the three hospitals and their medical staffs and oversee the effective and efficient cardiac service line operations, marketing and community wellness outreach. The Program is more fully described in the CON Application submitted by WH and SMH as part of OHCA document 03-3016. The Program will operate under the joint CON being sought by WH and SMH.

2. Employment by WAHC

WAHC shall hire approximate level of staffing who will receive direction from WH and SMH jointly as the sole members of WAHC in accordance with the WAHC Organizational Agreements. It is expected that WAHC will have additional

employees to provide, among other things, programmatic, quality, training, marketing, and community wellness coordination.

3. **Medical Management**

Each of WH and SMH shall be responsible for the management of all activities pertaining to the Program conducted within their respective hospitals. Neither hospital assumes any responsibility for the performance of services at the other hospital. Through WAHC, each hospital agrees to participate in a joint and ongoing program to monitor and evaluate the quality, patient selection criteria, and appropriateness of services provided under the Program. The hospitals have committed their best efforts to that end in establishing WAHC.

4. **UConn MOU**

The parties, together with WAHC, as part of the Program, will engage the services of University of Connecticut Health Center to provide clinical oversight for the Program pursuant to the terms and conditions of the UConn MOU attached as **Schedule B**.

5. **Privileges**

Only physicians credentialed by WH and SMH, in addition to any other credentialing as may be required by the UConn MOU, shall provide medical and surgical services for patients of the Program as conducted at each site of WH and SMH. Such credentials shall be sufficient to permit the physicians to provide clinical services as part of the Program at WH and SMH.

This Agreement does not confer privileges on any physician. The parties agree that the grant, renewal or any other action with respect to privileges is vested in the governing bodies of, and governed by the credentialing process in effect from time to time at each of WH and SMH. The parties, while reserving to each its autonomy and credentialing responsibility, agree to confer as needed to ensure that the lack of privileges at either hospital will not become a factor in the choice of hospital setting for patients of the Program.

6. **Selection of Site of Surgery**

Both hospitals recognize and affirm a cardinal principal which is that nothing in this Agreement requires any patient to receive services from the Program at, or to be referred either to or from, either WH or SMH. The choice of site is and will remain with the patient and the patient's personal physician.

7. **Ownership of Equipment and Facilities and Supplies**

WH and SMH shall provide WAHC with the resources necessary to conduct its business of the Program. Each hospital shall be solely responsible for providing and maintaining all equipment, facilities and supplies needed in connection with the Program at their respective facilities.

8. **Employment by WH and SMH**

Each of WH and SMH shall be responsible for the employment, discipline, and compensation of any and all of their respective employees or contractors who may be involved from time to time in providing services to the Program at their respective hospitals.

9. **Insurance Coverage**

Each of WH and SMH agree that, for its own employees, and at its own cost and expense, they will procure and continue in force, throughout the term of this Agreement, adequate insurance in amount and scope for any and all claims for injuries to persons and property as each of them deems necessary or adequate. WH and SMH shall arrange for appropriate insurances with respect to WAHC from resources provided by them to WAHC. Each party shall furnish the other party with customary insurance certificates evidencing the insurance required in this paragraph 9. Each party shall provide at least 30 days prior written notice to the other with respect to the cancellation or termination of the insurance required in this paragraph 9.

10. **Prior Approval of Public Materials**

No advertisement or other publicly distributed materials which mentions any party to this Agreement in the context of the Program will be used without the prior consent of all parties to this Agreement prior to its public announcement. No public announcement regarding this Agreement shall be made unless the Parties have mutually agreed on the content and timing of such announcement. The Parties recognize, however, that the substance of this Agreement and the UConn MOU will, in fact, be disclosed to the Office of Health Care Access as part of the CON Application in connection with the Program.

11. **Special Needs of the Program**

Each of WH and SMH agrees that the Program requires ancillary and support services. Each of WH and SMH agrees to provide, either on site or under contract, adequate ancillary and support services for the Program at each hospital's expense.

12. Billing and Collection

Each hospital shall be responsible for all billing and collection activities in connection with services under the Program performed within each hospital. In the event that any future law, rule or regulation ("Requirement") requires that either of WH or SMH bills for services involved with the Program differently than initially understood or agreed upon, the parties agree to comply with such requirement, with all unaffected provisions of this Agreement remaining in effect. In no event shall either hospital bill for or accept payment with respect to the surgical services provided by any cardiac-surgeon providing physician services to or on behalf of a patient. Payment for physician services of any type is expressly excluded from this Agreement.

13. Term

Subject to the further provisions of this Paragraph 13, this Agreement shall be effective from the date hereof for a period of six (6) years ("Initial Term"). The Initial Term shall be renewed by two additional five (5) year terms unless either of the parties provides notice to the other party of its intention not to renew by a written notice at least one (1) year prior to the end of the Initial Term or the first renewal term. The Initial Term and any renewals is referred to collectively as "Term."

14. Covenants of Hospital

Each hospital will:

Perform all renovations deemed by it to be necessary to provide facilities appropriate for the care of patients undergoing PCI or open-heart surgery, at a cost which is in accordance with the CON approval. In addition, each hospital will furnish all other necessary hospital facilities, furniture, equipment, supplies, support services, security services, housekeeping services, and inpatient services, including diagnostic services, to patients of the Program. Each hospital will maintain all such supplies, equipment, facilities and furniture in good order and at levels and at quality standards consistent with the requirements of the Program.

Provide, either on site or under arrangement, for ancillary services to the extent required to meet the needs of the Program, including, but not limited to, radiology, laboratory, angiography and cardiac catheterization.

15. Governmental Action

This Agreement is subject to and subordinate to the requirements of any governmental agency having jurisdiction. WH and SMH shall fully consult with each other with respect to all such approval processes. Notwithstanding any other provision of this Agreement, in the event that any governmental agency, or private entity acting on behalf of or under contract with any governmental agency, having jurisdiction , including OHCA, takes any other action inconsistent with the terms of this Agreement or the

intended operation and effect hereof, the party affected shall have the right, after consultations with the other parties, to suggest a modification of any of the terms of this Agreement to the extent and in the manner reasonably necessary or desirable to accommodate such governmental action. The other party shall be afforded an opportunity to contest any governmental action which might result in a modification of this Agreement.

In any such event, written notice of any such proposed modification shall be given not less than thirty (30) days prior to the proposed effective date of the modification. The proposed modification shall be conclusively binding on both parties if accepted by the other party. If either party rejects the proposed modification by written notice delivered to the other party prior to the proposed effective date contained in such notice, the proposed modification shall not be binding on the parties. If the parties cannot agree on a modification within thirty (30) days from the date of receipt of the written rejection of the proposed modification, this Agreement may be terminated by either party upon thirty (30) days further notice.

16. Relationship of the Parties

Except as required by this Affiliation Agreement per the WAHC Organizational Agreements, WH and SMH are independent contractors and nothing in this Agreement shall be construed as creating a joint venture, partnership or agency relationship between the parties. In furtherance of this intent, each party agrees that it shall not in its advertisements, correspondence, professional listings, stationary or other public representation state that the other party is its partner or agent, or that the other party constitutes a unit of the party making the representation.

The parties further agree that any publicly distributed materials which are reasonably susceptible of creating the inference that any agency, partnership, or other affiliation exists, will be submitted to the other party for its approval prior to its publication. No advertisement or other publicly distributed materials which mentions such other party will be used without the prior consent of the party referenced in such public pronouncement, which consent shall not be unreasonably withheld.

Nothing in this Agreement shall prevent WH or SMH from recognizing each other as affiliated institutions for the purposes of the Program. Each party, however, covenants and agrees that it will not use the name of the other party without having first obtained the prior consent of the other party.

17. Termination

This Agreement may be terminated at any time by the parties upon the mutual agreement of all of the parties. WH and SMH may terminate this Agreement for cause as to the other party by giving the other party ninety (90) days' (hereinafter "cure period") written notice identifying the breach of this Agreement and providing an opportunity to cure such breach. If the said breach is not cured within the cure period,

this Agreement shall automatically terminate, without need for further notice. For purposes of this paragraph, "for cause" shall mean the following:

a. A decision during the term of this Agreement, by WH and SMH to discontinue the Program.

b. Changes which affect this Agreement in the rules or regulations adopted by Medicare, Medicaid or any other third-party payor which has contractual agreements with the parties.

c. Material breach by WH or SMH of any of their respective obligations under this Agreement.

This Agreement may not be terminated other than for cause, or as otherwise permitted by this Agreement and the attempt by either hospital to do so, if that attempt shall cause an actual or threatened default in the performance of its obligations hereunder, shall render the hospital so attempting to terminate this Agreement to be in default of its obligations hereunder.

18. **Further Covenants of WH and SMH**

The hospitals agree that it is intended that the Program which provides PCI and open heart surgery will be offered exclusively at the two hospitals as proposed in the CON Application. Accordingly, unless the parties mutually agree in writing otherwise, each hospital covenants that during the Term of this Agreement, and any renewal thereof, and for a period of two (2) years following the termination of this Agreement, whether for cause, not for cause, or upon non renewal, the hospitals, and any subsidiaries, parent or sister corporations of the hospitals, will not within the service area identified in the CON Application directly or indirectly establish, maintain, operate, engage in, affiliate with, invest in, provide services to, or support or assist in any manner in a program with any other hospital for any services included in the Program defined by the CON Application.

Each of WH and SMH covenants that during the term of this Agreement or any renewal thereof, and for a period of two (2) years following the termination of this Agreement, whether for cause, not for cause, or upon non renewal, neither of WH or SMH will apply for or obtain a Certificate of Need for the conduct of open heart surgery or PCI at their respective hospitals, or, if the Certificate of Need program is no longer in effect at such time, it will not institute or conduct PCI or open heart surgery at their respective hospitals.

Each of WH and SMH agrees that, in the conduct of its own affairs, it will support the business and objectives of the Program, and it will refrain from taking any action that is likely to materially impair, or adversely affect, the Program's business or the accomplishment of its objectives.

Each of WH and SMH hereby acknowledges and agrees that, in light of the substantial financial investment in the Program and its related activities that will be required from each of them and the length of time that reasonably will be required to establish the Program as a provider of high quality medical care to the service area defined in the CON Application, the duration and scope of the restrictive covenants set forth in this Agreement are reasonable under the circumstances and are material terms of this Agreement, and they acknowledge that they have each relied on these restrictive covenants in entering into this Agreement. If any provision of Paragraph 18 is held or deemed to be invalid or unenforceable, in whole or in part, for any reason, including without limitation, the geographic or business scope or the duration thereof, by a court or administrative body of competent jurisdiction, then: (i) such provision shall be construed in such a way, and/or limited in scope and duration, so as to be valid and enforceable to the maximum extent deemed permissible by the court or administrative body; (ii) such provision, to the extent of such invalidity or unenforceability, shall be deemed ineffective and severable from the remainder of this Agreement; and (iii) all other provisions of this Agreement shall continue to be valid and enforceable.

Each of WH and SMH acknowledges and agrees that a breach or attempted or threatened breach by it of any provision of Paragraph 18 would cause the other irreparable injury not compensable in money damages. Therefore, each of WH and SMH agrees that, in addition to any other rights and remedies either party may have in the event of any such breach or attempted or threatened breach, the other party shall be entitled to obtain temporary and permanent injunctive relief against the other and a decree for specific performance of the provisions of Paragraph 18, without being required to prove damages or furnish any bond or other security. Resort by any party to equitable relief shall not be construed as a waiver by that party of any other rights or remedies it may have for damages or otherwise.

19. Medical Records

Each hospital agrees that medical records for patients of the Program shall be maintained at the hospital which provided services hereunder to the patient, and shall be maintained in accordance with the laws of the State of Connecticut and the hospital's procedures established in accordance therewith.

20. Condition Precedent and Covenant

Each hospital agrees that a condition precedent to the effectiveness and enforceability of this Agreement is the receipt from OHCA of a final Certificate of Need authorizing the Program, either without conditions or with such conditions as are mutually acceptable to both hospitals. Each of WH and SMH covenants to use its best efforts to obtain the CON from OHCA to satisfy this condition precedent. Each of WH and SMH agree that the development of the Program shall not go forward unless and until all regulatory approvals necessary for the joint development and operation of the Program are received by SMH, WH and any other party involved in the development of the Program with the result that each of SMH and WH are able to provide comprehensive

cardiac services, including cardiac surgery and PCI at each of their campuses as part of their plans for a long-term strategic collaboration involving cardiac surgery, PCI and other comprehensive heart care services for the patients in the Greater Waterbury Area.

21. **Legal Constraints**

The parties recognize that their efforts to develop the Program as described in this Agreement will be constrained by various legal requirements. The parties recognize that the Program will be structured and any activities undertaken pursuant to this Agreement will be carried out so as to assure that at all times no federal or state statute, rules or regulations are violated.

22. **Business Associate Agreement**

Prior to the Effective Date, the parties will execute HIPAA related Business Associate Agreements in the forms mutually agreed upon.

23. **Miscellaneous Provisions**

This Agreement shall be governed by and construed, interpreted, and enforced in accordance with the laws of the State of Connecticut.

Except to the extent that any other agreement may be implemented in accordance with the terms herein, or referenced herein, this Agreement constitutes the entire agreement between the parties hereto and supercedes all prior agreements and understandings, both written and oral, between the parties. No amendment or modification of this Agreement shall be valid or binding unless reduced to writing and executed by the parties.

No waiver by either party of any breach by the other of any of the terms, agreements, covenants or conditions of this Agreement, or acceptance of payment with respect to any of the services provided herein, shall be deemed to constitute a waiver of any succeeding breach or a waiver of any breach of any of the other terms, covenants, agreements and conditions herein contained.

Each of the parties hereto binds itself and its successors, administrators, assigns and legal representatives to the other party to this Agreement and to its successors, administrators and assigns.

Any notice required or permitted to be given by the parties hereto shall be given in writing and unless otherwise required under this Agreement, shall be sufficiently given or made if delivered personally to the person named below or mailed to such person by certified mail, return receipt requested, at the address set forth below. Any such mail notice shall be deemed to have been given on the second business day following the date of deposit in the United States mail. Any party may change the person

who is to receive notice under this Agreement in accordance with the provisions of this Section.

If to WH:	John H. Tobin, President 64 Robbins Street Waterbury, CT 06721
If to SMH:	Robert Ritz, President 56 Franklin Street Waterbury, CT 06706

Neither party shall have the right to sell, transfer or assign ("transfer") this Agreement directly, by operation of law or otherwise, without the prior written consent of the other. Any consent to any particular transfer shall not constitute consent to any other transfer.

The captions in this Agreement are solely for the purpose of identification and shall not, in any manner, alter or vary the interpretation or construction of this Agreement.

This Agreement may be executed in any number of counterparts, each of which shall be an original and all of which together shall constitute the same agreement. It shall not be necessary for both parties to this agreement to have signed the same counterpart, provided that both parties have signed at least one counterpart.

Until the expiration of four (4) years after the furnishing of services pursuant to this Agreement, either hospital shall make available, upon request by the Secretary of Health and Human Services ("Secretary") or the Comptroller General, or any of their duly authorized representatives, this Agreement, and any books, documents and/or records of such hospital that are necessary to certify the nature and extent of the cost claimed to Medicare with respect to the services provided under this Agreement.

If either hospital carries out any of the duties of this Agreement through a subcontract, with a value or cost of Ten Thousand and No/100 Dollars ($10,000.00) or more over a twelve-month (12) period, with a related organization, as that term is defined by applicable regulations the Secretary, until the expiration of four (4) years after the furnishing of such services pursuant to such subcontract, such hospital shall cause the regulated organizations to make available, upon written request by the Secretary or the Comptroller General, or any of their duly authorized representatives, the subcontract, and any books, documents and/or records of such related organization that are necessary to verify the nature and extent of the costs claimed to Medicare with respect to the services provided under this Agreement.

If any part of this Agreement should be held to be void or unenforceable, such part will be treated as severable, leaving valid the remainder of this Agreement notwithstanding the part or parts found void or unenforceable.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by their duly authorized officers and the respective corporate seals to be hereunto fixed, with the intent that this instrument is an instrument made under seal, on the date first above written.

ATTEST:

THE WATERBURY ~~HOSPITAL~~

By _____
John H. Tobin
Its President

ATTEST:

ST. MARY'S HOSPITAL

By _____
Robert Ritz
Its President

STATE OF CONNECTICUT)
) ss: Waterbury
COUNTY OF NEW HAVEN)

On this 23rd day of December, 2003, before me, the undersigned officer, personally appeared John H. Tobin, who acknowledged himself to be the President of The Waterbury Hospital, and as such President, being authorized to so do, executed the foregoing instrument for the purpose therein contained as the free act and deed of said corporation.

Helen B Sanderson

~~Commissioner of the Superior Court~~
Notary Public
My Commission Expires: 05/31/08

STATE OF CONNECTICUT)
) ss: Waterbury
COUNTY OF NEW HAVEN)

On this 23rd day of December, 2003, before me, the undersigned officer, personally appeared Robert Ritz, who acknowledged himself to be the President of St. Mary's Hospital, and as such President being authorized to so do, executed the foregoing instrument for the purpose therein contained as the free act and deed of said corporation.

Janice M Young

Commissioner of the Superior Court
Notary Public
My Commission Expires

JANICE M. YOUNG
NOTARY PUBLIC
My Commission Expires Feb. 28, 2006

7/1/08

AGREEMENT BETWEEN THE UNIVERSITY OF CONNECTICUT HEALTH CENTER FINANCE CORPORATION AND HEART CENTER OF GREATER WATERBURY

THIS AGREEMENT is by and between the Heart Center of Greater Waterbury ("Center"), Saint Mary's Hospital ("SMH") and Waterbury Hospital ("WH") (collectively, the "Hospitals") and the University of Connecticut Health Center Finance Corporation on behalf of John Dempsey Hospital ("JDH").

WHEREAS, the Hospitals are acute care hospitals; and

WHEREAS, the Hospitals require the services of qualified perfusionists ("PERFUSIONISTS") for their open heart surgery program ("Program"); and

WHEREAS, JDH is able to provide those services; and

WHEREAS, the parties seek to provide for the delivery of high quality services to patients; and

WHEREAS, each party is properly authorized to enter into this Agreement.

NOW THEREFORE, in consideration of the premises and the mutual covenants herein contained, the parties agree as follows:

1. Duties of JDH.

1.1. JDH shall maintain a Department of Perfusion ("DEPARTMENT") to service St. Mary's, Waterbury and John Dempsey Hospitals. JDH shall be the exclusive provider of said services unless otherwise agreed in writing by the PARTIES.

1.2. JDH shall supply administrative service for the DEPARTMENT including but not limited to:

- 1.2.1. Employ or otherwise engage a team of PERFUSIONISTS (minimum 5.0 FTEs including Perfusion Chief)
- 1.2.2. Administer all personnel functions
- 1.2.3. Associate Vice President of Operations of JDH will oversee the department

1.3. JDH shall assemble a team of PERFUSIONISTS who will be scheduled such that a PERFUSIONIST is available for all scheduled cases and for coverage of urgent and emergent cases 24 hours per day/365 days per year. The on-call PERFUSIONIST must maintain a response time of no more than thirty (30) minutes from the time of call to arrival at the Hospitals' cardiovascular operating suites.

1.4. In the performance of duties in association with the Hospitals, each PERFUSIONIST shall:

1.4.1. Be duly certified by the American Board of Cardiovascular Perfusion; attain and maintain licensure if/as required by the State of Connecticut

1.4.2. Attain and maintain privileges at the Hospitals in accordance with the Hospitals' Medical Staff By-laws

1.4.3. Comply with all laws, ordinances, rules, regulations and orders of all governmental authorities having jurisdiction in the premises which are applicable to the conduct of PERFUSIONISTS.

1.4.4. Cooperate with the Hospitals in the maintenance of adequate records relating to the provision of services, in such form and containing such information as are required by the Hospitals and applicable law. The Hospitals shall each have sole ownership and authority for records.

1.4.5. Cooperate with the Hospitals in documentation necessary to permit the Hospitals to render bills for services.

1.4.6. Upon request and under the supervision of either the primary surgeon or treating physician, PERFUSIONISTS shall furnish the following services:

1.4.6.1. Administer through the extra-corporeal circuit blood and blood products, anesthetic agents, and drugs;

1.4.6.2. Perform the initial set up and timing of an intra-aortic balloon pump;

1.4.6.3. Operate blood salvage system during cardiac cases;

1.4.6.4. Remain on the Hospitals' facilities for follow-up care until released by the primary surgeon or treating physician.

1.4.7. Comply with all policies, procedures, and/or standards of the Hospitals set forth in writing by the Hospitals, as they may exist from time to time, all applicable state, federal and local laws, rules and regulations, and the standards of the Joint Commission on Accreditation of Healthcare Organizations ("JCAHO").

1.4.8. While at the Hospitals, accept administrative and coordinative direction from the Hospitals' director of surgical services

1.5. JDH shall identify a Perfusion Chief who will be responsible to:

1.5.1. Develop and manage PERFUSIONISTS schedule and assignment

1.5.2. Manage the perfusion service

1.5.3. Participate and cooperate with designated Hospital representatives in program operations including but not limited to:

1.5.3.1. developing policies, procedures, protocols and standards as appropriate for the perfusion services

1.5.3.2. participating and coordinate equipment purchase, maintenance, and repair

1.5.3.3. participating in perfusion supply management

1.5.3.4. developing a quality management and quality improvement program for the perfusion service

1.5.3.5. preparing for licensure and accreditation visits/reviews

1.5.3.6. participating in capital and operating budget process

1.5.3.7. being available at reasonable mutually agreeable times, at no additional charge to the Hospitals, for providing

training and education of the Hospitals' staff and employees

1.5.4. Participate and cooperate with designated hospital representatives in quality management including but not limited to

1.5.4.1.1. conducting quality assurance and risk management review

1.5.4.1.2. conducting focused quality reviews

1.5.4.1.3. collecting and recording operative data for STS Adult Cardiac Surgery Database

1.5.4.1.4. identifying and conduct continuous quality improvement initiatives

1.5.4.1.5. submitting information upon request to the Hospitals' Quality Assurance Committees.

1.6. JDH shall establish a mechanism for reasonable input of the Hospitals in individual PERFUSIONIST assignment, performance review and disciplinary action, which shall include an ability on the part of the Hospitals to request a replacement for a PERFUSIONIST for legitimate reasons.

1.7. JDH shall provide to PERFUSIONISTS adequate information to fulfill their obligations under the terms of this Agreement.

2. Duties of Saint Mary's Hospital, Waterbury Hospital.

2.1. The Hospitals shall furnish all facilities and services reasonably required to support the provision of services, including but not limited to:

2.1.1. space, equipment and supplies;

2.1.2. technical and administrative support.

2.2. The Hospitals shall comply with all laws, ordinances, rules, regulations, and orders of all governmental authorities having jurisdiction in the premises.

2.3. The Hospitals agree to provide to JDH information as may reasonably be required to assess performance of PERFUSIONISTS.

2.4. The Hospitals shall not release to any third party information related to the performance of PERFUSIONISTS hereunder except with the express written permission of JDH.

3. Compensation.

3.1. The Hospitals each agree to pay and JDH agrees to accept as compensation in full for services hereunder during the period July 1, 2008 through June 30, 2009, $2,208 per case. A 3.5% increase would be applied to each subsequent year for 2 or 3 years if an option to renew the Agreement is executed.

3.2. JDH will prepare monthly invoices. SMH and WH shall each pay JDH within sixty (60) days of invoice.

3.3. The parties acknowledge and agree that the compensation set forth herein represents the fair market value of the services provided to the Hospitals by JDH, and has been negotiated in an arm's length transaction and has not been determined in a manner which takes into account the volume or value of referrals or business that may otherwise be generated between the parties.

4. Relationship of Parties.

4.1. The relationship among JDH and the Hospitals is that of independent contractors. Nothing contained in this Agreement is intended to create or shall be construed to create an agency, partnership, employer/employee or joint venture relationship among the parties. Each party shall remain solely liable for its own debts, obligations or liabilities without, however, in any way modifying the obligations each party has assumed herein.

4.2. JDH shall have sole responsibility to administer salary and benefits of Perfusionists. JDH shall withhold and be responsible for the payment of all federal, state and local income and occupational taxes, F.I.C.A. taxes, unemployment compensation and workers' compensation contributions, vacation pay, sick leave, retirement benefits and any other payments or expenses for or on behalf of Physician. All such payments, withholdings and benefits shall be the sole responsibility of JDH. JDH shall have the authority and responsibility to recruit, hire, train, supervise, and compensate in accordance with the policies of JDH. This provision shall survive termination of this Agreement.

4.3. It is specifically acknowledged and agreed by the parties hereto that the provision of services by JDH to the Hospitals and the payments made by SMH and WH to JDH pursuant to this Agreement will not in any way require or be contingent upon the referral of individuals for patient care services.

4.4. Neither of the Hospitals shall be responsible for the performance of the obligations of the other Hospital whether financial or otherwise.

5. **HIPAA**
Health Insurance Portability Act of 1996 ("HIPAA")

(a) If the Contactor is a Business Associate under the requirements of the Health Insurance Portability and Accountability Act of 1996 ("HIPAA"), the Contractor must comply with all terms and conditions of this Section of the Contract. If the Contractor is not a Business Associate under HIPAA, this Section of the Contract does not apply to the Contractor for this Contract.

(b) The Contractor is required to safeguard the use, publication and disclosure of information on all applicants for, and all clients who receive, services under the Contract in accordance "with all applicable federal and state law regarding confidentiality, which includes but is not limited to ("HIPAA"), more specifically with the Privacy and Security Rules at 45 C.F.R. Part 160 and Part 164, subparts A, C, and E; *and*

(c) The State of Connecticut Department named on page 1 of this Contract (hereinafter "Department") is a "covered entity" as that term is defined in 45 C.F.R. § 160.103; *and*

(d) The Contractor, on behalf of the Department, performs functions that involve the use or disclosure of "individually identifiable health information," as that term is defined in 45 C.F.R. § 160.103; *and*

(e) The Contractor is a "business associate" of the Department, as that term is defined in 45 C.F.R. § 160.103; *and*

(f) The Contractor and the Department agree to the following in order to secure compliance with the HIPAA, more specifically with the Privacy and Security Rules at 45 C.F.R. Part 160 and Part 164, subparts A, C, and E.

(g) Definitions

(1) "Business Associate" shall mean the Contractor.

(2) "Covered Entity" shall mean the Department of the State of Connecticut named on page 1 of this Contract.

(3) "Designated Record Set" shall have the same meaning as the term "designated record set" in 45 C.F.R. § 164.501.

(4) "Individual" shall have the same meaning as the term "individual"' in 45 C.F.R. § 160.103 and shall include a person who qualifies as a personal representative as defined in 45 C.F.R. § 164.502(g).

(5) "Privacy Rule" shall mean the Standards for Privacy of Individually Identifiable Health Information at 45 C.F.R. part 160 and parts 164, subparts A and E.

(6) "Protected Health Information" or "PHI" shall have the same meaning as the term "protected health information" in 45 C.F.R. § 160.103, limited to information created or received by the Business Associate from or on behalf of the Covered Entity.

(7) "Required by Law"' shall have the same meaning as the term "required by law" in 45 C.F.R. § 164.103.

(8) "Secretary" shall mean the Secretary of the Department of Health and Human Services or his designee.

(9) "More stringent" shall have the same meaning as the term "more stringent" in 45 C.F.R. § 160.202.

(10)"This Section of the Contract" refers to the HIPAA Provisions stated herein, in their entirety.

(11)"Security Incident" shall have the same meaning as the term "security incident" in 45 C.F.R.§ 164.304.

(12)"Security Rule" shall mean the Security Standards for the Protection of Electronic Protected Health Information at 45 C.F.R. part 160 and parts 164, subpart A and C.

(h) Obligations and Activities of Business Associates.

(1) Business Associate agrees not to use or disclose PHI other than as permitted or required by this Section of the Contract or as Required by Law.

(2) Business Associate agrees to use appropriate safeguards to prevent use or disclosure of PHI other than as provided for in this Section of the Contract.

(3) Business Associate agrees to use administrative, physical and technical safeguards that reasonably and appropriately protect the confidentiality, integrity, and availability of electronic protected health information that it creates, receives, maintains, or transmits on behalf of the Covered Entity.

(4) Business Associate agrees to mitigate, to the extent practicable, any harmful effect that is known to the Business Associate of a use or disclosure of PHI by Business Associate in violation of this Section of the Contract.

(5) Business Associate agrees to report to Covered Entity any use or disclosure of PHI not provided for by this Section of the Contract or any security incident of which it becomes aware.

(6) Business Associate agrees to insure that any agent, including a subcontractor, to whom it provides PHI received from, or created or received by Business Associate, on behalf of the Covered Entity, agrees to the same restrictions and conditions that apply through this Section of the Contract to Business Associate with respect to such information.

(7) Business Associate agrees to provide access, at the request of the Covered Entity, and in the time and manner agreed to by the parties, to PHI in a Designated Record Set, to Covered Entity or, as directed by Covered Entity, to an Individual in order to meet the requirements under 45 C.F.R. § 164.524.

(8) Business Associate agrees to make any amendments to PHI in a Designated Record Set that the Covered Entity directs or agrees to pursuant to 45 C.F.R. § 164.526 at the request of the Covered Entity, and in the time and manner agreed to by the parties.

(9) Business Associate agrees to make internal practices, books, and records, including policies and procedures and PHI, relating to the use and disclosure of PHI received from, or created or received by, Business Associate on behalf of Covered Entity, available to Covered Entity or to the Secretary in a time and manner agreed to by the parties or designated by the Secretary, for purposes of the Secretary determining Covered Entity's compliance with the Privacy Rule.

(10)Business Associate agrees to document such disclosures of PHI and information related to such disclosures as would be required for Covered Entity to respond to a request by an Individual for an accounting of disclosures of PHI in accordance with 45 C.F.R. § 164.528.

(11)Business Associate agrees to provide to Covered Entity, in a time and manner agreed to by the parties, information collected in accordance with paragraph I of this Section of the Contract, to permit Covered Entity to respond to a request by an Individual for an accounting of disclosures of PHI in accordance with 45 C.F.R. § 164.528.

(12)Business Associate agrees to comply with any state law that is more stringent than the Privacy Rule.

(i) Permitted Uses and Disclosure by Business Associate.

(1) General Use and Disclosure Provisions Except as otherwise limited in this Section of the Contract, Business Associate may use or disclose PHI to perform functions, activities, or services for, or on behalf of, Covered Entity as specified in this Contract, provided that such use or disclosure would not violate the Privacy Rule if done by Covered Entity or the minimum necessary policies and procedures of the Covered Entity.

(2) Specific Use and Disclosure Provisions

(A) Except as otherwise limited in this Section of the Contract, Business Associate may use PHI for the proper management and administration of Business Associate or to carry out the legal responsibilities of Business Associate.

(B) Except as otherwise limited in this Section of the Contract, Business Associate may disclose PHI for the proper management and administration of Business Associate, provided that disclosures are Required by Law, or Business Associate obtains reasonable assurances from the person to whom the information is disclosed that it will remain confidential and used or further disclosed only as Required by Law or for the purpose for which it was disclosed to the person, and the person notifies Business Associate of any instances of which it is aware in which the confidentiality of the information has been breached.

(C) Except as otherwise limited in this Section of the Contract, Business Associate may use PHI to provide Data Aggregation services to Covered Entity as permitted by 45 C.F.R. § 164.504(e)(2)(i)(B).

(j) Obligations of Covered Entity.

(1) Covered Entity shall notify Business Associate of any limitations in its notice of privacy practices of Covered Entity, in accordance with 45 C.F.R.

§ 164.520, or to the extent that such limitation may affect Business Associate's use or disclosure of PHI.

(2) Covered Entity shall notify Business Associate of any changes in, or revocation of, permission by Individual to use or disclose PHI, to the extent that such changes may affect Business Associate's use or disclosure of PHI.

(3) Covered Entity shall notify Business Associate of any restriction to the use or disclosure of PHI that Covered Entity has agreed to in accordance with 45 C.F.R. § 164.522, to the extent that such restriction may affect Business Associate's use or disclosure of PHI.

(k) Permissible Requests by Covered Entity. Covered Entity shall not request Business Associate to use or disclose PHI in any manner that would not be permissible under the Privacy Rule if done by the Covered Entity, except that Business Associate may use and disclose PHI for data aggregation, and management and administrative activities of Business Associate, as permitted under this Section of the Contract.

(l) Term and Termination.

(1) Term. The Term of this Section of the Contract shall be effective as of the date the Contract is effective and shall terminate when all of the PHI provided by Covered Entity to Business Associate, or created or received by Business Associate on behalf of Covered Entity, is destroyed or returned to Covered Entity, or, if it is infeasible to return or destroy PHI, protections are extended to such information, in accordance with the termination provisions in this Section.

(2) Termination for Cause Upon Covered Entity's knowledge of a material breach by Business Associate, Covered Entity shall either:

(A) Provide an opportunity for Business Associate to cure the breach or end the violation and terminate the Contract if Business Associate does not cure the breach or end the violation within the time specified by the Covered Entity; or

(B) Immediately terminate the Contract if Business Associate has breached a material term of this Section of the Contract and cure is not possible; or

(C) If neither termination nor cure is feasible, Covered Entity shall report the violation to the Secretary.

(3) Effect of Termination

(A) Except as provided in (l)(2) above, upon termination of this Contract, for any reason, Business Associate shall return or destroy all PHI received

from Covered Entity, or created or received by Business Associate on behalf of Covered Entity. This provision shall apply to PHI that is in the possession of subcontractors or agents of Business Associate. Business Associate shall retain no copies of the PHI.

(B) In the event that Business Associate determines that returning or destroying the PHI is infeasible, Business Associate shall provide to Covered Entity notification of the conditions that make return or destruction infeasible. Upon documentation by Business Associate that return of destruction of PHI is infeasible, Business Associate shall extend the protections of this Section of the Contract to such PHI and limit further uses and disclosures of PHI to those purposes that make return or destruction infeasible, for as long as Business Associate maintains such PHI. Infeasibility of the return or destruction of PHI includes, but is not limited to, requirements under state or federal law that the Business Associate maintains or preserves the PHI or copies thereof.

(m) Miscellaneous Provisions.

(1) Regulatory References. A reference in this Section of the Contract to a section in the Privacy Rule means the section as in effect or as amended.

(2) Amendment. The Parties agree to take such action as in necessary to amend this Section of the Contract from time to time as is necessary for Covered Entity to comply with requirements of the Privacy Rule and the Health Insurance Portability and Accountability Act of 1996, Pub. L. No. 104-191.

(3) Survival. The respective rights and obligations of Business Associate shall survive the termination of this Contract.

(4) Effect on Contract. Except as specifically required to implement the purposes of this Section of the Contract, all other terms of the Contract shall remain in force and effect.

(5) Construction. This Section of the Contract shall be construed as broadly as necessary to implement and comply with the Privacy Standard. Any ambiguity in this Section of the Contract shall be resolved in favor of a meaning that complies, and is consistent with, the Privacy Standard.

(6) Disclaimer. Covered Entity makes no warranty or representation that compliance with this Section of the Contract will be adequate or satisfactory for Business Associate's own purposes. Covered Entity shall not be liable to Business Associate for any claim, loss or damage related to or arising from the unauthorized use or disclosure of PHI by Business Associate or any of its officers, directors, employees, Contractors or agents, or any third party to whom Business Associate has disclosed PHI pursuant to this Contract. Business Associate is solely responsible for all decisions made, and actions

taken, by Business Associate regarding the safeguarding, use and disclosure of PHI within its possession, custody or control.

(7) Indemnification. The Business Associate shall indemnify and hold the Covered Entity harmless from and against all claims, liabilities, judgments, fines, assessments, penalties, awards, or other expenses, of any kind or nature whatsoever, including, without limitation, attorney's fees, expert witness fees, and costs of investigation, litigation or dispute resolution, relating to or arising out of any violation by the Business Associate and its agents, including subcontractors, of any obligation of Business Associate and its agents, including subcontractors, under this Section of the Contract.

6. Insurance and Indemnity.

6.1. JDH agrees that it will maintain such policies of professional liability insurance or formal program of self-insurance acceptable to the Hospitals as shall be necessary to protect JDH and PERFUSIONISTS, when providing services hereunder, from liability for any claim or claims for damages arising by reason of personal injury or death occasioned directly or indirectly in connection with the performance of PERFUSIONISTS hereunder. At a minimum, general and professional liability insurance in the amount of $1 million per claim and $3 million in the aggregate will be maintained. This provision may be satisfied by a program of self insurance.

6.2. SMH and WH agree that it will maintain such policies of insurance acceptable to JDH as shall be necessary to protect SMH and WH from liability for any claim or claims for damages arising by reason of personal injury or death occasioned directly or indirectly in connection with the performance by SMH or WH. At a minimum, general and professional liability insurance in the amount of $1 million per claim and $3 million in the aggregate will be maintained. This provision may be satisfied by a program of self insurance.

6.3. Each party shall be provided with a thirty (30) day written notice in the event that there is a material change or cancellation of the other party's self insurance program.

6.4. In addition, SMH and WH agree to indemnify and hold harmless the State of Connecticut, the University of Connecticut, JDH, the University of Connecticut Health Center Finance Corporation and/or its/their officers, agents and employees from and against any and all suits, actions, legal or administrative proceedings, claims, demands, judgments, damages, liabilities, monetary loss, interest, attorney's fees, costs and expenses of whatever kind or nature arising from the performance of this contract by the parties hereto relative to the respective duties of SMH and WH.

7. Term and Termination.

7.1. This Agreement shall commence on July 1, 2008 and remain in full force and effect for a term of one (1) year ending on June 30, 2009.

7.2. Each of WH and JDH on the one hand and SMH and JDH on the other hand, reserve the right to terminate this agreement without affecting the

rights of others. In such circumstances, WH and JDH as to each other and SMH and JDH as to each other shall have the right to terminate this Agreement upon written notice in the event that a party fails to keep, observe or perform any term or provision of this Agreement to be kept, observed or performed and such default shall continue for a period of thirty (30) days after written notice thereof to a party.

7.3. Termination of this Agreement shall not release or discharge either party from any obligation, debt, or liability which shall have previously accrued and remains to be performed upon the date of termination.

7.4. Changes which affect this Agreement in the rules or regulations adopted by Medicare, Medicaid or any other third-party payor which has contractual agreements with the parties following the completion by the parties of the process defined in this paragraph 7.4. If at any time during the term hereof any new legislation is enacted by the federal government or any state government, or if any governmental agency (or its representative, or any other payor or any other federal, Connecticut or local governmental agency passes, issues or promulgates any law, rule, regulation, standard or interpretation which would render this Agreement illegal, or which could cause significant and material legal and/or economic consequences for any party hereto (hereinafter referred to as "Legislative or Regulatory Change"), such party may give to the other party notice of intent to amend this Agreement in order to achieve the least burdensome alternative for the parties which still manages to bring this Agreement into compliance with such Legislative or Regulatory Changes and alleviate such legal or financial consequences. If this Agreement is not so amended in writing within ninety (90) days after said notice is given, this Agreement shall terminate as of midnight of the 90th day after said notice is given.

8. Governmental Action.

8.1. This agreement is subject to and subordinate to the requirements of any governmental agency having jurisdiction. Notwithstanding any other provision of this Agreement, in the event that any governmental agency, or private entity acting on behalf of or under contract with any governmental agency, having jurisdiction, including OHCA (Office of Health Care Access), takes any other action inconsistent with the terms of this Agreement or the intended operation and effect hereof, the party affected shall have the right, after consultations with the other party, to suggest a modification of any of the terms of this Agreement to the extent and in the manner reasonably necessary or desirable to accommodate such governmental action. The other party shall be afforded a reasonable opportunity to contest any governmental action which might result in a modification of this Agreement.

9. **Miscellaneous Provisions.**

9.1. The parties agree to comply with State orders described in **Exhibit A** appended hereto.

9.2. During the term of and following termination of this Agreement, each party shall keep strictly confidential any proprietary information regarding the other party. All information which is reasonably treated by any party as being proprietary, shall be presumed to be proprietary. Each party shall take necessary reasonable precautions to prevent unauthorized disclosure of proprietary information and shall require all of its officers, employees and other personnel to whom it is necessary to disclose the same, or to whom the same has been disclosed, to keep such proprietary information confidential. Upon termination of this Agreement, each party agrees to return to the other, within ten (10) days of the termination of this Agreement, all proprietary information of the other party in such party's possession.

9.3. No failure by either party to exercise, and no delay in exercising any right, power or privilege under this Agreement shall constitute a waiver thereof, nor shall any single or partial exercise of any right, power or privilege hereunder preclude any other or further exercise of any right, power or privilege. The rights and remedies provided herein are cumulative and not exclusive of any rights or remedies provided by law or otherwise.

9.4. This Agreement constitutes the entire agreement between the parties and contains all the agreements between the parties with respect to the subject matter hereof.

9.5. Neither this Agreement nor any of its provisions may be waived, altered, amended or supplemented in any manner except by a writing signed by the parties hereto. In the event any licensing, certifying or accrediting body requires or recommends that this Agreement include any provision not included herein, the parties agree to amend this Agreement to include such provision.

9.6. Neither this Agreement nor any right or interest hereunder may be assigned, in whole or in part, nor may any obligation hereunder be delegated, by JDH without the prior written consent of SMH and WH.

9.7. This Agreement shall be binding upon and shall inure to the benefit of the parties hereto and their respective successors and permitted assigns.

9.8. If any provision of this Agreement is held to be invalid or unenforceable, such invalidity or unenforceability shall not affect any other provision of this Agreement that can be given effect without the invalid provision. In such event, all parties agree that the court making such determination shall have the power to alter or amend such provision so that it shall be enforceable to an extent which is consistent with the intention of the parties.

9.9. This Agreement shall be governed by and construed in accordance with the laws of the State of Connecticut.

9.10. Nothing in this Agreement shall be construed as creating or giving rise to any rights in any third parties or any persons other than the parties hereto.

9.11. The Hospitals also agree that the sole and exclusive means for the presentation of any claim against JDH arising from this Agreement shall be in accordance with Chapter 53 of the Connecticut General Statutes (Claims

Against the State) and the Hospitals further agrees not to initiate legal proceedings in any State or Federal Court in addition to or in lieu of said Chapter 53 proceedings.

THE REMAINDER OF THIS PAGE IS INTENTIONALLY BLANK

9.12. All notices required or which may be given hereunder shall be mailed to:

JDH
University of Connecticut Health Center
263 Farmington Avenue – MC3802
Farmington, CT 06030-3802
Attn: James S. Thibeault

SMH
Saint Mary's Hospital
56 Franklin Street
Waterbury, CT 06706
Attn: Chad Wable, Executive Vice President

WH
The Waterbury Hospital
64 Robbins Street
Waterbury, CT 06721
Attn: John H. Tobin – President / CEO

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed by their duly authorized representatives as of the date set forth below.

WATERBURY HOSPITAL

John H. Tobin, Dman
President / CEO

Date: 6/27/08

UNIVERSITY OF CONNECTICUT HEALTH CENTER FINANCE CORPORATION

Lorraine M. Aronson
Executive Director
UCHC Finance Corporation

Date: 6/27/08

SAINT MARY'S HOSPITAL

Chad Wable, Executive Vice President, Strategy Development & System Operations

Date: 7/2/08

HEART CENTER OF GREATER WATERBURY

Loraine C. Shea, Executive Director

Date: 6/26/08

EXHIBIT B Compliance with State Orders

Sec. 4a-60. (Formerly Sec. 4-114a). Nondiscrimination and affirmative action provisions in contracts of the state and political subdivisions other than municipalities.

(a) Every contract to which the state or any political subdivision of the state other than a municipality is a party shall contain the following provisions: (1) The contractor agrees and warrants that in the performance of the contract such contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the state of Connecticut. The contractor further agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation, or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved; (2) the contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the commission; (3) the contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the commission advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (4) the contractor agrees to comply with each provision of this section and sections 46a-68e and 46a-68f and with each regulation or relevant order issued by said commission pursuant to sections 46a-56, as amended by this act, 46a-68e and 46a-68f; (5) the contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the contractor as relate to the provisions of this section and section 46a-56, as amended by this act. If the contract is a public works contract, the contractor agrees and warrants that he will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works project. Prior to entering into the contract, the contractor shall provide the state or such political subdivision of the state with documentation in the form of a company or corporate policy adopted by resolution of the board of directors, shareholders, managers, members or other governing body of such contractor to support the nondiscrimination agreement and warranty under subdivision (1) of this subsection. For the purposes of this section, "contract" includes any extension or modification of the contract, and "contractor" includes any successors or assigns of the contractor.

(b) For the purposes of this section, "minority business enterprise" means any small contractor or supplier of materials fifty-one per cent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) Who are active in the daily affairs of the enterprise, (2) who have the power to direct the management and policies of the enterprise and (3) who are members of a minority, as such term is defined in subsection (a) of section 32-9n; and "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations. "Good faith efforts" shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements.

Sec. 4a-60a. Contracts of the state and political subdivisions, other than municipalities, to contain provisions re nondiscrimination on the basis of sexual orientation.

(a) Every contract to which the state or any political subdivision of the state other than a municipality is a party shall contain the following provisions: (1) The contractor agrees and warrants that in the performance of the contract such contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or of the state of Connecticut, and that employees are treated when employed without regard to their sexual orientation; (2) the contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (3) the contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said commission pursuant to section 46a-56, as amended by this act; (4) the contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the contractor which relate to the provisions of this section and section 46a-56, as amended by this act. Prior to entering into the contract, the contractor shall provide the state or such political subdivision of the state with documentation in the form of a company or corporate policy adopted by resolution of the board of directors, shareholders, managers, members or other governing body of such contractor to support the nondiscrimination agreement and warranty under subdivision (1) of this subsection. For the purposes of this section, "contract" includes any extension or modification of the contract, and "contractor" includes any successors or assigns of the contractor.

(b) The contractor shall include the provisions of subsection (a) of this section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the state and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the commission. The contractor shall take such action with respect to any such subcontract or purchase order as the commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with section 46a-56; provided, if such contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the commission, the contractor may request the state of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the state and the state may so enter.

Executive Order No. Three

WHEREAS, sections 4-61d(b) and 4-114a of the 1969 supplement to the general statutes require nondiscrimination clauses in state contracts and subcontracts for construction on public buildings, other public works and goods and services, and

WHEREAS, section 4-61e(c) of the 1969 supplement to the general statutes requires the labor department to encourage and enforce compliance with this policy by both employers and labor unions, and to promote equal employment opportunities, and

WHEREAS, the government of this state recognizes the duty and desirability of its leadership in providing equal employment opportunity, by implementing these laws,

NOW, THEREFORE, I, THOMAS J. MESKILL, Governor of the State of Connecticut, acting by virtue of the authority vested in me under section twelve of article fourth of the constitution of the state, as supplemented by section 3-1 of the general statutes, do hereby ORDER and DIRECT, as follows, by this Executive Order:

I. The labor commissioner shall be responsible for the administration of this Order and shall adopt such regulations as he deems necessary and appropriate to achieve the purposes of this Order. Upon the promulgation of this Order, the commissioner of finance and control shall issue a directive forthwith to all state agencies, that henceforth all state contracts and subcontracts for construction on public buildings, other public works and goods and services shall contain a provision rendering such contract or subcontract subject to this Order, and that such contract or subcontract may be cancelled, terminated or suspended by the labor commissioner for violation of or noncompliance with this Order or state or federal laws concerning nondiscrimination, notwithstanding that the labor commissioner is not a party to such contract or subcontract.

II. Each contractor having a contract containing the provisions prescribed in section 4-114a of the 1969 supplement to the general statutes, shall file, and shall cause each of his subcontractors to file, compliance reports with the contracting agency or the labor commissioner, as may be directed. Such reports shall be filed within such times and shall contain such information as to employment policies and statistics of the contractor and each subcontractor, and shall be in such form as the labor commissioner may prescribe. Bidders or prospective contractors or subcontractors may be required to state whether they have participated in any previous contract subject to the provisions of this Order or any preceding similar Order, and in that event to submit on behalf of themselves and their proposed subcontractors compliance reports prior to or as an initial part of their bid or negotiation of a contract.

III. Whenever the contractor or subcontractor has a collective bargaining agreement or other contract or understanding with a labor organization or employment agency as defined in section 31-122 of the general statutes, the compliance report shall identify the said organization or agency and the contracting agency or the labor commissioner may require a compliance report to be filed with the contracting agency or the labor commissioner, as may be directed, by such organization or agency, signed by an authorized officer or agent of such organization or agency, with

supporting information, to the effect that the signer's practices and policies, including but not limited to matters concerning personnel, training, apprenticeship, membership, grievance and representation, and upgrading, do not discriminate on grounds of race, color, religious creed, age, sex or national origin, or ancestry of any individual, and that the signer will either affirmatively cooperate in the implementation of the policy and provisions of this Order, or that it consents and agrees that recruitment, employment and the terms and conditions of employment under the proposed contract shall be in accordance with the purposes and provisions of the Order.

IV. The labor commissioner may by regulation exempt certain classes of contracts, subcontracts or purchase orders from the implementation of this Order, for standard commercial supplies or raw materials, for less than specified amounts of money or numbers of workers or for subcontractors below a specified tier. The labor commissioner may also provide by regulation for the exemption of facilities of a contractor which are in all respects separate and distinct from activities of the contractor related to the performance of the state contract, provided only that such exemption will not interfere with or impede the implementation of this Order, and provided further, that in the absence of such an exemption, all facilities shall be covered by the provisions of this Order.

V. Each contracting agency shall be primarily responsible for obtaining compliance with the regulations of the labor commissioner with respect to contracts entered into by such agency or its contractors. All contracting agencies shall comply with the regulations of the labor commissioner in discharging their primary responsibility for securing compliance with the provisions of contracts and otherwise with the terms of this Order and of the regulations of the labor commissioner issued pursuant to this Order. They are directed to cooperate with the labor commissioner and to furnish the labor commissioner such information and assistance as he may require in the performance of his functions under this Order. They are further directed to appoint or designate from among the personnel of each agency, compliance officers, whose duty shall be to seek compliance with the objectives of this Order by conference, conciliation, mediation, or persuasion.

VI. The labor commissioner may investigate the employment practices and procedures of any state contractor or subcontractor and the practices and policies of any labor organization or employment agency hereinabove described, relating to employment under the state contract, as concerns nondiscrimination by such organization or agency as hereinabove described, or the labor commissioner may initiate such investigation by the appropriate contract agency, to determine whether or not the contractual provisions hereinabove specified or statutes of the state respecting them have been violated. Such investigation shall be conducted in accordance with the procedures established by the labor commissioner and the investigating agency shall report to the labor commissioner any action taken or recommended.

VII. The labor commissioner shall receive and investigate or cause to be investigated complaints by employees or prospective employees of a state contractor or subcontractor or members or applicants for membership or apprenticeship or training in a labor organization or employment agency hereinabove described, which

allege discrimination contrary to the contractual provisions specified hereinabove or state statutes requiring nondiscrimination in employment opportunity. If this investigation is conducted for the labor commissioner by a contracting agency, that agency shall report to the labor commissioner what action has been taken or is recommended with regard to such complaints.

VIII. The labor commissioner shall use his best efforts, directly and through contracting agencies, other interested federal, state and local agencies, contractors and all other available instrumentalities, including the commission on human rights and opportunities, the executive committee on human rights and opportunities, ad the apprenticeship council under its mandate to provide advice and counsel to the labor commissioner in providing equal employment opportunities to all apprentices and to provide training, employment and upgrading opportunities for disadvantages workers, in accordance with section 31-51(d) of the 1969 supplement to the general statutes, to cause any labor organization or any employment agency whose members are engaged in work under government contracts or referring workers or providing supervising apprenticeship or training for or in the course of work under a state contract or subcontract to cooperate in the implementation of the purposes of this Order. The labor commissioner shall in appropriate cases notify the commission on human rights and opportunities or other appropriate state or federal agencies whenever it has reason to believe that the practices of any such organization or agency violate equal employment opportunity requirements of state or federal law.

IX. The labor commissioner or any agency officer or employee in the executive branch designated by regulation of the labor commissioner may hold such hearings, public or private, as the labor commissioner may deem advisable for compliance, enforcement or educational purposes under this Order.

X. (a) The labor commissioner may hold or cause to be held hearings, prior to imposing ordering or recommending the imposition of penalties and sanctions under this Order. No order for disbarment of any contractor from further state contracts shall be made without affording the contractor an opportunity for a hearing. In accordance with such regulations as the labor commissioner may adopt, the commissioner or the appropriate contracting agency may

1. Publish or cause to be published the names of contractors or labor organizations or employment agencies as hereinabove described which it has concluded have complied or failed to comply with the provisions of this Order or the regulations of the labor commissioner in implementing this Order.

2. Recommend to the commission on human rights and opportunities that in cases in which there is substantial or material violation or threat thereof of the contractual provision or related state statutes concerned herein, appropriate proceedings be brought to enforce them, including proceedings by the commission on its own motion under chapter 563 of the general statutes and the enjoining, within the limitations of applicable law, of organizations, individuals or groups who prevent directly or indirectly compliance with the provisions of this Order.

3. Recommend that criminal proceedings be brought under chapter 939 of the general statutes.

4. Cancel, terminate, suspend or cause to be cancelled, terminated, or suspended in accordance with law any contract or any portion or portions thereof for failure of the contractor or subcontractor to comply with the nondiscrimination provisions of the contract. Contracts may be cancelled, terminated, suspended absolutely or their continuance conditioned upon a program for future compliance approved by the contracting agency.

5. Provide that any contracting agency shall refrain from entering into any further contracts or extensions or modifications of existing contracts with any contractor until he has satisfied the labor commissioner that he has established and will carry out personnel and employment policies compliant with this Order.

6. Under regulations prescribed by the labor commissioner each contracting agency shall make reasonable efforts with a reasonable period of time to secure compliance with the contract provisions of this Order by methods of conference, conciliation, mediation or persuasion, before other proceedings shall be instituted under this Order or before a state contract shall be cancelled or terminated in whole or in part for failure of the contractor or subcontractor to comply with the contract provisions of state statute and this Order.

(b) Any contracting agency taking any action authorized by this Order, whether on its own motion or as directed by the labor commissioner or pursuant to his regulations shall promptly notify him of such action. Whenever the labor commissioner makes a determination under this Order, he shall promptly notify the appropriate contracting agency and other interested federal, state and local agencies of the action recommended. The state and local agency or agencies shall take such action and shall report the results thereof to the labor commissioner within such time as he shall specify.

XI. If the labor commissioner shall so direct, contracting agencies shall not enter into contracts with any bidder or prospective contractor unless he has satisfactorily complied with the provisions of this Order, or submits a program for compliance acceptable to the labor commissioner, or if the labor commissioner so authorizes, to the contracting agency.

XII. Whenever a contracting agency cancels or terminates a contract, or a contractor has been disbarred from further government contracts because of noncompliance with the contract provisions with regard to nondiscrimination, the labor commissioner or the contracting agency shall rescind such disbarment, upon the satisfaction of the labor commissioner that the contractor has purged himself of such noncompliance and will thenceforth carry out personnel and employment policies of nondiscrimination in compliance with the provision of this Order.

XIII. The labor commissioner may delegate to any officer; agency or employee in the executive branch any function or duty of the labor commissioner under this Order except authority to promulgate regulations of a general nature.

XIV. This Executive Order supplements the Executive Order issued on September 28, 1967. All regulations, orders, instructions, designations and other directives issued heretofore in these premises, including those issued by the heads of various departments or agencies under or pursuant to prior order or statute, shall remain in full force and effect, unless and until revoked or superseded by appropriate authority, to the extent that they are not inconsistent with this Order.

Dated at Hartford, Connecticut, this 16th day of June, 1971.

Thomas J. Meskill, Governor

Executive Order No. Seventeen

WHEREAS, Section 31-237 of the General Statutes of Connecticut as amended requires the maintaining of the established free services of the Connecticut State Employment Service to both employers and prospective employees and

WHEREAS, Section 31-5 of the General Statutes of Connecticut requires that no compensation or fee shall be charged or received directly or indirectly for the services of the Connecticut State Employment Service and

WHEREAS, large numbers of our citizens who have served in the Armed Forces of our nation are returning to civilian life in our state and seeking employment in civilian occupations and

WHEREAS, we owe a duty as well as gratitude to these returning veterans including the duty to find suitable employment for them and

WHEREAS, many of our handicapped citizens are fully capable of employment and are entitled to be placed in suitable employment and

WHEREAS, many of the citizens of our state who are unemployed are unaware of the job openings and employment opportunities which do in fact exist in our state and

WHEREAS, notwithstanding the free services of the Connecticut State Employment Service, many of our Connecticut employers do not use its free services or do not avail themselves fully of all the services offered,

NOW, THEREFORE, I, THOMAS J. MESKILL, Governor of the State of Connecticut, acting by virtue of the authority vested in me under the fourth article of the Constitution of the State and in accordance with Section 3-1 of the General Statutes, do hereby ORDER and direct, as follows, by this Executive Order:

I. The Labor Commissioner shall be responsible for the administration of this Order and shall do all acts necessary and appropriate to achieve its purpose. Upon promulgation of this Order, the Commissioner of Finance and Control shall issue a directive forthwith to all state agencies, that henceforth all state contracts and subcontracts for construction on public buildings, other public works and goods and services shall contain a provision rendering such contract or subcontract subject to this Order, and that such contract or subcontract may be cancelled, terminated or suspended by the Labor Commissioner for violation of or noncompliance with this Order, notwithstanding that the Labor Commissioner is not a party to such contract or subcontract.

II. Every contractor and subcontractor having a contract with the state or any of its agencies, boards, commissions, or departments, every individual partnership, corporation, or business entity having business with the state or who or which seeks to do business with the state, and every bidder or prospective bidder who submits a bid or replies to an invitation to bid on any state contract shall list all employment openings with the office of the Connecticut State Employment Service in the area where the work is to be performed or where the services are to be rendered.

III. All state contracts shall contain a clause which shall be a condition of the contract that the contractor and any subcontractor holding a contract directly under the contractor shall list all employment openings with the Connecticut State Employment Service. The Labor Commissioner may allow exceptions to listings of employment openings which the contractor proposes to fill from within its organization from employees on the rolls of the contractor on the date of publication of the invitation to bid or the date on which the public announcement was published or promulgated advising of the program concerned.

IV. Each contracting agency of the state shall be primarily responsible for obtaining compliance with this Executive Order. Each contracting agency shall appoint or designate from among its personnel one or more persons who shall be responsible for compliance with the objectives of this Order.

V. The Labor Commissioner shall be and is hereby empowered to inspect the books, records, payroll and personnel data of each individual or business entity subject to this Executive Order and may hold hearings or conferences, formal or informal, in pursuance of the duties and responsibilities hereunto delegated to the Labor Commissioner.

VI. The Labor Commissioner or any agency officer or employee in the executive branch designated by regulation of the Labor Commissioner may hold such hearings, public or private, as the Labor Commissioner may deem advisable for compliance, enforcement or educational purposes under this Order.

VII. (a) The Labor Commissioner may hold or cause to be held hearings, prior to imposing, ordering, or recommending the imposition of penalties and sanctions under this Order. In accordance herewith, the Commissioner or the appropriate contracting agency may suspend, cancel, terminate, or cause to be suspended, cancelled, or terminated in accordance with law any contract or portion or portions thereof for failure of the contractor or subcontractor to comply with the listing provisions of the contract. Contracts may be cancelled, terminated, suspended absolutely or their continuance conditioned upon a program for future compliance approved by the contracting agency.

(b) Any contracting agency taking any action authorized by this Order, whether on its own motion or as directed by the Labor Commissioner, shall promptly notify him of such action. Whenever the Labor Commissioner makes a determination under this Order, he shall promptly notify the appropriate contracting agency of the action recommended. The agency shall report the results to the Labor Commissioner promptly.

VIII. If the Labor Commissioner shall so direct, contracting agencies shall not enter into contracts with any bidder or prospective contractor unless he has satisfactorily complied with the provisions of this Order.

Dated at Hartford, Connecticut, this 15th day of February 1973.

Thomas J. Meskill, Governor

Executive Order No. Sixteen

WHEREAS, the State of Connecticut recognizes that workplace violence is a growing problem that must be addressed; and

WHEREAS, the State is committed to providing its employees a reasonably safe and healthy working environment, free from intimidation, harassment, threats, and/or violent acts; and

WHEREAS, violence or the threat of violence by or against any employee of the State of Connecticut or member of the public in the workplace is unacceptable and will subject the perpetrator to serious disciplinary action up to and including discharge and criminal penalties.

NOW, THEREFORE, I, John G. Rowland, Governor of the State of Connecticut, acting by virtue of the authority vested in me by the Constitution and by the statutes of this state, do hereby ORDER and DIRECT:

1. That all state agency personnel, contractors, subcontractors, and vendors comply with the following **Violence in the Workplace Prevention Policy**:

   The State of Connecticut adopts a statewide zero tolerance policy for workplace violence.

   Therefore, except as may be required as a condition of employment:

   - No employee shall bring into any state worksite any weapon or dangerous instrument as defined herein.
   - No employee shall use, attempt to use, or threaten to use any such weapon or dangerous instrument in a state worksite.
   - No employee shall cause or threaten to cause death or physical injury to any individual in a state worksite.

   Weapon means any firearm, including a BB gun, whether loaded or unloaded, any knife (excluding a small pen or pocket knife), including a switchblade or other knife having an automatic spring release device, a stiletto, any police baton or nightstick or any martial arts weapon or electronic defense weapon.

   Dangerous instrument means any instrument, article, or substance that, under the circumstances, is capable of causing death or serious physical injury.

   Violation of the above reasonable work rules shall subject the employee to disciplinary action up to and including discharge.
2. That each agency must prominently post this policy and that all managers and supervisors must clearly communicate this policy to all state employees.
3. That all managers and supervisors are expected to enforce this policy fairly and uniformly.

4. That any employee who feels subjected to or witnesses violent, threatening, harassing, or intimidating behavior in the workplace immediately report the incident or statement to their supervisor, manager, or human resources office.
5. That any employee who believes that there is a serious threat to their safety or the safety of others that requires immediate attention notify proper law enforcement authorities and his or her manager or supervisor.
6. That any manager or supervisor receiving such a report shall immediately contact their human resources office to evaluate, investigate and take appropriate action.
7. That all parties must cooperate fully when questioned regarding violations of this policy.
8. That all parties be advised that any weapon or dangerous instrument at the worksite will be confiscated and that there is no reasonable expectation of privacy with respect to such items in the workplace.
9. That this order applies to all state employees in the executive branch.
10. That each agency will monitor the effective implementation of this policy.
11. That this order shall take effect immediately.

Dated at Hartford, Connecticut this 4th day of August 1999.

John G. Rowland, Governor

Executive Order Number 7C

This Contract is subject to **Executive Order No. 7C of Governor M. Jodi Rell, promulgated on July 13, 2006.** The Parties to this Contract, as part of the consideration hereof, agree that:

a. The State Contracting Standards Board ("Board") may review this contract and recommend to the state contracting agency termination of this contract for cause. The State contracting agency shall consider the recommendations and act as required or permitted in accordance with the contract and applicable law. The Board shall provide the results of its review, together with its recommendations, to the state contracting agency and any other affected party in accordance with the notice provisions in the contract not later than fifteen (15) days after the Board finalizes its recommendation. For the purposes of this Section, "for cause" means:

(1) a violation of the State Ethics Code (Chapter 10 of the general statutes) or section 4a-100 of the general statutes or

(2) wanton or reckless disregard of any state contracting and procurement process by any person substantially involved in such contract or state contracting agency.

b. For purposes of this Section, "contract" shall not include real property transactions involving less than a fee simple interest or financial assistance comprised of state or federal funds, the form of

which may include but is not limited to grants, loans, loan guarantees, and participation interests in loans, equity investments and tax credit programs. Notwithstanding the foregoing, the Board shall not have any authority to recommend the termination of a contract for the sale or purchase of a fee simple interest in real property following transfer of title.

c. Notwithstanding the contract value listed in sections 4-250 and 4-252 of the Connecticut General Statutes and section 8 of Executive Order Number 1, all State Contracts between state agencies and private entities with a value of $50,000 (fifty thousand dollars) or more in a calendar or fiscal year shall comply with the gift and campaign contribution certification requirements of section 4-252 of the Connecticut General Statutes and section 8 of Executive Order Number 1. For purposes of this section, the term "certification" shall include the campaign contribution and annual gift affidavits required by section 8 of Executive Order Number 1.

Dated at Hartford, Connecticut this 13th day of July 2006

M. Jodi Rell, Governor

Campaign Contribution Restrictions

On February 8, 2007, Governor Rell signed into law Public Act 07-1, An Act Concerning the State Contractor Contribution Ban and Gifts to State and Quasi-Public Agencies.

For all State contracts as defined in P.A. 07-1 having a value in a calendar year of $50,000 or more or a combination or series of such agreements or contracts having a value of $100,000 or more, the authorized signatory to this Agreement expressly acknowledges receipt of the State Elections Enforcement Commission's notice advising state contractors of state campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice. See SEEC Form 11.

SEEC FORM 11

NOTICE TO EXECUTIVE BRANCH STATE CONTRACTORS AND PROSPECTIVE STATECONTRACTORS OF CAMPAIGN CONTRIBUTION AND SOLICITATION BAN

This notice is provided under the authority of Connecticut General Statutes 9-612(g)(2), as amended by P.A. 07-1, and is for the purpose of informing state contractors and prospective state contractors of the following law (italicized words are defined below):

Campaign Contribution and Solicitation Ban

No state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor, with regard to a state contract or state

contract solicitation with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall make a contribution to, or solicit contributions on behalf of (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee;

In addition, no holder or principal of a holder of a valid prequalification certificate, shall make a contribution to, or solicit contributions on behalf of (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of State senator or State representative, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

Duty to Inform

State contractors and prospective state contractors are required to inform their principals of the above prohibitions, as applicable, and the possible penalties and other consequences of any violation thereof.

Penalties for Violations

Contributions or solicitations of contributions made in violation of the above prohibitions may result in the following civil and criminal penalties:

Civil penalties—$2000 or twice the amount of the prohibited contribution, whichever is greater, against a principal or a contractor. Any state contractor or prospective state contractor which fails to make reasonable efforts to comply with the provisions requiring notice to its principals of these prohibitions and the possible consequences of their violations may also be subject to civil penalties of $2000 or twice the amount of the prohibited contributions made by their principals.

Criminal penalties—Any knowing and willful violation of the prohibition is a Class D felony, which may subject the violator to imprisonment of not more than 5 years, or $5000 in fines, or both.

Contract Consequences

Contributions made or solicited in violation of the above prohibitions may result, in the case of a state contractor, in the contract being voided.

Contributions made or solicited in violation of the above prohibitions, in the case of a prospective state contractor, shall result in the contract described in the state contract solicitation not being awarded to the prospective state contractor, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

The State will not award any other state contract to anyone found in violation of the above prohibitions for a period of one year after the election for which such

contribution is made or solicited, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

Additional information and the entire text of P.A. 07-1 may be found on the website of the State Elections Enforcement Commission, www.ct.gov/seec. Click on the link to "State Contractor Contribution Ban."

UNIVERSITY OF CONNECTICUT HEALTH CENTER
NON-DISCRIMINATION CERTIFICATION

Certification to accompany all State contracts, regardless of type, term, cost, or value., pursuant to Connecticut General Statutes §4a-60(a)(1) and § 4a-60a(a)(1), as amended by Public Act 07-245 and Section 9(a)(1) and 10(a)(1) of Public Act 07-142.

(By corporate or other business entity regarding support of nondiscrimination against persons on account of their race, color, religious creed, age, marital or civil union status, national origin, ancestry, sex, mental retardation, physical disability or sexual orientation.)

I Loraine Shea (signer's name) Executive Director (signer's title)
of Heart Center of Greater Waterbury (name of entity) an entity lawfully organized and existing under the laws of Connecticut (name of state or commonwealth) do hereby certify that the following is a true and correct copy of a resolution adopted on the __ day of ____, 20__ by the governing body of Heart Center of Greater (name of entity) in accordance with all of its documents of governance and management and the laws of Connecticut (name of state or commonwealth) and further certify that such resolution has not been modified, rescinded, or revoked, and is at present in full force and effect.

RESOLVED: That Heart Center of Greater Wtby (name of entity) hereby adopts as is policy to support the nondiscrimination agreements and warranties required under Connecticut General Statues § 4a-60(a)(1) and § 4a-60a(a)(1), as amended in State of Connecticut Public Act 07-245 and sections 9(a)(1) and 10(a)(1) of Public Act 07-142.

WHEREOF, I, the undersigned has executed this certificate this 27 day of June 2008

Print Name: Loraine C Shea

Title: Executive Director

Loraine C Shea
Signature

6-27-08
Date

STATE OF CONNECTICUT
GIFT AND CAMPAIGN CONTRIBUTION CERTIFICATION

Certification to accompany a State contract with a value of $50,000 or more in a calendar or fiscal year, pursuant to C.G.S. §§ 4-250 and 4-252(c); Governor M. Jodi Rell's Executive Orders No. 1, Para. 8, and No. 7C, Para. 10; and C.G.S. §9-612(g)(2), as amended by Public Act 07-1

INSTRUCTIONS:

Complete all sections of the form. Attach additional pages, if necessary, to provide full disclosure about any lawful campaign contributions made to campaigns of candidates for statewide public office or the General Assembly, as described herein. Sign and date the form, under oath, in the presence of a Commissioner of the Superior Court or Notary Public. Submit the completed form to the awarding State agency at the time of initial contract execution (and on each anniversary date of a multi-year contract, if applicable).

CHECK ONE: ☑ Initial Certification ☐ Annual Update (Multi-year contracts only.)

GIFT CERTIFICATION:

As used in this certification, the following terms have the meaning set forth below:

1) "Contract" means that contract between the State of Connecticut (and/or one or more of it agencies or instrumentalities) and the Contractor, attached hereto, or as otherwise described by the awarding State agency below;
2) If this is an Initial Certification, "Execution Date" means the date the Contract is fully executed by, and becomes effective between, the parties; if this is an Annual Update, "Execution Date" means the date this certification is signed by the Contractor;
3) "Contractor" means the person, firm or corporation named as the contactor below;
4) "Applicable Public Official or State Employee" means any public official or state employee described in C.G.S. §4-252(c)(1)(i) or (ii);
5) **"Gift"** has the same meaning given that term in C.G.S. § 4-250(1);
6) "Planning Start Date" is the date the State agency began planning the project, services, procurement, lease or licensing arrangement covered by this Contract, as indicated by the awarding State agency below; and
7) "Principals or Key Personnel" means and refers to those principals and key personnel of the Contractor, and its or their agents, as described in C.G.S. §§ 4-250(5) and 4-252(c)(1)(B) and (C).

I, the undersigned, am the official authorized to execute the Contract on behalf of the Contractor. I hereby certify that, between the Planning Start Date and Execution Date, neither the Contractor nor any Principals or Key Personnel has made, will make (or has promised, or offered, to, or otherwise indicated that he, she or it will, make) any **Gifts** to any Applicable Public Official or State Employee.

I further certify that no Principals or Key Personnel know of any action by the Contractor to circumvent (or which would result in the circumvention of) the above certification regarding **Gifts** by providing for any other principals, key personnel, officials, or employees of the Contractor, or its or their agents, to make a **Gift** to any Applicable Public Official or State Employee. I further certify that the Contractor made the bid or proposal for the Contract without fraud or collusion with any person.

CAMPAIGN CONTRIBUTION CERTIFICATION:

I further certify that, on or after December 31, 2006, neither the Contractor nor any of its principals, as defined in C.G.S. § 9-612(g)(1), has made any **campaign contributions** to, or solicited any contributions on behalf of, any exploratory committee, candidate committee, political committee, or party committee established by, or supporting or authorized to support, any candidate for statewide public office, in violation of C.G.S. § 9-612(g)(2)(A). I further certify that **all lawful campaign contributions** that have been made on or after December 31, 2006 by the Contractor or any of its principals, as defined in C.G.S. § 9-612(g)(1), to, or solicited on behalf of, any exploratory committee, candidate committee, political committee, or party committee established by, or supporting or authorized to support any candidates for statewide public office or the General Assembly, are listed below:

STATE OF CONNECTICUT
GIFT AND CAMPAIGN CONTRIBUTION CERTIFICATION

Lawful Campaign Contributions to Candidates for Statewide Public Office:

Contribution Date	Name of Contributor	Recipient	Value	Description
none				

Lawful Campaign Contributions to Candidates for the General Assembly:

Contribution Date	Name of Contributor	Recipient	Value	Description
none				

Sworn as true to the best of my knowledge and belief, subject to the penalties of false statement.

Loraine C. Shea - Heart Center Greater Wtby
Printed Contractor Name

Loraine C. Shea
Signature of Authorized Official

Subscribed and acknowledged before me this 1st **day of** July, 2008.

Victoria Cipriano
~~**Commissioner of the Superior Court**~~ **(or Notary Public)**

VICTORIA CIPRIANO
NOTARY PUBLIC
MY COMMISSION EXPIRES FEB. 28, 2012

For State Agency Use Only

Awarding State Agency

Planning Start Date

Contract Number or Description

STATE OF CONNECTICUT
CONSULTING AGREEMENT AFFIDAVIT

Affidavit to accompany a State contract for the purchase of goods and services with a value of $50,000 or more in a calendar or fiscal year, pursuant to Connecticut General Statutes §§ 4a-81(a) and 4a-81(b)

INSTRUCTIONS:

If the bidder or vendor has entered into a consulting agreement, as defined by Connecticut General Statutes § 4a-81(b)(1): Complete all sections of the form. If the bidder or vendor has entered into more than one such consulting agreement, use a separate form for each agreement. Sign and date the form in the presence of a Commissioner of the Superior Court or Notary Public. **If the bidder or vendor has not entered into a consulting agreement, as defined by Connecticut General Statutes § 4a-81(b)(1):** Complete only the shaded section of the form. Sign and date the form in the presence of a Commissioner of the Superior Court or Notary Public.

Submit completed form to the awarding State agency with bid or proposal. For a sole source award, submit completed form to the awarding State agency at the time of contract execution.

This affidavit must be amended if the contractor enters into any new consulting agreement(s) during the term of the State contract.

AFFIDAVIT: [Number of Affidavits Sworn and Subscribed On This Day: _____]

I, the undersigned, hereby swear that I am the chief official of the bidder or vendor awarded a contract, as described in Connecticut General Statutes § 4a-81(a), or that I am the individual awarded such a contract who is authorized to execute such contract. I further swear that I have not entered into any consulting agreement in connection with such contract, **except for the agreement listed below:**

Consultant's Name and Title	Name of Firm (if applicable)

Start Date	End Date	Cost

Description of Services Provided: NONE

Is the consultant a former State employee or former public official? ☐ YES ☒ NO

If YES: _____ (Name of Former State Agency) _____ (Termination Date of Employment)

Sworn as true to the best of my knowledge and belief, subject to the penalties of false statement.

Printed Name of Bidder or Vendor	Signature of Chief Official or Individual	Date
Heart Center Greater Waterbury	Loraine C Shea	7-1-08

Loraine C Shea
Printed Name (of above)

Awarding State Agency

Sworn and subscribed before me on this 1st **day of** July, 2008.

Victoria Cipriano
~~Commissioner of the Superior Court~~
~~or Notary Public~~

VICTORIA CIPRIANO
NOTARY PUBLIC
MY COMMISSION EXPIRES FEB. 28, 2012

UNIVERSITY OF CONNECTICUT HEALTH CENTER
NON-DISCRIMINATION CERTIFICATION

Certification to accompany all State contracts, regardless of type, term, cost, or value., pursuant to Connecticut General Statutes §4a-60(a)(1) and § 4a-60a(a)(1), as amended by Public Act 07-245 and Section 9(a)(1) and 10(a)(1) of Public Act 07-142.

(By corporate or other business entity regarding support of nondiscrimination against persons on account of their race, color, religious creed, age, marital or civil union status, national origin, ancestry, sex, mental retardation, physical disability or sexual orientation.)

I Chad Wable (signer's name) Executive VP of Strategic Development + System C (signer's title)
of Saint Mary's Hospital (name of entity) an entity lawfully organized and existing under the laws of
Connecticut (name of state or commonwealth) do hereby certify that the following is a true and correct copy
of a resolution adopted on the __ day of ____, 20__ by the governing body of Saint Mary's Hospital (name of entity)
in accordance with all of its documents of governance and management and the laws of
Connecticut (name of state or commonwealth) and further certify that such resolution has not been modified,
rescinded, or revoked, and is at present in full force and effect.

RESOLVED: That Saint Marys Hospital (name of entity) hereby adopts as is policy to support the nondiscrimination agreements and warranties required under Connecticut General Statues § 4a-60(a)(1) and § 4a-60a(a)(1), as amended in State of Connecticut Public Act 07-245 and sections 9(a)(1) and 10(a)(1) of Public Act 07-142.

WHEREOF, I, the undersigned has executed this certificate this 2nd day of July 2008

Print Name: Chad Wable

Title: Executive VP of Strategic Development + Syster

Signature 7/2/08 Date

STATE OF CONNECTICUT
GIFT AND CAMPAIGN CONTRIBUTION CERTIFICATION

Certification to accompany a State contract with a value of $50,000 or more in a calendar or fiscal year, pursuant to C.G.S. §§ 4-250 and 4-252(c); Governor M. Jodi Rell's Executive Orders No. 1, Para. 8, and No. 7C, Para. 10; and C.G.S. §9-612(g)(2), as amended by Public Act 07-1

INSTRUCTIONS:

Complete all sections of the form. Attach additional pages, if necessary, to provide full disclosure about any lawful campaign contributions made to campaigns of candidates for statewide public office or the General Assembly, as described herein. Sign and date the form, under oath, in the presence of a Commissioner of the Superior Court or Notary Public. Submit the completed form to the awarding State agency at the time of initial contract execution (and on each anniversary date of a multi-year contract, if applicable).

CHECK ONE: ☑ Initial Certification ☐ Annual Update (Multi-year contracts only.)

GIFT CERTIFICATION:

As used in this certification, the following terms have the meaning set forth below:

1) "Contract" means that contract between the State of Connecticut (and/or one or more of it agencies or instrumentalities) and the Contractor, attached hereto, or as otherwise described by the awarding State agency below;
2) If this is an Initial Certification, "Execution Date" means the date the Contract is fully executed by, and becomes effective between, the parties; if this is an Annual Update, "Execution Date" means the date this certification is signed by the Contractor;
3) "Contractor" means the person, firm or corporation named as the contactor below;
4) "Applicable Public Official or State Employee" means any public official or state employee described in C.G.S. §4-252(c)(1)(i) or (ii);
5) **"Gift"** has the same meaning given that term in C.G.S. § 4-250(1);
6) "Planning Start Date" is the date the State agency began planning the project, services, procurement, lease or licensing arrangement covered by this Contract, as indicated by the awarding State agency below; and
7) "Principals or Key Personnel" means and refers to those principals and key personnel of the Contractor, and its or their agents, as described in C.G.S. §§ 4-250(5) and 4-252(c)(1)(B) and (C).

I, the undersigned, am the official authorized to execute the Contract on behalf of the Contractor. I hereby certify that, between the Planning Start Date and Execution Date, neither the Contractor nor any Principals or Key Personnel has made, will make (or has promised, or offered, to, or otherwise indicated that he, she or it will, make) any **Gifts** to any Applicable Public Official or State Employee.

I further certify that no Principals or Key Personnel know of any action by the Contractor to circumvent (or which would result in the circumvention of) the above certification regarding **Gifts** by providing for any other principals, key personnel, officials, or employees of the Contractor, or its or their agents, to make a **Gift** to any Applicable Public Official or State Employee. I further certify that the Contractor made the bid or proposal for the Contract without fraud or collusion with any person.

CAMPAIGN CONTRIBUTION CERTIFICATION:

I further certify that, on or after December 31, 2006, neither the Contractor nor any of its principals, as defined in C.G.S. § 9-612(g)(1), has made any **campaign contributions** to, or solicited any contributions on behalf of, any exploratory committee, candidate committee, political committee, or party committee established by, or supporting or authorized to support, any candidate for statewide public office, in violation of C.G.S. § 9-612(g)(2)(A). I further certify that **all lawful campaign contributions** that have been made on or after December 31, 2006 by the Contractor or any of its principals, as defined in C.G.S. § 9-612(g)(1), to, or solicited on behalf of, any exploratory committee, candidate committee, political committee, or party committee established by, or supporting or authorized to support any candidates for statewide public office or the General Assembly, are listed below:

STATE OF CONNECTICUT
GIFT AND CAMPAIGN CONTRIBUTION CERTIFICATION

Lawful Campaign Contributions to Candidates for Statewide Public Office:

Contribution Date	Name of Contributor	Recipient	Value	Description
None				

Lawful Campaign Contributions to Candidates for the General Assembly:

Contribution Date	Name of Contributor	Recipient	Value	Description
None				

Sworn as true to the best of my knowledge and belief, subject to the penalties of false statement.

Saint Mary's Hospital / Chad Wable
Printed Contractor Name

Signature of Authorized Official

Subscribed and acknowledged before me this 2nd **day of** July **, 200**8.

Victoria Cipriano
~~Commissioner of the Superior Court~~ **(or Notary Public)**

VICTORIA CIPRIANO
NOTARY PUBLIC
MY COMMISSION EXPIRES FEB. 28, 2012

For State Agency Use Only

Awarding State Agency

Planning Start Date

Contract Number or Description

STATE OF CONNECTICUT
CONSULTING AGREEMENT AFFIDAVIT

Affidavit to accompany a State contract for the purchase of goods and services with a value of $50,000 or more in a calendar or fiscal year, pursuant to Connecticut General Statutes §§ 4a-81(a) and 4a-81(b)

INSTRUCTIONS:

If the bidder or vendor has entered into a consulting agreement, as defined by Connecticut General Statutes § 4a-81(b)(1): Complete all sections of the form. If the bidder or vendor has entered into more than one such consulting agreement, use a separate form for each agreement. Sign and date the form in the presence of a Commissioner of the Superior Court or Notary Public. **If the bidder or vendor has not entered into a consulting agreement, as defined by Connecticut General Statutes § 4a-81(b)(1):** Complete only the shaded section of the form. Sign and date the form in the presence of a Commissioner of the Superior Court or Notary Public.

Submit completed form to the awarding State agency with bid or proposal. For a sole source award, submit completed form to the awarding State agency at the time of contract execution.

This affidavit must be amended if the contractor enters into any new consulting agreement(s) during the term of the State contract.

AFFIDAVIT: [Number of Affidavits Sworn and Subscribed On This Day: _____]

I, the undersigned, hereby swear that I am the chief official of the bidder or vendor awarded a contract, as described in Connecticut General Statutes § 4a-81(a), or that I am the individual awarded such a contract who is authorized to execute such contract. I further swear that I have not entered into any consulting agreement in connection with such contract, **except for the agreement listed below:**

Consultant's Name and Title _____ Name of Firm (if applicable) _____

Start Date _____ End Date _____ Cost _____

Description of Services Provided: NONE

Is the consultant a former State employee or former public official? ☐ YES ☐ NO

If YES: Name of Former State Agency _____ Termination Date of Employment _____

Sworn as true to the best of my knowledge and belief, subject to the penalties of false statement.

Saint Mary's Hospital
Printed Name of Bidder or Vendor

Signature of Chief Official or Individual

7/2/08
Date

Chad Wable
Printed Name (of above)

Awarding State Agency

Sworn and subscribed before me on this 2nd **day of** July, 2008.

Victoria Cipriano
~~**Commissioner of the Superior Court**~~
~~**or Notary Public**~~

VICTORIA CIPRIANO
NOTARY PUBLIC
MY COMMISSION EXPIRES FEB. 28, 201[illegible]

UNIVERSITY OF CONNECTICUT HEALTH CENTER
NON-DISCRIMINATION CERTIFICATION

Certification to accompany all State contracts, regardless of type, term, cost, or value., pursuant to Connecticut General Statutes §4a-60(a)(1) and § 4a-60a(a)(1), as amended by Public Act 07-245 and Section 9(a)(1) and 10(a)(1) of Public Act 07-142.

(By corporate or other business entity regarding support of nondiscrimination against persons on account of their race, color, religious creed, age, marital or civil union status, national origin, ancestry, sex, mental retardation, physical disability or sexual orientation.)

I _____ _____
(signer's name) (signer's title)
of _____ an entity lawfully organized and existing under the laws of
(name of entity)
_____ do hereby certify that the following is a true and correct copy
(name of state or commonwealth)
of a resolution adopted on the __ day of ____, 20__ by the governing body of _____
(name of entity)
in accordance with all of its documents of governance and management and the laws of
_____ and further certify that such resolution has not been modified,
(name of state or commonwealth)
rescinded, or revoked, and is at present in full force and effect.

RESOLVED: That Waterbury Hospital hereby adopts as is policy
(name of entity)
to support the nondiscrimination agreements and warranties required under Connecticut General Statues § 4a-60(a)(1) and § 4a-60a(a)(1), as amended in State of Connecticut Public Act 07-245 and sections 9(a)(1) and 10(a)(1) of Public Act 07-142.

WHEREOF, I, the undersigned has executed this certificate this 27 day of June 2008

Print Name: John H Tobin

Title: President and CEO

Signature 6/27/08 Date

STATE OF CONNECTICUT
GIFT AND CAMPAIGN CONTRIBUTION CERTIFICATION

Certification to accompany a State contract with a value of $50,000 or more in a calendar or fiscal year, pursuant to C.G.S. §§ 4-250 and 4-252(c); Governor M. Jodi Rell's Executive Orders No. 1, Para. 8, and No. 7C, Para. 10; and C.G.S. §9-612(g)(2), as amended by Public Act 07-1

INSTRUCTIONS:

Complete all sections of the form. Attach additional pages, if necessary, to provide full disclosure about any lawful campaign contributions made to campaigns of candidates for statewide public office or the General Assembly, as described herein. Sign and date the form, under oath, in the presence of a Commissioner of the Superior Court or Notary Public. Submit the completed form to the awarding State agency at the time of initial contract execution (and on each anniversary date of a multi-year contract, if applicable).

CHECK ONE: ☑ Initial Certification ☐ Annual Update (Multi-year contracts only.)

GIFT CERTIFICATION:

As used in this certification, the following terms have the meaning set forth below:

1) "Contract" means that contract between the State of Connecticut (and/or one or more of it agencies or instrumentalities) and the Contractor, attached hereto, or as otherwise described by the awarding State agency below;
2) If this is an Initial Certification, "Execution Date" means the date the Contract is fully executed by, and becomes effective between, the parties; if this is an Annual Update, "Execution Date" means the date this certification is signed by the Contractor;
3) "Contractor" means the person, firm or corporation named as the contactor below;
4) "Applicable Public Official or State Employee" means any public official or state employee described in C.G.S. §4-252(c)(1)(i) or (ii);
5) **"Gift"** has the same meaning given that term in C.G.S. § 4-250(1);
6) "Planning Start Date" is the date the State agency began planning the project, services, procurement, lease or licensing arrangement covered by this Contract, as indicated by the awarding State agency below; and
7) "Principals or Key Personnel" means and refers to those principals and key personnel of the Contractor, and its or their agents, as described in C.G.S. §§ 4-250(5) and 4-252(c)(1)(B) and (C).

I, the undersigned, am the official authorized to execute the Contract on behalf of the Contractor. I hereby certify that, between the Planning Start Date and Execution Date, neither the Contractor nor any Principals or Key Personnel has made, will make (or has promised, or offered, to, or otherwise indicated that he, she or it will, make) any **Gifts** to any Applicable Public Official or State Employee.

I further certify that no Principals or Key Personnel know of any action by the Contractor to circumvent (or which would result in the circumvention of) the above certification regarding **Gifts** by providing for any other principals, key personnel, officials, or employees of the Contractor, or its or their agents, to make a **Gift** to any Applicable Public Official or State Employee. I further certify that the Contractor made the bid or proposal for the Contract without fraud or collusion with any person.

CAMPAIGN CONTRIBUTION CERTIFICATION:

I further certify that, on or after December 31, 2006, neither the Contractor nor any of its principals, as defined in C.G.S. § 9-612(g)(1), has made any **campaign contributions** to, or solicited any contributions on behalf of, any exploratory committee, candidate committee, political committee, or party committee established by, or supporting or authorized to support, any candidate for statewide public office, in violation of C.G.S. § 9-612(g)(2)(A). I further certify that **all lawful campaign contributions** that have been made on or after December 31, 2006 by the Contractor or any of its principals, as defined in C.G.S. § 9-612(g)(1), to, or solicited on behalf of, any exploratory committee, candidate committee, political committee, or party committee established by, or supporting or authorized to support any candidates for statewide public office or the General Assembly, are listed below:

STATE OF CONNECTICUT
CONSULTING AGREEMENT AFFIDAVIT

Affidavit to accompany a State contract for the purchase of goods and services with a value of $50,000 or more in a calendar or fiscal year, pursuant to Connecticut General Statutes §§ 4a-81(a) and 4a-81(b)

INSTRUCTIONS:

If the bidder or vendor has entered into a consulting agreement, as defined by Connecticut General Statutes § 4a-81(b)(1): Complete all sections of the form. If the bidder or vendor has entered into more than one such consulting agreement, use a separate form for each agreement. Sign and date the form in the presence of a Commissioner of the Superior Court or Notary Public. **If the bidder or vendor has not entered into a consulting agreement, as defined by Connecticut General Statutes § 4a-81(b)(1):** Complete only the shaded section of the form. Sign and date the form in the presence of a Commissioner of the Superior Court or Notary Public.

Submit completed form to the awarding State agency with bid or proposal. For a sole source award, submit completed form to the awarding State agency at the time of contract execution.

This affidavit must be amended if the contractor enters into any new consulting agreement(s) during the term of the State contract.

AFFIDAVIT: [Number of Affidavits Sworn and Subscribed On This Day: _____]

I, the undersigned, hereby swear that I am the chief official of the bidder or vendor awarded a contract, as described in Connecticut General Statutes § 4a-81(a), or that I am the individual awarded such a contract who is authorized to execute such contract. I further swear that I have not entered into any consulting agreement in connection with such contract, **except for the agreement listed below**:

Consultant's Name and Title	Name of Firm (if applicable)

Start Date	End Date	Cost

Description of Services Provided: NONE

Is the consultant a former State employee or former public official? ☐ YES ☒ NO

If YES: _____ (Name of Former State Agency) _____ (Termination Date of Employment)

Sworn as true to the best of my knowledge and belief, subject to the penalties of false statement.

Printed Name of Bidder or Vendor	Signature of Chief Official or Individual	Date
Waterbury Hospital	[signature]	6/30/08
	John H. Tobin (Printed Name (of above))	Awarding State Agency

Sworn and subscribed before me on this 30th **day of** June, 2008.

[signature]
Commissioner of the Superior Court or Notary Public

Kelly L. Keating
Notary Public
State of Connecticut
My Commission Expires
August 31, 2012

APPENDIX 9.e.

TWH Board Resolution

SMH Board Resolution

JDH Board Resolution

RESOLUTIONS OF THE BOARD OF TRUSTEES OF THE WATERBURY HOSPITAL

WHEREAS, pursuant to the Connecticut Office of Health Care Access ("OHCA") Docket No. 03-30167 ("Initial CON"), the Waterbury Hospital (the "Hospital"), Saint Mary's Hospital, Inc. ("SMH") and John Dempsey Hospital ("JDH") developed a joint program for a regional comprehensive heart care services including cardiac surgery and angioplasty (the "Program"); and

WHEREAS, the demonstration project contemplated by the Initial CON has expired and a letter of intent for a new Certificate of Need for the Program has been filed; and

WHEREAS, the Board of Directors of the Hospital continues to believe that there is sufficient patient need in Waterbury, Connecticut and its surrounding towns (the "Greater Waterbury Area") for the Program; and

WHEREAS, the Hospital, together with SMH and JDH, has the ability to jointly provide interventional cardiology, including cardiac surgery and angioplasty, to patients in the Greater Waterbury Area; and

WHEREAS, the Board of Trustees believes it to be in the best interests of the Hospital and health care consumers within the Greater Waterbury Area to continue the Program and that absent the continuation of the Program the lives of health care consumers within the Greater Waterbury Area could be endangered; and

WHEREAS, the Board of Trustees of the Hospital believes it to be in the best interests of the Hospital and health care consumers within the Greater Waterbury Area to take further action to maintain the Program and to seek all regulatory approvals necessary for the operation of the Program; and

WHEREAS, the Board of Trustees of the Hospital hereby adopts the following resolutions, a copy of such resolutions to be filed with the minutes of the meetings of the Board of Trustees of the Hospital.

NOW, THEREFORE, be it:

RESOLVED, that the Hospital, SMH and JDH continue to jointly operate the Program in Waterbury; and further

RESOLVED, that the Hospital and SMH utilize the existing cath lab capacities and cardiac operating rooms at the Hospital and SMH; and further

RESOLVED, that the Hospital and SMH continue to jointly manage the Program through the Heart Center of Greater Waterbury, Inc. ("HCGW"), which shall serve as a management services organization to oversee the Program and to provide programmatic, quality, marketing and community wellness coordination for the Program; and further

RESOLVED, that the Hospital, jointly with SMH and JDH, pursue all necessary regulatory approvals for the joint operation of the Program and develop a mutual strategy for obtaining such regulatory approvals, including but not limited to, the filing of a joint application for a Certificate of Need with OHCA; and further

RESOLVED, that John Tobin, President of the Hospital is hereby authorized and empowered, in the name and on behalf of the Hospital to negotiate, execute and deliver such agreements, instruments and documents on the terms such individual may deem necessary or appropriate and in the best interests of the Hospital, specifically in connection with obtaining all regulatory approvals necessary for the hospitals to jointly operate the Program, such execution and delivery thereof to be conclusive evidence of such individual's approval thereof and authority hereunder; and further

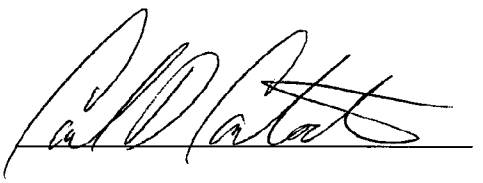
RESOLVED, that John Tobin, the President of the Hospital is hereby authorized and empowered, in the name and on behalf of the Hospital to execute and deliver such agreements, assignments, instruments, certificates or other documents and exhibits thereto, including (without limitation) any amendments, additions or modifications thereto, as he may deem necessary or appropriate and in the best interests of the Hospital specifically for the consummation of the transactions contemplated hereby, including, but not limited to those documents necessary to confirm or formalize the agreement(s) among the hospitals, and/or HCGW to jointly administer and operate the Program and set forth the specific details for the joint administration of the Program; such determination to be conclusively evidenced by such individual's execution thereof; and further

RESOLVED, that the Hospital pursue all regulatory approvals necessary for the joint operation of the Program; and further

RESOLVED, that all actions taken by the Hospital in connection with the development and operation of the Program prior to the date hereof, are hereby ratified, confirmed and approved; and further

RESOLVED, that to the extent any prior resolutions of the Board of Trustees of the Hospital are or may be in conflict with any of the resolutions set forth herein, such prior resolutions are hereby revoked.

Dated: August 12, 2008



Secretary

RESOLUTIONS OF
THE EXECUTIVE COMMITTEE OF THE BOARD OF DIRECTORS OF
SAINT MARY'S HOSPITAL, INC.

WHEREAS, pursuant to the Connecticut Office of Health Care Access ("OHCA") Docket No. 03-30167 ("Initial CON"), Saint Mary's Hospital, Inc. (the "Hospital"), The Waterbury Hospital ("WH") and John Dempsey Hospital ("JDH") developed a joint program for regional comprehensive heart care services including cardiac surgery and angioplasty (the "Program"); and

WHEREAS, the demonstration project contemplated by the Initial CON has expired and a letter of intent for a new Certificate of Need for the Program has been filed; and

WHEREAS, the Board of Directors of the Hospital continues to believe that there is sufficient patient need in Waterbury, Connecticut and its surrounding towns (the "Greater Waterbury Area") for the Program; and

WHEREAS, the Hospital, together with WH and JDH, has the ability to jointly provide interventional cardiology, including cardiac surgery and angioplasty, to patients in the Greater Waterbury Area; and

WHEREAS, the Board of Directors believes it to be in the best interests of the Hospital and health care consumers within the Greater Waterbury Area to continue the Program and that absent the continuation of the Program the lives of health care consumers within the Greater Waterbury Area could be endangered; and

WHEREAS, the Board of Directors of the Hospital believes it to be in the best interests of the Hospital and health care consumers within the Greater Waterbury Area to take further action to maintain the Program and to seek all regulatory approvals necessary for the operation of the Program; and

WHEREAS, the Board of Directors of the Hospital hereby adopts the following resolutions, a copy of such resolutions to be filed with the minutes of the meetings of the Board of Directors of the Hospital.

NOW, THEREFORE, be it:

RESOLVED, that the Hospital, WH and JDH continue to jointly operate the Program in Waterbury; and further

RESOLVED, that the Hospital and WH utilize the existing cath lab capacities and cardiac operating rooms at the Hospital and WH; and further

RESOLVED, that the Hospital and WH continue to jointly manage the Program through the Heart Center of Greater Waterbury, Inc. ("HCGW"), which shall serve as a management

services organization to oversee the Program and to provide programmatic, quality, marketing and community wellness coordination for the Program; and further

RESOLVED, that the Hospital, jointly with WH and JDH, pursue all necessary regulatory approvals for the joint operation of the Program and develop a mutual strategy for obtaining such regulatory approvals, including but not limited to, the filing of a joint application for a Certificate of Need with OHCA; and further

RESOLVED, that William Casey, Interim President and Chief Executive Officer of the Hospital, is hereby authorized and empowered, in the name and on behalf of the Hospital to negotiate, execute and deliver such agreements, instruments and documents on the terms such individual may deem necessary or appropriate and in the best interests of the Hospital, specifically in connection with obtaining all regulatory approvals necessary for the hospitals to jointly operate the Program, such execution and delivery thereof to be conclusive evidence of such individual's approval thereof and authority hereunder; and further

RESOLVED, that William Casey, Interim President and Chief Executive Officer of the Hospital, is hereby authorized and empowered, in the name and on behalf of the Hospital to execute and deliver such agreements, assignments, instruments, certificates or other documents and exhibits thereto, including (without limitation) any amendments, additions or modifications thereto, as he may deem necessary or appropriate and in the best interests of the Hospital specifically for the consummation of the transactions contemplated hereby, including, but not limited to those documents necessary to confirm or formalize the agreement(s) among the hospitals, and/or HCGW to jointly administer and operate the Program and set forth the specific details for the joint administration of the Program; such determination to be conclusively evidenced by such individual's execution thereof; and further

RESOLVED, that the Hospital pursue all regulatory approvals necessary for the joint operation of the Program; and further

RESOLVED, that all actions taken by the Hospital in connection with the development and operation of the Program prior to the date hereof, are hereby ratified, confirmed and approved; and further

RESOLVED, that to the extent any prior resolutions of the Board of Directors of the Hospital are or may be in conflict with any of the resolutions set forth herein, such prior resolutions are hereby revoked.

Dated: August 14, 2008

Stephen R. Griffin
Secretary

University of Connecticut Health Center
John Dempsey Hospital

TO: **Members of the Clinical Affairs Subcommittee of the UCHC Board of Directors**

FROM: **Dr. Steven Strongwater**

DATE: **February 3, 2004**

Recommendation:
That the Clinical Affairs Subcommittee make the following recommendation to the UCHC Board of Directors:

That the UCHC Board of Directors authorize the University of Connecticut Health Center to provide support, assistance and clinical oversight for the proposed Angioplasty and Open Heart Surgery Program at St. Mary's Hospital and Waterbury Hospital and to cooperate with the Hospitals in a Certificate of Need application to the Office of Health Care Access to secure regulatory approval to establish the Program; and further authorize UCHC to contract with the Finance Corporation to enter into an agreement with St. Mary's Hospital and Waterbury Hospital to provide the services.

Background:
The CEOs of Waterbury and St. Mary's Hospitals indicated in discussions with Dr. Strongwater that they needed support and assistance in the development of a proposed Angioplasty and Open Heart Surgery Program. UCHC agreed to work with the two Waterbury facilities to support and assist the proposed program.

Rationale: 1) UCHC, as the State's academic medical center, is committed to facilitating the translation of education, research and clinical expertise to Connecticut communities, and to lending its expertise toward the goal of delivering high quality heath care services to the citizens of the State of Connecticut; 2) Cardiovascular Health is a key Signature Program for UCHC; 3) JDH is the Connecticut provider with the most recent experience implementing an Angioplasty and Open Heart Surgery Program.

See the Memorandum of Understanding attached.

APPENDIX 10.b.iii.

TWH July 2008 monthly financial statement

SMH July 2008 monthly financial statement

JDH July 2008 monthly financial statement

WATERBURY HOSPITAL
GENERAL FUND
COMPARATIVE BALANCE SHEET

CURRENT ASSETS	9/30/2007	10/31/2007	11/30/2007	12/31/2007	1/31/2008	2/29/2008	3/31/2008	4/30/2008	5/31/2008	6/30/2008	7/31/2008
Cash & Cash Equivalents	$4,036,670	$8,259,694	$6,282,817	$3,778,942	$5,730,752	$1,299,072	$5,250,620	$7,141,897	$6,856,972	$3,480,187	$8,992,496
Assets whose use is Limited	$3,058,221	$3,210,505	$3,362,197	$3,590,923	$3,125,088	$2,661,417	$2,813,932	$3,003,991	$3,174,266	$3,383,509	$2,166,352
Accounts Receivable - Patients	$42,920,866	$44,187,421	$44,671,777	$43,232,911	$44,937,656	$45,555,281	$47,281,202	$45,805,738	$41,842,874	$42,127,052	$40,819,969
Less: Allow. for Doubtful Accounts	$9,500,000	$9,416,187	$10,889,624	$9,155,582	$8,737,091	$8,595,565	$8,355,066	$8,546,867	$8,914,266	$8,603,457	$7,991,893
Net Accounts Receivable	$33,420,866	$34,771,234	$33,782,153	$34,077,329	$36,200,565	$36,959,716	$38,926,136	$37,258,871	$32,928,608	$33,523,595	$32,828,076
Grants Receivable & Other Receivables	$1,417,154	$922,951	$1,167,589	$1,570,473	$1,094,301	$1,480,670	$1,703,604	$1,732,072	$1,861,542	$1,913,431	$1,989,890
Inventory of Supplies	$478,384	$486,292	$492,559	$500,278	$500,706	$505,319	$492,630	$500,205	$502,683	$501,655	$507,481
Prepaid Insurance & Expense	$1,272,851	$4,452,599	$4,284,840	$4,001,623	$3,934,938	$3,487,108	$3,188,118	$3,035,163	$2,559,288	$2,233,813	$2,419,687
Due From Affiliates	$4,025,599	($1,946,114)	($1,559,802)	($1,134,245)	($800,362)	($1,397,672)	($756,375)	($19,772)	$481,205	$1,160,530	($1,795,123)
TOTAL CURRENT ASSETS	$47,709,745	$50,157,161	$47,812,353	$46,385,323	$49,785,988	$44,995,630	$51,618,665	$52,652,427	$48,364,564	$46,196,720	$47,108,859
ASSETS LIMITED AS TO USE:											
Investments - Self-Insurance	$9,816,451	$9,701,963	$9,749,849	$9,956,577	$7,363,150	$7,308,088	$5,225,497	$5,052,399	$5,020,225	$5,157,751	$4,981,232
Investments - Cap Purch/Repl	$0	$0	$4,320	$4,320	$0	$0	$0	$0	$0	$0	$0
Debt Service Fund	$536,274	$688,558	$840,250	$1,068,976	$603,141	$756,401	$908,442	$1,060,008	$1,230,508	$1,441,275	$226,418
Debt Service Reserve Fund	$1,991,138	$1,991,138	$1,991,138	$1,991,138	$1,991,138	$1,991,138	$1,991,138	$1,991,138	$1,991,138	$1,991,138	$1,991,138
TOTAL CHEFA ASSETS	$2,527,412	$2,679,696	$2,831,388	$3,060,114	$2,594,279	$2,747,539	$2,899,580	$3,051,146	$3,221,646	$3,432,413	$2,217,556
TOTAL ASSETS WITH LIMITED USE	$12,343,863	$12,381,659	$12,585,557	$13,021,011	$9,957,429	$10,055,627	$8,125,077	$8,103,545	$8,241,871	$8,590,164	$7,198,788
Less: CP Assets With Limited Use	$3,058,221	$3,210,505	$3,362,197	$3,590,923	$3,125,088	$2,661,417	$2,813,932	$3,003,991	$3,174,266	$3,383,509	$2,166,352
TOTAL N/C ASSETS WITH LIMITED USE	$9,285,642	$9,171,154	$9,223,360	$9,430,088	$6,832,341	$7,394,210	$5,311,145	$5,099,554	$5,067,605	$5,206,655	$5,032,436
Note Receivable - Cancer Center	$1,277,492	$1,286,275	$1,295,058	$1,239,004	$1,199,218	$1,159,193	$1,119,509	$1,079,586	$1,038,838	$998,427	$955,900
Other Investments	$5,109,903	$5,388,174	$4,593,207	$4,717,512	$4,831,905	$5,016,072	$5,173,603	$5,337,986	$4,378,269	$4,540,810	$4,722,932
Prepaid Pension Asset	$1,795,780	$1,745,780	$1,695,780	$1,645,780	$1,595,780	$1,545,780	$1,495,780	$1,445,780	$1,395,780	$1,345,780	$1,517,780
Bond Issuance & Discount Costs - Net	$1,163,324	$1,158,867	$1,154,410	$1,149,952	$1,145,495	$1,141,038	$1,136,581	$1,132,124	$1,127,667	$1,123,209	$1,118,752
TOTAL OTHER ASSETS	$9,346,499	$9,579,096	$8,738,455	$8,752,248	$8,772,398	$8,862,083	$8,925,473	$8,995,476	$7,940,554	$8,008,226	$8,315,364
FIXED ASSETS											
Property, Plant & Equipment	$236,040,404	$236,247,716	$236,442,374	$236,498,189	$236,556,298	$236,698,298	$236,723,320	$236,805,634	$236,718,741	$236,893,137	$237,208,680
Less: Accumulated Depreciation	$179,321,783	$180,196,783	$181,071,783	$181,946,783	$182,821,783	$183,696,783	$184,571,783	$185,446,783	$186,214,224	$187,089,224	$187,964,224
Net Property, Plant & Equipment	$56,718,621	$56,050,933	$55,370,591	$54,551,406	$53,734,515	$53,001,515	$52,151,537	$51,358,851	$50,504,517	$49,803,913	$49,244,456
Projects in Progress	$282,268	$357,586	$655,636	$665,701	$831,273	$1,077,687	$1,302,577	$1,550,161	$1,572,361	$1,603,316	$1,675,424
TOTAL FIXED ASSETS	$57,000,889	$56,408,519	$56,026,227	$55,217,107	$54,565,788	$54,079,202	$53,454,114	$52,909,012	$52,076,878	$51,407,229	$50,919,880
TOTAL ASSETS	$123,342,775	$125,315,930	$121,800,395	$119,784,766	$119,956,515	$115,331,125	$119,309,397	$119,656,469	$113,449,601	$110,818,830	$111,376,539

WATERBURY HOSPITAL
INCOME STATEMENT
July 31, 2008

	OCT 07	NOV 07	DEC 07	JAN 08	FEB 08	MAR 08	APR 08	MAY 08	JUN 08	JUL 08	YTD TOTAL	YTD THRU 9/30/08
REVENUE												
State/City	5,427,621	4,492,897	4,328,031	5,111,164	9,469,873	2,408,387	6,877,513	7,412,298	6,183,682	5,988,427	57,699,693	57,699,693
Blue Cross	3,734,168	3,620,861	2,946,615	3,424,232	3,231,416	3,453,732	3,308,184	3,114,048	2,974,447	3,165,502	32,973,205	32,973,205
Medicare	25,441,965	23,410,121	22,183,752	27,728,188	25,403,093	24,930,263	23,818,157	25,483,042	24,179,567	27,004,056	249,582,204	249,582,204
Commercial	10,119,796	10,676,408	8,087,389	9,298,910	2,397,521	15,040,798	7,319,824	8,169,572	8,874,512	9,404,717	89,389,447	89,389,447
Managed Care	16,980,211	16,441,846	14,396,665	17,009,142	15,230,633	16,835,273	16,581,734	15,573,381	17,706,612	15,756,685	161,511,982	161,511,982
GROSS REVENUE	61,703,761	58,641,733	51,942,452	62,571,636	55,732,536	61,668,453	57,905,412	59,752,341	59,918,820	61,319,387	591,156,531	591,156,531
ALLOWANCES												
State/City	4,962,633	4,256,989	3,488,463	5,656,956	7,720,608	1,550,937	3,899,651	6,027,177	5,413,992	11,674,380	54,651,786	54,651,786
Blue Cross	2,564,901	2,561,559	1,741,712	2,429,529	2,201,321	2,674,566	2,366,838	2,100,480	2,511,501	3,056,171	24,208,578	24,208,578
Medicare	17,990,533	17,151,594	13,979,248	21,422,030	17,367,293	18,205,480	16,509,689	18,059,381	16,531,063	18,052,681	175,268,992	175,268,992
Commercial	4,144,722	4,405,770	773,484	5,379,042	(779,857)	7,958,544	4,274,324	4,895,716	3,838,400	841,562	35,731,707	35,731,707
Managed Care	11,961,872	12,227,714	15,092,598	7,516,759	11,015,114	11,537,387	11,970,046	11,204,432	12,582,779	7,272,370	112,380,871	112,380,871
Uncompensated Care Pool/DSH	(257,201)	(257,201)	(257,201)	(261,769)	(261,769)	(261,769)	(261,769)	(261,769)	(261,769)	(259,485)	(2,601,702)	(2,601,702)
Free Care	207,033	192,416	364,872	312,318	339,572	683,039	489,117	345,522	325,456	204,183	3,463,528	3,463,528
Provision for Bad Debts	1,595,362	2,495,361	1,946,574	1,679,154	1,517,521	1,678,619	2,690,506	2,465,961	2,026,632	2,494,393	20,590,103	20,590,103
Recoveries	(372,189)	(371,742)	(446,121)	(306,056)	(710,025)	(422,821)	(222,393)	(609,604)	(470,902)	(378,539)	(4,310,392)	(4,310,392)
TOTAL ALLOWANCES	42,797,466	42,662,460	36,683,629	43,827,963	38,409,778	43,603,982	41,716,009	44,227,316	42,497,152	42,957,716	419,383,471	419,383,471
NET REVENUE	18,906,295	15,979,273	15,258,823	18,743,673	17,322,758	18,064,471	16,189,403	15,525,025	17,421,668	18,361,671	171,773,060	171,773,060
EXPENSES												
Payroll Expenses	9,324,307	8,931,687	9,167,269	9,229,246	8,586,966	9,375,897	9,287,686	8,873,117	9,022,705	9,218,423	91,017,303	91,017,303
Employee Benefits	2,199,475	2,147,555	2,358,219	2,372,582	2,318,341	2,652,025	2,261,244	2,183,868	2,549,579	2,268,753	23,311,641	23,311,641
Professional/Legal Fees	1,046,274	1,149,099	1,095,585	1,029,279	1,178,059	1,009,297	1,050,649	1,024,201	986,005	1,070,322	10,638,970	10,638,970
Med & Surg Supplies	1,930,855	1,907,766	1,572,490	2,090,513	1,607,970	1,155,428	1,853,974	1,857,986	1,905,871	2,196,142	18,078,995	18,078,995
Other Supplies	968,501	1,048,214	879,033	992,815	1,000,162	916,509	1,038,551	978,164	1,027,634	1,068,060	9,916,663	9,916,663
Purchased Services	997,277	1,086,888	1,129,498	1,065,975	1,076,046	1,020,491	1,274,322	1,293,767	1,195,782	1,334,016	11,474,062	11,474,062
Depreciation	875,000	875,000	875,000	875,000	875,000	875,000	875,000	875,335	875,000	875,000	8,750,335	8,750,335
Interest	123,600	124,494	123,989	172,202	148,592	133,813	129,841	129,182	128,988	124,705	1,339,406	1,339,406
Insurances	660,810	661,105	131,276	579,394	667,076	989,584	585,548	567,374	568,028	570,413	5,980,608	5,980,608
Drugs	670,431	544,987	569,476	602,317	552,685	750,041	661,768	553,389	678,365	671,382	6,254,821	6,254,821
Food	111,693	113,882	104,339	106,508	107,715	110,950	114,196	114,722	123,158	105,976	1,113,139	1,113,139
Utilities	305,203	303,230	313,660	245,729	328,057	455,187	294,138	291,555	277,482	292,144	3,106,385	3,106,385
TOTAL EXPENSES	19,213,426	18,893,907	18,319,834	19,361,560	18,446,669	19,443,222	19,427,117	18,742,680	19,338,597	19,795,316	190,982,328	190,982,328
OTHER OPERATING INCOME	586,022	512,124	522,468	843,608	457,492	929,746	273,046	255,167	266,504	138,595	4,784,772	4,784,772
PARTNERSHIP INCOME	184,167	184,167	184,167	113,221	184,167	184,167	114,360	184,167	184,167	184,167	1,700,917	1,700,917
NET ASSETS RELEASED FROM RESTRICTION (PROGRAM EXPENSES)	N/A	N/A	N/A	N/A	N/A	1,852,519	680,377	130,894	570,283	279,751	3,513,824	3,513,824
SUBTOTAL	770,189	696,291	706,635	956,829	641,659	2,966,432	1,067,783	570,228	1,020,954	602,513	9,999,513	9,999,513
NET EXPENSES	18,443,237	18,197,616	17,613,199	18,404,731	17,805,010	16,476,790	18,359,334	18,172,452	18,317,643	19,192,803	180,982,815	180,982,815
INCOME/(LOSS) FROM OPERATIONS	463,058	(2,218,343)	(2,354,376)	338,942	(482,252)	1,587,681	(2,169,931)	(2,647,427)	(895,975)	(831,132)	(9,209,755)	(9,209,755)
NON-OPERATING INCOME												
Endowment Income	195,492	194,593	193,852	196,274	194,593	199,559	(181,903)	143,862	144,615	142,098	1,423,035	1,423,035
Donations	3,190	2,511	40,150	54,192	2,048	(6,367)	567	2,940	1,412	4,026	104,669	104,669
Board-Restricted Income	(1,781)	(2,374)	74,660	(2)	(592)	(1,337)	2	312	50,542	(146)	119,284	119,284
TOTAL NON-OPERATING INCOME	196,901	194,730	308,662	250,464	196,049	191,855	(181,334)	147,114	196,569	145,978	1,646,988	1,646,988
NET INCOME/(LOSS) BEFORE CHANG IN UNREALIZED GAINS AND LOSSES	659,959	(2,023,613)	(2,045,714)	589,406	(286,203)	1,779,536	(2,351,265)	(2,500,313)	(699,406)	(685,154)	(7,562,767)	(7,562,767)
CHANGE IN UNREALIZED GAINS AND LOSSES	N/A	N/A	N/A	N/A	N/A	96,761	(7,555)	(33,992)	(52,619)	(12,873)	(10,278)	(10,278)
NET INCOME/(LOSS)	659,959	(2,023,613)	(2,045,714)	589,406	(286,203)	1,876,297	(2,358,820)	(2,534,305)	(752,025)	(698,027)	(7,573,045)	(7,573,045)

WATERBURY HOSPITAL
GENERAL FUND
COMPARATIVE BALANCE SHEET

CURRENT LIABILITIES	9/30/2007	10/31/2007	11/30/2007	12/31/2007	1/31/2008	2/29/2008	3/31/2008	4/30/2008	5/31/2008	6/30/2008	7/31/2008
Accounts Payable	$7,725,388	$9,316,918	$8,506,643	$8,492,281	$7,877,999	$7,174,033	$7,032,637	$8,815,648	$7,594,123	$8,224,765	$10,000,702
Accrued Interest - CHEFA	$309,843	$413,123	$516,404	$619,685	$103,281	$206,562	$309,843	$413,123	$516,404	$619,685	$100,093
Miscellaneous Payable	$642,316	$607,646	$471,698	$658,571	$578,485	$626,152	$596,059	$632,214	$700,371	$680,151	$593,381
Current Portion - Res for Self Ins	$2,521,947	$2,521,947	$2,521,947	$2,521,947	$2,521,947	$1,905,016	$1,955,016	$1,943,983	$1,943,758	$1,942,234	$1,939,934
TOTAL AP & ACCRUED EXPENSES	$11,199,494	$12,859,634	$12,016,692	$12,292,484	$11,081,712	$9,911,763	$9,893,555	$11,804,968	$10,754,656	$11,466,835	$12,634,110
Accrued Salaries & Taxes	$2,200,761	$3,180,603	$1,880,197	$2,799,752	$2,904,359	$1,713,501	$2,558,077	$3,243,321	$1,934,481	$2,563,254	$3,500,745
Accrued Vacation	$5,607,913	$5,732,835	$5,800,913	$5,925,677	$5,990,472	$6,254,971	$6,486,166	$6,507,907	$6,606,166	$6,669,252	$6,414,488
Accrued Unemployment	$12,001	$32,977	$65,177	$84,040	$23,897	$26,315	$22,854	$26,783	$31,040	$43,040	$34,008
Accrued Benefits	$584,103	$499,495	$425,278	$357,171	$296,216	$235,260	$174,304	$145,254	$116,204	$87,154	$58,104
TOTAL SAL, WAGES & TAXES	$8,404,778	$9,445,910	$8,171,565	$9,166,640	$9,214,944	$8,230,047	$9,241,401	$9,923,265	$8,687,891	$9,362,700	$10,007,345
Notes Payable - Line	$1,687,615	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Current Portion L/T Debt	$3,085,351	$3,062,539	$3,039,726	$3,016,914	$3,016,914	$1,956,540	$1,956,540	$1,837,105	$1,673,166	$1,508,620	$1,343,465
TOTAL C/P LONG TERM DEBT	$4,772,966	$3,062,539	$3,039,726	$3,016,914	$3,016,914	$1,956,540	$1,956,540	$1,837,105	$1,673,166	$1,508,620	$1,343,465
Due to Restricted Funds	$1,369,400	$1,411,857	$1,338,457	$1,349,067	$1,357,416	$1,333,704	$1,472,305	$2,096,426	$2,090,668	$1,786,278	$2,388,585
Due to Third-Party Payors	$2,350,453	$2,830,594	$3,417,935	$2,601,362	$3,389,898	$3,796,851	$4,493,608	$4,049,686	$2,669,430	($300,190)	($644,426)
Current Portion - CHEFA Obligations	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000	$790,000
TOTAL CURRENT LIABILITIES	$28,847,091	$30,360,534	$28,734,375	$29,176,467	$28,810,884	$25,978,905	$27,807,409	$30,461,450	$26,625,811	$24,574,243	$26,519,079
Long-Term Debt	$1,011,316	$851,566	$691,225	$530,290	$368,759	$206,629	$43,898	$0	$0	$0	$0
CHEFA Obligations	$21,045,000	$21,045,000	$21,045,000	$21,045,000	$21,045,000	$21,045,000	$21,045,000	$21,045,000	$21,045,000	$21,045,000	$20,255,000
Other Long-Term Liabilities	$8,704,801	$8,651,114	$8,804,994	$8,537,322	$8,422,242	$7,018,525	$7,688,465	$7,784,290	$7,945,735	$8,105,406	$8,206,306
TOTAL LONG-TERM LIABILITIES	$30,761,117	$30,547,680	$30,541,219	$30,112,612	$29,836,001	$28,270,154	$28,777,363	$28,829,290	$28,990,735	$29,150,406	$28,461,306
FUND BALANCE	$63,734,567	$64,407,716	$62,524,801	$60,495,687	$61,309,630	$61,082,066	$62,724,625	$60,365,729	$57,833,055	$57,094,181	$56,396,154
TOTAL LIABILITIES & FUND BALANCE	$123,342,775	$125,315,930	$121,800,395	$119,784,766	$119,956,515	$115,331,125	$119,309,397	$119,656,469	$113,449,601	$110,818,830	$111,376,539
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

WATERBURY HOSPITAL
COMPARATIVE INCOME STATEMENT
7/31/08

	YEAR TO DATE		
	FY 08 ACTUAL	FY 08 BUDGET	FY 07 ACTUAL
GROSS REVENUE	591,156,531	591,311,034	550,602,473
Contractual Allowances	402,241,934	395,104,503	367,973,773
NET CONTRACTED REVENUE	188,914,597	196,206,531	182,628,700
Bad Debt	16,279,711	17,251,024	15,546,258
Free Care	3,463,528	2,228,458	2,852,433
UCP	(2,601,702)	(2,833,334)	(2,727,125)
OTHER ALLOWANCES	17,141,537	16,646,148	15,671,566
NET REVENUE	171,773,060	179,560,383	166,957,134
EXPENSES			
Payroll Expenses	91,017,303	88,778,076	87,803,695
Employee Benefits	23,311,641	24,502,881	22,909,211
Professional/Legal Fees	10,638,970	9,839,270	9,657,248
Med & Surg Supplies	18,078,995	19,819,464	16,435,228
Other Supplies	9,916,663	10,000,330	9,122,817
Purchased Services	11,474,062	11,766,214	11,057,491
Depreciation	8,750,335	8,750,000	8,582,974
Interest	1,339,406	1,500,000	1,512,375
Insurances	5,980,608	4,981,552	3,890,287
Drugs	6,254,821	6,827,510	5,811,584
Food	1,113,139	1,087,396	1,037,170
Utilities	3,106,385	3,175,234	3,156,135
TOTAL EXPENSES	190,982,328	191,027,927	180,976,215
OTHER OPERATING INCOME	4,784,772	5,306,550	5,847,784
PARTNERSHIP INCOME	1,700,917	1,841,667	2,157,091
NET ASSETS RELEASED FROM RESTRICTION (PROGRAM EXPENSES)	3,513,824	N/A	N/A
SUBTOTAL	9,999,513	7,148,217	8,004,875
NET EXPENSES	180,982,815	183,879,710	172,971,340
INCOME/(LOSS) FROM OPERATIONS	(9,209,755)	(4,319,327)	(6,014,206)
NON-OPERATING INCOME	1,646,988	2,400,417	2,250,018
NET INCOME/(LOSS) BEFORE CHANGE IN UNREALIZED GAINS AND LOSSES	(7,562,767)	(1,918,910)	(3,764,188)
CHANGE IN UNREALIZED GAINS AND LOSSES	(10,278)	N/A	N/A
NET INCOME/(LOSS)	(7,573,045)	N/A	N/A

SAINT MARY'S HEALTH SYSTEM (Obligated Group)
CONSOLIDATING STATEMENT OF REVENUE AND EXPENSES
For the Ten Months Ended July 31, 2008
($ in Thousands)

	Saint Mary's Hospital	Naugatuck Valley Surgical Center	Diagnostic Imaging of Southbury	Scovill Medical Group	Franklin Medical Group	Eliminations	Consolidated Totals
Total Patient Revenues	$ 344,547	$ 18,683	$ 17,363	$ 3,847	$ 23,894	$ -	$ 408,334
Contractual Allowances	(187,687)	(10,044)	(11,031)	(802)	(10,491)	-	(220,055)
Net Patient Revenue	156,860	8,639	6,332	3,045	13,403	-	188,279
Other Operating Revenue	3,465	65	9	26	7,993	(5,541)	6,016
Total Operating Revenues	160,325	8,704	6,340	3,071	21,396	(5,541)	194,295
Salaries and Wages	60,642	3,139	998	2,118	17,809	(73)	84,632
Employee Benefits	18,412	960	221	257	2,877	-	22,727
Total Labor Costs	79,054	4,099	1,219	2,375	20,686	(73)	107,360
Physician Fees	8,092	11	1,361	21	1,036	(5,381)	5,140
Purchased Services	16,161	122	606	3	1,696	-	18,588
Medical Supplies	15,017	1,691	204	65	216	-	17,193
Pharmaceuticals	4,455	-	-	-	145	-	4,600
General Supplies	2,405	182	79	24	93	-	2,783
Maintenance & Repair	3,243	323	316	38	135	-	4,055
Utilities	3,273	206	88	44	107	-	3,719
Insurance	2,811	117	22	16	129	-	3,096
Bad Debts	9,366	53	-	43	1,047	-	10,509
Depreciation	6,467	316	469	146	132	-	7,530
Interest	1,772	-	3	-	-	-	1,775
Other Expenses	5,188	927	272	294	1,087	(86)	7,682
Non-Salary Expenses	78,250	3,950	3,421	694	5,823	(5,468)	86,670
Total Operating Expenses	157,304	8,049	4,640	3,069	26,509	(5,541)	194,030
Operating Income/(Loss)	3,021	655	1,700	2	(5,113)	-	265
Minority Interest	-	-	-	-	-	(787)	(787)
Non-Operating Revenue/(Expense)	6,511	-	-	-	-	(1,568)	4,943
Total Non-Operating Revenue/(Expense)	6,511	-	-	-	-	(2,355)	4,156
Net Income/(Loss)	$ 9,532	$ 655	$ 1,700	$ 2	$ (5,113)	$ (2,355)	$ 4,421
OPERATING MARGIN	1.9%	7.5%	26.8%	0.1%	(23.9%)	0.0%	0.1%
NET MARGIN	5.9%	7.5%	26.8%	0.1%	(23.9%)	42.5%	2.3%
Budget Net Income (Loss)	$ 9,082	$ 832	$ 1,209	$ 8	$ (4,136)	$ (2,041)	$ 4,955
Variance - Actual vs. Budget	$ 450	$ (177)	$ 490	$ (6)	$ (977)	$ (314)	$ (534)

1139
09/15/08

SAINT MARY'S HEALTH SYSTEM (Obligated Group)
CONSOLIDATING BALANCE SHEET
July 31, 2008
($ in Thousands)

	Saint Mary's Hospital	Naugatuck Valley Surgical Center	Diagnostic Imaging of Southbury	Scovill Medical Group	Franklin Medical Group	Eliminations	Consolidated Totals	Prior Year End
Cash	$ 14,772	$ 1,581	$ 319	$ 559	$ 279	$ -	$ 17,509	$ 8,214
Short-term Investments	21	1,000	-	-	-	-	1,022	60
Current Portion of Assets Whose Use is Limited	3,712	-	-	-	-	-	3,712	4,206
Accounts Receivable (net)	18,488	1,431	572	331	1,604	-	22,426	23,378
Other Current Assets	3,834	513	57	39	122	(822)	3,743	3,766
Total Current Assets	40,827	4,525	948	929	2,005	(822)	48,412	39,624
Marketable Securities	11,488	-	-	-	-	-	11,488	11,959
Asset Whose Use is Limited:								
By Donor and Held in Trust by Others	14,145	-	-	-	-	-	14,145	15,975
For Estimated Self-Insurance Liability	28,870	-	-	-	-	-	28,870	27,372
By Bond Indenture	4,533	-	-	-	-	-	4,533	4,977
Interest in Foundation	4,079	-	-	-	-	-	4,079	4,904
Other	6	-	-	-	-	-	6	6
Total Assets Whose Use is Limited	51,633	-	-	-	-	-	51,633	53,234
Less Current Portion of Assets Whose Use is Limited	(3,712)	-	-	-	-	-	(3,712)	(4,206)
Noncurrent Assets Whose Use is Limited	47,921	-	-	-	-	-	47,921	49,028
Net, Property, Plant & Equip.	47,617	2,652	1,710	117	841	-	52,937	56,158
Other Assets:								
Investments in Joint Ventures	15,073	-	-	-	-	(7,863)	7,210	6,808
Deferred Financing Costs, Net	290	-	-	-	-	-	290	334
Other Noncurrent Assets	1,010	-	-	564	-	-	1,574	2,603
	16,373	-	-	564	-	(7,863)	9,074	9,745
TOTAL ASSETS	$ 164,226	$ 7,177	$ 2,658	$ 1,610	$ 2,846	$ (8,685)	$ 169,832	$166,515

SAINT MARY'S HEALTH SYSTEM (Obligated Group)
CONSOLIDATING BALANCE SHEET
July 31, 2008
($ in Thousands)

	Saint Mary's Hospital	Naugatuck Valley Surgical Center	Diagnostic Imaging of Southbury	Scovill Medical Group	Franklin Medical Group	Eliminations	Consolidated Totals	Prior Year End
Current Portion of LT Obligations	$ 3,055	$ -	$ -	$ -	$ -	$ -	$ 3,055	$ 3,357
Accounts Payable	11,782	124	31	5	227	-	12,169	13,521
Accrued Payroll Expenses	3,407	106	246	369	1,289	-	5,417	4,787
Due to Third Parties	5,422	-	-	-	-	-	5,422	4,179
Accrued Other Expenses	7,671	325	104	569	704	(822)	8,551	8,482
Total Current Liabilities	31,337	555	381	943	2,220	(822)	34,614	34,326
Long Term Obligations	30,580	-	-	1,000	-	(1,000)	30,580	33,485
Estimated Self-Insurance Liability	19,198	-	-	-	-	-	19,198	17,643
Accrued Compensation & Benefits	18,399	-	-	-	-	-	18,399	17,095
Minimum Pension Liability	44,639	-	-	-	-	-	44,639	37,308
Other Long term Liabilities	8,209	-	74	-	66	-	8,349	5,265
Total Other Liabilities	121,025	-	74	1,000	66	(1,000)	121,165	110,796
Minority Interest in Subsidiaries	-	-	-	-	-	1,962	1,962	2,075
Unrestricted Fund Balance	(5,583)	6,622	2,203	(333)	560	(8,825)	(5,356)	(719)
Temporarily Restricted Fund Balance	2,313	-	-	-	-	-	2,313	3,034
Restricted Fund Balance	15,134	-	-	-	-	-	15,134	17,002
Total Fund Balance	11,864	6,622	2,203	(333)	560	(8,825)	12,091	19,317
TOTAL LIABILITIES AND FUND BALANCE	$ 164,226	$ 7,177	$ 2,658	$ 1,610	$ 2,846	$ (8,685)	$ 169,832	$166,515

SAINT MARY'S HEALTH SYSTEM (OBLIGATED GROUP)
Consolidating Statement of Cash Flows
For the Ten Months Ended July 31, 2008
($ in Thousands)

	Saint Mary's Hospital	Naugatuck Valley Surgical Center	Diagnostic Imaging of Southbury	Scovill Medical Group	Franklin Medical Group	Eliminations	Consolidated
Cash Flows From Operating Activities							
Profit (Loss)	$ 9,532	$ 655	$ 1,700	$ 2	$ (5,113)	$ (2,355)	$ 4,421
Adjustments to reconcile to net cash:							
Depreciation and amortization	6,467	316	469	146	132	-	7,530
Change in unrealized (gains) losses on marketable securities	(2,677)	-	-	-	-	-	(2,677)
Distributions	(4,369)	(550)	(2,025)	-	4,727	2,575	358
(increase) decrease in operating assets:							
Net asset recognition for Foundation	(596)	-	-	-	-	-	(596)
Accounts receivable, net	803	(21)	13	1	156	-	952
Other current assets	(14)	(179)	(21)	(13)	7	243	23
Other non-current assets	1,136	(1)	-	9	3	-	1,147
Increase (decrease) in operating liabilities:							
Accounts payable and other current liabilities	(1,010)	(118)	(2)	(20)	110	(244)	(1,284)
Due to third party payors, net	1,243	-	-	-	-	-	1,243
Estimated self-insurance liability	1,555	-	-	-	-	-	1,555
Other long term liabilities	3,091	-	(13)	-	6	-	3,084
Pension and accrued compensation	1,589	40	23	46	236	-	1,934
Minority interest in subsidiaries	-	-	-	-	-	(113)	(113)
Net Cash Provided by Operating Activities	16,750	142	145	171	264	106	17,578
Cash Flows From Investing Activities							
Purchases of property and equipment, net	(3,707)	(145)	(203)	(21)	(109)	-	(4,185)
Investments in joint venture arrangements	(295)	-	-	-	-	(107)	(402)
Net (increase) decrease in investments	510	(1,000)	-	-	-	-	(490)
Net cash provided by (used in) investing activities	(3,492)	(1,145)	(203)	(21)	(109)	(107)	(5,078)
Cash Flows From Financing Activities							
Net (payments) borrowings in long-term obligations	(2,962)	-	(245)	-	-	-	(3,207)
Net cash provided by (used in) financing activities	(2,962)	-	(245)	-	-	-	(3,207)
Net Increase (decrease) in Cash and Cash Equivalents	10,296	(1,003)	(304)	150	156	(0)	9,295
Cash and Cash Equivalents - Beginning of the Period	4,476	2,584	623	409	123	-	8,214
Cash and Cash Equivalents - End of the Period	$ 14,772	$ 1,581	$ 319	$ 559	$ 279	$ (0)	$ 17,509

COMBINED JOHN DEMPSEY HOSPITAL and DENTAL CLINICS
OPERATING STATEMENT
JULY 2008

	Current Month					Year to Date (7/1/08 - 7/31/08)				
	Actual '09	Budget '09	Variance	% Change	Actual '08	Actual '09	Budget '09	Variance	YTD % Change	YTD Actual '08
Gross Inpatient Revenue	$16,858,601	$16,982,591	$ (123,990)	-0.7%	$15,433,677	$16,858,601	$16,982,591	$(123,990)	-0.7%	$15,433,677
Gross Outpatient Revenue	19,012,009	17,438,873	1,573,136	9.0%	$15,266,026	19,012,009	17,438,873	1,573,136	9.0%	$15,266,026
Total Gross Patient Revenue	35,870,610	34,421,464	1,449,146	4.2%	30,699,703	35,870,610	34,421,464	1,449,146	4.2%	30,699,703
Less: Contractual Allowances	16,127,817	14,540,923	1,586,894	10.9%	13,397,465	16,127,817	14,540,923	1,586,894	10.9%	13,397,465
Less: Bad Debt Expense	730,298	450,334	279,964	62.2%	360,367	730,298	450,334	279,964	62.2%	360,367
Net Patient Revenue	19,012,495	19,430,207	(417,712)	-2.1%	16,941,871	19,012,495	19,430,207	(417,712)	-2.1%	16,941,871
Investment Income	39,770	46,392	(6,622)	-14.3%	105,354	39,770	46,392	(6,622)	-14.3%	105,354
Other Operating Revenue	205,525	307,983	(102,458)	-33.3%	216,885	205,525	307,983	(102,458)	-33.3%	216,885
Total Other Operating Income	245,295	354,375	(109,080)	-30.8%	322,239	245,295	354,375	(109,080)	-30.8%	322,239
Total Revenue	19,257,790	19,784,582	(526,792)	-2.7%	17,264,110	19,257,790	19,784,582	(526,792)	-2.7%	17,264,110
Expenses:										
Salaries and Wages	8,416,151	8,467,330	(51,179)	-0.6%	7,738,285	8,416,151	8,467,330	(51,179)	-0.6%	7,738,285
Fringe Benefits	3,383,637	3,407,877	(24,240)	-0.7%	3,046,971	3,383,637	3,407,877	(24,240)	-0.7%	3,046,971
Medical Contractual Support	367,667	379,085	(11,418)	-3.0%	432,098	367,667	956,317	(588,650)	-61.6%	432,098
Medical/Dental House Staff	960,000	1,087,708	(127,708)	-11.7%	894,370	960,000	510,476	449,524	88.1%	894,370
Outside Agency Per Diems	72,873	79,434	(6,561)	-8.3%	20,946	72,873	79,434	(6,561)	-8.3%	20,946
Drugs	1,235,471	1,246,649	(11,178)	-0.9%	1,147,510	1,235,471	1,246,649	(11,178)	-0.9%	1,147,510
Medical Supplies	2,583,704	3,062,174	(478,470)	-15.6%	2,304,488	2,583,704	3,062,174	(478,470)	-15.6%	2,304,488
Utilities	255,707	299,338	(43,631)	-14.6%	286,554	255,707	299,338	(43,631)	-14.6%	286,554
Outside & Other Purchased Services	2,266,340	2,293,394	(27,054)	-1.2%	1,600,065	2,266,340	2,293,394	(27,054)	-1.2%	1,600,065
Insurance	244,033	243,005	1,028	0.4%	241,866	244,033	243,005	1,028	0.4%	241,866
Repairs & Maintenance	298,651	443,647	(144,996)	-32.7%	251,509	298,651	443,647	(144,996)	-32.7%	251,509
Other Expenses	264,416	275,753	(11,337)	-4.1%	300,319	264,416	275,753	(11,337)	-4.1%	300,319
Depreciation Expense	880,311	757,837	122,474	16.2%	735,505	880,311	757,837	122,474	16.2%	735,505
Total Operating Expenses	21,228,961	22,043,231	(814,270)	-3.7%	19,000,486	21,228,961	22,043,231	(814,270)	-3.7%	19,000,486
Net Operating Gain (Loss)	(1,971,171)	(2,258,649)	287,478	-12.7%	(1,736,376)	(1,971,171)	(2,258,649)	287,478	-12.7%	(1,736,376)
Nonoperating Revenue (Expenses)										
In-kind Fringe Benefits	247,115	-	247,115		0	247,115	-	247,115		-
Total Nonoperating Revenue (Expenses)	247,115	-	247,115		0	247,115	-	247,115		-
Change in Net Assets	$ (1,724,056)	$ (2,258,649)	$ 534,593	-23.7%	$ (1,736,376)	$ (1,724,056)	$ (2,258,649)	$ 287,478	-12.7%	$ (1,736,376)

1143
09/15/08

APPENDIX 11.b.i

TWH Financial Worksheet 11.b.i

TWH Financial Worksheet 11.c.i

SMH Financial Worksheet 11.b.i.

SMH Financial Worksheet 11.c.i.

JDH Financial Worksheet 11.b.i.

HCGW Financial Worksheet 11.c.i.

The Waterbury Hospital

11. B (i). Please provide FY 2008 (Annualized) and four years of historical actual results of **Total Facility** revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Facility: / Description	FY 2008 Actual Annualized	FY 2007 Historical W/out HCGW	FY 2007 Historical Incremental	FY 2007 Historical With HCGW	FY 2006 Historical W/out HCGW	FY 2006 Historical Incremental	FY 2006 Historical With HCGW	FY 2005 Historical W/out HCGW	FY 2005 Historical Incremental	FY 2005 Historical With HCGW	FY 2004 Historical W/out HCGW	FY 2004 Historical Incremental	FY 2004 Historical With HCGW
NET PATIENT REVENUE													
Non-Government	$84,222,263	$80,727,688	$5,574,782	$86,302,470	$78,490,792	$5,149,377	$83,640,169	$74,785,519	$1,250,813	$76,036,332	$71,225,720		$71,225,720
Medicare	$107,653,210	$95,284,612	$6,645,663	$101,930,275	$93,642,338	$6,138,540	$99,780,878	$89,052,961	$1,491,086	$90,544,048	$86,564,628		$86,564,628
Medicaid and Other Medical Assistance	$38,744,086	$37,157,478	$119,235	$37,276,714	$30,820,864	$110,137	$30,931,001	$32,128,706	$26,753	$32,155,459	$29,497,899		$29,497,899
Other Government	$0	$0	$0		$0			$0			$0		
Total Net Patient Patient Revenue	$230,619,559	$213,169,778	$12,339,681	$225,509,459	$202,953,994	$11,398,054	$214,352,048	$195,967,186	$2,768,652	$198,735,838	$187,288,247	$0	$187,288,247
Other Operating Revenue	$11,999,416	$10,790,913	$0	$10,790,913	$10,052,871	$0	$10,052,871	$10,973,709	$0	$10,973,709	$8,289,308		$8,289,308
Revenue from Operations	$242,618,974	$223,960,691	$12,339,681	$236,300,372	$213,006,865	$11,398,054	$224,404,919	$206,940,895	$2,768,652	$209,709,547	$195,577,555	$0	$195,577,555
OPERATING EXPENSES													
Salaries and Fringe Benefits	$137,194,733	$129,657,753	$4,443,162	$134,100,915	$125,023,581	$4,199,322	$129,222,903	$120,268,603	$1,021,071	$121,289,674	$113,722,170		$113,722,170
Professional / Contracted Services	$26,535,638	$25,240,344	$0	$25,240,344	$27,848,851	$0	$27,848,851	$22,806,995	$0	$22,806,995	$18,646,633		$18,646,633
Supplies and Drugs	$41,100,575	$34,649,092	$3,821,497	$38,470,589	$32,649,718	$3,611,774	$36,261,492	$32,566,604	$878,208	$33,444,812	$28,684,582		$28,684,582
Bad Debts	$23,691,887	$25,096,401	$0	$25,096,401	$17,502,772	$0	$17,502,772	$14,608,168	$0	$14,608,168	$15,020,924		$15,020,924
Other Operating Expense	$12,240,158	$7,347,782	$1,322,006	$8,669,788	$7,032,833	$1,249,454	$8,282,287	$6,629,298	$303,807	$6,933,105	$7,196,993		$7,196,993
Subtotal	$240,762,991	$221,991,373	$9,586,664	$231,578,037	$210,057,755	$9,060,550	$219,118,305	$196,879,668	$2,203,086	$199,082,754	$183,271,302	$0	$183,271,302
Depreciation/Amortization	$10,500,402	$10,056,129	$0	$10,056,129	$9,533,985	$0	$9,533,985	$8,773,671	$0	$8,773,671	$9,465,000		$9,465,000
Interest Expense	$1,607,287	$1,642,933	$0	$1,642,933	$1,683,030	$0	$1,683,030	$1,628,380	$0	$1,628,380	$1,598,408		$1,598,408
Lease Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
Total Operating Expense	$252,870,680	$233,690,435	$9,586,664	$243,277,099	$221,274,770	$9,060,550	$230,335,320	$207,281,719	$2,203,086	$209,484,805	$194,334,710	$0	$194,334,710
Gain/(Loss) from Operations	($10,251,706)	($9,729,744)	$2,753,017	($6,976,727)	($8,267,905)	$2,337,504	($5,930,401)	($340,824)	$565,566	$224,742	$1,242,845	$0	$1,242,845
Plus: Non-Operating Revenue	$1,801,212	$2,637,808	$0	$2,637,808	$3,617,853	$0	$3,617,853	$2,783,101	$0	$2,783,101	$3,753,342		$3,753,342
Revenue Over/(Under) Expense	($8,450,494)	($7,091,936)	$2,753,017	($4,338,919)	($4,650,052)	$2,337,504	($2,312,548)	$2,442,277	$565,566	$3,007,843	$4,996,187	$0	$4,996,187
FTEs							$0				0		

Note: The "Incremental" should include revenues and expenses from the operation of the Heart Center of Greater Waterbury ("HCGW")

*Volume Statistics:
Provide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

The Waterbury Hospital

11. B (i). Please provide three years of projections of Total Facility revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Facility: Description	FY 2009 Projected W/out CON	FY 2009 Projected Incremental	FY 2009 Projected With CON	FY 2010 Projected W/out CON	FY 2010 Projected Incremental	FY 2010 Projected With CON	FY 2011 Projected W/out CON	FY 2011 Projected Incremental	FY 2011 Projected With CON
NET PATIENT REVENUE									
Non-Government	$84,255,586	$4,796,368	$89,051,953	$87,811,937	$4,802,095	$92,614,032	$91,324,414	$4,994,178	$96,318,593
Medicare	$107,776,010	$6,050,529	$113,826,538	$112,316,042	$6,063,558	$118,379,600	$116,808,684	$6,306,100	$123,114,784
Medicaid and Other Medical Assistance	$40,494,741	$471,109	$40,965,849	$42,123,610	$480,874	$42,604,483	$43,808,554	$500,109	$44,308,663
Other Government			$0			$0			$0
Total Net Patient Patient Revenue	$232,526,336	$11,318,005	$243,844,341	$242,251,589	$11,346,526	$253,598,115	$251,941,652	$11,800,387	$263,742,039
Other Operating Revenue	$12,479,392		$12,479,392	$12,978,568		$12,978,568	$13,497,711		$13,497,711
Revenue from Operations	$245,005,728	$11,318,005	$256,323,733	$255,230,156	$11,346,526	$266,576,683	$265,439,363	$11,800,387	$277,239,750
OPERATING EXPENSES									
Salaries and Fringe Benefits	$135,921,111	$4,182,918	$140,104,028	$140,813,464	$4,194,205	$145,007,669	$145,720,964	$4,361,973	$150,082,938
Professional / Contracted Services	$27,232,789	$0	$27,232,789	$28,322,100	$0	$28,322,100	$29,454,984	$0	$29,454,984
Supplies and Drugs	$38,982,764	$3,597,665	$42,580,429	$41,102,077	$3,607,373	$44,709,450	$43,193,255	$3,751,668	$46,944,923
Bad Debts	$24,402,643	$0	$24,402,643	$25,134,723	$0	$25,134,723	$25,888,764	$0	$25,888,764
Other Operating Expense	$11,194,760	$1,244,573	$12,439,333	$11,564,581	$1,247,932	$12,812,513	$11,899,039	$1,297,849	$13,196,888
Subtotal	$237,734,067	$9,025,156	$246,759,222	$246,936,946	$9,049,510	$255,986,456	$256,157,007	$9,411,490	$265,568,498
Depreciation/Amortization	$10,500,402		$10,500,402	$10,500,402		$10,500,402	$10,500,402		$10,500,402
Interest Expense	$1,607,287		$1,607,287	$1,607,287		$1,607,287	$1,607,287		$1,607,287
Lease Expense			$0			$0			$0
Total Operating Expense	$249,841,756	$9,025,156	$258,866,912	$259,044,635	$9,049,510	$268,094,145	$268,264,697	$9,411,490	$277,676,187
Gain/(Loss) from Operations	($4,836,028)	$2,292,850	($2,543,178)	($3,814,479)	$2,297,016	($1,517,462)	($2,825,334)	$2,388,897	($436,437)
Plus: Non-Operating Revenue	$1,855,248		$1,855,248	$1,910,906		$1,910,906	$1,968,233		$1,968,233
Revenue Over/(Under) Expense	($2,980,779)	$2,292,850	($687,930)	($1,903,573)	$2,297,016	$393,444	($857,101)	$2,388,897	$1,531,796
FTEs	1573.170824	41.82917639	1615	1573.057948	41.94205243	1615	1571.380265	43.61973452	1615

*Volume Statistics:
Provide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

11. C (i). Please provide one year of actual results and three years of ***Total Hospital Health System*** projections of revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Greater Waterbury Health Network

Total Facility: / Description	FY 2008 Actual Annualized	FY 2007 Historical W/out HCGW	FY 2007 Historical Incremental	FY 2007 Historical With HCGW	FY 2006 Historical W/out HCGW	FY 2006 Historical Incremental	FY 2006 Historical With HCGW	FY 2005 Historical W/out HCGW	FY 2005 Historical Incremental	FY 2005 Historical With HCGW	FY 2004 Historical W/out HCGW	FY 2004 Historical Incremental	FY 2004 Historical With HCGW
NET PATIENT REVENUE													
Non-Government	$84,222,263	$80,727,688	$5,574,782	$86,302,470	$78,490,792	$5,149,377	$83,640,169	$74,785,519	$1,250,813	$76,036,332	$71,225,720		$71,225,720
Medicare	$107,653,210	$95,284,612	$6,645,663	$101,930,275	$93,642,338	$6,138,540	$99,780,878	$89,052,961	$1,491,086	$90,544,046	$86,564,628		$86,564,628
Medicaid and Other Medical Assistance	$38,744,086	$37,157,478	$119,235	$37,276,714	$30,820,864	$110,137	$30,931,001	$32,128,706	$26,753	$32,155,459	$29,497,899		$29,497,899
Other Government	$0		$0	$0		$0	$0		$0	$0			$0
Total Net Patient Patient Revenue	$230,619,559	$213,169,778	$12,339,681	$225,509,459	$202,953,994	$11,398,054	$214,352,048	$195,967,186	$2,768,652	$198,735,838	$187,288,247	$0	$187,288,247
Other Operating Revenue	$11,280,367	$14,812,551		$14,812,551	$12,582,156		$12,582,156	$14,245,758		$14,245,758	$11,023,244		$11,023,244
Revenue from Operations	$241,899,925	$228,082,329	$12,339,681	$240,422,010	$215,536,150	$11,398,054	$226,934,204	$210,212,944	$2,768,652	$212,981,596	$198,311,491	$0	$198,311,491
OPERATING EXPENSES													
Salaries and Fringe Benefits	$139,175,537	$131,491,822	$4,443,162	$135,934,984	$126,110,691	$4,199,322	$130,310,013	$121,335,047	$1,021,071	$122,356,118	$114,730,073		$114,730,073
Professional / Contracted Services	$28,374,292	$27,204,192		$27,204,192	$29,187,313		$29,187,313	$24,891,435		$24,891,435	$20,266,628		$20,266,628
Supplies and Drugs	$41,100,575	$34,649,092	$3,821,497	$38,470,589	$32,649,718	$3,611,774	$36,261,492	$32,566,604	$878,208	$33,444,812	$28,684,582		$28,684,582
Bad Debts	$23,691,887	$25,096,401		$25,096,401	$17,502,772		$17,502,772	$14,608,168		$14,608,168	$15,020,924		$15,020,924
Other Operating Expense	$12,240,158	$7,347,782	$1,322,006	$8,669,788	$7,032,833	$1,249,454	$8,282,287	$6,629,298	$303,807	$6,933,105	$7,196,993		$7,196,993
Subtotal	$245,582,419	$225,789,290	$9,586,664	$235,375,954	$212,483,327	$9,060,550	$221,543,877	$200,030,552	$2,203,086	$202,233,638	$185,899,200	$0	$185,899,200
Depreciation/Amortization	$10,500,402	$10,056,129		$10,056,129	$9,533,985		$9,533,985	$8,773,671		$8,773,671	$9,465,000		$9,465,000
Interest Expense	$1,800,013	$1,697,714		$1,697,714	$1,737,126		$1,737,126	$1,681,190		$1,681,190	$1,638,411		$1,638,411
Lease Expense	$0			$0			$0			$0			$0
Total Operating Expense	$257,882,834	$237,543,133	$9,586,664	$247,129,797	$223,754,438	$9,060,550	$232,814,988	$210,485,413	$2,203,086	$212,688,499	$197,002,611	$0	$197,002,611
Gain/(Loss) from Operations	($15,982,909)	($9,460,804)	$2,753,017	($6,707,787)	($8,218,288)	$2,337,504	($5,880,784)	($272,469)	$565,566	$293,097	$1,308,880	$0	$1,308,880
Plus: Non-Operating Revenue	$1,801,212	$2,637,808		$2,637,808	$3,617,853		$3,617,853	$2,783,101		$2,783,101	$3,753,342		$3,753,342
Revenue Over/(Under) Expense	($14,181,697)	($6,822,996)	$2,753,017	($4,069,979)	($4,600,435)	$2,337,504	($2,262,931)	$2,510,632	$565,566	$3,076,198	$5,062,222	$0	$5,062,222
FTEs	$1,615			$1,648			$1,691			$1,622			$1,561

Note: The "Incremental" should include revenues and expenses from the operation of the Heart Center of Greater Waterbury ("HCGW")

*Volume Statistics:
Provide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

Greater Waterbury Health Network

11. C (I). Please provide one year of actual results and three years of Total Hospital Health System projections of revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Hospital Health System: Description	FY 2009 Projected W/out CON	FY 2009 Projected Incremental	FY 2009 Projected With CON	FY 2010 Projected W/out CON	FY 2010 Projected Incremental	FY 2010 Projected With CON	FY 2011 Projected W/out CON	FY 2011 Projected Incremental	FY 2011 Projected With CON
NET PATIENT REVENUE									
Non-Government	$84,255,586	$4,796,368	$89,051,953	$87,811,937	$4,802,095	$92,614,032	$91,324,414	$4,994,178	$96,318,593
Medicare	$107,776,010	$6,050,529	$113,826,538	$112,316,042	$6,063,558	$118,379,600	$116,808,684	$6,306,100	$123,114,784
Medicaid and Other Medical Assistance	$40,494,741	$471,109	$40,965,849	$42,123,610	$480,874	$42,604,483	$43,808,554	$500,109	$44,308,663
Other Government			$0			$0			$0
Total Net Patient Patient Revenue	$232,526,336	$11,318,005	$243,844,341	$242,251,589	$11,346,526	$253,598,115	$251,941,652	$11,800,387	$263,742,039
Other Operating Revenue	$14,399,392		$14,399,392	$15,052,168		$15,052,168	$15,737,199		$15,737,199
Revenue from Operations	$246,925,728	$11,318,005	$258,243,733	$257,303,756	$11,346,526	$268,650,283	$267,678,851	$11,800,387	$279,479,238
OPERATING EXPENSES									
Salaries and Fringe Benefits	$137,921,111	$4,182,918	$142,104,028	$142,883,464	$4,194,205	$147,077,669	$147,863,414	$4,361,973	$152,225,388
Professional / Contracted Services	$28,342,789	$0	$28,342,789	$28,726,500	$0	$28,726,500	$29,875,560	$0	$29,875,560
Supplies and Drugs	$38,982,764	$3,597,665	$42,580,429	$41,102,077	$3,607,373	$44,709,450	$43,193,255	$3,751,668	$46,944,923
Bad Debts	$24,402,643	$0	$24,402,643	$25,134,723	$0	$25,134,723	$25,888,764	$0	$25,888,764
Other Operating Expense	$11,194,760	$1,244,573	$12,439,333	$11,564,581	$1,247,932	$12,812,513	$11,899,039	$1,297,849	$13,196,888
Subtotal	$240,844,067	$9,025,156	$249,869,222	$249,411,346	$9,049,510	$258,460,856	$258,720,033	$9,411,490	$268,131,524
Depreciation/Amortization	$10,500,402		$10,500,402	$10,500,402		$10,500,402	$10,500,402		$10,500,402
Interest Expense	$1,800,013		$1,800,013	$1,800,013		$1,800,013	$1,800,013		$1,800,013
Lease Expense			$0			$0			$0
Total Operating Expense	$253,144,482	$9,025,156	$262,169,638	$261,711,761	$9,049,510	$270,761,271	$271,020,449	$9,411,490	$280,431,939
Gain/(Loss) from Operations	($6,218,754)	$2,292,850	($3,925,904)	($4,408,005)	$2,297,016	($2,110,988)	($3,341,598)	$2,388,897	($952,701)
Plus: Non-Operating Revenue	$1,855,248		$1,855,248	$1,910,906		$1,910,906	$1,968,233		$1,968,233
Revenue Over/(Under) Expense	($4,363,505)	$2,292,850	($2,070,656)	($2,497,099)	$2,297,016	($200,082)	($1,373,365)	$2,388,897	$1,015,532
FTEs	1573.170824	41.82917639	1615	1573.057948	41.94205243	1615	1571.380265	43.61973452	1615

*Volume Statistics:
Provide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

St. Mary's Hospital (Obligated Group)

11. B (i). Please provide FY 2008 (Annualized) and four years of historical actual results of **Total Facility** revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Facility: Description	FY 2008 Actual Annualized	FY 2007 Historical W/out HCGW	FY 2007 Historical Incremental	FY 2007 Historical With HCGW	FY 2006 Historical W/out HCGW	FY 2006 Historical Incremental	FY 2006 Historical With HCGW	FY 2005 Historical W/out HCGW	FY 2005 Historical Incremental	FY 2005 Historical With HCGW	FY 2004 Historical W/out HCGW	FY 2004 Historical Incremental	FY 2004 Historical With HCGW
NET PATIENT REVENUE													
Non-Government	$85,680,000	$79,115,000	$2,604,000	$81,719,000	$71,249,000	$2,755,000	$74,004,000	$63,505,000	$569,000	$64,074,000	$65,386,000	$0	$65,386,000
Medicare	$91,853,000	$84,192,000	$4,247,000	$88,439,000	$75,985,000	$4,104,000	$80,089,000	$68,298,000	$1,045,000	$69,343,000	$70,762,000	$0	$70,762,000
Medicaid and Other Medical Assi	$47,953,000	$45,940,000	$230,000	$46,170,000	$41,710,000	$101,000	$41,811,000	$36,179,000	$22,000	$36,201,000	$36,942,000	$0	$36,942,000
Other Government	$450,000	$434,000	$0	$434,000	$393,000	$0	$393,000	$340,000	$0	$340,000	$347,000	$0	$347,000
Total Net Patient Patient Revenu	$225,936,000	$209,681,000	$7,081,000	$216,762,000	$189,337,000	$6,960,000	$196,297,000	$168,322,000	$1,636,000	$169,958,000	$173,437,000	$0	$173,437,000
Other Operating Revenue	$7,172,000	$5,274,000	$0	$5,274,000	$5,192,000	$0	$5,192,000	$5,337,000	$0	$5,337,000	$5,195,000	$0	$5,195,000
Revenue from Operations	$233,108,000	$214,955,000	$7,081,000	$222,036,000	$194,529,000	$6,960,000	$201,489,000	$173,659,000	$1,636,000	$175,295,000	$178,632,000	$0	$178,632,000
OPERATING EXPENSES													
Salaries and Fringe Benefits	$126,392,000	$121,138,000	$2,337,000	$123,475,000	$117,458,000	$2,184,000	$119,642,000	$110,610,000	$852,000	$111,462,000	$101,916,000	$0	$101,916,000
Professional / Contracted Service	$28,448,000	$26,293,000	$949,000	$27,242,000	$22,314,000	$1,314,000	$23,628,000	$18,410,000	$620,000	$19,030,000	$15,552,000	$0	$15,552,000
Supplies and Drugs	$33,330,000	$28,872,000	$2,224,000	$31,096,000	$28,090,000	$1,875,000	$29,965,000	$25,931,000	$3,000	$25,934,000	$25,014,000	$0	$25,014,000
Bad Debts	$12,735,000	$11,406,000	$0	$11,406,000	$8,787,000	$0	$8,787,000	$9,189,000	$0	$9,189,000	$7,291,000	$0	$7,291,000
Other Operating Expense	$17,119,000	$14,365,000	$5,000	$14,370,000	$15,984,000	$6,000	$15,990,000	$15,471,000	$0	$15,471,000	$12,963,000	$0	$12,963,000
Subtotal	$220,024,000	$202,074,000	$5,515,000	$207,589,000	$192,633,000	$5,379,000	$198,012,000	$179,611,000	$1,475,000	$181,086,000	$162,736,000	$0	$162,736,000
Depreciation/Amortization	$8,944,000	$9,253,000	$301,000	$9,554,000	$9,406,000	$233,000	$9,639,000	$9,528,000	$48,000	$9,576,000	$8,471,000	$0	$8,471,000
Interest Expense	$2,158,000	$2,645,000	$0	$2,645,000	$2,620,000	$0	$2,620,000	$2,710,000	$0	$2,710,000	$2,496,000	$0	$2,496,000
Lease Expense	$1,679,000	$734,000	$0	$734,000	$912,000	$0	$912,000	$674,000	$0	$674,000	$760,000	$0	$760,000
Total Operating Expense	$232,805,000	$214,706,000	$5,816,000	$220,522,000	$205,571,000	$5,612,000	$211,183,000	$192,523,000	$1,523,000	$194,046,000	$174,463,000	$0	$174,463,000
Gain/(Loss) from Operations	$303,000	$249,000	$1,265,000	$1,514,000	($11,042,000)	$1,348,000	($9,694,000)	($18,864,000)	$113,000	($18,751,000)	$4,169,000	$0	$4,169,000
Plus: Non-Operating Revenue	$4,728,000	$4,503,000	$0	$4,503,000	$3,497,000	$0	$3,497,000	$4,930,000	$0	$4,930,000	$1,799,000	$0	$1,799,000
Revenue Over/(Under) Expense	$5,031,000	$4,752,000	$1,265,000	$6,017,000	($7,545,000)	$1,348,000	($6,197,000)	($13,934,000)	$113,000	($13,821,000)	$5,968,000	$0	$5,968,000
FTEs	1,493	1,464	16	1,480	1,463	17	1,480	1,459	3	1,462	1,404	-	1,404
Cases													
Primary Angio	136	-	128	128	-	156	156	-	30	30	-	-	-
Elective Angio	100	-	104	104	-	126	126	-	29	29	-	-	-
OHS	78	-	97	97	-	70	70	-	18	18	-	-	-

Note: The "Incremental" should include revenues and expenses from the operation of the Heart Center of Greater Waterbury ("HCGW")

*Volume Statistics:
Provide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

St. Mary's Hospital (Obligated Group)

11. B (i). Please provide three years of projections of **Total Facility** revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Facility: Description	FY 2009 Projected W/out CON	FY 2009 Projected Incremental	FY 2009 Projected With CON	FY 2010 Projected W/out CON	FY 2010 Projected Incremental	FY 2010 Projected With CON	FY 2011 Projected W/out CON	FY 2011 Projected Incremental	FY 2011 Projected With CON
NET PATIENT REVENUE									
Non-Government	$84,219,000	$2,060,000	$86,279,000	$86,694,000	$2,071,000	$88,765,000	$89,274,000	$2,154,000	$91,428,000
Medicare	$88,114,000	$5,260,000	$93,374,000	$90,756,000	$5,308,000	$96,064,000	$93,426,000	$5,520,000	$98,946,000
Medicaid and Other Medical Assistance	$48,605,000	$142,000	$48,747,000	$50,010,000	$141,000	$50,151,000	$51,510,000	$146,000	$51,656,000
Other Government	$458,000	$0	$458,000	$472,000	$0	$472,000	$485,000	$0	$485,000
Total Net Patient Patient Revenue	$221,396,000	$7,462,000	$228,858,000	$227,932,000	$7,520,000	$235,452,000	$234,695,000	$7,820,000	$242,515,000
Other Operating Revenue	$7,814,000	$0	$7,814,000	$8,048,000	$0	$8,048,000	$8,290,000	$0	$8,290,000
Revenue from Operations	$229,210,000	$7,462,000	$236,672,000	$235,980,000	$7,520,000	$243,500,000	$242,985,000	$7,820,000	$250,805,000
OPERATING EXPENSES									
Salaries and Fringe Benefits	$129,199,000	$2,392,000	$131,591,000	$133,199,000	$2,409,000	$135,608,000	$137,184,000	$2,492,000	$139,676,000
Professional / Contracted Services	$28,314,000	$987,000	$29,301,000	$29,154,000	$1,026,000	$30,180,000	$30,018,000	$1,067,000	$31,085,000
Supplies and Drugs	$29,768,000	$2,266,000	$32,034,000	$30,707,000	$2,288,000	$32,995,000	$31,572,000	$2,413,000	$33,985,000
Bad Debts	$13,325,000	$0	$13,325,000	$13,725,000	$0	$13,725,000	$14,136,000	$0	$14,136,000
Other Operating Expense	$17,651,000	$5,000	$17,656,000	$18,819,000	$5,000	$18,824,000	$19,385,000	$5,000	$19,390,000
Subtotal	$218,257,000	$5,650,000	$223,907,000	$225,604,000	$5,728,000	$231,332,000	$232,295,000	$5,977,000	$238,272,000
Depreciation/Amortization	$8,610,000	$439,000	$9,049,000	$9,635,000	$428,000	$10,063,000	$11,476,000	$428,000	$11,904,000
Interest Expense	$1,978,000	$0	$1,978,000	$1,798,000	$0	$1,798,000	$1,618,000	$0	$1,618,000
Lease Expense	$1,729,000	$0	$1,729,000	$1,781,000	$0	$1,781,000	$1,834,000	$0	$1,834,000
Total Operating Expense	$230,574,000	$6,089,000	$236,663,000	$238,818,000	$6,156,000	$244,974,000	$247,223,000	$6,405,000	$253,628,000
Gain/(Loss) from Operations	($1,364,000)	$1,373,000	$9,000	($2,838,000)	$1,364,000	($1,474,000)	($4,238,000)	$1,415,000	($2,823,000)
Plus: Non-Operating Revenue	$3,179,000	$0	$3,179,000	$3,274,000	$0	$3,274,000	$3,373,000	$0	$3,373,000
Revenue Over/(Under) Expense	$1,815,000	$1,373,000	$3,188,000	$436,000	$1,364,000	$1,800,000	($865,000)	$1,415,000	$550,000
FTEs	1,477	16	1,493	1,477	16	1,493	1,477	16	1,493
Cases									
Primary Angio	-	33	33	-	42	42	-	42	42
Elective Angio	-	206	206	-	190	190	-	190	190
OHS	-	81	81	-	78	78	-	78	78

*Volume Statistics:
Provide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

Saint Mary's Health System, Inc.

11. C (i). Please provide one year of actual results and three years of ***Total Hospital Health System*** projections of revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Facility: / Description	FY 2008 Actual Annualized	FY 2007 Historical W/out HCGW	FY 2007 Historical Incremental	FY 2007 Historical With HCGW	FY 2006 Historical W/out HCGW	FY 2006 Historical Incremental	FY 2006 Historical With HCGW	FY 2005 Historical W/out HCGW	FY 2005 Historical Incremental	FY 2005 Historical With HCGW	FY 2004 Historical W/out HCGW	FY 2004 Historical Incremental	FY 2004 Historical With HCGW
NET PATIENT REVENUE													
Non-Government	$85,680,000	$79,115,000	$2,604,000	$81,719,000	$71,249,000	$2,755,000	$74,004,000	$63,505,000	$569,000	$64,074,000	$65,386,000	$0	$65,386,000
Medicare	$91,853,000	$84,192,000	$4,247,000	$88,439,000	$75,985,000	$4,104,000	$80,089,000	$68,298,000	$1,045,000	$69,343,000	$70,762,000	$0	$70,762,000
Medicaid and Other Medical Assi:	$47,953,000	$45,940,000	$230,000	$46,170,000	$41,710,000	$101,000	$41,811,000	$36,179,000	$22,000	$36,201,000	$36,942,000	$0	$36,942,000
Other Government	$450,000	$434,000	$0	$434,000	$393,000	$0	$393,000	$340,000	$0	$340,000	$347,000	$0	$347,000
Total Net Patient Patient Revenue	$225,936,000	$209,681,000	$7,081,000	$216,762,000	$189,337,000	$6,960,000	$196,297,000	$168,322,000	$1,636,000	$169,958,000	$173,437,000	$0	$173,437,000
Other Operating Revenue	$7,249,000	$6,344,000	$0	$6,344,000	$6,282,000	$0	$6,282,000	$6,090,000	$0	$6,090,000	$5,899,000	$0	$5,899,000
Revenue from Operations	$233,185,000	$216,025,000	$7,081,000	$223,106,000	$195,619,000	$6,960,000	$202,579,000	$174,412,000	$1,636,000	$176,048,000	$179,336,000	$0	$179,336,000
OPERATING EXPENSES													
Salaries and Fringe Benefits	$126,429,000	$121,586,000	$2,337,000	$123,923,000	$117,821,000	$2,184,000	$120,005,000	$110,963,000	$852,000	$111,815,000	$102,278,000	$0	$102,278,000
Professional / Contracted Service	$28,448,000	$26,293,000	$949,000	$27,242,000	$22,314,000	$1,314,000	$23,628,000	$18,410,000	$620,000	$19,030,000	$15,552,000	$0	$15,552,000
Supplies and Drugs	$33,330,000	$28,872,000	$2,224,000	$31,096,000	$28,090,000	$1,875,000	$29,965,000	$25,931,000	$3,000	$25,934,000	$25,014,000	$0	$25,014,000
Bad Debts	$12,735,000	$11,429,000	$0	$11,429,000	$8,804,000	$0	$8,804,000	$9,193,000	$0	$9,193,000	$7,300,000	$0	$7,300,000
Other Operating Expense	$17,165,000	$14,768,000	$5,000	$14,773,000	$16,296,000	$6,000	$16,302,000	$15,744,000	$0	$15,744,000	$13,300,000	$0	$13,300,000
Subtotal	$220,107,000	$202,948,000	$5,515,000	$208,463,000	$193,325,000	$5,379,000	$198,704,000	$180,241,000	$1,475,000	$181,716,000	$163,444,000	$0	$163,444,000
Depreciation/Amortization	$8,999,000	$9,323,000	$301,000	$9,624,000	$9,472,000	$233,000	$9,705,000	$9,592,000	$48,000	$9,640,000	$8,536,000	$0	$8,536,000
Interest Expense	$2,158,000	$2,651,000	$0	$2,651,000	$2,627,000	$0	$2,627,000	$2,723,000	$0	$2,723,000	$2,492,000	$0	$2,492,000
Lease Expense	$1,679,000	$734,000	$0	$734,000	$912,000	$0	$912,000	$674,000	$0	$674,000	$760,000	$0	$760,000
Total Operating Expense	$232,943,000	$215,656,000	$5,816,000	$221,472,000	$206,336,000	$5,612,000	$211,948,000	$193,230,000	$1,523,000	$194,753,000	$175,232,000	$0	$175,232,000
Gain/(Loss) from Operations	$242,000	$369,000	$1,265,000	$1,634,000	($10,717,000)	$1,348,000	($9,369,000)	($18,818,000)	$113,000	($18,705,000)	$4,104,000	$0	$4,104,000
Plus: Non-Operating Revenue	$0	$4,269,000	$0	$4,269,000	$3,088,000	$0	$3,088,000	$4,784,000	$0	$4,784,000	$1,923,000	$0	$1,923,000
Revenue Over/(Under) Expense	$242,000	$4,638,000	$1,265,000	$5,903,000	($7,629,000)	$1,348,000	($6,281,000)	($14,034,000)	$113,000	($13,921,000)	$6,027,000	$0	$6,027,000
FTEs	1,498	1,469	16	1,485	1,468	17	1,485	1,464	3	1,467	1,409	-	1,409
Cases													
Primary Angio	136	-	128	128	-	156	156	-	30	30	-	-	-
Elective Angio	100	-	104	104	-	126	126	-	29	29	-	-	-
OHS	78	-	97	97	-	70	70	-	18	18	-	-	-

Note: The "Incremental" should include revenues and expenses from the operation of the Heart Center of Greater Waterbury ("HCGW")

*Volume Statistics:
Provide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

Saint Mary's Health System, Inc

11. C (i). Please provide one year of actual results and three years of ***Total Hospital Health System*** projections of revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Hospital Health System: Description	FY 2009 Projected W/out CON	FY 2009 Projected Incremental	FY 2009 Projected With CON	FY 2010 Projected W/out CON	FY 2010 Projected Incremental	FY 2010 Projected With CON	FY 2011 Projected W/out CON	FY 2011 Projected Incremental	FY 2011 Projected With CON
NET PATIENT REVENUE									
Non-Government	$84,219,000	$2,060,000	$86,279,000	$86,694,000	$2,071,000	$88,765,000	$89,274,000	$2,154,000	$91,428,000
Medicare	$88,114,000	$5,260,000	$93,374,000	$90,756,000	$5,308,000	$96,064,000	$93,426,000	$5,520,000	$98,946,000
Medicaid and Other Medical Assistance	$48,605,000	$142,000	$48,747,000	$50,010,000	$141,000	$50,151,000	$51,510,000	$146,000	$51,656,000
Other Government	$458,000	$0	$458,000	$472,000	$0	$472,000	$485,000	$0	$485,000
Total Net Patient Patient Revenue	$221,396,000	$7,462,000	$228,858,000	$227,932,000	$7,520,000	$235,452,000	$234,695,000	$7,820,000	$242,515,000
Other Operating Revenue	$7,893,000	$0	$7,893,000	$8,129,000	$0	$8,129,000	$8,374,000	$0	$8,374,000
Revenue from Operations	$229,289,000	$7,462,000	$236,751,000	$236,061,000	$7,520,000	$243,581,000	$243,069,000	$7,820,000	$250,889,000
OPERATING EXPENSES									
Salaries and Fringe Benefits	$129,237,000	$2,392,000	$131,629,000	$133,238,000	$2,409,000	$135,647,000	$137,224,000	$2,492,000	$139,716,000
Professional / Contracted Services	$28,314,000	$987,000	$29,301,000	$29,154,000	$1,026,000	$30,180,000	$30,018,000	$1,067,000	$31,085,000
Supplies and Drugs	$29,768,000	$2,266,000	$32,034,000	$30,707,000	$2,288,000	$32,995,000	$31,572,000	$2,413,000	$33,985,000
Bad Debts	$13,325,000	$0	$13,325,000	$13,725,000	$0	$13,725,000	$14,136,000	$0	$14,136,000
Other Operating Expense	$17,698,000	$5,000	$17,703,000	$18,867,000	$5,000	$18,872,000	$19,435,000	$5,000	$19,440,000
Subtotal	$218,342,000	$5,650,000	$223,992,000	$225,691,000	$5,728,000	$231,419,000	$232,385,000	$5,977,000	$238,362,000
Depreciation/Amortization	$8,663,000	$439,000	$9,102,000	$9,686,000	$428,000	$10,114,000	$11,525,000	$428,000	$11,953,000
Interest Expense	$1,978,000	$0	$1,978,000	$1,798,000	$0	$1,798,000	$1,618,000	$0	$1,618,000
Lease Expense	$1,729,000	$0	$1,729,000	$1,781,000	$0	$1,781,000	$1,834,000	$0	$1,834,000
Total Operating Expense	$230,712,000	$6,089,000	$236,801,000	$238,956,000	$6,156,000	$245,112,000	$247,362,000	$6,405,000	$253,767,000
Gain/(Loss) from Operations	($1,423,000)	$1,373,000	($50,000)	($2,895,000)	$1,364,000	($1,531,000)	($4,293,000)	$1,415,000	($2,878,000)
Plus: Non-Operating Revenue	$3,179,000	$0	$3,179,000	$3,274,000	$0	$3,274,000	$3,373,000	$0	$3,373,000
Revenue Over/(Under) Expense	$1,756,000	$1,373,000	$3,129,000	$379,000	$1,364,000	$1,743,000	($920,000)	$1,415,000	$495,000
FTEs	1,482	16	1,498	1,482	16	1,498	1,482	16	1,498
Cases									
Primary Angio	-	33	33	-	42	42	-	42	42
Elective Angio	-	206	206	-	190	190	-	190	190
OHS	-	81	81	-	78	78	-	78	78

*Volume Statistics:
Provide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

John Dempsey Hospital, Including Dental

11. B (i). Please provide FY 2008 (Annualized) and four years of historical actual results of **Total Facility** revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Facility: / Description	FY 2008 Actual Annualized	FY 2008 Actual Incremental	FY 2008 Actual With HCGW	FY 2007 Historical W/out HCGW	FY 2007 Historical Incremental	FY 2007 Historical With HCGW	FY 2006 Historical W/out HCGW	FY 2006 Historical Incremental	FY 2006 Historical With HCGW	FY 2005 Historical W/out HCGW	FY 2005 Historical Incremental	FY 2005 Historical With HCGW	FY 2004 Historical W/out HCGW	FY 2004 Historical Increment	FY 2004 Historical With HCGW
NET PATIENT REVENUE															
Non-Government	$98,092,113		$98,092,113	$98,212,995	$151	$98,213,146	$93,054,006	$336,279	$93,390,285	$86,395,939	$1,040,652	$87,436,591	79,418,570		$79,418,570
Medicare	$88,907,487		$88,907,487	$88,824,920	$101,637	$88,926,557	$87,906,504	$1,446,609	$89,353,113	$83,213,382	$2,695,682	$85,909,064	72,855,001		$72,855,001
Medicaid and Other Medical Assis	$44,324,511		$44,324,511	$39,308,670	$0	$39,308,670	$40,931,891	$18,479	$40,950,370	$36,062,467	$10,911	$36,073,378	31,775,586		$31,775,586
Other Government	$760,853		$760,853	$889,456	$0	$889,456	$546,179	$0	$546,179	$409,265	$0	$409,265	529,485		$529,485
Total Net Patient Patient Revenue	$232,084,965		$232,084,965	$227,236,041	$101,788	$227,337,829	$222,438,580	$1,801,367	$224,239,947	$206,081,053	$3,747,245	$209,828,298	$184,578,641	$0	$184,578,641
Other Operating Revenue	$2,735,454	$302,400	$3,037,854	$1,342,345	$247,805	$1,590,150	$2,081,160	$506,680	$2,587,840	$1,330,869		$1,330,869	$2,335,116		$2,335,116
Revenue from Operations	$234,820,419	$302,400	$235,122,819	$228,578,386	$349,593	$228,927,979	$224,519,740	$2,308,047	$226,827,787	$207,411,922	$3,747,245	$211,159,167	$186,913,757	$0	$186,913,757
OPERATING EXPENSES															
Salaries and Fringe Benefits	$135,657,600	$413,553	$136,071,153	$120,318,510	$458,097	$120,776,607	$110,736,348	$1,531,190	$112,267,538	$101,739,649	$2,487,082	$104,226,731	$90,842,128		$90,842,128
Professional / Contracted Service	$43,509,171	$174	$43,509,345	$40,173,399	$742	$40,174,141	$37,168,396	$134	$37,168,530	$37,183,862		$37,183,862	$33,862,416		$33,862,416
Supplies and Drugs	$44,709,680		$44,709,680	$42,342,636	$25,094	$42,367,730	$39,114,894	$407,311	$39,522,205	$38,659,019	$962,082	$39,621,101	$35,185,511		$35,185,511
Bad Debts	$5,570,353		$5,570,353	$6,099,715		$6,099,715	$3,610,639		$3,610,639	$4,139,516		$4,139,516	5,633,587		$5,633,587
Other Operating Expense	$13,980,318	$551	$13,980,869	$13,458,643	$456	$13,459,099	$20,588,045	$505	$20,588,550	$11,427,679		$11,427,679	$12,460,459		$12,460,459
Subtotal	$243,427,122	$414,278	$243,841,400	$222,392,903	$484,389	$222,877,292	$211,218,322	$1,939,140	$213,157,462	$193,149,725	$3,449,164	$196,598,889	$177,984,101	$0	$177,984,101
Depreciation/Amortization	$11,192,211		$11,192,211	$10,432,879		$10,432,879	$9,126,980		$9,126,980	$6,523,998		$6,523,998	$5,555,208		$5,555,208
Interest Expense			$0	$526,248		$526,248	$491,471		$491,471	$155,758		$155,758	$163,436		$163,436
Lease Expense			$0			$0			$0			$0			$0
Total Operating Expense	$254,619,333	$414,278	$255,033,611	$233,352,030	$484,389	$233,836,419	$220,836,773	$1,939,140	$222,775,913	$199,829,481	$3,449,164	$203,278,645	$183,702,745	$0	$183,702,745
Gain/(Loss) from Operations	($19,798,914)	($111,878)	($19,910,792)	($4,773,644)	($134,796)	($4,908,440)	$3,682,967	$368,907	$4,051,874	$7,582,441	$298,081	$7,880,522	$3,211,012	$0	$3,211,012
Plus: Non-Operating Revenue	$1,057,468		$1,057,468	$951,575		$951,575	$590,435		$590,435	$254,274		$254,274	$64,851		$64,851
Revenue Over/(Under) Expense	($18,741,446)	($111,878)	($18,853,324)	($3,822,069)	($134,796)	($3,956,865)	$4,273,402	$368,907	$4,642,309	$7,836,715	$298,081	$8,134,796	$3,275,863	$0	$3,275,863
FTEs	1,494.07		1,494.07	1,406.45		1,406.45	1,382.09		1,382.09	1,378.01	3.00	1,381.01	1,315.84		1,315.84

Note: The "Incremental" should include revenues and expenses from the operation of the Heart Center of Greater Waterbury ("HCGW")

*Volume Statistics:

Waterbury Cases Performed at John Dempsey Hospital due to the Waterbury Heart Center

Case Type	FY 05	FY 06	FY 07	FY 08
Open Heart Cases	40	27	0	0
Angioplasty Cases	107	17	0	0
Transfers from WHC	0	10	3	0
Diagnostic Caths	30	7	0	0
Total	177	61	3	0

Additonal Volume: JDH has a contractual relationship with the Waterbury Heart Center to provide Perfusionist Services for the open heart cases at the Waterbury Heart Center.

	FY 06	FY 07	FY 08
Perfusionist Cases at WHC	188	211	216

John Dempsey Hospital, including Dental

11. B (i). Please provide three years of projections of **Total Facility** revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Facility: / Description	FY 2009 Projected W/out CON	FY 2009 Projected Incremental	FY 2009 Projected With CON	FY 2010 Projected W/out CON	FY 2010 Projected Incremental	FY 2010 Projected With CON	FY 2011 Projected W/out CON	FY 2011 Projected Incremental	FY 2011 Projected With CON
NET PATIENT REVENUE									
Non-Government	$100,546,557		$100,546,557	105,397,337		$105,397,337	$110,165,303		$110,165,303
Medicare	$91,132,115		$91,132,115	95,528,704		$95,528,704	$99,850,232		$99,850,232
Medicaid and Other Medical Assistance	$45,433,591		$45,433,591	47,625,495		$47,625,495	$49,779,978		$49,779,978
Other Government	$779,891		$779,891	817,517		$817,517	$854,499		$854,499
Total Net Patient Patient Revenue	$237,892,155	$0	$237,892,155	$249,369,052	$0	$249,369,052	$260,650,012	$0	$260,650,012
Other Operating Revenue	$274,858	$474,718	$749,576	$288,601	$514,186	$802,787	$303,031	$532,182	$835,213
Revenue from Operations	$238,167,013	$474,718	$238,641,731	$249,657,653	$514,186	$250,171,839	$260,953,043	$532,182	$261,485,225
OPERATING EXPENSES									
Salaries and Fringe Benefits	$135,672,340	$496,798	$136,169,138	$142,785,974	$514,186	$143,300,160	$150,265,101	$532,182	$150,797,283
Professional / Contracted Services	$46,586,136		$46,586,136	$48,117,302		$48,117,302	$49,702,075		$49,702,075
Supplies and Drugs	$43,707,748		$43,707,748	$45,433,946		$45,433,946	$48,463,329		$48,463,329
Bad Debts	$5,000,000		$5,000,000	$5,000,000		$5,000,000	$5,000,000		$5,000,000
Other Operating Expense	$14,703,587		$14,703,587	$15,682,070		$15,682,070	$16,750,308		$16,750,308
Subtotal	$245,669,811	$496,798	$246,166,609	$257,019,292	$514,186	$257,533,478	$270,180,813	$532,182	$270,712,995
Depreciation/Amortization	$11,309,000		$11,309,000	$12,483,400		$12,483,400	$12,609,400		$12,609,400
Interest Expense			$0			$0			$0
Lease Expense			$0			$0			$0
Total Operating Expense	$256,978,811	$496,798	$257,475,609	$269,502,692	$514,186	$270,016,878	$282,790,213	$532,182	$283,322,395
Gain/(Loss) from Operations	($18,811,798)	($22,080)	($18,833,878)	($19,845,039)	$0	($19,845,039)	($21,837,170)	$0	($21,837,170)
Plus: Non-Operating Revenue	$3,224,554		$3,224,554	$2,624,531		$2,624,531	$2,755,758		$2,755,758
Revenue Over/(Under) Expense	($15,587,244)	($22,080)	($15,609,324)	($17,220,508)	$0	($17,220,508)	($19,081,412)	$0	($19,081,412)
FTEs				0			0		0

*Volume Statistics:

Waterbury Cases Projected to be performed at John Dempsey Hospital due to the Waterbury Heart Center

Case Type	FY 09	FY 10	FY 11
Open Heart Cases	0	0	0
Angioplasty Cases	0	0	0
Transfers from WHC	0	0	0
Diagnostic Caths	0	0	0
Total	0	0	0

Additonal Volume: JDH has a contractual relationship with the Waterbury Heart Center to provide Perfusionist Services for the open heart cases at the Waterbury Heart Center.

	FY 09	FY 10	FY 11
Perfusionist Cases at WHC	215	207	207

Heart Center of Greater Waterbury

11. C (i). Please provide one year of actual results and three years of ***Total Hospital Health System*** projections of revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Facility: / Description	FY 2008 Actual Annualized	FY 2007 Historical W/out HCGW	FY 2007 Historical Incremental	FY 2007 Historical With HCGW	FY 2006 Historical W/out HCGW	FY 2006 Historical Incremental	FY 2006 Historical With HCGW	FY 2005 Historical W/out HCGW	FY 2005 Historical Incremental	FY 2005 Historical With HCGW	FY 2004 Historical W/out HCGW	FY 2004 Historical Incremental	FY 2004 Historical With HCGW
NET PATIENT REVENUE													
Non-Government	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Medicare	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Medicaid and Other Medical Assistance	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Other Government	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Net Patient Patient Revenue	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Other Operating Revenue	$675,000	$0	$591,000	$591,000	$0	$680,000	$680,000	$0	$390,000	$390,000	$0	$0	$0
Revenue from Operations	$675,000	$0	$591,000	$591,000	$0	$680,000	$680,000	$0	$390,000	$390,000	$0	$0	$0
OPERATING EXPENSES													
Salaries and Fringe Benefits	$380,000	$0	$371,000	$371,000	$0	$359,000	$359,000	$0	$141,000	$141,000	$0	$0	$0
Professional / Contracted Services	$69,000	$0	$139,000	$139,000	$0	$47,000	$47,000	$0	$33,000	$33,000	$0	$0	$0
Supplies and Drugs	$55,000	$0	$56,000	$56,000	$0	$37,000	$37,000	$0	$29,000	$29,000	$0	$0	$0
Bad Debts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Other Operating Expense	$89,000	$0	$94,000	$94,000	$0	$149,000	$149,000	$0	$90,000	$90,000	$0	$0	$0
Subtotal	$593,000	$0	$660,000	$660,000	$0	$592,000	$592,000	$0	$293,000	$293,000	$0	$0	$0
Depreciation/Amortization	$24,000	$0	$39,000	$39,000	$0	$38,000	$38,000	$0	$19,000	$19,000	$0	$0	$0
Interest Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lease Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Operating Expense	$617,000	$0	$699,000	$699,000	$0	$630,000	$630,000	$0	$312,000	$312,000	$0	$0	$0
Gain/(Loss) from Operations	$58,000	$0	($108,000)	($108,000)	$0	$50,000	$50,000	$0	$78,000	$78,000	$0	$0	$0
Plus: Non-Operating Revenue	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Revenue Over/(Under) Expense	$58,000	$0	($108,000)	($108,000)	$0	$50,000	$50,000	$0	$78,000	$78,000	$0	$0	$0
FTEs	4	-	4	4	-	4	4	-	4	4	-	-	-

Note: The "incremental" should include revenues and expenses from the operation of the Heart Center of Greater Waterbury ("HCGW")

*Volume Statistics:
Provide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

APPENDIX 11.b.vi.

CHA Testimony on Financial Impact

TWH Financial Attachment II

SMH Financial Attachment II

JDH Financial Attachment II

CHA CONNECTICUT HOSPITAL ASSOCIATION

TESTIMONY OF
STEPHEN FRAYNE
SENIOR VICE PRESIDENT, HEALTH POLICY
CONNECTICUT HOSPITAL ASSOCIATION
BEFORE THE
THE DEPARTMENT OF ECONOMIC AND COMMUNITY DEVELOPMENT
Thursday, January 17, 2008

Economic Impact of Connecticut Hospitals

Good evening Commissioner McDonald. My name is Stephen Frayne and I am the Senior Vice President, Health Policy of the Connecticut Hospital Association (CHA). I appreciate the opportunity to testify on behalf of CHA and its members regarding the Department of Economic and Community Development's study on the future course of the state's economy.

In 2007, Governor M. Jodi Rell began planning for growing the state's economy by creating a strategic plan for Connecticut. The Governor's strategic plan is to be a blueprint for state policy and includes recommendations on how Connecticut's industries and workers can successfully innovate, grow, and compete in the global economy. I know that you are looking at a variety of topics in your study, including transportation, technology transfer, brownfield remediation and redevelopment, business regulation, labor force quality and sustainability, cost of doing business, affordable housing, land use policy, taxation, availability of capital, and energy costs and supply.

I am here tonight to ask you to make sure hospitals and healthcare are included in the strategic plan for growing the state's economy. Connecticut's hospitals, like good schools and safe roads, are an essential part of the state's economy. As you focus on investing in the future of Connecticut, CHA asks that you recognize the need to invest in hospitals so that hospitals can continue to provide the services needed in their communities.

Providing patients and communities with the finest quality healthcare services is the highest priority for Connecticut's not-for-profit hospitals. Hospitals fulfill a vital role, caring for Connecticut residents 24 hours a day, seven days a week, and they make enormous contributions to the health and quality of life for millions of Connecticut residents. Last year, Connecticut hospitals provided 2.1 million days of inpatient care. In addition, hospital provide a significant amount of outpatient care. Last year, Connecticut hospitals provided more than 4 million outpatient visits, including: 1.5 million emergency department visits; 183,000 ambulatory surgery visits; 30,000 cardiac procedures; 99,000 cardiac rehab visits; 144,000 gastroenterology procedures; 43,000 chemotherapy visits; 204,000 radiation therapy visits; 844,000 outpatient rehabilitation visits; 344,000 psychiatric care visits; and 624,000 primary care visits. Every moment of every day hospitals touch the lives of Connecticut residents by providing high quality healthcare services.

What is often overlooked, however, are the vital contributions that Connecticut's not-for-profit hospitals make to the state's economy. Connecticut's hospitals are both the economic bedrock and engine in their communities. They are major employers, offering jobs at all skill and salary levels in a growing employment sector. Connecticut hospitals won't move out of Connecticut in search of a more favorable business climate – Connecticut hospitals are here to stay. Hospital purchases provide important secondary income and job benefits to the local economy. Hospitals serve as a magnet for other healthcare business and serve as a stimulus for new businesses, attracting other businesses into the community, such as retail shops, banks, grocery stores, and family restaurants. This year, CHA conducted an analysis of the economic impact of Connecticut hospitals a summary of which I have appended to this testimony. The study shows that Connecticut hospitals and health systems:

- Generate nearly **$12.2 billion** per year for the state and local economies—about **6%** of the Gross State Product;
- Provide **70,000** jobs in our communities generating approximately **$6.5** billion in annual local economy payroll; and
- Purchased goods and services generating approximately **$2.7** billion annually in local economic activity.

During the last three years, there has been a 24% increase in hospital contributions to Connecticut's economy---from $9.8 billion in 2004 to $12.2 billion in 2006.

The ability of Connecticut hospitals' to continue to make such contributions is constantly threatened. Payments for individuals enrolled in state and federal programs always fall short of the amount needed to cover the cost of care. These deficits rob Connecticut hospitals of the dollars needed for investment in facilities and acquiring modern technology. As of today, it would take $1.1 billion in investment by Connecticut hospitals to catch up to the nation in average age of physical plant.

Connecticut hospitals are also struggling with a growing workforce shortage. Today's workforce problems can easily become tomorrow's crisis, particularly when you consider the needs of an expanding elderly population in Connecticut. According to the U.S. Census Bureau, Connecticut is one of the top 10 oldest states in the country. By the year 2030, the Census Bureau projects there will be a 69% increase in those over 65 in Connecticut and a 7% decrease in the population aged 18 to 50. This shift in demographics has serious implications for hospitals and the residents of Connecticut:

- As people age they require more hospital care—this will challenge a system that can't absorb the need.
- The need for essential hospital caregivers will rise; the federal government projects that by 2020, Connecticut will have the second worst nurse vacancy rate in the country—second only to Alaska.
- Connecticut's older physical plants—and the lack of necessary capital and cash reserves to upgrade these aged structures—will impede both the implementation of new and life-saving technologies and the safety and quality of care for Connecticut residents.

Last spring, Governor Rell established the *Hospital System Strategic Task Force,* chaired by Secretary of the Office of Policy and Management Robert Genuario and Commissioner of the Office of Healthcare Access Cristine Vogel. Its members included representatives of Connecticut hospitals and other healthcare experts, as well as business leaders. The report is final and has been submitted to the Governor. I urge you to review the report's findings and recommendations. One of the topics extensively discussed by the task force was "cost shifting" of losses from underfunded government programs to employer-sponsored insurance. The report concludes cost shifting is one of the leading drivers of the financial instability of Connecticut hospitals, is unsustainable, and is eroding the employer-sponsored insurance system hospitals rely on to make ends meet. CHA believes that one of the most important ways to stabilize Connecticut hospitals, recognized in the task force report, is to increase Medicaid funding in the state budget so that hospitals receive the full cost of providing care to patients who are covered by government-funded programs, such as Medicaid and SAGA.

On behalf of the millions of Connecticut residents who rely on a strong, stable hospital and healthcare system, we ask that you include in your strategic plan strategies to help Connecticut hospitals. We believe that a hospital investment strategy should be an integral component in any plan to strengthen Connecticut's infrastructure for today and tomorrow.

Thank you for your consideration. I am happy to answer any questions.

The Waterbury Hospital (Financial Attachment II)

11.B(vi): Please provide three years of projections of incremental revenue, expense and volume statistics attributable to the proposal in the following reporting format:

Type of Service Description: Primary PCI
Type of Unit Description: Cases
# of Months in Operation: 12

FY _2009_____ FY Projected Incremental Total Incremental Expenses: 643,035	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Total Facility by Payer Category:										
Medicare		58,844	25	$1,471,095	$1,008,671			462,424	$334,914	$127,510
Medicaid			2	$117,688	$82,117			35,571	$26,793	$8,778
CHAMPUS/TriCare				$0				$0	$0	$0
Total Governmental			27	$1,588,782	$1,090,787	$0	$0	$497,995	$361,707	$136,288
Commericial Insurers			20	$1,176,876	$810,220			366,656	$267,931	$98,725
Uninsured		$0	1	$58,844			$58,844	$0	$13,397	($13,397)
Total NonGovernment			21	$1,235,720	$810,220	$0	$58,844	$366,656	$281,328	$85,328
Total All Payers		$58,844	48	$2,824,502	$1,901,007	$0	$58,844	$864,651	$643,035	$221,616

The Waterbury Hospital (Financial Attachment II)

11.B(vi): Please provide three years of projections of incremental revenue, expense and volume statistics attributable to the proposal in the following reporting format:

Type of Service Description: Primary PCI
Type of Unit Description: Cases
# of Months in Operation: 12

FY _2010_____ FY Projected Incremental Total Incremental Expenses: 645,840	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Total Facility by Payer Category:										
Medicare		61,198	24	$1,468,741	$1,004,894			463,847	$336,960	$126,887
Medicaid			2	$122,395	$85,401			36,994	$28,080	$8,914
CHAMPUS/TriCare				$0				$0	$0	$0
Total Governmental			26	$1,591,136	$1,090,295	$0	$0	$500,841	$365,040	$135,801
Commericial Insurers			19	$1,162,753	$795,660			367,093	$266,760	$100,333
Uninsured		$0	1	$61,198			$61,198	$0	$14,040	($14,040)
Total NonGovernment			20	$1,223,951	$795,660	$0	$61,198	$367,093	$280,800	$86,293
Total All Payers		$61,198	46	$2,815,087	$1,885,955	$0	$61,198	$867,934	$645,840	$222,094

The Waterbury Hospital (Financial Attachment II)

11.B(vi): Please provide three years of projections of incremental revenue, expense and volume statistics attributable to the proposal in the following reporting format:

Type of Service Description: Primary PCI
Type of Unit Description: Cases
# of Months in Operation: 12

FY _2011_____ FY Projected Incremental Total Incremental Expenses: 671,673	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Total Facility by Payer Category:										
Medicare		63,645	24	$1,527,491	$1,045,090			482,401	$350,438	$131,963
Medicaid			2	$127,291	$88,817			38,474	$29,203	$9,271
CHAMPUS/TriCare				$0				$0	$0	$0
Total Governmental			26	$1,654,781	$1,133,906	$0	$0	$520,875	$379,641	$141,234
Commericial Insurers			19	$1,209,263	$827,486			381,777	$277,430	$104,347
Uninsured		$0	1	$63,645			$63,645	$0	$14,602	($14,602)
Total NonGovernment			20	$1,272,909	$827,486	$0	$63,645	$381,777	$292,032	$89,745
Total All Payers		$63,645	46	$2,927,690	$1,961,393	$0	$63,645	$902,652	$671,673	$230,979

The Waterbury Hospital (Financial Attachment II)

11.B(vi): Please provide three years of projections of incremental revenue, expense and volume statistics attributable to the proposal in the following reporting format:

Type of Service Description: Elective PCI
Type of Unit Description: Cases
# of Months in Operation: 12

FY _2009	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
FY Projected Incremental Total Incremental Expenses:	3,643,866									
Total Facility by Payer Category:										
Medicare		58,844	144	$8,473,505	$5,853,103			2,620,402	$1,922,039	$698,363
Medicaid			11	$647,282	$445,712			201,569	$146,822	$54,747
CHAMPUS/TriCare				$0				$0	$0	$0
Total Governmental			155	$9,120,787	$6,298,815	$0	$0	$2,821,971	$2,068,862	$753,110
Commericial Insurers			114	$6,708,192	$4,630,477			2,077,715	$1,521,614	$558,100
Uninsured		$0	4	$235,375			$235,375	0	$53,390	($53,390)
Total NonGovernment		$58,844	118	$6,943,567	$4,630,477	$0	$235,375	$2,077,715	$1,575,004	$502,710
Total All Payers		$58,844	273	$16,064,354	$10,929,292	$0	$235,375	$4,899,686	$3,643,866	$1,255,820

The Waterbury Hospital (Financial Attachment II)

11.B(vi): Please provide three years of projections of incremental revenue, expense and volume statistics attributable to the proposal in the following reporting format:

Type of Service Description: Elective PCI
Type of Unit Description: Cases
# of Months in Operation: 12

FY _2010	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
FY Projected Incremental Total Incremental Expenses:	3,659,758									
Total Facility by Payer Category:										
Medicare		61,198	139	$8,179,286	$5,550,822			2,628,465	$1,855,302	$773,163
Medicaid			11	$647,282	$437,650			209,632	$146,822	$62,810
CHAMPUS/TriCare				$0				$0	$0	$0
Total Governmental			150	$8,826,568	$5,988,471	$0	$0	$2,838,097	$2,002,124	$835,972
Commericial Insurers			110	$6,472,817	$4,392,620			2,080,197	$1,468,225	$611,972
Uninsured		$0	4	$235,375			$235,375	0	$53,390	($53,390)
Total NonGovernment		$61,198	114	$6,708,192	$4,392,620	$0	$235,375	$2,080,197	$1,521,614	$558,582
Total All Payers		$61,198	264	$15,534,760	$10,381,091	$0	$235,375	$4,918,293	$3,523,739	$1,394,554

The Waterbury Hospital (Financial Attachment II)

11.B(vi): Please provide three years of projections of incremental revenue, expense and volume statistics attributable to the proposal in the following reporting format:

Type of Service Description: Elective PCI
Type of Unit Description: Cases
# of Months in Operation: 12

FY _2011	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
FY Projected Incremental Total Incremental Expenses:	3,806,149									
Total Facility by Payer Category:										
Medicare		63,645	139	$8,179,286	$5,445,583			2,733,603	$1,855,302	$878,301
Medicaid			11	$647,282	$429,265			218,017	$146,822	$71,195
CHAMPUS/TriCare				$0				$0	$0	$0
Total Governmental			150	$8,826,568	$5,874,848	$0	$0	$2,951,620	$2,002,124	$949,496
Commericial Insurers			110	$6,472,817	$4,309,412			2,163,404	$1,468,225	$695,180
Uninsured		$0	4	$235,375			$235,375	0	$53,390	($53,390)
Total NonGovernment		$63,645	114	$6,708,192	$4,309,412	$0	$235,375	$2,163,404	$1,521,614	$641,790
Total All Payers		$63,645	264	$15,534,760	$10,184,360	$0	$235,375	$5,115,024	$3,523,739	$1,591,286

The Waterbury Hospital (Financial Attachment II)

11.B(vi): Please provide three years of projections of incremental revenue, expense and volume statistics attributable to the proposal in the following reporting format:

Type of Service Description: OHS
Type of Unit Description: Cases
# of Months in Operation: 12

FY _2009_____	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FY Projected Incremental		Rate	Units	Gross	Allowances/	Charity	Bad	Net	Operating	Gain/(Loss)
Total Incremental Expenses:	4,738,254			Revenue	Deductions	Care	Debt	Revenue	Expenses	from Operations
				Col. 2 * Col. 3				Col.4 - Col.5	Col. 1 Total *	Col. 8 - Col. 9
Total Facility by								-Col.6 - Col.7	Col. 4 / Col. 4 Total	
Payer Category:										
Medicare		138,683	69	$9,573,235	$6,605,532			2,967,703	$2,493,274	$474,429
Medicaid			5	$754,736	$520,768			233,968	$196,565	$37,403
CHAMPUS/TriCare				$0				$0	$0	$0
Total Governmental			74	$10,327,971	$7,126,300	$0	$0	$3,201,671	$2,689,839	$511,832
Commericial Insurers			55	$7,587,086	$5,235,090			2,351,997	$1,975,997	$376,000
Uninsured		$0	2	$278,061			$278,061	-	$72,419	($72,419)
Total NonGovernment			57	$7,865,147	$5,235,090	$0	$278,061	$2,351,997	$2,048,416	$303,581
Total All Payers		$138,683	131	$18,193,118	$12,361,390	$0	$278,061	$5,553,668	$4,738,254	$815,413

The Waterbury Hospital (Financial Attachment II)

11.B(vi): Please provide three years of projections of incremental revenue, expense and volume statistics attributable to the proposal in the following reporting format:

Type of Service Description: OHS
Type of Unit Description: Cases
# of Months in Operation: 12

FY _2010_____	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FY Projected Incremental		Rate	Units	Gross	Allowances/	Charity	Bad	Net	Operating	Gain/(Loss)
Total Incremental Expenses:	4,743,912			Revenue	Deductions	Care	Debt	Revenue	Expenses	from Operations
				Col. 2 * Col. 3				Col.4 - Col.5	Col. 1 Total *	Col. 8 - Col. 9
Total Facility by								-Col.6 - Col.7	Col. 4 / Col. 4 Total	
Payer Category:										
Medicare		144,230	66	$9,584,665	$6,613,419			2,971,246	$2,496,251	$474,996
Medicaid			5	$755,638	$521,390			234,248	$196,800	$37,448
CHAMPUS/TriCare				$0				$0	$0	$0
Total Governmental			72	$10,340,303	$7,134,809	$0	$0	$3,205,494	$2,693,050	$512,443
Commericial Insurers			53	$7,596,146	$5,241,340			2,354,805	$1,978,356	$376,449
Uninsured		$0	2	$278,393			$278,393	-	$72,505	($72,505)
Total NonGovernment			55	$7,874,538	$5,241,340	$0	$278,393	$2,354,805	$2,050,862	$303,944
Total All Payers		$144,230	126	$18,214,841	$12,376,150	$0	$278,393	$5,560,299	$4,743,912	$816,387

The Waterbury Hospital (Financial Attachment II)

11.B(vi): Please provide three years of projections of incremental revenue, expense and volume statistics attributable to the proposal in the following reporting format:

Type of Service Description: OHS
Type of Unit Description: Cases
# of Months in Operation: 12

FY _2011_____	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FY Projected Incremental		Rate	Units	Gross	Allowances/	Charity	Bad	Net	Operating	Gain/(Loss)
Total Incremental Expenses:	4,933,668			Revenue	Deductions	Care	Debt	Revenue	Expenses	from Operations
				Col. 2 * Col. 3				Col.4 - Col.5	Col. 1 Total *	Col. 8 - Col. 9
Total Facility by								-Col.6 - Col.7	Col. 4 / Col. 4 Total	
Payer Category:										
Medicare		150,000	66	$9,968,052	$6,877,956			3,090,096	$2,596,101	$493,995
Medicaid			5	$785,863	$542,245			243,618	$204,672	$38,946
CHAMPUS/TriCare				$0				$0	$0	$0
Total Governmental			72	$10,753,915	$7,420,201	$0	$0	$3,333,714	$2,800,772	$532,941
Commercial Insurers			53	$7,899,991	$5,450,994			2,448,997	$2,057,491	$391,507
Uninsured		$0	2	$289,528			$289,528	-	$75,405	($75,405)
Total NonGovernment			55	$8,189,520	$5,450,994	$0	$289,528	$2,448,997	$2,132,896	$316,101
Total All Payers		$150,000	126	$18,943,435	$12,871,195	$0	$289,528	$5,782,711	$4,933,668	$849,043

St. Mary's Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Primary Angio
Type of Unit Description: Cases
# of Months in Operation: 12

FY 2009 **FY Projected Incremental** Total Incremental Expenses: **$427,000** **Total Facility by Payer Category:**	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Medicare		$47,879	18	$861,822	$532,822			$329,000	$232,909	$96,091
Medicaid		$47,879	2	$95,758	$87,758			$8,000	$25,879	($17,879)
CHAMPUS/TriCare		$47,879		$0				$0	$0	$0
Total Governmental			20	$957,580	$620,580	$0	$0	$337,000	$258,788	$78,212
Commericial Insurers		$47,879	13	$622,427	$433,427			$189,000	$168,212	$20,788
Uninsured		$47,879		$0				$0	$0	$0
Total NonGovernment		$47,879	13	$622,427	$433,427	$0	$0	$189,000	$168,212	$20,788
Total All Payers		$47,879	33	$1,580,007	$1,054,007	$0	$0	$526,000	$427,000	$99,000

St. Mary's Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Primary Angio
Type of Unit Description: Cases
# of Months in Operation: 12

FY 2010 **FY Projected Incremental** Total Incremental Expenses: **$566,000** **Total Facility by Payer Category:**	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Medicare		$50,905	23	$1,170,815	$733,815			$437,000	$309,952	$127,048
Medicaid		$50,905	2	$101,810	$89,810			$12,000	$26,952	($14,952)
CHAMPUS/TriCare		$50,905		$0				$0	$0	$0
Total Governmental			25	$1,272,625	$823,625	$0	$0	$449,000	$336,905	$112,095
Commericial Insurers		$50,905	17	$865,385	$608,385			$257,000	$229,095	$27,905
Uninsured		$50,905		$0				$0	$0	$0
Total NonGovernment		$50,905	17	$865,385	$608,385	$0	$0	$257,000	$229,095	$27,905
Total All Payers		$50,905	42	$2,138,010	$1,432,010	$0	$0	$706,000	$566,000	$140,000

St. Mary's Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Primary Angio
Type of Unit Description: Cases
# of Months in Operation: 12

FY 2011 **FY Projected Incremental** Total Incremental Expenses: **$590,000** **Total Facility by Payer Category:**	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Medicare		$52,952	23	$1,217,896	$763,896			$454,000	$323,095	$130,905
Medicaid		$52,952	2	$105,904	$93,904			$12,000	$28,095	($16,095)
CHAMPUS/TriCare		$52,952		$0				$0	$0	$0
Total Governmental			25	$1,323,800	$857,800	$0	$0	$466,000	$351,190	$114,810
Commericial Insurers		$52,952	17	$900,184	$633,184			$267,000	$238,810	$28,190
Uninsured		$52,952		$0				$0	$0	$0
Total NonGovernment		$52,952	17	$900,184	$633,184	$0	$0	$267,000	$238,810	$28,190
Total All Payers		$52,952	42	$2,223,984	$1,490,984	$0	$0	$733,000	$590,000	$143,000

St. Mary's Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Elective Angio
Type of Unit Description: Cases
# of Months in Operation: 12

FY 2009 **FY Projected Incremental** Total Incremental Expenses: **$1,972,000** **Total Facility by Payer Category:**	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Medicare		$41,660	123	$5,124,180	$3,137,180			$1,987,000	$1,177,456	$809,544
Medicaid		$41,660	21	$874,860	$768,860			$106,000	$201,029	($95,029)
CHAMPUS/TriCare		$41,660		$0				$0	$0	$0
Total Governmental			144	$5,999,040	$3,906,040	$0	$0	$2,093,000	$1,378,485	$714,515
Commericial Insurers		$41,660	62	$2,582,920	$1,431,920			$1,151,000	$593,515	$557,485
Uninsured		$41,660		$0				$0	$0	$0
Total NonGovernment		$41,660	62	$2,582,920	$1,431,920	$0	$0	$1,151,000	$593,515	$557,485
Total All Payers		$41,660	206	$8,581,960	$5,337,960	$0	$0	$3,244,000	$1,972,000	$1,272,000

St. Mary's Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Elective Angio
Type of Unit Description: Cases
# of Months in Operation: 12

FY 2010 **FY Projected Incremental** Total Incremental Expenses: **$1,897,000** **Total Facility by Payer Category:**	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Medicare		$43,321	114	$4,938,594	$3,023,594			$1,915,000	$1,138,200	$776,800
Medicaid		$43,321	19	$823,099	$723,099			$100,000	$189,700	($89,700)
CHAMPUS/TriCare		$43,321		$0				$0	$0	$0
Total Governmental			133	$5,761,693	$3,746,693	$0	$0	$2,015,000	$1,327,900	$687,100
Commericial Insurers		$43,321	57	$2,469,297	$1,368,297			$1,101,000	$569,100	$531,900
Uninsured		$43,321		$0				$0	$0	$0
Total NonGovernment		$43,321	57	$2,469,297	$1,368,297	$0	$0	$1,101,000	$569,100	$531,900
Total All Payers		$43,321	190	$8,230,990	$5,114,990	$0	$0	$3,116,000	$1,897,000	$1,219,000

St. Mary's Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Elective Angio
Type of Unit Description: Cases
# of Months in Operation: 12

FY 2011 **FY Projected Incremental** Total Incremental Expenses: **$1,976,000** **Total Facility by Payer Category:**	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Medicare		$45,058	114	$5,136,612	$3,144,612			$1,992,000	$1,185,600	$806,400
Medicaid		$45,058	19	$856,102	$752,102			$104,000	$197,600	($93,600)
CHAMPUS/TriCare		$45,058		$0				$0	$0	$0
Total Governmental			133	$5,992,714	$3,896,714	$0	$0	$2,096,000	$1,383,200	$712,800
Commericial Insurers		$45,058	57	$2,568,306	$1,423,306			$1,145,000	$592,800	$552,200
Uninsured		$45,058		$0				$0	$0	$0
Total NonGovernment		$45,058	57	$2,568,306	$1,423,306	$0	$0	$1,145,000	$592,800	$552,200
Total All Payers		$45,058	190	$8,561,020	$5,320,020	$0	$0	$3,241,000	$1,976,000	$1,265,000

St. Mary's Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: OHS
Type of Unit Description: Cases
# of Months in Operation: 12

FY 2009 **FY Projected Incremental** Total Incremental Expenses: **$3,690,000** **Total Facility by Payer Category:**	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Medicare		$125,963	58	$7,305,854	$4,361,854			$2,944,000	$2,642,222	$301,778
Medicaid		$125,963	2	$251,926	$223,926			$28,000	$91,111	($63,111)
CHAMPUS/TriCare		$125,963		$0				$0	$0	$0
Total Governmental			60	$7,557,780	$4,585,780	$0	$0	$2,972,000	$2,733,333	$238,667
Commericial Insurers		$125,963	21	$2,645,223	$1,925,223			$720,000	$956,667	($236,667)
Uninsured		$125,963		$0				$0	$0	$0
Total NonGovernment		$125,963	21	$2,645,223	$1,925,223	$0	$0	$720,000	$956,667	($236,667)
Total All Payers		$125,963	81	$10,203,003	$6,511,003	$0	$0	$3,692,000	$3,690,000	$2,000

St. Mary's Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: OHS
Type of Unit Description: Cases
# of Months in Operation: 12

FY 2010 **FY Projected Incremental** Total Incremental Expenses: **$3,693,000** **Total Facility by Payer Category:**	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Medicare		$131,192	56	$7,346,752	$4,390,752			$2,956,000	$2,651,385	$304,615
Medicaid		$131,192	2	$262,384	$233,384			$29,000	$94,692	($65,692)
CHAMPUS/TriCare		$131,192		$0				$0	$0	$0
Total Governmental			58	$7,609,136	$4,624,136	$0	$0	$2,985,000	$2,746,077	$238,923
Commericial Insurers		$131,192	20	$2,623,840	$1,910,840			$713,000	$946,923	($233,923)
Uninsured		$131,192		$0				$0	$0	$0
Total NonGovernment		$131,192	20	$2,623,840	$1,910,840	$0	$0	$713,000	$946,923	($233,923)
Total All Payers		$131,192	78	$10,232,976	$6,534,976	$0	$0	$3,698,000	$3,693,000	$5,000

St. Mary's Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: OHS
Type of Unit Description: Cases
# of Months in Operation: 12

FY 2011 **FY Projected Incremental** Total Incremental Expenses: **$3,839,000** **Total Facility by Payer Category:**	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Medicare		$136,436	56	$7,640,416	$4,566,416			$3,074,000	$2,756,205	$317,795
Medicaid		$136,436	2	$272,872	$242,872			$30,000	$98,436	($68,436)
CHAMPUS/TriCare		$136,436		$0				$0	$0	$0
Total Governmental			58	$7,913,288	$4,809,288	$0	$0	$3,104,000	$2,854,641	$249,359
Commericial Insurers		$136,436	20	$2,728,720	$1,986,720			$742,000	$984,359	($242,359)
Uninsured		$136,436		$0				$0	$0	$0
Total NonGovernment		$136,436	20	$2,728,720	$1,986,720	$0	$0	$742,000	$984,359	($242,359)
Total All Payers		$136,436	78	$10,642,008	$6,796,008	$0	$0	$3,846,000	$3,839,000	$7,000

John Dempsey Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Perfusionist Services
Type of Unit Description: 215 cases
# of Months in Operation: 12 months

FY ____2009 **FY Projected Incremental** Total Incremental Expenses: **$496,798**	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Total Facility by Payer Category:										
Medicare				$0				$0	$0	$0
Medicaid		$0		$0				$0	$0	$0
CHAMPUS/TriCare		$0		$0				$0	$0	$0
Total Governmental			0	$0	$0	$0	$0	$0	$0	$0
Commericial Insurers		$0	0	$0				$0	$0	$0
Other Revenue		$2,208	215	$474,720	$0	$0	$0	$474,720	$0	$474,720
Total NonGovernment		$0	215	$474,720	$0	$0	$0	$474,720	$0	$474,720
Total All Payers		$0	215	$474,720	$0	$0	$0	$474,720	$0	$474,720

John Dempsey Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Perfusionist Services
Type of Unit Description: 207 cases
# of Months in Operation: 12 months

FY 2010 **FY Projected Incremental** Total Incremental Expenses: **$514,186**	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Total Facility by Payer Category:										
Medicare				$0				$0	$0	$0
Medicaid		$0		$0				$0	$0	$0
CHAMPUS/TriCare		$0		$0				$0	$0	$0
Total Governmental			0	$0	$0	$0	$0	$0	$0	$0
Commericial Insurers		$0	0	$0				$0	$0	$0
Other Revenue		$2,484	207	$514,186				$514,186	$0	$514,186
Total NonGovernment		$0	207	$514,186	$0	$0	$0	$514,186	$0	$514,186
Total All Payers		$0	207	$514,186	$0	$0	$0	$514,186	$0	$514,186

John Dempsey Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Perfusionist Services
Type of Unit Description: 207 cases
# of Months in Operation: 12 months

FY ____2011 **FY Projected Incremental** Total Incremental Expenses: **$532,182**	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Total Facility by Payer Category:										
Medicare				$0				$0	$0	$0
Medicaid		$0		$0				$0	$0	$0
CHAMPUS/TriCare		$0		$0				$0	$0	$0
Total Governmental			0	$0	$0	$0	$0	$0	$0	$0
Commericial Insurers		$0	0	$0				$0	$0	$0
Other Revenue		$2,571	207	$532,182				$532,182	$0	$532,182
Total NonGovernment		$0	207	$532,182	$0	$0	$0	$532,182	$0	$532,182
Total All Payers		$0	207	$532,182	$0	$0	$0	$532,182	$0	$532,182

Lazarus, Steven

From: Chad Wable [CWable@Stmh.org]
Sent: Wednesday, October 01, 2008 2:07 PM
To: Lazarus, Steven
Subject: RE: Confirming Public Hearing Date for Docket No.: 08-31202-CON

Thanks Steven. Loraine will organize for us and get back to you as indicated.
I hope you are well... And, we appreciate your assistance with this process.

Take care!

From: Lazarus, Steven [mailto:Steven.Lazarus@ct.gov]
Sent: Wednesday, October 01, 2008 11:23 AM
To: cscott@wtbyhosp.org; Chad Wable; Giannini,Monte; Loraine Shea (HCGW)
Cc: Durdy, Barbara; Martone, Kim; Fedorjaczenko, Alexis
Subject: Confirming Public Hearing Date for Docket No.: 08-31202-CON

Dear Chad, Colleen, Loraine and Monte,

Please be advised that OHCA is in the process of scheduling a public hearing regarding the Establishment of Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and St. Mary's Hospital, an application filed under CON Docket No.: 08-31202-CON.

Based on Commissioner Vogel's schedule and availability of a room for the public hearing at the Legislative Office Building, Wednesday, November 5, 2008, appears to be the best date available for the public hearing in this matter.

If possible by this coming Monday, (October 6, 2008), please confirm if that date works for all Applicants involved as well. If you have any questions regarding this email, please feel free to contact me.

Thank you,
-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

Lazarus, Steven

RECEIVED
2008 OCT 1 A 11: 36
CONNECTICUT OFFICE OF HEALTH CARE ACCESS

From: Lazarus, Steven
Sent: Wednesday, October 01, 2008 11:23 AM
To: 'cscott@wtbyhosp.org'; 'Chad Wable'; 'Giannini,Monte'; 'Loraine Shea (HCGW)'
Cc: Durdy, Barbara; Martone, Kim; Fedorjaczenko, Alexis
Subject: Confirming Public Hearing Date for Docket No.: 08-31202-CON

Dear Chad, Colleen, Loraine and Monte,

Please be advised that OHCA is in the process of scheduling a public hearing regarding the Establishment of Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and St. Mary's Hospital, an application filed under CON Docket No.: 08-31202-CON.

Based on Commissioner Vogel's schedule and availability of a room for the public hearing at the Legislative Office Building, Wednesday, November 5, 2008, appears to be the best date available for the public hearing in this matter.

If possible by this coming Monday, (October 6, 2008), please confirm if that date works for all Applicants involved as well. If you have any questions regarding this email, please feel free to contact me.

Thank you,
-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

Lazarus, Steven

From: Loraine Shea (HCGW) [lshea@hcogw.org]
Sent: Wednesday, October 01, 2008 11:28 AM
To: Lazarus, Steven; cscott@wtbyhosp.org; Chad Wable; Giannini,Monte
Cc: Durdy, Barbara; Martone, Kim; Fedorjaczenko, Alexis
Subject: RE: Confirming Public Hearing Date for Docket No.: 08-31202-CON

RECEIVED
2008 OCT -1 A 11: 36
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Thank you Steven,

We will get back to you as soon as we can confirm availability of all parties

Regards,
Loraine

From: Lazarus, Steven [mailto:Steven.Lazarus@ct.gov]
Sent: Wednesday, October 01, 2008 11:23 AM
To: cscott@wtbyhosp.org; Chad Wable; Giannini,Monte; Loraine Shea (HCGW)
Cc: Durdy, Barbara; Martone, Kim; Fedorjaczenko, Alexis
Subject: Confirming Public Hearing Date for Docket No.: 08-31202-CON

Dear Chad, Colleen, Loraine and Monte,

Please be advised that OHCA is in the process of scheduling a public hearing regarding the Establishment of Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and St. Mary's Hospital, an application filed under CON Docket No.: 08-31202-CON.

Based on Commissioner Vogel's schedule and availability of a room for the public hearing at the Legislative Office Building, Wednesday, November 5, 2008, appears to be the best date available for the public hearing in this matter.

If possible by this coming Monday, (October 6, 2008), please confirm if that date works for all Applicants involved as well. If you have any questions regarding this email, please feel free to contact me.

Thank you,
-Steven

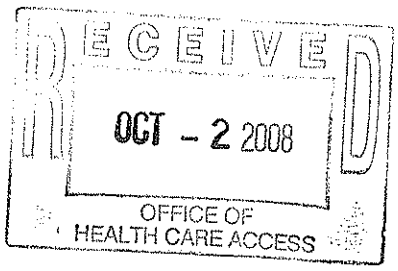
Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

Lazarus, Steven

From: Loraine Shea (HCGW) [lshea@hcogw.org]
Sent: Thursday, October 02, 2008 10:14 AM
To: Lazarus, Steven; cscott@wtbyhosp.org; Chad Wable; Giannini,Monte
Cc: Durdy, Barbara; Martone, Kim; Fedorjaczenko, Alexis
Subject: RE: Confirming Public Hearing Date for Docket No.: 08-31202-CON



Steven,

Our group has collectively looked at the calendars of the key witnesses that we would expect to testify at the Public Hearing for CON Docket Number 08-31202-CON. November 5, 2008 presents the Applicants with difficultly as John Tobin, CEO and President of Waterbury Hospital and Steve Widman, MD, Interventional Cardiologist are out of the state on that date. If at all possible we would like to respectfully request an alternative hearing date of November 14, 2008 or any day the week of November 17, 2008. Your consideration of this request is appreciated.

Sincerely,

Loraine Shea

From: Lazarus, Steven [mailto:Steven.Lazarus@ct.gov]
Sent: Wednesday, October 01, 2008 11:23 AM
To: cscott@wtbyhosp.org; Chad Wable; Giannini,Monte; Loraine Shea (HCGW)
Cc: Durdy, Barbara; Martone, Kim; Fedorjaczenko, Alexis
Subject: Confirming Public Hearing Date for Docket No.: 08-31202-CON

Dear Chad, Colleen, Loraine and Monte,

Please be advised that OHCA is in the process of scheduling a public hearing regarding the Establishment of Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and St. Mary's Hospital, an application filed under CON Docket No.: 08-31202-CON.

Based on Commissioner Vogel's schedule and availability of a room for the public hearing at the Legislative Office Building, Wednesday, November 5, 2008, appears to be the best date available for the public hearing in this matter.

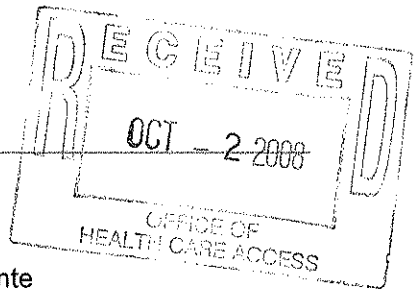
If possible by this coming Monday, (October 6, 2008), please confirm if that date works for all Applicants involved as well. If you have any questions regarding this email, please feel free to contact me.

Thank you,
-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.



Lazarus, Steven

From: Lazarus, Steven
Sent: Thursday, October 02, 2008 10:39 AM
To: 'Loraine Shea (HCGW)'; cscott@wtbyhosp.org; Chad Wable; Giannini,Monte
Cc: Durdy, Barbara; Martone, Kim; Fedorjaczenko, Alexis
Subject: RE: Confirming Public Hearing Date for Docket No.: 08-31202-CON

Hi Loraine,

I'll call you directly in a few minutes to discuss the hearing dates and I'll follow our conversation with an email to confirm in writing afterwards, so that everyone is on the same page.

-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

From: Loraine Shea (HCGW) [mailto:lshea@hcogw.org]
Sent: Thursday, October 02, 2008 10:14 AM
To: Lazarus, Steven; cscott@wtbyhosp.org; Chad Wable; Giannini,Monte
Cc: Durdy, Barbara; Martone, Kim; Fedorjaczenko, Alexis
Subject: RE: Confirming Public Hearing Date for Docket No.: 08-31202-CON

Steven,

Our group has collectively looked at the calendars of the key witnesses that we would expect to testify at the Public Hearing for CON Docket Number 08-31202-CON. November 5, 2008 presents the Applicants with difficultly as John Tobin, CEO and President of Waterbury Hospital and Steve Widman, MD, Interventional Cardiologist are out of the state on that date. If at all possible we would like to respectfully request an alternative hearing date of November 14, 2008 or any day the week of November 17, 2008. Your consideration of this request is appreciated.

Sincerely,

Loraine Shea

From: Lazarus, Steven [mailto:Steven.Lazarus@ct.gov]
Sent: Wednesday, October 01, 2008 11:23 AM
To: cscott@wtbyhosp.org; Chad Wable; Giannini,Monte; Loraine Shea (HCGW)
Cc: Durdy, Barbara; Martone, Kim; Fedorjaczenko, Alexis

Subject: Confirming Public Hearing Date for Docket No.: 08-31202-CON

Dear Chad, Colleen, Loraine and Monte,

Please be advised that OHCA is in the process of scheduling a public hearing regarding the Establishment of Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and St. Mary's Hospital, an application filed under CON Docket No.: 08-31202-CON.

Based on Commissioner Vogel's schedule and availability of a room for the public hearing at the Legislative Office Building, Wednesday, November 5, 2008, appears to be the best date available for the public hearing in this matter.

If possible by this coming Monday, (October 6, 2008), please confirm if that date works for all Applicants involved as well. If you have any questions regarding this email, please feel free to contact me.

Thank you,
-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

Lazarus, Steven

From: Loraine Shea (HCGW) [lshea@hcogw.org]
Sent: Tuesday, October 07, 2008 1:26 PM
To: Lazarus, Steven
Cc: Durdy, Barbara; Martone, Kim; Fedorjaczenko, Alexis; Malinowski, Sharon
Subject: RE: Confirming Public Hearing Date for Docket No.: 08-31202-CON

Hello all,

Has the Public Hearing in this matter been confirmed for October 30, 2008?
Thanks
Loraine Shea

From: Lazarus, Steven [mailto:Steven.Lazarus@ct.gov]
Sent: Friday, October 03, 2008 10:12 AM
To: Loraine Shea (HCGW)
Cc: Durdy, Barbara; Martone, Kim; Fedorjaczenko, Alexis; Malinowski, Sharon; cscott@wtbyhosp.org; Chad Wable; Giannini,Monte
Subject: RE: Confirming Public Hearing Date for Docket No.: 08-31202-CON

Good Morning Loraine,

Thank you for your voice mail message yesterday afternoon requesting to hold the public hearing on either November 12th or 13th. We will check Commissioner Vogel's schedule, as well as room availability at the Legislative Office Building and get back to you hopefully by Monday afternoon.

In the meantime, have a nice weekend,

-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

From: Loraine Shea (HCGW) [mailto:lshea@hcogw.org]
Sent: Thursday, October 02, 2008 10:14 AM
To: Lazarus, Steven; cscott@wtbyhosp.org; Chad Wable; Giannini,Monte
Cc: Durdy, Barbara; Martone, Kim; Fedorjaczenko, Alexis
Subject: RE: Confirming Public Hearing Date for Docket No.: 08-31202-CON

Steven,

Our group has collectively looked at the calendars of the key witnesses that we would expect to testify at the

Public Hearing for CON Docket Number 08-31202-CON. November 5, 2008 presents the Applicants with difficultly as John Tobin, CEO and President of Waterbury Hospital and Steve Widman, MD, Interventional Cardiologist are out of the state on that date. If at all possible we would like to respectfully request an alternative hearing date of November 14, 2008 or any day the week of November 17, 2008. Your consideration of this request is appreciated.

Sincerely,

Loraine Shea

From: Lazarus, Steven [mailto:Steven.Lazarus@ct.gov]
Sent: Wednesday, October 01, 2008 11:23 AM
To: cscott@wtbyhosp.org; Chad Wable; Giannini,Monte; Loraine Shea (HCGW)
Cc: Durdy, Barbara; Martone, Kim; Fedorjaczenko, Alexis
Subject: Confirming Public Hearing Date for Docket No.: 08-31202-CON

Dear Chad, Colleen, Loraine and Monte,

Please be advised that OHCA is in the process of scheduling a public hearing regarding the Establishment of Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and St. Mary's Hospital, an application filed under CON Docket No.: 08-31202-CON.

Based on Commissioner Vogel's schedule and availability of a room for the public hearing at the Legislative Office Building, Wednesday, November 5, 2008, appears to be the best date available for the public hearing in this matter.

If possible by this coming Monday, (October 6, 2008), please confirm if that date works for all Applicants involved as well. If you have any questions regarding this email, please feel free to contact me.

Thank you,
-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

Lazarus, Steven

From: Lazarus, Steven
Sent: Wednesday, October 08, 2008 10:08 AM
To: 'Loraine Shea (HCGW)'
Cc: Durdy, Barbara; Martone, Kim; Fedorjaczenko, Alexis; Malinowski, Sharon
Subject: RE: Confirming Public Hearing Date for Docket No.: 08-31202-CON

Hi Loraine,

Please share with your group that October 30, 2008 has been confirmed as the public hearing date and we have reserved room 2C at the Legislative Office Building.

OHCA will fax & mail out public hearing notice to the Applicants, as well as to the Newspaper tomorrow. Please let me know if you have any additional questions.

Thanks,
-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

From: Loraine Shea (HCGW) [mailto:lshea@hcogw.org]
Sent: Tuesday, October 07, 2008 1:26 PM
To: Lazarus, Steven
Cc: Durdy, Barbara; Martone, Kim; Fedorjaczenko, Alexis; Malinowski, Sharon
Subject: RE: Confirming Public Hearing Date for Docket No.: 08-31202-CON

Hello all,

Has the Public Hearing in this matter been confirmed for October 30, 2008?
Thanks
Loraine Shea

From: Lazarus, Steven [mailto:Steven.Lazarus@ct.gov]
Sent: Friday, October 03, 2008 10:12 AM
To: Loraine Shea (HCGW)
Cc: Durdy, Barbara; Martone, Kim; Fedorjaczenko, Alexis; Malinowski, Sharon; cscott@wtbyhosp.org; Chad Wable; Giannini,Monte
Subject: RE: Confirming Public Hearing Date for Docket No.: 08-31202-CON

Good Morning Loraine,

Thank you for your voice mail message yesterday afternoon requesting to hold the public hearing on either November 12th or 13th. We will check Commissioner Vogel's schedule, as well as room availability at the Legislative Office Building and get back to you hopefully by Monday afternoon.

In the meantime, have a nice weekend,

-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

From: Loraine Shea (HCGW) [mailto:lshea@hcogw.org]
Sent: Thursday, October 02, 2008 10:14 AM
To: Lazarus, Steven; cscott@wtbyhosp.org; Chad Wable; Giannini,Monte
Cc: Durdy, Barbara; Martone, Kim; Fedorjaczenko, Alexis
Subject: RE: Confirming Public Hearing Date for Docket No.: 08-31202-CON

Steven,

Our group has collectively looked at the calendars of the key witnesses that we would expect to testify at the Public Hearing for CON Docket Number 08-31202-CON. November 5, 2008 presents the Applicants with difficultly as John Tobin, CEO and President of Waterbury Hospital and Steve Widman, MD, Interventional Cardiologist are out of the state on that date. If at all possible we would like to respectfully request an alternative hearing date of November 14, 2008 or any day the week of November 17, 2008. Your consideration of this request is appreciated.

Sincerely,

Loraine Shea

From: Lazarus, Steven [mailto:Steven.Lazarus@ct.gov]
Sent: Wednesday, October 01, 2008 11:23 AM
To: cscott@wtbyhosp.org; Chad Wable; Giannini,Monte; Loraine Shea (HCGW)
Cc: Durdy, Barbara; Martone, Kim; Fedorjaczenko, Alexis
Subject: Confirming Public Hearing Date for Docket No.: 08-31202-CON

Dear Chad, Colleen, Loraine and Monte,

Please be advised that OHCA is in the process of scheduling a public hearing regarding the Establishment of Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and St. Mary's Hospital, an application filed under CON Docket No.: 08-31202-CON.

Based on Commissioner Vogel's schedule and availability of a room for the public hearing at the Legislative Office Building, Wednesday, November 5, 2008, appears to be the best date available for the public hearing in this matter.

If possible by this coming Monday, (October 6, 2008), please confirm if that date works for all Applicants involved as well. If you have any questions regarding this email, please feel free to contact me.

Thank you,
-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

October 9, 2008

Colleen Scott
Chief Financial Officer
The Waterbury Hospital
64 Robbins Street
Waterbury, CT 06708

Chad W. Wable
Executive VP, Strategy Development
and System Operations
St. Mary's Hospital
56 Franklin Street
Waterbury, CT 06706

Monte Giannini
Planning Analyst
John Dempsey Hospital
263 Farmington Ave.
Farmington, CT 06030

Re: Certificate of Need Application, Docket Number 08-31202
The Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital
Establish a Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and St. Mary's Hospital
Notice of Public Hearing

Dear Gentlemen:

With the receipt of the completed Certificate of Need ("CON") application information submitted by The Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital ("Applicants") on September 15, 2008, the Office of Health Care Access ("OHCA") has initiated its review of the CON application identified above.

Pursuant to Section 19a-638 of the Connecticut General Statutes ("C.G.S."), OHCA may hold a hearing whenever a health care facility or institution proposes to introduce a new or additional function or service, or terminate a service.

This hearing notice is being issued pursuant to Section 19a-638, C.G.S.

Applicants:	The Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital
Docket Number:	08-31202-CON
Proposal:	Establish a Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and St. Mary's Hospital with no capital expenditure.

Notice is hereby given of a public hearing to be held in this matter to commence on:

Date: October 30, 2008

Time: 9:00 a.m.

Place: Conference Room 2C, Legislative Office Building
300 Capitol Ave. Hartford, CT

The Applicants are designated as parties in this proceeding. Enclosed for your information is a copy of the hearing notice for the public hearing that will be published in the *Waterbury Republican Americane* pursuant to Section 19a-643-48 of OHCA's Regulations.

Sincerely,

Kimberly R. Martone
Certificate of Need Supervisor

Enclosure

cc: Richard Lynch, Esq., Office of the Attorney General
Wendy Furniss, Department of Public Health
Steven Longo, Department of Public Health
Marielle Daniels, Connecticut Hospital Association

KRM:SL:bko

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

October 9, 2008

Requisition # HCA09-048
(203) 754-0644

Waterbury Republican American
389 Meadow Street
Box 2090
Waterbury, CT 06722-2090

Gentlemen/Ladies:

Please make an insertion of the attached copy, in a single column space, set solid under legal notices, in the issue of your newspaper by no later than Monday, October 13, 2008.

Please provide the following **within 30 days** of publication:

- Proof of publication (copy of legal ad. acceptable) showing published date along with the invoice.

If there are any questions regarding this legal notice, please contact Steven Lazarus at (860) 418-7001.

KINDLY RENDER BILL IN DUPLICATE ATTACHED TO THE TEAR SHEET.

Sincerely,

Kimberly R. Martone
Certificate of Need Supervisor

Attachment

cc: Sandy Salus, OHCA
Marielle Daniels, Connecticut Hospital Association

KRM:SL:bko

Waterbury Republican American October 9, 2008
Notice of Public Hearing, Docket Number 08-31202-CON

PLEASE INSERT THE FOLLOWING:

Office of Health Care Access Public Hearing

Statute Reference:	19a-638
Applicants:	Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital
Location of project	Waterbury
Docket Number:	08-31202-CON
Proposal:	Establish a Primary and Elective Angioplasty and Open Heart Surgery Program at Waterbury Hospital and Saint Mary's Hospital with no capital expenditure
Date:	October 30, 2008
Time:	9:00 a.m.
Place:	Conference Room 2C, Legislative Office Building 300 Capitol Ave. Hartford, CT

Any person who wishes to request status in the above listed public hearing may file a written petition no later than October 25, 2008 (5 calendar days before the date of the hearing) pursuant to Sections 19a-643-37/38/39 of OHCA's Regulation. If the request for status is granted, such person shall be designated as a Party, an Intervenor or an Informal Participant in the above proceeding. Please check OHCA's website at **www.ct.gov/ohca** for more information or call OHCA directly at (860) 418-7001.

RepublicanAmerican

389 Meadow Street - P.O. Box 2090
Waterbury, CT 06722-2090
Phone: 203-574-3636 Fax: 203-573-0090 Toll Free: 800-992-3232
e mail: advbilling@rep-am.com

Customer	A/C #	Billing Period
HEALTH CARE ACCESS	R18404	10/01/08-10/31/08

PAYMENT TERMS	30 DAYS
TOTAL AMOUNT DUE	$ 92.66

Fed EIN 06-0581760 * Please See Reverse Side for Pub Index

DATE	AD # / INV #	CUST ORDER #	PUB*	DESCRIPTION	SIZE	BILLED UNITS	TIMES RUN	RATE	BILLED AMOUNT
				PREVIOUS BALANCE					$0.00
10/10/08	RA0258684 / INV000383877		RA	LEGAL NOTICE Office of the Health Care Access Public Hearin	1x	41.000	1	$2.2600	$92.66
				CURRENT AMOUNT DUE					$92.66
				TOTAL AMOUNT DUE					$92.66

LEGAL NOTICE

Office of the Health Care Access Public Hearing.

Statute Reference: 19a-638
Applicants: Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital
Location of project Waterbury
Docket Number: 08-31202-CON
Proposal: Establish a Primary and Elective Angioplasty and Open Heart Surgery Program at Waterbury Hospital and Saint Mary's Hospital with no capital expenditure.
Date: October 30, 2008
Time: 9:00 a.m.
Place: Conference Room 2C, Legislative Office Building 300 Capitol Ave. Hartford, CT.

Any person who wishes to request status in the above listed public hearing may file a written petition no later than October 25, 2008 (5 calendar days before the date of the hearing) pursuant to Sections 19a-643-37/38/39 of OHCA's Regulation. If the request for status is granted, such person shall be designated as a Party, an Intervenor or an Informal Participant in the above proceeding. Please check OHCA's website at www.ct.gov/ohca for more information or call OHCA directly at 860-418-7001
iRA OCT. 10, 2008

Past due balance accrues finance charge of 1.5% per month

All charges include any applicable Connecticut State sales tax

REMITTANCE ADVICE - PLEASE RETURN WITH PAYMENT

REMITTANCE ADDRESS

REPUBLICAN AMERICAN
PO BOX 2090
WATERBURY, CT 06722-2290

CUSTOMER	A/C #	BILLING PERIOD	TOTAL AMOUNT DUE	AMOUNT REMITTED
HEALTH CARE ACCESS	R18404	10/01/08-10/31/08	$ 92.66	

CREDIT CARD #	
EXPIRATION DATE	
SIGNATURE	

HEALTH CARE ACCESS
MS 13HCA POBOX 340308
410 CAPITOL AVENUE
HARTFORD CT 06134

CHECK #	

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4103
RECIPIENT ADDRESS	912037540644
DESTINATION ID	
ST. TIME	10/09 09:00
TIME USE	00'21
PAGES SENT	2
RESULT	OK

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

October 9, 2008

Requisition # HCA09-048
(203) 754-0644

Waterbury Republican American
389 Meadow Street
Box 2090
Waterbury, CT 06722-2090

Gentlemen/Ladies:

Please make an insertion of the attached copy, in a single column space, set solid under legal notices, in the issue of your newspaper by no later than Monday, October 13, 2008.

Please provide the following **within 30 days** of publication:

- Proof of publication (copy of legal ad. acceptable) showing published date along with the invoice.

If there are any questions regarding this legal notice, please contact Steven Lazarus at (860) 418-7001.

KINDLY RENDER BILL IN DUPLICATE ATTACHED TO THE TEAR SHEET.

Sincerely,

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

October 9, 2008

Ms. Loraine C. Shea
Executive Director
Heart Center of Greater Waterbury
1075 Chase Parkway
Waterbury, CT 06708

RE: Docket Number 08-31202-CON
The Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital
Establish Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and St. Mary's Hospital
Request for Prefiled Testimony and a Response to the Interrogatories

Dear Ms. Shea:

The Office of Health Care Access ("OHCA") will hold a public hearing on October 30, 2008, at 9:00 a.m. in Conference Room 2C in the Legislative Office Building at 300 Capitol Avenue, Hartford, the Certificate of Need ("CON") application identified above. Pursuant to Section 19a-643-51(e) of OHCA's Regulations, OHCA hereby requires any party or other participant to prefile in written form all substantive, technical or expert testimony that it proposes to offer at the hearing. It is the responsibility of The Waterbury Hospital, St. Mary's Hospital and John Dempsey Hospital ("Applicants") to present their "Case in Chief" in the CON application and provide prefiled testimony prior to the hearing, and it is the Applicants' burden to justify the request.

Attached are OHCA's interrogatories that must be addressed by the Applicants' in addition to providing its prefiled testimony. Please submit an original and eight (8) copies of your paginated response to these interrogatories to OHCA. In responding to an interrogatory, please repeat each question prior to providing a response. If a response is continued in an attachment or an appendix, the response must clearly list the page number of the attachment or appendix in which the response is continued. Conversely, the attachment or appendix should contain a page number reference to the original question.

The Applicants' prefiled testimony and responses to OHCA's interrogatories must be submitted to OHCA no later than 4:30 p.m. on Friday, October 24, 2008. As required by the Regulation identified above, all persons responsible for providing prefiled evidence must be present at the public hearing to adopt their written testimony under oath, and such persons must be available for cross-examination for the entire duration of the hearing.

If the Applicants are unable to meet the specified time for filing the prefiled testimony or the interrogatories, the Applicants must request a time extension in writing to the OHCA Commissioner detailing the reasons for not being able to meet the specified deadline.

Please contact Alexis G. Fedorjaczenko or Steven W. Lazarus at (860) 418-001 if you have any questions concerning this request.

Sincerely,

Cristine A. Vogel
Commissioner

Attachment

CAV:swl

INTERROGATORIES

for Public Hearing:

Certificate of Need Application, Docket Number: 08-31202-CON

The Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital

Establish Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and St. Mary's Hospital, with No Associated Capital Expenditure

Physical Layout:

1) For **each** The Waterbury Hospital ("TWH") and St. Mary's Hospital ("SMH"), provide schematic drawings to demonstrate the dedicated inpatient beds for the inpatient cardiac services. Please elaborate in a narrative if necessary.

2) How many times in the last three years have the cardiac OR's at TWH and SMH been in use for Open Heart Surgery ("OHS") at the same time? Please elaborate in a narrative if necessary.

Care Pathways:

3) For **each** TWH and SMH, provide the following:

   a) The number of patients who arrived at each hospital for cardiac-related services through the Emergency Department ("ED") each year, for the last three Fiscal Years ("FYs"). Break out these volumes by the method of arrival to the ED (e.g., ambulance, personal transportation).

   b) For the last three FYs, the number of patients admitted for cardiac catheterization, angioplasty and heart surgery broken out by scheduled and non-scheduled. Please use the following table.

	FY 2006		**FY 2007**		**FY 2008**	
	Scheduled	Non-Sch.	Scheduled	Non-Sch.	Scheduled	Non-Sch.
Cardiac Catheterization						
Angioplasty						
Heart Surgery						

Staffing:

4) Is there a cardiac services team that rotates between TWH and SMH? If so, provide the following:

   a) Type of staff the team is comprised of (provide specific titles, for example nurse, tech., etc.);

   b) The number of staff by type of team; and

   c) Provide a narrative on the function or duties of the team.

5) Are any changes proposed for the staffing as a result of this proposal?

Capacity and Utilization:

6) For **each** TWH and SMH, provide the following:

   a) The bed capacity and occupancy rate by major service line for the past three FYs. Please use the following table and complete additional rows as needed for service lines.

	Licensed Beds	Physical Beds	Staffed Beds	Occupancy FY 2006	Occupancy FY 2007	Occupancy FY 2008
ICU						
CCU						
Telemetry						
Step-down						

   b) The average monthly census by inpatient unit for all services for the past three years.

c) For the last year, the number of patients that were treated monthly at each hospital for cardiac services (OHS, Primary and Elective PCI, Diagnostic Cardiac Catheterizations). Use the following table.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
TWH												
OHS												
Angioplasty												
Cardiac Cath												
SMH												
OHS												
Angioplasty												
Cardiac Cath												

Financial:

7) For FY 2009 through FY 2011, the Heart Center of Greater Waterbury ("HCGW") is projected to provide a gain of approximately $2.3 million to Waterbury Hospital ("TWH") and 1.3 million to Saint Mary's Hospital ("SMH") ***(pgs. 1146 and 1150).*** The sum of these amounts is not consistent with the $10 million combined impact noted on page 108. Please reconcile these amounts.

8) On page 104, the cash equivalent balances of SMH and TWH were reported as $30 million and $33.6 million, respectively. These amounts do not agree to the cash and cash equivalent balances of SMH and TWH reported on pages 1135 and 1140, of $9 and $14.8 million, respectively. Please reconcile these amounts.

9) Please provide the most recently completed annual financial statements of HCGW, which contain at a minimum a balance sheet and statement of operations.

10) Please provide copies of HCGW Internal Revenue Service Form 990 for the fiscal years beginning October 1, 2006 and October 1, 2007.

11) Provide a copy of Audited or if unavailable, Unaudited FY 2008, Financial Statements for each, TWH and SMH.

12) Please provide revised appendices 11.b.i and 11.c.i, which includes the incremental FTEs and volume statistics including primary angioplasty, elective angioplasty and open heart surgery cases.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4108
RECIPIENT ADDRESS	912035755575
DESTINATION ID	
ST. TIME	10/09 16:25
TIME USE	02'00
PAGES SENT	6
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: LORRAINE SHEA

FAX: (203) 575-5575

AGENCY: HEART CENTER OF GREATER WATERBURY

FROM: ALEXIS FEDORJACZENKO

DATE: 10/9/08 **TIME:**

NUMBER OF PAGES: 6
(including transmittal sheet

Comments: Docket 08-31202 Request for Prefiled Testimony and a Response to the Interrogatories

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

RECEIVED
2008 OCT 24 P 2:23
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Pre-File Testimony
Before the Office of Health Care Access: Docket No. 08-31202-CON
Saint Mary's Hospital, Waterbury Hospital and John Dempsey Hospital
Elective and Primary Angioplasty and Open Heart Surgery
October 24, 2008

I am John Tobin, President and CEO of Waterbury Hospital. I hereby submit this written pre-file testimony for the Office of Health Care Access Public Hearing in the matter of Docket Number 08-31202-CON to be held on October 30, 2008. As you know and have previously heard, I am a native Waterburian, and, I have lived and worked in or near Waterbury for my entire life. My family and I rely on the hospitals and caregivers of Greater Waterbury. I know on both professional and personal levels just how much our community needs and values the advanced cardiac services provided through the Heart Center of Greater Waterbury.

The Office of Health Care Access took an affirmative step when it granted approval for the original demonstration project in 2004. No longer does the Waterbury area suffer from being the only major region in Connecticut without a full service, comprehensive cardiac program. What OHCA had the vision to do in 2004 was nothing less than the most significant change in the healthcare landscape in Connecticut in my almost 35 years in this field. We are looking forward to the opportunity you have given us to prove – beyond shadow of doubt – that our Program has earned permanent status.

In 2004, the granting of a demonstration project to The Heart Center was controversial, just as was the granting of a permanent full service cardiac program to the Danbury Hospital. But OHCA took that controversy head on and did the right thing to correct a flawed delivery system for cardiac care. OHCA changed Connecticut's de facto long standing health philosophy concerning advanced cardiac services. I truly believe that years from now, many will look back at OHCA's 2004 decision and recognize it to have been visionary and a critical turning point in health care in Connecticut.

We are pleased that the controversy surrounding the 2004 CON application appears to have abated. Why is the granting of permanent status to this Program so uncontroversial when compared to 2004? I suggest it is because in 2004 although we knew our Program would be a successful one, not even those close to the Program could predict just how impressive the results of this Program would

be in such a short period of time. Another important reason for the lack of controversy is that unlike all of the other applications that are brought before OHCA that are based solely on projections, we stand before OHCA with three years' worth of actual quality data and results of which we are extremely proud, and deservedly so. When you hear of some of the specifics of our quality data from Dr. Underhill, you will learn that in a mere three years, extraordinary when you think about that, our quality results rival, and in some manners surpass, nationally renowned centers. We have demonstrated not just need, but that critical needs have been met with outstanding care and results.

Although it has been said before, we cannot stress enough that the lack of a full service cardiac program is simply no longer acceptable in an urban area such as greater Waterbury, with a large population of poor and elderly citizens who are often medically fragile, and who cannot travel easily to other cities for acute care. Interventional cardiac services – angioplasty and open-heart surgery – are the centerpiece of an entire system of care that includes prevention and medical therapies as well as these more invasive, acute forms of care, and thus benefits thousands of greater Waterbury residents, not just the acutely ill. We also expect that the best treatments for the various manifestations of heart disease will continue to evolve. The continuation of a full service program in Waterbury ensures that all current treatment options are at the disposal of our local caregivers and available to our citizens, and, at the same time, will enable our program to evolve along with changing technologies. We simply cannot turn back to the way it was, nor is there any reason to even consider doing so.

As it relates to the structure of the Program, the Applicants have on numerous occasions seriously explored the feasibility of alternative structures for the Program, which are outlined in the CON application. Initially the one Program-two campus model was instituted as one that would suit the needs of the community and allow the hospitals the ability to start offering advanced cardiac services with capital costs that could be expended at the time. Significant

investments were made and have begun to show a positive financial return for the hospitals.

Any change to the structure of the Program would not only cause disruption to services that directly impact patient care, but will also cause irreparable financial harm to both hospitals. An analysis has been conducted jointly by each of the hospital financial teams to determine the financial impact should the Program be reorganized. The details of this analysis are staggering.

For example, if the Program were to be consolidated into one of the campuses, (that is, only one hospital provides all of the cardiac services) the other hospital would potentially lose between $10 and $12 million. This includes only the expected revenue for the procedure volume that would be lost. This does not account for any additional expenses that the host hospital would need to incur for renovation, capital equipment and additional staffing costs. This would be a lose-lose situation for the hospitals and for those we serve.

Another proposal analyzed was the following: one hospital performs primary angioplasty only and the other hospital continues to provide all advanced cardiac services including primary and elective angioplasty and open heart surgery. This too would create a devastating financial situation for both hospitals as demonstrated by a projected loss of between $8.1 and $9.5 million. Again, a decision of this nature limits access to the community and puts the hospitals in a financial situation that would be devastating.

Over the past several months, it appears that our Heart Center's application for permanent status has become enmeshed in our hospitals' ongoing discussions about a possible merger. From our perspective, neither the day to day operation nor the two campus configuration would be changed, even if the hospitals were to merge, because the Program works so well in our environment. The Heart Center's application must be considered on its own merits.

Pre-File Testimony
Before the Office of Health Care Access: Docket No. 08-31202- CON
Saint Mary's Hospital, Waterbury Hospital and John Dempsey Hospital
Elective and Primary Angioplasty and Open Heart Surgery
October 24, 2008

As to the status of the merger, we know OHCA, through its own analyses, is well aware of the unique challenges facing the health care delivery system in Waterbury—financial, demographic and other unique community characteristics, such as traffic patterns, hospital use patterns, existing infrastructure, and so forth. While a full asset merger offers the greatest long term economic benefit, as discussed with State officials it will require an initial investment that can only be made with financial support from the State of Connecticut. In the meantime, given both institutions financial stresses, disruption or cessation of this program will only aggravate an already difficult situation. Furthermore, under the law, our hospitals remain competitors until a merger transaction is actually consummated. Even if a preliminary agreement were achieved today, we still face months of regulatory process and due diligence. Any OHCA decision that puts the hospitals back into a competitive situation, hurts financial performance or requires further capital investment (or negates investments already made) simply makes no sense.

The decision before OHCA today is whether or not a Heart Center that provides seamless access to a complete system of care for thousands of heart patients should be granted permanent status.

As a hospital executive, I am often put in a position of reviewing data and other information and of having to make a difficult decision. This does not appear to me to be one of these situations. There is no clinical or financial reason to discontinue or reorganize the advanced cardiac services provides in this one Program-two campus model. In fact, there is quite simply no other financially possible alternative for these two-financially distressed hospitals.

OHCA embraced the opportunity given to it to correct a historic imbalance and a flawed delivery system in 2004. OHCA allowed for marked enhancement of the healthcare delivery system in the Greater Waterbury community. OHCA ensured the continued clinical relevance of two community hospitals that have served this region with distinction for over a century.

Pre-File Testimony
Before the Office of Health Care Access: Docket No. 08-31202- CON
Saint Mary's Hospital, Waterbury Hospital and John Dempsey Hospital
Elective and Primary Angioplasty and Open Heart Surgery
October 24, 2008

OHCA must appreciate the significance of its 2004 decision and see the Heart Center for what it actually has become: the centerpiece of a comprehensive system of care for thousands of heart patients—and potential heart patients—in our region. Three years of safe, high quality heart care is ample proof for any reasonable person that the Heart Center of Greater Waterbury has earned permanent status. We are proud of the fact that we have made this decision for permanent status in 2008 an easy one by demonstrating not only critical need and quality results, but no reasonable alternative Program configuration. We hope that the Office of Health Care Access will allow us to continue to provide this vital service to our community on a permanent basis.

Respectfully submitted,

John Robin, CEO and President
Waterbury Hospital

Pre-File Testimony
Before the Office of Health Care Access: Docket No. 08-31202- CON
Saint Mary's Hospital, Waterbury Hospital and John Dempsey Hospital
Elective and Primary Angioplasty and Open Heart Surgery
October 24, 2008

I, Chad Wable, hereby submit this written pre-file testimony for the Office of Health Care Access (OHCA) Public Hearing in the Matter of Docket Number 08-31202- CON on October 30, 2008.

I am currently serving as the interim President and CEO of Saint Mary's Hospital. In addition to my role at Saint Mary's, I am a fellow of the American College of Healthcare Executives.

In my previous role as Vice President, I was actively involved in the development of our initial Certificate of Need application in 2003 and was administratively responsible for the cardiology division during the demonstration project period. Based on that experience and the merits of the joint cardiac Program, including the tremendous track record of quality care and lives that have been dramatically improved and even saved, I believe the current application for permanent status should, in fact, be straightforward to review and approve.

The fundamental difference, of course, is that this application is based not on forecasts or market projections but on actual history and clinical data. For the past three years the Heart Center of Greater Waterbury has amassed a performance record that places it on solid footing among its peers throughout the state and in fact, the country. Our initial application projected significant need for advanced cardiac services in Waterbury—the past three years have proven the demand is greater than originally estimated. The application before you today is unique for OHCA—it is not about approving a new program, but rather about making an existing program permanent.

Since 2005, we have performed well over 2,500 interventional cardiac procedures and saved countless lives. Market share data indicates that more than 80% of people in the Waterbury area choose the Heart Center for their cardiac care. The significance of that

very high market share in such a short period of time should not be lost in the massive amount of information and data in this application. Our community has embraced the Heart Center as it is currently configured and has voiced its passionate support for maintaining the program on a permanent basis. In fact, more than 17,000 individuals have signed letters and petitions in support of the Program, and our public rally vividly demonstrated the widespread support for the Heart Center.

Our hospitals pledged to provide the standard of care to our community, and we have delivered on that promise. In turn, the community has come to expect nothing less than the access to advanced cardiac care that is available in other major cities of Connecticut. It is imperative that we maintain this level of access by granting the Heart Center program permanent status.

The ability to deliver on our commitment to provide advanced cardiac care did not come without significant financial investment. Our hospitals spent a combined $7 million in order to complete the renovations and construction necessary for these services. And although that figure is significant, particularly for the financially distressed hospitals of Waterbury, the cost was far less than the alternatives to the one program, two-campus configuration that were considered. We believe that this investment has resulted in cardiac surgical suites and patient care units that are among the most advanced in the state. In addition to financial capital, we have also invested heavily in human capital by creating and training specialized teams focused exclusively on providing high quality cardiac care. The quality of our program is a direct reflection of the exceptional people who work in the Heart Center. All of these investments were made with a long term focus. There is simply no defensible clinical or patient access reason to not utilize these valuable resources.

Finally, the Heart Center has had a positive financial impact on both Saint Mary's and Waterbury Hospital. The revenue generated from our cardiac program is an integral component of our overall financial stability. As has been clearly reported on numerous occasions, our hospitals are financially challenged. It simply does not make sense to eliminate or even significantly change one of the major clinical service lines that makes a positive contribution to our financial viability. In fact, should income from cardiac procedures be reduced or eliminated, it is likely that the loss in revenue would cause the closure of other unprofitable medical, surgical, and psychological clinics in our community. The result would be a reduction in access not only to cardiac care, but to other services as well. Most importantly, it may cause a dramatic reduction in access to safety net services for those indigent citizens that may not be able to receive care elsewhere.

The Heart Center of Greater Waterbury is a Program with a proven need and a proven track record. And it works! The past three years have clearly demonstrated the clinical quality and life saving capabilities of our hospitals. Our community has rallied behind the program and shown their unwavering confidence and support. We respectfully request that you grant permanent status to this program, allowing us to continue providing the services our community needs and deserves.

Respectfully submitted,

Chad Wable, Interim President & CEO
Saint Mary's Hospital

Pre-File Testimony
Before the Office of Health Care Access: Docket No. 08-31202- CON
Saint Mary's Hospital, Waterbury Hospital and John Dempsey Hospital
Elective and Primary Angioplasty and Open Heart Surgery
October 24, 2008

I, James Thornton, hereby submit this written pre-file testimony for the Office of Health Care Access Public Hearing in the matter of Docket Number 08-31202-CON to be held on October 30, 2008. Since January 2007, I have been the Hospital Director of John Dempsey Hospital, University of Connecticut Health Center. I have over 30 years hospital administrative experience, including 8 years at the CEO/Hospital Director level.

As Connecticut's only public academic medical center, the University of Connecticut Health Center and John Dempsey Hospital are committed to facilitating the translation of education, research and clinical expertise to Connecticut communities. It is consistent with the strategic planning of the Health Center and John Dempsey Hospital to expand and enhance our community relationships, with the goal of using our education, research and clinical strengths to improve the quality of care, health status and clinical outcomes of the citizens of the State of Connecticut.

We are pleased to support the efforts of Waterbury Hospital and Saint Mary's Hospital to provide specialized cardiac services to the residents of Waterbury and its surrounding communities.

As a co-Applicant on this innovative project I ask that consideration be made to establish The Heart Center of Greater Waterbury as a permanent service.

John Dempsey Hospital is proud to have been the tertiary partner with Saint Mary's Hospital and Waterbury Hospital over the last three years as we collectively brought advanced cardiac services to the greater Waterbury area. The knowledge and expertise at the University of Connecticut and John Dempsey Hospital were shared with the full purpose of fulfilling its mission as a teaching institution. Cardiology and operating room staff from Waterbury were trained at John Dempsey. Clinical protocols were developed with the assistance and direction of our education department, and equipment and facility consultation and decisions were made with collaboration of our physician and professional staff.

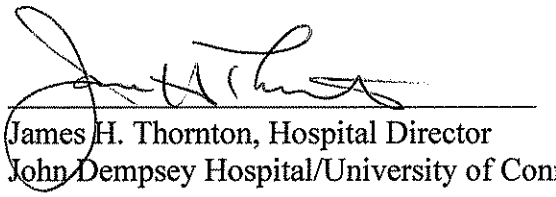
Because of this initial and ongoing involvement we are confident in the skills and competencies of the staff, the clinical leadership of cardiology and cardiac surgery and the overall strong foundation on which the Program was built. The level of service provided has consistently met quality benchmarks and this alone should have value as OHCA makes its decision related to this proposal.

Pre-File Testimony
Before the Office of Health Care Access: Docket No. 08-31202- CON
Saint Mary's Hospital, Waterbury Hospital and John Dempsey Hospital
Elective and Primary Angioplasty and Open Heart Surgery
October 24, 2008

John Dempsey Hospital continues to support the Heart Center in Waterbury through clinical oversight of quality and in an advisory capacity for areas such as administrative issues, marketing, community outreach and strategic planning. John Dempsey Hospital has consistently participated in the Heart Center of Greater Waterbury's Advisory Board and has provided advice and counsel on many administrative and clinical matters since the inception of the Program.

The Heart Center of Greater Waterbury has saved lives from in and around the greater Waterbury area with the help of John Dempsey Hospital. We believe this program to be an excellent community resource for the people of Waterbury. The Heart Center of Greater Waterbury represents hospitals doing what hospitals are supposed to do, namely create and sustain a very real improvement in the health status of the communities they serve. Accordingly, John Dempsey Hospital is proud to be co-applicant for a new CON and will gladly continue to serve the program in the same capacity as the previous three years.

Respectfully submitted,



James H. Thornton, Hospital Director
John Dempsey Hospital/University of Connecticut Health Center

Pre-File Testimony
Before the Office of Health Care Access: Docket No. 08-31202- CON
Saint Mary's Hospital, Waterbury Hospital and John Dempsey Hospital
Elective and Primary Angioplasty and Open Heart Surgery
October 24, 2008

I, Henry Borkowski, hereby submit this written pre-file testimony for the Office of Health Care Access Public Hearing in the matter of Docket Number 08-31202-CON to be held on October 30, 2008. I am a Board Certified Cardiologist and have been practicing in Waterbury for thirty-one (31) years. I am the Medical Director of the Heart Center of Greater Waterbury, a managing partner of Cardiology Associates of Waterbury, an ex-officio member of the Heart Center of Greater Waterbury Board of Directors, a member of the Advisory Board of the Heart Center, a member of the Saint Mary's Hospital Board of Directors, Chairman of the Quality Committee of the Saint Mary's Hospital Board of Directors and a member of the Saint Mary's Health System Board of Directors.

As the Medical Director of the Heart Center, I worked for two years with the clinical and interventional cardiologists, the cardiothoracic surgeons, emergency medicine physicians and the administrations of Waterbury Hospital, Saint Mary's Hospital and University of Connecticut – John Dempsey Hospital to design, develop and operationalize the Heart Center of Greater Waterbury. With a goal of providing access to high quality, life saving primary angioplasty, elective angioplasty as well as emergent, urgent and emergency cardiothoracic surgery, we considered all clinical models before committing to the one program – two campus model. Given the reality of our community's resources including two overloaded emergency rooms and telemetry units, transferring patients from one facility to the other would have delayed or prevented the care of the most vulnerable patients, the acute ST-Elevation Myocardial Infarction (STEMI) patients, especially those presenting with cardiac arrest or cardiogenic shock. Neither emergency room nor telemetry unit is large enough to care for all the patients who present with acute STEMI, acute coronary syndrome, unstable angina or congestive heart failure.

In addition to structuring the location of care in both hospitals, we did the following to insure the delivery of excellent care at the inception of the program:

1. Primary and elective angioplasty was provided by senior experienced interventional cardiologists 24 hours a day, 7 days a week, 365 days a year with emergency Coronary Artery Bypass Graft (CABG) surgery available on site;
2. Cardiac Surgery was provided by senior experienced surgeons from University of Connecticut John Dempsey Hospital;
3. Post angioplasty and post CABG care was provided by experienced Registered Nurses and Advanced Practice Registered Nurses, many of whom were trained at University of Connecticut John Dempsey Hospital;
4. A comprehensive quality assurance program was established prior to the program's first patient. The QA program includes:
    a. Participation in the American College of Cardiology (ACC) database
    b. Participation in the Society of Thoracic Surgeons database
    c. Use of uniform treatment protocols on both campuses
    d. Morbidity and Mortality Review Conference
    e. Joint Quality Review Committee with representatives from the medical staff and each campus
    f. External peer review by The Greeley Group

In the first three years of the program, we have performed 289 primary angioplasties for acute STEMI, 1687 urgent and elective angioplasties, and 641cardiac surgeries (page 0042 of CON application). We have established clinical outcomes that are comparable to the national averages set by the ACC and the STS. The angiographic success is at or above the ACC mean of 99.3%. The program's risk adjusted mortality is lower than the ACC mean of 1.23 ranging from 0.67% to 1.05%. We joined the Door to Balloon Alliance, a national quality initiative to decrease the time from onset of symptoms to treatment of STEMI patients. The Program's Door to Balloon time is at an average of 67 minutes. This is superior to the average door to balloon time 2.5 to 4 hours or more that

existed prior to July 2005 when our patients were transported to other cities for emergency PCI. Approximately 88% of the patients arriving at the emergency departments of Saint Mary's Hospital and Waterbury Hospital are being treated with emergency angioplasty in less than 90 minutes. This is significantly better than the national target of 75% and the ACC mean of 72%.

The cardiac surgery clinical outcomes are also comparable to national averages set by the Society of Thoracic Surgeons with a raw mortality for isolated coronary bypass surgery of 2.4%, and for isolated aortic valve surgery 1.7% or 1 of 57 patients. These results were achieved by the Heart Center of Greater Waterbury on both campuses through a systematic, collaborative process with all Emergency Department physicians and staff, cardiologists, interventional cardiologists and catheterization lab staff. In summary, the Heart Center of Greater Waterbury succeeded in achieving its goal: to dramatically transform the care of cardiac patients in our community by providing high quality access where and when it was needed.

Closure of this highly successful program is unacceptable to the community and to those of us who have been involved with its development and implementation from 2003 through 2008. Continuation of the program will allow us to continue to provide primary angioplasty to our most vulnerable ST-Elevation Myocardial Infarction (STEMI) patients, urgent angioplasty to patients with non-STEMI and acute coronary syndrome, elective angioplasty at the time of diagnostic catheterization when clinically indicated, elective diagnostic catheterization, as well as elective, urgent and emergency cardiac surgery. These procedures are part of the larger, total continuum of heart care now available in Waterbury – from prevention to diagnosis to treatment.

Pre-File Testimony
Before the Office of Health Care Access: Docket No. 08-31202- CON
Saint Mary's Hospital, Waterbury Hospital and John Dempsey Hospital
Elective and Primary Angioplasty and Open Heart Surgery
October 24, 2008

Closing the Heart Center of Greater Waterbury would create a health care crisis by terminating access to lifesaving care and will directly result in immediate and long term, permanent adverse effects on patients with cardiovascular disease in our community.

Cessation of Primary Angioplasty for STEMI patients will immediately increase the time to treatment for these critically ill patients and will be the cause of preventable deaths and permanent disability. Use of thrombolytic management protocols, where these are not the appropriate standard of care, will increase the risk of bleeding complications including life threatening hemorrhage and stroke. An increase in chronic congestive heart failure due to permanent myocardial loss will result in long term disability, increased risk of total cost of care due to medications and outpatient monitoring for the duration of patients' lifetime and the increased need for Automatic Implantable Cardiac Devices (AICD).

In addition to emergency angioplasty, elective and urgent angioplasty for non-STEMI, acute coronary syndrome as well as diagnostic cardiac catheterizations will no longer be available to area residents. Our cardiologists and primary care physicians will choose to send patients to a full service hospital for diagnostic procedures rather than have the patient subjected to duplicative procedures in different facilities.

Additionally, our Emergency Departments, already stressed and overburdened, will be required to triage, stabilize, manage and board cardiac patients, including STEMI, Non-STEMI and Acute Coronary Syndrome patients, while waiting for available beds at other Connecticut hospitals. Patients would then be transferred away from family support and their physicians incurring substantial increase in cost of care to themselves and the entire healthcare system including, but not limited to, duplication of admission and discharge services and fees, duplication of consultations by specialty physicians, duplication of laboratory testing and ambulance charges.

Pre-File Testimony
Before the Office of Health Care Access: Docket No. 08-31202- CON
Saint Mary's Hospital, Waterbury Hospital and John Dempsey Hospital
Elective and Primary Angioplasty and Open Heart Surgery
October 24, 2008

In summary, the Heart Center of Greater Waterbury was developed by the collaborative efforts of Waterbury Hospital, Saint Mary's Hospital and the University of Connecticut to improve heath care access for the 280,000 residents of the greater Waterbury area. Patients with cardiovascular disease have benefited from a comprehensive program that dramatically improved their morbidity and mortality in comparison to the care available prior to the program. The quality of our outcomes is documented in detail in the ACC and STS databases and in the DTB Alliance and American Heart Association Get with the Guidelines databases.

As you are well aware, the permanent status of the Heart Center of Greater Waterbury has been linked to the potential merger of Waterbury Hospital and Saint Mary's Hospital. As a member of the medical staff of both hospitals and as member of the Board of Directors of Saint Mary's Hospital, I am fully aware of the importance of the merger process. However, it is essential to recognize that, although many things will be changed by a merger, the actual delivery of emergency, urgent and elective cardiovascular care will not be changed at all until there is a single campus large enough to accommodate the needs of all our patients.

This CON is about terminating a program that has already proven its value to our community and, from OHCA's perspective, should be viewed totally differently than approving a new program. On behalf of the citizens of greater Waterbury, the staff of the Heart Center, the cardiologists, cardiothoracic surgeons, nurses and technicians who are dedicated to this program, I ask you to grant us the permanent status we earned.

Respectfully Submitted,

Henry Borkowski, M.D.

Pre-File Testimony
Before the Office of Health Care Access: Docket No. 08-31202- CON
Saint Mary's Hospital, Waterbury Hospital and John Dempsey Hospital
Elective and Primary Angioplasty and Open Heart Surgery
October 24, 2008

I, Dr. Stephen Widman, hereby submit this written pre-file testimony for the Office of Health Care Access Public Hearing in the matter of Docket Number 08-31202-CON to be held on October 30, 2008. I am the director of interventional cardiology at the Heart Center of Greater Waterbury and have been a member of Cardiology Associates of Waterbury, a private practice located in Waterbury, CT for the past 18 years.

I am a fellow of the American College of Cardiology (ACC), the former vice president of the Connecticut Chapter of the American College of Cardiology, and am board certified in Internal medicine, Cardiovascular medicine, Nuclear medicine, and Interventional cardiology. Just since the inception of the Program I have performed a total of 564 primary and elective angioplasties in Waterbury (page 0067 CON application).

The purpose of my testimony is to request approval of this certificate of need application for interventional cardiac care. In addition I will review the current construct of the interventional program at the Heart Center of Greater Waterbury (HCGW) and the benefits of such.

In the most recent ACC data summary, the heart center performed 598 total PCI's over the rolling four quarters. Volumes continue to remain steady and our expectation going forward is that this will continue. We maintain four interventional cardiologists working in the program. Each averages approximately 150 cases per year, far exceeding the ACC recommended 75 per year. Our mortality and procedural complications match or exceed the ACC standards in all areas. This is despite intervening on an older more urgent patient population and higher risk lesion subset.

The development of the interventional cardiac program in Waterbury was based upon the recognition of an ongoing and burgeoning need for local, urgent and emergent interventional services for this population of greater than 280,000 people. We maintain a high quality service, but more importantly stand ready to emergently serve the needs of this large patient population unable to be so served by any other interventional program in the state.

In a continuing effort to improve our efficiency and quality, we have entered into a national, ACC sponsored, Door to Balloon Alliance. This endeavor is based upon the knowledge that combining experience and knowledge amongst the various hospitals in the state performing emergency angioplasty will improve the likelihood of a more rapid response in each site. Embracing the concept that "time is myocardium" there are monthly meetings within our own heart center involving emergency room (ER)

personnel, catheterization lab personnel and physicians reviewing each case in an effort to improve local performance. Our Program door-to-balloon time average of 67 minutes far exceeds the less than 90 minute standard promulgated by the ACC and is among the best in the country based upon the ACC database. Clearly, the local availability of angioplasty has benefited the hundreds of individuals served by this effort.

Full time interventional services provide emergency angioplasty services but additionally provide urgent services to those patients admitted from the ER with acute coronary syndromes. We know through our data that we have an unusually high percentage of angioplasty patients admitted through the ER when compared to the national average. This highlights the acuity of our population. Finally, we provide routine outpatient services to our more stable patient population.

The HCGW functions as a single entity. Both catheterization laboratories are identically equipped and staffed. The post angioplasty recovery areas are identical, and the Program staff meets on a monthly basis to review difficult procedures, complications and strategies for improved performance. The hospitals have been uniformly supportive of this interaction and encourage cooperation on all levels.

This CON request seeks to maintain the current level of service in the HCGW. Our proposal is to maintain the one program, two campus approach. Our performance thus far justifies this approach as the most efficient way to deliver expedient and, when required, emergent care to the patients within our service area who present with progressive coronary syndromes. To not approve the continuation of this successful Program would do a disservice to a population that has benefited greatly from these services. This is a population that according to the most recent Connecticut economic resource center has a poverty rate of 16%, double the state average of 7.9% (1999 data). Restructuring the program, limiting services to one campus, would financially handicap both hospitals by forfeiting a very sizeable investment made by one to accommodate cardiac services, and requiring a further sizeable investment by the other to accommodate the substantially increased volumes at a single campus.

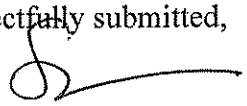
Additionally to advocate a restructuring of the program to provide only emergency services for ST-Elevation Myocardial Infarction (STEMI) is impractical for our community on several levels. Providing STEMI only services would reduce volumes in the catheterization lab drastically. Urgent cases would no longer undergo catheterization in Waterbury since the opportunity to therapeutically intervene would not be available. Routine cases with a high likelihood of coronary artery disease would similarly be

admitted elsewhere to avoid duplicative procedures. Commensurate with that marked drop in volume would be a loss of personnel. Fewer interventionalists would be required, thus, those remaining would spend most days out of town, no longer able to respond to a local emergency. Catheterization lab nurses and technicians, who are highly trained practitioners, would be forced to find employment elsewhere given the drastic change in work load. The catheterization labs would functionally become irrelevant. There is no advantage to the residents of Waterbury to make a change of this nature. There is in fact harm.

Given the city dynamics of two stressed hospitals, a documented successful track record over the past three years, broad based community support and a demonstrated commitment to excellence, this is the Program that works for us at the present time. Opposition exists to this program. It is not opposition borne of safety concerns, for those have been answered. The concerns are those of stressed hospitals in other communities who see our volume as a panacea for their difficulties. While we sympathize with and understand their plight, we see our patients care needs safely and completely met by our own Heart Center.

The noted British philosopher Bertrand Russell observed in all affairs it is a healthy thing now and then to hang a question mark on things you have long taken for granted. Our one program-two campus approach is different and for that the Program has been questioned by some and undergone much scrutiny, scrutiny we welcomed because we knew of the quality and achievements of the Program. The information in our application and pre-file testimony, particularly that of Dr. Underhill, responds to and squelches every unsupported doubt and question mark. The time for permanency of the Program is more than appropriate and justified.

Respectfully submitted,



Stephen Widman, M.D.

Pre-File Testimony

Before the Office of Health Care Access: Docket No. 08-31202- CON

Saint Mary's Hospital, Waterbury Hospital and John Dempsey Hospital

Elective and Primary Angioplasty and Open Heart Surgery

October 24, 2008

I, David Underhill, MD, hereby submit this written pre-file testimony for the Office of Health Care Access Public Hearing in the matter of Docket Number 08-301202 to be held on October 30, 2008. I am a board certified cardiothoracic surgeon and went to medical school at the University of Vermont before completing my general surgical residency at the New England Medical Center. During this time I spent two years that the National Institutes of Health (NIH) in Bethesda, Maryland in the National Heart, Lung, and Blood Institutes. After completing my general surgery training in Boston, I did my formal Cardiothoracic Surgical residency at the University of Michigan in Ann Arbor, Michigan. My first staff position was working for the Indian Ohio Heart Group in Fort Wayne, Indiana. I have been working at the Hartford Hospital since 1992 and the University of Connecticut Medical Center since the program opened there. I am proud to have been a member of Connecticut Cardiothoracic Surgical Associates (CCTSA) since 1998 and have been an active participant in the Heart Center of Greater Waterbury (HCGW) since the Program opened in 2005.

The scope of my practice, as well as that of my partners, includes the full range of all types of cardiac and general thoracic surgery including all open heart operations, heart transplant and artificial heart devices, lung operations such as lung cancer surgery and esophageal surgery, and in addition I perform all types of peripheral vascular surgery. With the exception of transplants and ventricular support devises we have performed all of these procedures at both Saint Mary's Hospital and Waterbury Hospital.

I have always been interested in outcomes data since my fellowship at the NIH when I studied under Dr. Richard Clark who developed the Society for Thoracic Surgeons (STS) database. I am on the High Risk Cardiac Surgical Review Committee at Hartford Hospital and recently presented the data for Hartford Hospital's Quality Improvement Program at the American Heart Association national meeting. I am also an active participant in the Northern New England Cardiovascular Study Group (NNECSG).

As a group we have participated in the STS database through Hartford Hospital since its' inception and are proud to have been the longest continuously participating heart surgery group in this database in the state of Connecticut. Between the four members in our group we have over 70 years of clinical practice as staff surgeons and have cared for tens of thousands of cardiothoracic surgical patients. We have been pleased to bring this experience to the patients in greater Waterbury and feel that our presence has made a measurable improvement in the cardiovascular health of the community. Presently

between Hartford Hospital and the University of Connecticut and the Heart Center of Greater Waterbury we perform nearly 620 open heart surgeries each year that is perhaps the largest number of any single group practice in the state of Connecticut.

I have been involved with the HCGW during the preparation and implementation phases and am extremely proud to be associated with such an excellent Program. This Program is critical to greater Waterbury and its residents.

The important points which I wish to make in this testimony are the following:

I. To assure the Office of Health Care Access (OHCA) of the quality of the cardiac surgical outcomes in the program;

II. To re-emphasize that volume is not considered a proxy for quality in cardiac surgical performance;

III. To illustrate the concept of surgeon procedure volume and its relation to quality metrics. I will use references to peer reviewed articles in the cardiac surgical literature to emphasize and illustrate these points.

I. Quality Outcomes.

I have reviewed all of the open heart surgical data for the Program to date. All of the cardiac surgery has been performed by the four members of our group. This is an incredible amount of data and it is my intention to make it palatable and understandable for OHCA and other members of the non-medical community. Naturally when trying to assess quality metrics, it is inevitable that comparisons must be made to either national or regional benchmarks. In addition, in the field of cardiac surgery, an organization will frequently compare itself to other nationally known programs. We are fortunate in cardiac surgery to have probably the finest clinical data base in all of medicine in the STS Adult Cardiac Surgical Database. Cardiac surgeons on the national scene have been very proactive in trying to assure patients that the work that they are performing is of top quality. I am confident that you will be very pleased when you see that STS results of the open heart surgical Program.

Since its inception on July 18, 2005 until most recently on September 15, 2008, we have performed 669 open heart surgical operations in the Program. Of the 669 total patients, 416 patients underwent isolated coronary artery bypass graft (CABG) surgery. This includes CABG surgeries that were emergencies from the emergency room or

catheterization lab or elective procedures. Importantly second and third redo operations are also included in this total. We are proud that our overall operative mortality rate for isolated CABG was only 2.4%. This compares very favorably to the nationally renowned Cleveland Clinic's isolated CABG mortality rate of 2.6%. Finally, there have been 57 patients who have undergone isolated aortic valve replacement (AVR) surgery. There has been only one mortality in this cohort of 57 patients.

Please recognize that this is raw data without any risk adjustment associated with it. However, these results are outstanding in the field of cardiac surgery.

As stated earlier, perhaps the most meaningful way of determining quality of a program is by using national and regional benchmark comparisons. The STS database affords this opportunity to all of its participants. What follows are the data from two of the largest and most commonly performed "homogeneous" patient groups in the STS database. These are isolated CABG and isolated AVR. As these are the two most commonly performed operations in adult cardiac surgery, the numbers of patients in these groups are naturally larger and allow for meaningful statistical comparison. To ensure that we have presented our most recent information for OHCA, the data is presented for calendar year 2007.

The STS Database is administered and validated by the Duke Clinical Research Institute (DCRI). The results are risk stratified using a proprietary methodology and each participating center's results are reported back to them with 95% confidence intervals. What this means is that if the results are within that confidence interval, the Program's data is not statistically different from those reporting to the database. OHCA required the Program to report its results to the STS database. In 2008 the Program was randomly selected by STS to participate in an audit of its data for validation purposes. This audit occurred on October 15, 2008 and concluded that the Program has an excellent data collection, monitoring and submission process.

Tables 1 and 2 illustrate the data for isolated CABG and AVR procedures

Table 1 Isolated CABG

THW (57 Cases)	**2007**	**STS Average**
Inpatient Mortality	0%	1.8%
Deep Sternal Wound Infection	0%	0.3%
Post Operative Stroke	0%	1.1%
SMH (69 Cases)		
Inpatient Mortality	1.4 %	1.8%
Deep Sternal Wound Infection	0%	0.3%
Post Operative Stroke	1.3%%	1.1%

Source: STS Database 2007

Table 2 Isolated AVR

THW (9 Cases)	**2007**	**STS Average**
Inpatient Mortality	0%	2.5%
Deep Sternal Wound Infection	0%	0.4%
Post Operative Stroke	0%	1.6%
SMH (6 Cases)		
Inpatient Mortality	0%	2.5%
Deep Sternal Wound Infection	0%	0.4%
Post Operative Stroke	0%	1.6%

Source: STS Database 2007

As stated above, we would have chosen to submit this data as CCTSA has already participated in this database longer than any other group in the state of Connecticut. Even if it were not required by OHCA, CCTSA would have demanded that the hospitals enroll in this database as it is the most logical way for us to monitor the quality of our outcomes. This demonstrates our commitment to the transparency of our results.

Pre-File Testimony

Before the Office of Health Care Access: Docket No. 08-31202- CON

Saint Mary's Hospital, Waterbury Hospital and John Dempsey Hospital

Elective and Primary Angioplasty and Open Heart Surgery

October 24, 2008

We are pleased to report to OHCA that the outcomes for all procedure categories in the STS database for both Saint Mary's Hospital and the Waterbury Hospital are within the 95% national confidence intervals. This means that these results are not statistically different than the nationally established outcomes of any of the given procedures performed by the open heart surgical team. Furthermore, the quality is absolutely excellent. In the Program, our patients get the same or better care than anywhere else in the United States.

STS Composite Quality Rating And National Quality Forum (NQF Measures)

The STS has recently developed a comprehensive rating system that allows for comparisons of the quality of cardiac surgery among hospitals across the United States. Seventy-seven percent (77%) of all hospitals throughout the United States are considered "equal" in the hospital's performance and outcomes in their open heart surgical results. This means that their performance is not statistically different from the STS average. In the most recent analysis issued by the STS, the Program was considered to be in this select group. In the most recent assessment of the program's performance per the NQF measures, both hospitals conformed to the STS standards in all categories assessed. This was found to be within a 95% confidence interval. The NQF measures include indicators such as the usage of preoperative beta blocker medications, the use of internal mammary arteries during performance of isolated coronary bypass graft surgery, discharging the patients on appropriate anti-platelet medications from the hospital, discharging patients on appropriate beta blocker medications from the hospital, the occurrence of deep sternal wound infection as a complication of surgery, the incidence of postoperative renal insufficiency after performing open heart surgery, the need for reoperation for bleeding, the occurrence of stroke during or after the operation, and finally operative mortality for both isolated CABG and isolated AVR. What this means is that the quality and the results of the open heart surgical team in the program at the Heart Center of Greater Waterbury are absolutely outstanding and compare favorably to any other program performing open heart surgery in the United States.

European System for Cardiac Operative Risk Evaluation

In addition to an analysis of the clinical outcome data, the program completed an extensive retrospective review of its patient data in relation to the predicted versus

observed mortality. Essentially what this means is that we are able to assign a predicted risk of mortality for a patient undergoing open heart surgery. Naturally, all patients present to the operating team with various medical conditions and co-morbidities. Furthermore, not everyone's surgical procedure has the same complexity. It naturally follows that each would have different risks for undergoing open heart surgical procedures. In an attempt to try and compare programs to one another, various instruments have been devised to help establish the risk of the surgical candidates. This therefore allows a so-called "leveling of the playing field" when comparing program A to program B and so forth. When it appeared as though the program was going to be reviewed last year, we retrospectively assessed each patient for their risk of mortality using a risk stratifying instrument called the EuroSCORE tool. EuroSCORE stands for the European System for Cardiac Operative Risk Evaluation. This is a standardized and validated tool and it is used by cardiac programs in Connecticut, the country, and especially in Europe. It is a method of calculating predicted operative mortality for cardiac surgery patients by closely examining risk factors. The tool is comprised of 13 patient related factors such as age, sex, and existing and historical clinical conditions for the patient and 4 operation related factors. Research has demonstrated that these 17 elements are accurate measures of a patient's risk of mortality from open heart surgery. Once this is assessed through a mathematical formula, an overall risk score is calculated for each patient.

As stated, this assessment tool was retrospectively administered for each of the patients who underwent any type of open heart surgery at the program from July 18, 2005 through July 17, 2007 through a medical record review by me and a team of individuals. Per the table below, the actual observed mortality rate for our program was far lower than the expected mortality, demonstrating that the program outcomes have exceeded what was predicted. Please note Table 3, EuroSCORE comparisons for categories of open heart surgical patients.

Table 3 EuroSCORE Comparison for all Categories of OHS Patients (HCGW)

Category	Patient Cases	Expected Mortality Rate	Observed Mortality Rate	Expected # Deaths	Observed # Deaths
Isolated CABG	271	7.62%	2.95%	20.64	8
CABG + Other OHS	11	18.69%	9.09%	2.06	1
CABG + Valve	44	13.63%	6.82%	6	3
CABG + Valve + Other	5	9.77%	0.0%	.49	0
Other	11	16.78%	18.18%	1.85	2
Isolated Valve	60	10.45%	5%	6.27	3
Valve + Other	12	15.78%	0.0%	1.89	0
Total All Procedures	414	9.47%	4.11%	39.19	17

The patient population in greater Waterbury has presented great challenges to both the cardiologists as well as the surgeons in the program. As surgeons operating in different service areas in the state of Connecticut, we have suspected that the Waterbury patients presented with more significant co-morbidities in terms of both number and severity.

The patients having isolated CABG for the first two years of our program, that is July 18, 2005 until July 17, 2007, were compared to another group of similar patients operated on by our same group of surgeons at another hospital here in Connecticut during the same time period. We noted that the average additive EuroSCORE for patients in the Program was 5.37 points with an expected mortality of 7.62%. This compared to the same group of patients having isolated coronary bypass graft surgery at another hospital of only 4.54 with a predicted death risk of only 5.9%. This bore out our suspicions that the severity and the level of acuity of the patients in the Waterbury area was greater than in the other service areas in which we practice.

When risk stratifying patients using the EuroSCORE, patients can be broken into four different categories in terms of quartiles by their assigned risk score. Patients who are considered low risk have a EuroSCORE of between 1 and 2 points, while medium risk patients score in the range of 3 to 5 points. High risk patients are considered any patients with a score higher than 6 points and extremely high risk patients obviously will score even higher. After reviewing our data, we found that the majority of our Observed Mortality occurred only in the patients with the highest average EuroSCORE. In other words, the patients who had the highest co-morbidities and potential risk for undergoing the operations were the patients who had poor outcomes.

Comparison to New York State Programs

The Heart Center of Greater Waterbury's Program outcomes were also analyzed through a comparison of our Program outcomes with the State of New York Adult Surgery Report published by the New York State Department of Health. Once again, this was done in preparation for filing for permanent CON status last year. Therefore the statistics from New York utilized were published in June of 2006. As noted in this report, "New York has taken a leadership role in setting standards for cardiac services, monitoring outcomes, and sharing performance data with patients, hospitals, and physicians." At the current time, public reporting of cardiac surgical data in the State of Connecticut is being developed but has not occurred yet. As a result of this, local comparison of public reported data in the State of Connecticut cannot be accomplished at this time. However, the data from New York State is available for comparison. To allow for this comparison, the data from our program for isolated CABG patients were collected and analyzed using the data elements and data analysis currently used in the State of New York. This analysis was independently prepared by Dr. Gerald O'Connor, Ph.D., Sc.D., Professor of Medicine and Community and Family Medicine, Dartmouth Medical School and the Research Director of the Northern New England Cardiac Disease Study Group (NNECDSG). I am also a participant in this group and have been so for over ten years now. This analysis provides a Risk Adjusted Mortality Rate (RAMR) and demonstrates that the Program's outcomes are comparable to several of the higher and the lower volume programs in this neighboring state. In addition, this RAMR is within the confidence levels set by this validated system.

Pre-File Testimony

Before the Office of Health Care Access: Docket No. 08-31202- CON

Saint Mary's Hospital, Waterbury Hospital and John Dempsey Hospital

Elective and Primary Angioplasty and Open Heart Surgery

October 24, 2008

Please see Table 4 Program Comparison to New York State Data on the following page. In fact we believe now one year later that our results are even better than those which were used in this comparison!

Table 4: Observed, Expected, and Risk-Adjusted In-Hospital/30-day Mortality Rates (RAMR) for Isolated CABG Surgery in New York State (NY residents only), 2004 Discharges (Listed Alphabetically by Hospital)

Hospital	Cases	Deaths	OMR	EMR	RAMR	95% CI for RAMR
Albany Medical Center	384	7	1.82	1.85	2.06	(0.83, 4.25)
Arnot-Ogden	118	2	1.69	2.18	1.63	(0.18, 5.88)
Bellevue	132	1	0.76	1.38	1.15	(0.01, 6.38)
Beth Israel	256	5	1.95	1.66	2.47	(0.80, 5.76)
Buffalo General	488	11	2.25	1.9	2.49	(1.24, 4.45)
Champlain Valley	1	0	0.00	0.63	0.00	(0.00,100.0)
Columbia Presbyterian-NYP	290	5	1.72	1.92	1.88	(0.60, 4.38)
Ellis Hospital	277	4	1.44	1.73	1.74	(0.47, 4.47)
Erie County	286	8	2.80	1.78	3.29	(1.42, 6.49)
Heart Center of Greater Waterbury	**255**	**8**	**3.14**	**2.47**	**2.66**	**(1.11,5.57)**
LIJ Medical Center	307	4	1.30	2.78	0.98	(0.26, 2.51)
Lenox Hill	355	4	1.13	2.68	0.88	(0.24, 2.25)
Maimonides	579	21	3.63	2.45	3.10	(1.92, 4.74)
Mary Imogene Bassett Hosp.	81	1	1.23	1.94	1.33	(0.02, 7.41)
Mercy Hospital	224	7	3.13	1.85	3.53	(1.42, 7.28)
Millard Fillmore	251	6	2.39	1.70	2.95	(1.08, 6.43)
Montefiore-Einstein	212	7	3.30	1.91	3.61	(1.45, 7.44)
Montefiore - Moses	269	4	1.49	1.59	1.96	(0.53, 5.02)
Mount Sinai	257	6	2.33	2.00	2.45	(0.89, 5.32)
NYU Hospitals Center	155	4	2.58	1.96	2.75	(0.74, 7.05)
New York Hospital - Queens	223	7	3.14	2.04	3.22	(1.29, 6.64)
New York Methodist Hosp.	89	2	2.25	1.43	3.29	(0.37, 11.88)
North Shore	770	19	2.47	2.37	2.18	(1.31, 3.40)
Rochester General	595	15	2.52	2.67	1.98	(1.11, 3.26)
St. Elizabeth	297	10	3.37	2.20	3.21	(1.54, 5.90)
St. Francis	1188	23	1.94	2.00	2.03	(1.29, 3.05)
St. Josephs	558	8	1.43	2.01	1.50	(0.64, 2.95)
St. Lukes-Roosevelt	155	5	3.23	2.55	2.65	(0.86, 6.19)
St. Peters	459	6	1.31	1.59	1.72	(0.63, 3.75)
St. Vincents	217	2	0.92	2.20	0.88	(0.10, 3.16)
Staten Island Univ-North	488	10	2.05	2.14	2.01	(0.96, 3.69)
Strong Memorial	390	7	1.79	1.90	1.98	(0.79, 4.08)
United Health Services	288	4	1.39	2.32	1.26	(0.34, 3.22)
Univ. Hosp. - Stony Brook	426	12	2.82	1.69	3.49	(1.80, 6.10)
Univ. Hosp. - Upstate	295	10	3.39	2.28	3.12	(1.49, 5.73)
Univ. Hosp. of Brooklyn	115	2	1.74	1.87	1.94	(0.22, 7.02)
Vassar Brothers	169	3	1.78	2.15	1.73	(0.35, 5.05)
Weill Cornell-NYP	460	4	0.87	2.44	0.75**	(0.20, 1.91)
Westchester Medical Center	503	10	1.99	1.96	2.12	1.02, 3.90)
Winthrop Univ. Hosp.	381	6	1.57	2.64	1.25	(0.46, 2.72)
Total	**12988**	**272**	**2.09**	**2.09**	**2.09**	

** Risk-adjusted mortality rate significantly lower than statewide rate based on 95% confidence interval. Revised 7/24/07

II. Volume is not a proxy for quality in cardiac surgery performance.

In the past decade there has been a steady decline in the rates of coronary artery bypass graft surgery in the United States as evidenced by the most recent executive summary from the STS database. The average number of cases per hospital has dropped from 553 in 1999 to 318 in 2007.

A similar decline in the number of open heart surgeries in the State of Connecticut has also been observed as seen in Table 5 from the OHCA web site shown below. There has been a drop of nearly 25% in the total number of open heart operations from 4644 in 2002 as compared to 3508 in 2007. This occurred despite opening three new heart surgery programs during this time period.

Table 5 The number of open heart surgeries performed by hospital FY 2002-FY 2007.

Hospital	2002	2003	2004	2005	2006	2007
Bridgeport	345	313	268	263	175	194
Danbury	0	0	0	114	177	121
JDH	115	134	121	174	97	70
Hartford	901	844	756	726	742	685
St. Francis	1239	1299	1311	1188	998	990
SMH	0	0	0	19	72	100
St. Raphael	761	687	617	510	353	342
St. Vincent	310	296	293	291	259	232
TWH	0	0	0	20	117	110
Yale	973	905	860	861	704	664
Total	4644	4478	4226	4166	3694	3508

Source: OHCA Inpatient Acute Care Hospital Database.
ICD-9-CM Procedure Codes: 35.10-35.28 and 36.10-36.19
Please note: unduplicated counts utilizing all procedure codes
Fiscal Year from October 1 through September 30

As demonstrated in the table the only hospitals that have consistently increased the number of procedures each year are the two members of the Heart Center of Greater Waterbury. This clearly shows an increased need in utilization by the people of this area. If one evaluates the profiles of the patients undergoing cardiac surgery at the Program, it is easily apparent that these patients conform to the usual patient profile of patients undergoing these operations throughout the United States and certainly in the region.

Additionally as we have already shown above, in looking at patients just having coronary bypass graft surgery, the Waterbury patients are even perhaps "sicker" than other patients in the State of Connecticut. Angioplasty volume during the first three years of the Program exceeded expectations by one and a half times. In fact, this is further testimony to the quality and the integrity of the practitioners and the whole philosophy of the HCGW Program. By the very fact that we performed one and a half times the expected number of angioplasties, it is obvious evidence that no attempt was made to "pad" the surgical numbers with patients who could have been treated and were treated by percutaneous means. This would certainly have been easy to do, but did not occur because practitioners, both cardiologists and surgeons, did what they felt was "right" both medically and ethically for the patient group here. The Waterbury community can be proud that they have cardiac professionals that are acting on their best interests at all costs.

GUIDELINES:

The ACC/AHA published Revised Guideline Update for Coronary Artery Bypass Graft Surgery (CABG) in 2004. The revised guidelines were approved by the American College of Cardiology Foundation Board of Trustees in March of 2004 and by the American Heart Association Science Advisory and Coordinating Committee in June of 2004 and published for the first time on August 31, 2004 in *Circulation, The Journal of the American Heart Association.* These updated guidelines are not the same guidelines used to approve the Program's demonstration project in 2004 as such were published after the Technical Hearing and the signing of the Agreed Settlement. These guidelines provide an extensive review of relevant literature at the time and noted that the studies found a wide variation in the mortality rates and that some low volume programs maintained excellent outcomes. The conclusion reached is as follows:

> In summary, studies suggest that survival after CABG is negatively affected when carried out in institutions that perform less than a threshold number of cases annually. Similar conclusions have been drawn regarding individual surgeon volumes. In states where reporting of outcomes is an accepted practice (example New York State), the relationship between low volumes at either an institution or individual level seem to have diminished over time. This observation strengthens

> the argument for outcome tracking and supports a posture of close monitoring of institutions or individuals who perform that less than 100 cases annually. It must be remembered that these studies also found a wide variation in risk adjusted mortality rates in low volume situations; i.e., some institutions and practitioners maintain excellent outcomes despite relatively low volumes. Therefore, credentialing policies based on conclusions drawn from these data must be made with caution.

These guidelines continue to support the argument for monitoring clinical outcomes in those programs that perform less than 100 cases annually, however, that do not support that programs with an institutional volume of less than 100 cases not be allowed to operate. As a program HCGW has never performed below 100 cases as will be demonstrated further is not projected to do so. These guidelines refer to surgeon volume which in the case of this program is key, as will be shown by other supporting literature as well as data in the pre-file testimony.

Society of Thoracic Surgeons:

Additionally, the Society of Thoracic Surgeons (STS) is the nationally recognized professional organization for cardiothoracic surgeons. The Society of Thoracic Surgeons established a Quality Measure Taskforce to develop a methodology for the comprehensive assessment of adult cardiac surgery quality of care, including both individual measures and overall composite quality score. The report of the STS Quality Measure Taskforce entitled, *Quality Measurement in Adult Cardiac Surgery: Part 1 – Conceptual Framework and Measure Selection* was published in 2007 and recommended the use of National Quality Forum measures of quality and program evaluation. The STS does not endorse threshold volume for cardiac surgeons or open heart surgical programs. The 2007 document states the following regarding the use of volume as a proxy for CABG procedures:

> **Structure**:
> Structural measures refer to inherent characteristics of the provider that are believed to be associated with higher quality. These may include, for example, the volume of a particular type of procedure performed annually, advanced information technology such as electronic health records or computerized order

entry, participation in an outcomes database registry, sophisticated radiographic imaging capabilities, the number of approved residencies, and nurse staffing ratios. For many such measures, the strength of their relationship with desired healthcare outcomes is not well defined.

Without question, volume is the most extensively studied structural measure of quality in all of medicine and surgery. Whether this reflects "practice makes perfect" or "selective referral" to institutions perceived to be of higher quality is uncertain. The strength of the volume outcome relationship varies widely. For complex procedures such as esophagectomy or pancreatectomy that are performed relatively infrequently even at high volume institutions, the volume outcome association is strong. For some frequently performed, relatively standardized and mature or complex procedures such as CABG where annual hospital volumes may range from 100 to 1000 cases the volume-outcome relationship is weak.

Structural measures may be useful proxies for outcomes when the latter data are unavailable. Conversely, their relative utility diminishes when reliable outcomes data are accessible. Furthermore, structural measures are often not readily actionable by providers, and this diminishes their usefulness as quality improvement tools.

The leading organization for cardiothoracic surgeons has very strong opinions on the matter of volume targets.

As a surgeon, I understand the reasons that the 1996 guidelines for the American College of Surgeons (ACS) were used originally. However, in 2008 this document is significantly outdated.

The 1996 guidelines state that the "current standards of practice form the basis of the report." However, the standards state that the volume guidelines are based on data from 1975. In 1975, cardiac surgery was in its infancy. In 1975, the practice of cardiothoracic surgery did not have the benefit of subsequent years of the additional science and technology that have shaped the practice today.

In 2008, over 30 years later, it is important to consider and review the current status of the medical literature which speaks to cardiac surgery volume and outcomes. The Program seeks to provide quality services with excellent outcomes for our community. Relevant and current medical literature to date related to cardiac surgery and the volume-outcome connection is summarized below. The medical literature supports the fact that programs such as the Heart Center of Greater Waterbury, can and do produce excellent outcomes. Medical research takes years of study and analysis and what is presented in the following summary of literature is information that OHCA did not have available when this Program was initially implemented.

III. Surgeon Procedure Volume and its Relation to Quality Metrics

OHCA can be assured that the surgeons in the Program are all considered to be "high volume practitioners." As noted above, in at least one of the reference articles, surgeon volume unlike hospital volume may be an important predictor for quality of outcomes. As stated above, our group performed 620 open heart surgical procedures last year. This makes CCTSA one of the busiest open heart surgical private practice groups in the State of Connecticut.

The surgical team is highly experienced and is currently providing cardiothoracic surgical services at two other advanced cardiac programs in the State of Connecticut. Each member of this skilled team of surgeons is considered to be, according to the current standards contained in the literature, a high volume surgeon. Tables 6,7 and 8 illustrate this point.

Table 6 Individual Surgeon Totals Program Year 1* (OHS)

	Hartford Hospital	**UCHC**	**HCGW**	**Totals***
Paul Preissler, MD	81	24	69	174
John Hammond, MD	134	39	28	201
Daniel Fusco, MD	25	33	67	125
David Underhill, MD	71	14	33	118

***July 18, 2005 – July 17, 2006: This does not include other thoracic surgeries**

Table 7 Individual Surgeon Totals Program Year 2* (OHS)

	Hartford Hospital	UCHC	HCGW	Totals*
Paul Preissler, MD	79	23	55	157
John Hammond, MD	146	22	37	205
Daniel Fusco, MD	23	22	74	119
David Underhill, MD	68	9	50	127

*** July 18, 2006- July 17, 2007: This does not include other thoracic surgeries.**

Table8 Individual Surgeon Totals Program Year 3* (OHS)

	Hartford Hospital	UCHC	HCGW	Totals*
Paul Preissler, MD	71	21	62	154
John Hammond, MD	135	6	40	181
Daniel Fusco, MD	23	50	70	143
David Underhill, MD	78	8	37	123

*** July 18, 2007- June 30, 2008: This does not include other thoracic surgeries.**

As stated below, recent studies have suggested the importance of surgeon – procedure volume. Many, if not most of the studies that noted a relationship between hospital volume and outcome did not consider the influence of surgeon volume on this relationship. The more recent studies clearly show that surgeon-procedure volume is a very important component in any analysis of the quality of a program especially with higher risk patients.

More importantly however, is that like the literature cited below, our surgical group has been able to reproduce the same excellent outcomes at the Heart Center of Greater Waterbury Program as it achieves in the high volume program where we practice.

Table 9 is a demonstration of this.

Table 9 Key NQF Measures - Source STS Data Base and Program Data Bases

Comparison of Surgeon Outcomes in two separate Programs

	HCGW	# of Cases	HVP Surgeon Data	# of Cases
CABG Inpatient Mortality	2.6%	10 of 385 cases	1.7%	9 of 530
CABG: Deep Sternal Wound Infection	0.2%	1	0.6%	3
CABG: Post Operative Stroke	1.8%	7	1.1%	6
CABG: Post Operative Renal Insufficiency	4.6	18	2.6%	14
AVR Mortality	1.9%	1 of 51 cases	1 %	1 of 94 cases
AVR: Deep Sternal Wound Infection	0%	0	0%	0
AVR: Post Operative Stroke	0%	0	0%	0
AVR: Post Operative Renal Insufficiency	1.9	1	6.4%	6

As previously noted above, the Program's outcomes for these major quality indicators have been exceptional and well within the confidence levels which are identified by the STS Database. Furthermore, even within our own state, the results in the program in Waterbury are absolutely of the highest quality and equal to the same results that my surgical group achieves in our high volume hospital where we operate. In addition, the results of a 2 – Proportions Statistical Test demonstrate that there is no statistically difference between the rates for mortality and complications in the program at Waterbury and in my surgical group's practice at the high volume hospital for the same relative time frame. This clearly demonstrates that our group's practicing in different programs of varying volumes have similar outcomes regardless of the institution in which we provide these services for our patients.

The information is complex, but the conclusion is not. The surgeon's judgment and skill do not differ because of location.

IV. Summary of Recent Medical Literature related to Volume and Outcome

The following is a summary of nine studies and their conclusions. These studies were published subsequent to the approval of the Program in 2004. All of this literature can be found on pages 0343-0426 of the CON application. They demonstrate that there is no clear relationship between volume and outcome, that volume is a poor predictor of quality and that the prior studies that found an association between volume and outcome did not address the effects of surgeon-specific volume. The following more relevant and recent medical literature must be taken into consideration in evaluating any advanced cardiac care Program in the greater Waterbury area.

Ricciardi R., Virnig B. A., Ogilvie J. W., Dahlberg P. S., Selker H. P. & Baxter N.N. (2008). Volume-outcome relationship for coronary artery bypass grafting in an era of decreasing volume. ***Archives of Surgery*****, 143(4), 338-44.**

This study was conducted over a period of 16 years. Study leaders hypothesized that the decrease in hospital procedure volume for CAGB would relate to an increase in the in-hospital mortality rate. It used hospital discharge data from the National Inpatient Sample from January 1, 1988 to December 31, 2003. A 20% random sample of all patients who underwent CABG or angioplasty was used. The study had four different aims including: 1) to determine trends in coronary revascularization techniques performed surgically or by angioplasty; 2) to define trends in valve replacement and repair; 3) to record mortality by year and by CAGB volume to evaluate the effect of declining CABG volume on the volume-outcome relationship, and 4) to quantify the difference in mortality between high and low volume hospitals.

During this period, the rate of CABG increased from 7.2 cases per 1,000 discharges in 1988 to 12.2 cases per 1,000 in 1997 and then declined to 9.7 cases in 2003. During this same period the volume of angioplasty procedures tripled. For CABG, the proportion of high volume hospitals increased to a peak of 32.5%, but then decreased to 15.5% in 2003.

During this same time frame, low volume hospitals (12-149 CABG/year) decreased from 49.6% in 1988 to 35.5% in 1997, but then increased to 52.4% in 2003. The numbers of individuals undergoing CABG procedures in low volume hospitals peaked in 2003 at 24.6%.

In this 16 year time frame CABG mortality rate declined from 5.4% to 3.3% and in every category of hospital defined by volume, there was a statistically significant decrease in mortality. Hospitals performing the lowest volume of CABG experienced the largest decrease of in-hospital mortality. The study concludes that these results should, "challenge the setting of any arbitrary volume cut point: positive effects on patient outcome are multi-factorial and are inadequately described by procedure volume."

Yuh, D. D. (2008). Volume-outcome relationship for coronary artery bypass grafting in an era of decreasing volume-invited critique. ***Archives of Surgery*****, 143(4), 344.**

In this invited critique the author notes that findings of above study suggest that traditional volume-outcome tenets may be overly simplistic and inaccurate in assessing current CABG practices. The critique notes that there is growing experiential evidence that hospital-based quality control, monitoring and best-practice programs may have a more significant effect on outcomes than volume, particularly in generally routine surgical procedures such as CABG.

Marcin, J. P., Li, Z., Kravitz, R. L., Dai, J. J., Rocke, D. M., & Romano P. S. (2008, February). The CABG surgery volume-outcome relationship: Temporal Trends and Selection Effects in California, 1998-2004. ***Health Research & Educational Trust*****, 43(1). Retrieved from http://www3.interscience.wiley.com/cgi-bin/fulltext/119390760/PDFSTART**

This recently published study examines patient-level clinical data collected from the California CABG Mortality Reporting Program; a voluntary reporting program from 1998 to 2002 involving between 68 and 81 hospitals. In addition, for the years from 2003 to 2004, patient-level clinical data was examined from the California CABG Reporting Program which is a mandatory reporting program in the State of California. This study took place during a transition from the voluntary to the mandatory reporting of CABG

outcomes. In this study the patient was the primary unit of study and in-hospital mortality was the primary outcome measured. The study acknowledged previous research in the area of volume and outcomes. It also noted that several recent studies with vigorous statistical methods and the use of risk adjusted data found limited or insignificant relationships between volume and outcome. The data elements collected included patient-level data defined by the STS in addition to data elements defined by other state programs including Massachusetts, New York, New Jersey and Pennsylvania. For this group of multiple hospitals in California it was determined that there was a "consistent but small" volume-outcome relationship for CABG surgery during the years 1998 to 2002, however this relationship disappeared in 2003 and 2004.

The study demonstrated, as other more recent studies, that CABG volume may no longer be the quality metric to use to determine Program value. Several reasons were hypothesized for this result including the use of patient specific clinical and risk adjusted data rather than administrative data as well as the advances in surgical practice that have increased overall quality of care to the patient.

Welke K. F., Barnett M. J., Sarrazin M. S. & Rosenthal G. E. (2005). Limitations of hospital volume as a measure of quality of care for coronary artery bypass graft surgery. *Annals of Thoracic Surgery*, 80(6), 2114-9.

This study reviewed over 900,000 Medicare patients for the purpose of quantifying the strength of hospital volume as a predictor of mortality following CABG surgery. Through examination of six years worth of data, the study demonstrated that although on average higher volume hospitals had lower CABG mortality rates than lower volume hospitals, a wide variation in risk-adjusted mortality rates existed among hospitals within similar volume categories and the discrimination of volume as a predictor of mortality was only "slightly better than a coin flip". It concluded that while there are many factors that contribute to the mortality risk of a patient undergoing CABG, hospital volume is a relatively weak predictor.

Khuri S. F. & Henderson W.G. (2005). The case against volume as a measure of quality of surgical care. *World Journal of Surgery*, 29(10), 1222-9.

The purpose of this study was to evaluate the use of volume criteria in setting standards of quality of surgical care. The conclusion of this study was that the use of risk-adjusted

outcomes is more appropriate for setting such standards. The author notes that allowing standards based on volume means accepting the premise that low volume hospitals deliver substandard care and high volume hospitals always deliver good care. The author, Dr. Shukri Khuri, has been actively involved in the Veterans Administration National Surgical Quality Improvement Program (NSQIP), the first national, validated, outcome-based and peer controlled program for measuring and enhancing quality surgical care. In contrast to many research studies which have reviewed administrative databases to look at the volume-outcome relationship, NSQIP utilizes a trained nurse to collect prospective clinical data on all major surgical operations in the V.A. This allows for the ability to adequately adjust for patient severity of illness.

Work by the NSQIP indicates that volume of surgical workload is unrelated to quality of care and attempts at setting volume as a standard are flawed. NSQIP has found no direct relationship between volumes and outcomes and has demonstrated that the systems of care have more impact on overall outcomes than does volume. Dr. Khuri notes that any threshold volume below which quality is likely to be compromised is illusive at best.

Zacharias A., Schwann T. A., Riordan C. J., Durham S. J., Shah A., Papadimos T. J., Engoren M. & Habib R.H. (2005). Is hospital procedure volume a reliable marker of quality for coronary artery bypass surgery? A comparison of risk and propensity adjusted operative and midterm outcomes. ***Annals of Thoracic Surgery*****, 79(6), 1961-9.**

This study reviews the type of system currently in place within the Program [i.e. same surgical team providing services at what are considered Low Volume Hospitals (LVH) and High Volume Hospitals (HVH)]. Zacharias et al. reviewed the results of several recent studies looking at the association between hospital volume and outcome, including a study by Peterson, et al. described below. In these studies, the authors concur that hospital volume-outcome effects are confounded by a significant independent surgeon volume effect. The purpose of this study was to better define whether the procedure volume effects are surgeon or institutional in origin. The study examined 30-day and 3-year mortality for two different institutions served by the same surgical team over a two-year period. The same perfusion team provided bypass services at the two hospitals. Results showed that the two hospitals exhibited multiple demographic and risk factor differences. However, unadjusted operative mortality was similar for the LVH and the

HVH (2.38% vs. 2.98%), with nearly identical observed to expected ratios, irrespective of preoperative risk category. Hospital volume did not predict operative mortality.

The study concluded that when served by the same high volume surgeons, similar operative and mid-term outcomes may be achieved in LVH and HVH and surgeon experience rather than institutional volume may be the more critical factor. In addition, cardiac surgeons who apply similar patient care standards and pathways and emphasize a team approach to cardiac surgery care can and do achieve similar outcomes at independent low volume and high volume programs.

Peterson E.D., Coombs L.P., DeLong E. R., Haan C. K. & Ferguson T. B. (2004). Procedural volume as a marker of quality for CABG surgery. *JAMA*, 291(2), 195-201.

This study did an observational analysis of 267,089 CABG procedures performed at 439 U.S. hospitals and reported through the STS National Cardiac Data Base. Overall, operative mortality for CABG surgery was 2.66%. After adjusting for patient risk, the rates of operative mortality decreased with increasing CABG volume; however, this association was not observed in patients under the age of 65 or for those with low preoperative risk. Hospital volume generally had poor predictive accuracy as a means of identifying hospitals with significantly better or worse CABG mortality rates. The study indicates, however, that in contemporary practice, hospital procedure volume is only modestly associated with CABG risk adjusted outcomes, and therefore is not an adequate quality metric for CABG surgery. The use of risk adjusted outcomes through national clinical databases should be supported as a measure of quality. The results of this study indicating that the volume-outcome effect is not significant in patients under 65 years of age and in those with low pre-operative risk, imply that prior studies performed exclusively in Medicare patients and without risk stratification would have inflated the volume-outcome effect. The conclusion was that "the closure of up to 100 of the lowest volume centers (i.e. those performing less than or equal to 150 CABG procedures) would avert fewer than 50 of the 7,110 (less than 1%) of CABG related deaths."

Papadimos T. J., Habib R. H., Zacharias A., Schwann T. A., Riordan C. J., Durham S. J. & Shah A. (2005, May). Early efficacy of CABG care delivery in a low procedure-volume community hospital: operative and midterm results. *BMC Surgery*, 5,10. Retrieved from http://www.pubmedcentral.nih.gov/picrender.fcgi?artid=1131908&blobtype=pdf

The authors note that the studies related to the volume-outcome connection have had varying and sometimes conflicting results. This study reviews the experience with a recently initiated small community hospital cardiac surgery program modeled after a similar high volume program in the same region. The newer program had cardiac surgery services provided by the same surgeons who performed services at an HVH. The authors looked at isolated CABG morbidity and mortality outcomes at the LVH (new program) and compared them to the national data as reported by the STS National Cardiac Data Base over the period of time from February 1, 2001 to December 31, 2003. All CABG procedures at the LVH were performed by the same high volume surgeons who performed CABG procedures at the HVH. The LVH operative mortality did not statistically differ from the STS benchmark.

This study paradigm, involving a group of high volume surgeons from a high volume facility establishing a new lower volume program at another facility is similar to the structure of the HCGW Program and demonstrates that high quality CABG care with good outcomes can be achieved at a new lower volume program provided that it is served by high volume cardiac surgeons and backed up by a highly trained dedicated support team.

Kalant N. & Shrier I. (2004). Volume and outcome of coronary artery bypass graft surgery: Are more and less the same? *Canadian journal of cardiology*, 20(1), 81-6.

This research looked at and compared many previously quoted studies relating procedure volume to outcomes. Although in early studies there seemed to be a relationship between volume and procedure outcome, the relationship has diminished over time virtually to zero. The findings of this study, along with the other recent studies, suggest that the evolution of CABG surgery has reduced the importance of the earlier evidence linking volume and outcome. Individual studies may still show a small effect of volume on outcome, but the overall pattern of results does not. Consequently, the combined evidence does not provide support for a policy of regionalization of CABG surgery.

V. Conclusion

The study of outcomes data has been a passion of mine now for nearly 30 years. I realize that I have presented an enormous amount of information and I have tried to explain this technical data in a way in which it can be understood by the OHCA administrative team upon review. I welcome the opportunity to explain or review this information with you now, in the future or at the administrative hearing. I thank you very much for your time and for consideration of the great amount of data. I realize that your time is very valuable and at the risk of being too inclusive and exhaustive, I hope I have not included too much information. Thank you.

Respectfully submitted,

David J. Underhill, M.D.

Pre-File Testimony
Before the Office of Health Care Access: Docket No. 08-31202- CON
Saint Mary's Hospital, Waterbury Hospital and John Dempsey Hospital
Elective and Primary Angioplasty and Open Heart Surgery
October 24, 2008

I am Paul Preissler and I hereby submit this written pre-file testimony for the Office of Health Care Access ("OHCA") hearing in the matter of docket number 08-31202-CON. I am a cardiac surgeon and I have been active in the practice of cardiac and thoracic surgery in Connecticut for over 25 years. My colleagues are Jonathan Hammond, M.D., David Underhill, M.D., Daniel Fusco M.D. and Henry B.C. Low, M.D. We care for patients at five of the nine hospitals in Connecticut that have a full cardiac program: Hartford Hospital (HH), John Dempsey Hospital at the University of Connecticut Health Center (JDH), Connecticut Children's Medical Center (CCMC), Waterbury Hospital (TWH), and Saint Mary's Hospital (SMH). I am Chief of Cardiac Surgery at John Dempsey Hospital, Waterbury Hospital, and Saint Mary's Hospital. Prior to being Chief of Cardiac Surgery for these three hospitals I had been Chief of Cardiac Surgery at Hartford Hospital. As a group we bring over 100 years of collective experience in cardiac surgery to the care of our patients. I would like to address the issue of permanent status of the Heart Center of Greater Waterbury. In making this request, I will enumerate several reasons why permanency of the Program as currently configured is necessary for the citizens of greater Waterbury.

I. Background

When Dr. Steven Strongwater and Dr. Peter Deckers first approached me to discuss the University of Connecticut's decision to support the CON for expanded cardiac services in Waterbury, the proposal seemed logical and appropriate to me. The concept of redistributing these services to medium sized communities, while rare in Connecticut, has occurred frequently in recent years in the Northeast region. The driving issue behind this redistribution of cardiac services is timely access and local availability. The issue is not one of capacity.

The reasons for this expansion of cardiac programs to local sites is easy to understand. First, interventional cardiology and cardiac surgery are mature, well-developed routine therapies that

are easily installed in local hospitals. We are just one of numerable examples of successful programs in smaller communities, often with results better than found in larger centers.

The Program was immediately successful. It began serving patients on its first day of approval and operation and since that time has received continued significant support and acceptance in the community. The Heart Center work is now a known entity. There is no conjecture about the needs and the volumes of care being delivered by the Heart Center. This has been demonstrated by over three years of experience with over 2400 patients having chosen the Heart Center of Greater Waterbury either at Waterbury Hospital or Saint Mary's Hospital for their care. This represents over 600 open heart surgery patients and roughly 1800 angioplasty patients. There are also an untold number of patients who have received diagnostic studies and consultations in addition to the above mentioned patients who have chosen to have the procedures done in Waterbury. As my associate Dr. David Underhill will expand upon in his Prefile testimony and at the hearing, this program has generated excellent outcomes in all areas. The quality of the work that is being delivered to Waterbury patients rivals any program in the state of Connecticut.

The Program's mission was and is to deliver the utmost in advance cardiac care at the lowest possible investment cost. Having both catheterization labs with angioplasty capabilities and open heart surgery at both campuses allowed the best access with the least amount of construction costs at either hospital. Neither hospital in the city without very major renovations is large enough to accept all chest pain patients. Secondly, having a two campus configuration allowed for the smallest disruption in Emergency Medical Technician and Emergency Department algorithms. Both the angioplasty and open heart surgery, were they to be isolated to one hospital or the other, would necessitate triaging all chest pain patients to one emergency room which would have overburdened one over the other. Thirdly, the two campus arrangement allowed both hospitals to participate and each hospital to maintain an active presence in cardiac care, also allowing for inpatient cardiac patients that arose from other services such as

orthopedics or general surgery the benefit from onsite angioplasty and open heart surgery services should they arise in the postoperative period following their other procedures. Fourthly, having a two campus program required no disruption of patients' historic institutional loyalties and choices, some generations in the making and difficult to alter. The logistics of angioplasty for ST-Elevation Myocardial Infarction (STEMI) and open heart surgery at both hospitals has been well worked out and has worked very well over the past 3½ years creating the situation where patients never need to be transferred regardless of where they present for their care.

I am here to talk particularly about the open heart surgery component of the program which is critical for the overall completeness of cardiac care in Waterbury. The Heart Center of Greater Waterbury has added significant value to the medical community not just through its procedures, but through education of both physicians and patients, through the heart health awareness programs and smoking cessation programs. It has allowed each emergency room to accept all chest pain patients knowing that each cause of chest pain can be evaluated and treated at its institution. The open heart surgery component, of course has supported the angioplasty for acute myocardial infarction program, which continues to be the ideal arrangement throughout the country. There has been extensive support of elective angioplasty as well.

II. Quality Outcomes

An important prerequisite to understanding why permanency of the Program as it is currently configured will benefit the community is to understand the outcomes of care that the Program has produced. As for the plethora of empirical evidence of the quality results of the Program, I will only touch upon what Dr. Underhill will cover in depth. The Program has submitted data via the OHCA CT Cardiac Registry since 2005 and at no time was the Program notified that OHCA had any concerns or issues with quality. There is good reason for this lack of action. Very simply, the quality of the Program is exceptional and in line with the other programs in

which my group practices and consistent with national measures of the Society of Thoracic Surgeons (STS) database to which we submit our data for review.

As a surgeon we look at many aspects of the care we provide. We do this consistently with the intention of making improvements as needed. We have looked at our outcomes and are compelled to share them with OHCA so that OHCA is comfortable with the necessary decision to continue the Program.

Our quality endeavors did not end with submission of our data to you the Commissioner via OHCA's CT Cardiac Registry, nor for national scrutiny via the STS. Our surgical group provides cardiothoracic surgery at Hartford Hospital, UCONN, Connecticut Children's Medical Center, Saint Mary's Hospital and Waterbury Hospital. I have looked at our outcomes in all of the programs in which we provide cardiothoracic surgery. This was not required, but was done because we felt it was important to us to be certain that our performance was not significantly different based on where we practiced. We were not surprised to find that our outcomes in Waterbury, despite volume differences, were not significantly different than at the other hospitals where we provide these services. We have compared our own outcomes for key measures related to Coronary Artery Bypass Graft Surgery and Aortic Valve Replacement Surgery. These measures are those that the STS database examines as National Quality Forum measures. The data clearly demonstrates that the Program's surgeons practicing in different hospitals of varying volumes have similar outcomes regardless of the institution in which they care for patients.

OHCA must also understand that positive outcomes are not inadvertent. There are several factors that contribute to this and as the decision to continue the Program is considered, it is important to understand those other elements.

III. Program success is Due to Structure, not In spite of It

By providing the cardiac surgery component of the Program, my colleagues and I have brought the same experience and expertise noted previously to the patients in the Waterbury community. In doing so, we did not start a new cardiac surgery program in Waterbury; rather we extended our work into a new area. We used the same procedures, protocols, personnel (physicians and physician assistants), equipment and instrumentation in all of the hospitals (Hartford, UCONN, CCMC, SMH and TWH) in which we work. We chose to integrate the Program into our existing network in order to gain efficiencies not available to new or startup programs. By using our tried and true approaches and bringing a whole team of experienced professionals with us, we could coordinate every aspect of care and management for the patients in Waterbury. All that we do is coordinated through a single centralized control office. We can generate flexibility, efficiency and cost savings unavailable to stand-alone programs. By rotating personnel, including physicians, physician assistants, perfusionists and anesthesiologists, we can guarantee continuous coverage 24/7 and 365 days a year. This approach has yielded our quality outcomes.

In addition, our network approach offers direct access to more advance technologies in cardiac care for every patient regardless of their hospital of origin. We can coordinate and arrange for cardiac transplantation, left ventricular assist device support, advanced analysis of complex high risk cases or adult congenital heart problems without having to move outside of our network. We have also brought a collection of resources in noncardiac thoracic surgery to the Waterbury community, allowing for more noncardiac thoracic patients to stay near home for their care. Also, there have been a number of patients, often elderly, who have been able to benefit from our consultation and evaluation even if no operative intervention has followed. This has been an invaluable service to their total care. They can make their decisions knowing that every potential therapy has been investigated and explored. Of course, cardiac surgery service in Waterbury has also supported and allowed the development of a robust high quality program for both emergency and elective coronary angioplasty. Lastly, the Heart Center has propagated a huge

community outreach and education effort in the Waterbury area, focusing on disease prevention, smoking cessation, and cardiac risk factor management.

I raise these issues because they help elucidate the value of the total Program, and to emphasize that each component is intrinsically related to the other's within the Program. The Program must be assessed as a whole, not dissected into small pieces. Cardiac surgery is one component of the program, but it supports the entire program. It allows for the emergency room evaluation of chest pain, to back up emergency angioplasty for STEMI, or stabilization of non-STEMI acute coronary syndrome patients who need urgent operations but not emergency operations, patients who cannot be discharged safely prior to an intervention. If cardiac surgery and emergency angioplasty are not available, then emergency rooms are impacted in how they must do their work and patients cannot efficiently proceed to definitive therapy without significant delays and unnecessary transfers to other institutions. The point I am attempting to emphasize is the cardiac surgery portion of the Program is not a stand-alone surgical entity. It is completely integrated into our larger practice. As such, the Program is part of one of the largest cardiac surgery programs in Connecticut.

As evidenced by the CHIME data for FY 2006, 2007 and the first six months of fiscal year 2008, the Program has performed more surgical cases than the John Dempsey Hospital, the Bridgeport Hospital, the Danbury Hospital and the Stamford Hospital programs. These programs, also providing vital service to their respective communities and unlike our Program are in no danger of being discontinued or altered. The two hospitals in Waterbury should not be dissected apart by the State into two separate identities. This would further the error of incorrectly evaluating the Program at large. As stated elsewhere, everything in each hospital is identical, including the people doing the procedures. The only differences are the bricks and mortar surrounding the patient, and the color of the scrub suits that we wear. To assume that institutional volumes instead of the surgeon volumes is how the Program is to be judged is to assume that each surgeon

loses his skills and judgment as he heads West on Interstate 84. Surely, life and death decisions should not be made upon such notions. In fact, the structure of the Program is clearly one of its strengths. While allowing Waterbury patients their choice of access to the hospitals that they prefer, the Program delivers the most advanced, efficient and lifesaving cardiac care available in Connecticut. The number of cardiac surgery cases performed in each hospital in the Program should not be the marker of its worth, nor should it be a factor in judging its success or failure. The total impact of the program and the network that it is part of should be the measure. To decide the existence of this program in the long term based on quantity measures alone and to ignore the quality and access the

Program has provided to citizens of the state is in my opinion, simply too narrow and shortsighted and is a complete disservice to efficient and effective patient care,

IV. **Conclusion**

In summary, the permanent approval of this CON, giving long-term and permanent status to the Program would allow an established, known program which delivers advanced cardiac care to continue its work and serve its community. Cardiac surgery procedures are being performed by highly experienced surgeons that bring with them not only significant years of experience, but also systems of care that are necessary to provide this high quality care. It would allow us to continue to deliver excellent care and outcomes to a community that has embraced the Program. Any change in the Program's configuration would compromise access, compromise outcomes, could necessitate transfers, and generate new and increased investment costs. I appeal to the Commission to approve the Heart Center's application for permanent CON status unaltered and to allow the program to continue its work for both the near and distant future. Closing and even altering the Program would deny access to care to the Waterbury population.

Respectfully submitted,

Paul L. Preissler, M.D.

Pre-File Testimony
Before the Office of Health Care Access: Docket No. 08-31202-CON
Saint Mary's Hospital, Waterbury Hospital and John Dempsey Hospital
Elective and Primary Angioplasty and Open Heart Surgery
October 24, 2008

I, Dr. Christopher Michos, hereby submit this written pre-file testimony for the Office of Health Care Access Public Hearing in the matter of Docket Number 08-31202-CON to be held on October 30, 2008. I am currently the Chairman of Emergency Medicine at Waterbury Hospital and have been practicing emergency medicine in Connecticut for 13 years. I am Board Certified in Emergency Medicine and a Fellow of the American College of Emergency Medicine. I received my medical education at the University of Medicine and Dentistry, The New Jersey Medical School and completed my internship in medicine at The Long Island Jewish Medical Center in Queens, New York and completed my residency training in Emergency Medicine at The Long Island Jewish Medical Center and was also Chief Resident for the program. For five years I was an attending in Emergency Medicine at Griffin Hospital and during those five years served as the Emergency Department Quality Assurance Director, the Assistant Chairman and the Interim Director of the Emergency Department. During the past eight years at Waterbury Hospital, I have served as the ED quality assurance Director, Research Director and currently as the Chairman of the Department. In this role, I am responsible for the day-to-day operations and long-term planning for the department. I am also the Medical Director for our ground emergency medical services. I want to make it clear that I am not just an administrator but also a clinician who works 6-8 clinical shifts per month and in addition to those assigned clinical shifts, I see patients almost on a daily basis because of our high volume and acuity. In addition to my emergency medicine responsibilities, I am the Health Director for the Town of Easton, Connecticut. Our mission, through the efforts of our highly trained group of clinicians, nurses and staff, is to provide the highest level of care to our patients. Our Emergency Department cares for over 55,000 patients per year and my colleagues at Saint Mary's Hospital lead by Dr. Peter Jacoby care for approximately 70,000 patients per year in their ED.

The Certificate of Need application is about maintaining a program that saves lives in the City of Waterbury and surrounding communities and as the Chairman of the Emergency Department at Waterbury Hospital I can speak directly to that. The Emergency Department (ED) is the front door for the majority of cardiac patients that enter the hospital. Each year, anywhere from 13,000-15,000 patients require a cardiac evaluation and/or intervention between the two emergency departments in the City of Waterbury. This is a staggering number of patients entering the system that need fast and experienced emergency care. I see this occur on a daily basis. We are fortunate that our educational programs have been effective, because when someone experiences chest pain, they go to the closest facility.

In the Emergency Department, we move fast because we have to. When a heart attack hits the door of the ER, we say, "time is muscle" because the longer we wait to provide definitive treatment the more the heart is damaged. In some cases, it can cost a life. With the Heart Center

of Greater Waterbury, when the radio call comes to the department from our outstanding paramedics or for those patients who actually walk into the Emergency Department and this happens more often than you think, our experienced group of Emergency Department physicians, Cardiologists, nurses and technicians spring into action to provide life saving treatment. It is like a well trained Olympic athlete running a sprint. If you so much as blink, you might miss seeing the patient whisked to the catheterization lab for life saving treatment. This becomes our race to save a life. I have no doubt that in the three years since the Heart Center opened, we have saved the lives of many, many patients who might not have made it if they had to spend hours being transported out of Waterbury to another hospital. Many of them might not survive the wait time it would take to transfer them across town.

I respectfully request your consideration that this certificate of need application for a permanent program be maintained in its current structure. The staffs at both emergency departments in the City of Waterbury have been well trained and now function like a well oiled machine. They are able to care for the current volume of cardiac patients at both hospitals and have contributed largely to the exceptional door to balloon times that has been reported by the program. The Emergency Department staffs have also contributed to identifying other urgent cardiac patients that have needed medical or interventional care.

So I ask, why alter something when it works so well? Perhaps total patient volumes are the question and if that is the case, then the problems associated with redirecting the total volume should be considered. Currently, each of the city's Emergency Departments is overwhelmed with patients on a daily basis. Any reconfiguring of the Cardiac Program that would partially or completely force all cardiac patients to one institution would severely impact the quality of care provided to all patients, not just cardiac patients. No emergency department in Waterbury can assume the entire burden of cardiac care for the city and surrounding communities. This should be a strong consideration of OHCA in the context of this Application. Not only would space, equipment and expense be issues but increased volume of this extent would significantly increase wait times for all patients. Patients would leave the emergency department without being seen. Most importantly, such would impact quick access and treatment at a time when it is needed most. Patients on the other side of town from the designated heart center will be geographically disadvantaged as they will have to endure a longer ambulance transport to that designated facility instead of the closest facility that can also provide life saving care. Waiting to transport a patient from one facility to another, even across town will strain ambulance services. I have worked at an institution without advanced cardiac care where we would "drip and ship" and there are difficulties with this transfer process. Imagine the Herculean effort required to move a patient from an ED stretcher to the ambulance stretcher with all the monitoring

equipment and intravenous medications, placing and securing that patient in the ambulance and then repeating that process at the receiving institution. This consumes the ED in activity directed toward one patient who needs critical care, depriving other patients in the emergency department and the waiting room of the care that they need.

Let me describe these two scenarios, the way we currently practice and the way it will be should the Heart Center no longer be available. With our Heart Center, the patient arrives, is seen by the clinician and nurse, the EKG is performed, a heart attack is identified, a call is made to activate the cath lab and in minutes the patient is receiving treatment and the ED is ready to see its next patient. Without our Heart Center, the patient arrives, is seen by the clinician and nurse, the EKG is performed, a heart attack is identified, medical treatment is initiated, a call is made to the cardiologist, an ambulance is called, the receiving institution is called, paperwork must be completed and instead of traveling down a corridor, the patient must travel to another institution while the clock is ticking.

The importance of approving this program on a permanent basis could not be more strongly stated. After providing emergency cardiac care for the last three and a half years, what am I going to say to our critical heart patients when they arrive in the Emergency Department because we are the closest hospital if that care is no longer available? Instead of providing this highest level of care, instead of rushing that patient to the catheterization lab, I will need to delay care. And by doing so, we are going to place that patient at great risk. There is no reason for this outcome. To me, this is a potential health crisis for the City of Waterbury and the surrounding communities. The program is all about providing life saving treatment. And from someone who knows first hand about the value of time, failure to approve this application as it has been submitted would be a disservice of the greatest magnitude to this community. Right now, we do our job well and we are saving lives. As a physician, all I want is the best care for my patients, the care they deserve.

Respectfully submitted,

Christopher J. Michos, MD, FACEP
Chairman, Emergency Department
Waterbury Hospital

Introduction

Interrogatory Response for Public Hearing:

Certificate of Need Application, Docket Number: 08-31202-CON

The Waterbury Hospital, and Saint Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital

Establish Primary and Elective Angioplasty and Open Heart Surgery Program at The Waterbury Hospital and Saint Mary's Hospital, with No Associated Capital Expenditure

The Waterbury Hospital (TWH), Saint Mary's Hospital (SMH) and John Dempsey Hospital (JDH), the Applicants, hereby submit responses to the Interrogatories posed by the Office of Health Care Access (OHCA) related to Certificate of Need Application, Docket Number: 08-31202- CON.

In review of the questions posed, the Applicants perceive that OHCA is seeking information to determine if it is possible to consolidate the advanced cardiac services (Program) currently provided to the greater Waterbury community. Consolidation may appear to be the next step had the hospitals demonstrated inefficiency, poor quality or overall inability to provide the necessary services. This, however, has not been the case for this Program. In the three year demonstration project, the Applicants demonstrated excellent quality, efficient use of hospital and staffing resources and a level of care that has been overwhelmingly accepted and appreciated by the community. In addition, the Program has provided these two financially distressed hospitals with positive financial results. The Applicants, as part of their review of the program and program alternatives, have asked the questions:

Is there value in changing the Program's current structure?
Will outcomes become more positive than they are currently?
Will patients be taken better care of?
Will access to life saving healthcare increase?
Will there be positive financial impact for the hospitals and the community?

The Applicants have overwhelmingly determined that the answers to these questions are a resounding "No."

The Program works exceedingly well for Waterbury. It is a model that should not be modified simply because it is different from other programs in Connecticut. Residents of other Connecticut urban areas have two hospitals with separate and distinct advanced cardiac Program offerings. How fortunate for the residents of greater Waterbury, the fourth largest urban area in the State, that their hospitals had the foresight to be

collaborative in the development of one advanced cardiac care Program; a program that not only has saved lives, but has provided continuity of care regardless of which side of the Naugatuck River one chooses to receive treatment. What was once a long range plan for advance cardiac services has been successfully implemented and should be allowed to continue in this current configuration on a permanent basis.

This application represents three hospitals that are collaborating for the benefit of the community to deliver excellent and much needed cardiac care. To do this, in the initial planning phases of the Program (prior to 2004) and again through the existence of the demonstration project, ongoing analysis has been conducted by the Applicants to determine if another Program structure would benefit the community in any way. As noted on pages 0017-0019 of the CON Application, several different structures were considered. Clinical and financial analyses were conducted to determine if these structures would be a benefit to the community and to the hospitals providing this care. The overwhelming conclusion is no. No other program configuration would provide greater access to these services for members of the community, especially the poor and elderly.

ALTERNATIVES CONSIDERED:

Full service advanced cardiac care in Waterbury - One Campus:

Patients receiving care at either of the Program's campuses benefit from the care of established, experienced interventional cardiologists, cardiothoracic surgeons and clinicians. Patients suffering chest pain, or other symptoms associated with a heart attack, are well advised to go to the nearest emergency department for expert evaluation. While such symptoms may or may not be due to a heart attack, if these advanced cardiac services were available at only one hospital campus, patients who think they may be having a heart attack would choose the emergency department in Waterbury where both coronary intervention and open heart surgery capabilities exist. This could put those patients at risk and create a financial burden for the hospital that did not have the advanced cardiac program. Likewise, patients seeking diagnostic treatment and in need of a cardiac catheterization would choose the location where advanced cardiac services were available. According to the Connecticut Hospital Association's *Patient Census Report*, the combined total of emergency department visits at both of the Waterbury hospitals was almost 122,400 in fiscal year 2007. The emergency departments, catheterization labs, cardiovascular intensive care units and telemetry units at SMH or TWH campuses could not accommodate a shift in demand from one hospital to the other. To consolidate advanced cardiac services at a single campus would cost more, in terms of capital investment, than the two campus model, because one institution's facilities would have to be expanded in order to meet demand, while the other institutions facilities would suffer from diminished use—resulting in an unnecessary waste of existing resources.

A financial impact analysis has been completed by the hospitals that shows significant financial losses at both hospitals should the program be consolidated into one or the other, or if the Program were not given final approval to continue. The conservative

estimate of the financial impact of this scenario would be a $10 million to $12 million loss. This accounts for the loss of net revenue for interventional as well as other cardiac services and takes into consideration the direct fixed expenses that would stay with each hospital.

If the Program were to be consolidated into one facility, the financial impact noted above does not account for the necessary physical plant renovations that would be required by one hospital to renovate for increased cardiovascular (CVU) unit bed space, increased cardiovascular operating room space, increased emergency department space as well as capital equipment purchases in the catheterization labs and for the CVU. These additional expenses would generate further losses.

Primary Angioplasty Only (PAMI Only) in Waterbury:

Decreasing access by limiting the type of advanced cardiac care provided in Waterbury would be a significant disservice to the community. Over the last 3 years the greater Waterbury community has enjoyed the access and availability of advanced cardiac services.

PAMI-only programs offer services to only a small segment of the total population requiring immediate emergency interventional cardiac care. Given the volume and acuity of patients seen in Waterbury, the Program would find itself in an untenable situation where a patient could present with STEMI (ST- Elevation Myocardial Infarction) and be treated with primary angioplasty intervention, while, simultaneously, another patient presents with unstable coronary syndrome, undergoes a cardiac catheterization which identifies the need for coronary intervention, and must subsequently be transferred to another location for definitive therapy. The cardiologist and clinical staff involved in this scenario could have treated both patients in one locale, providing the most efficacious treatment, while saving time and dollars. Moreover, under a PAMI-only program, current caregivers, having provided a full range of life-saving angioplasty services over the last three years during the demonstration project, would find themselves in the untenable situation of not being able to practice what they have demonstrated an ability to do exceedingly well. A step backward in the standard of care would be an unfortunate and devastating result. While a PAMI-only program may be a solution for communities without access to any advanced cardiac care, it is not so for the fourth largest urban region in the State that has already had the full range of advanced cardiac services for over three years.

Furthermore, PAMI-only programs often produce a financial loss. Although some hospitals are able to absorb this loss, the case is quite different with SMH and TWH. An impact analysis of converting to this reduced level of service has been conducted and demonstrates that for SMH and TWH a conservative estimate of the financial loss would be between $3.8 million and $6.1million if one or both of the hospitals were to revert to PAMI-only. This accounts for the revenue lost for elective angioplasty and open heart surgery only. In reality, the impact would be greater as additional cardiac services provided on an outpatient basis could be impacted as well.

The additional financial burden that would be incurred would further distress the overall status of both SMH and TWH, and impact the ability of each campus to operate other unprofitable medical, surgical and psychiatric clinics that are so desperately needed by the poor and uninsured in this region. Again this does not account for the investments already made by the Program to train and educate staff and to renovate and equip the CVU and CVOR. These important and valuable resources will have been wasted in an era of healthcare when this can be ill-afforded.

Other Scenarios

An examination of any combination of the above scenarios continues to demonstrate that the Program as it exists today is one that provides the highest level of care to thousands of greater Waterbury residents in an efficient and cost effective manner. Any other imposed structure, done without careful thought and consideration of the consequences could lead us down a path of ultimate financial destruction of one or both hospitals. Thus, the Applicants ask for consideration of this application based its merits.

Conclusion

This CON Application is about Saint Mary's Hospital and Waterbury Hospital's desire to continue to serve the greater Waterbury community with the advanced cardiac services that it needs and deserves and as has been available since July 18, 2005.

Since approval of the original demonstration project several facts have remained constant. The need for advanced cardiac care remains high in this community and will continue to increase. The physician group who committed to the development and implementation of this Program has remained strong. Additionally, community members who originally voiced strong opinions related to the development of this Program have grown by the thousands and continue to voice their support.

Several facts, however, have changed since the approval of the original demonstration project. The most obvious is that the Program has demonstrated a proven track record of success and has demonstrated *actual* need, not projected need. By all measures including clinical outcomes, patient satisfaction, community support and financial impact, the Program has been a success.

The Applicants request that OHCA evaluate the Program as it was presented in the CON application-- one Program-two campuses -- based on the needs of the community, a proven track record of success and a structure that works for this community.

INTERROGATORIES

for Public Hearing:

Certificate of Need Application, Docket Number: 08-31202-CON

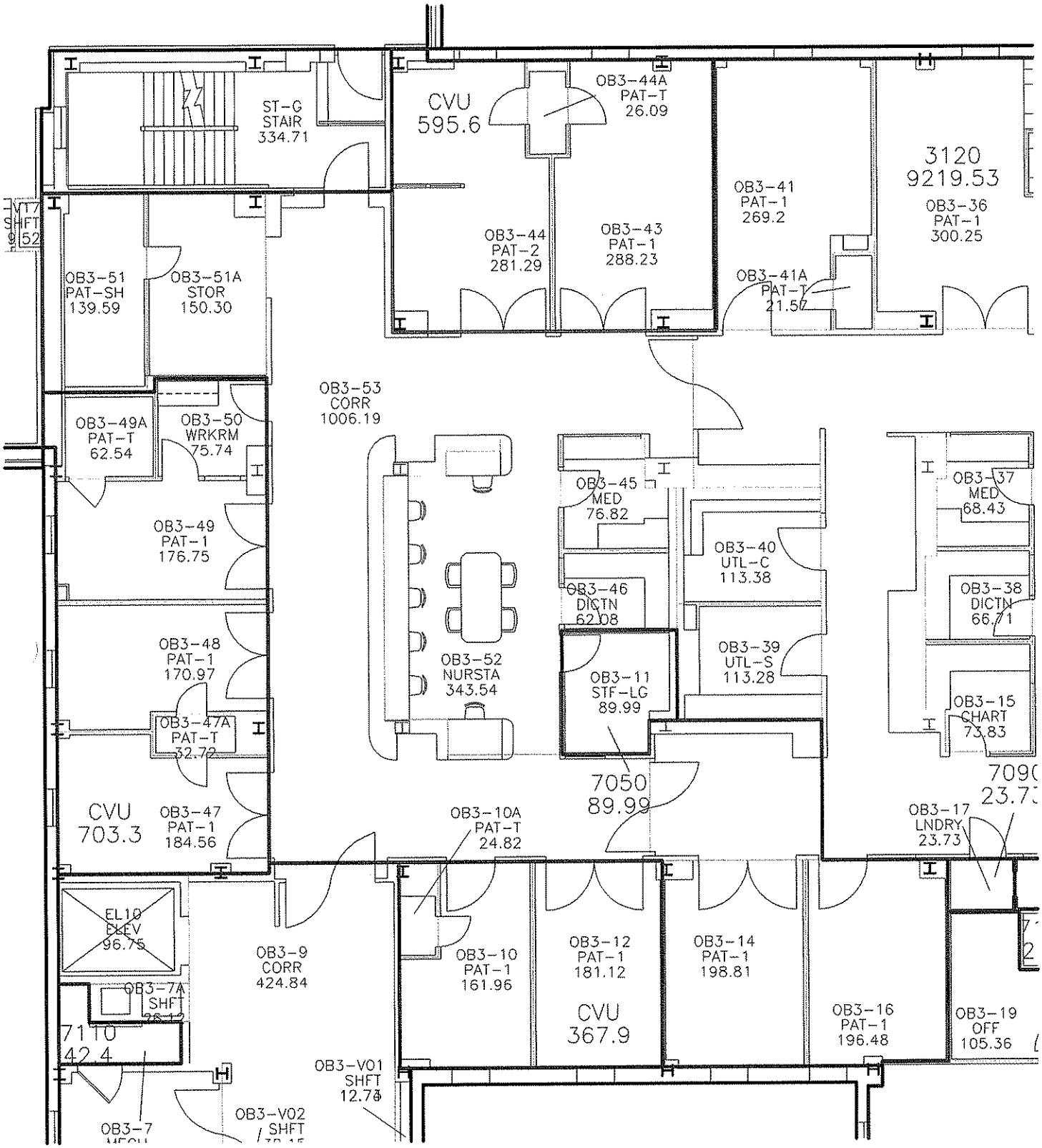
The Waterbury Hospital, and Saint Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital

Establish Primary and Elective Angioplasty and Open Heart Surgery Program at The Waterbury Hospital and Saint Mary's Hospital, with No Associated Capital Expenditure

Physical Layout:

1) For each The Waterbury Hospital (TWH) and Saint Mary's Hospital (SMH), provide schematic drawings to demonstrate the dedicated inpatient beds for the inpatient cardiac service. Please elaborate in a narrative if necessary.

Response:
The Cardiovascular Units (CVU) at TWH and SMH are the units dedicated to provide inpatient care to cardiac patients receiving advanced cardiac services (angioplasty and open heart surgery services) through the established Program. Each CVU is an eight bed intensive care unit specifically designed and staffed for the post cardiac procedure patient. At TWH, the CVU is on the second floor of the Pomeroy building and was newly renovated space when the Program commenced in July 2005. At SMH, the CVU is on the third floor of the O'Brien building and was newly renovated space when the Program commenced in July 2005. Schematic drawings for the units are provided on the following pages.

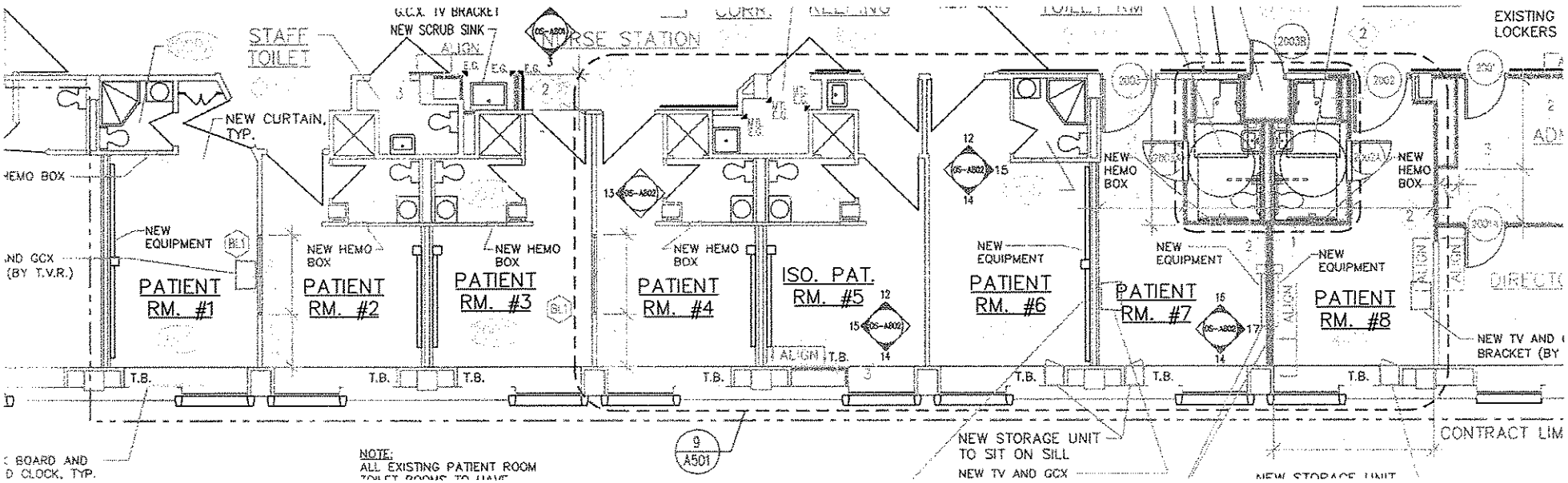


3/32" = 1'-0"

INVISION INC
96 Main Street New Canaan
Connecticut 06840
(203)966-8606
FAX (203) 966-3660

PARTIAL
FLOOR THREE O`BRIEN OCTOBER 2008

NORTH Saint Mary's HOSPITAL


STAFF TOILET
G.C.X. TV BRACKET
NEW SCRUB SINK
ALIGN
NURSE STATION
EXISTING LOCKERS
NEW CURTAIN, TYP.
NEW EQUIPMENT
NEW HEMO BOX
PATIENT RM. #1
PATIENT RM. #2
PATIENT RM. #3
PATIENT RM. #4
ISO. PAT. RM. #5
PATIENT RM. #6
PATIENT RM. #7
PATIENT RM. #8
T.B.
NEW STORAGE UNIT TO SIT ON SILL
NEW TV AND GCX
NOTE:
ALL EXISTING PATIENT ROOM
CONTRACT LIM

2) How many times in the last three years have the cardiac OR's at TWH and SMH been in use for Open Heart Surgery (OHS) at the same time? Please elaborate in a narrative if necessary.

Response:

In Fiscal Year (FY) 2006 the operating rooms at TWH and SMH were not used simultaneously. In FY 2007 the Operating rooms were used simultaneously three (3) times and this increased to eight (8) times in FY 2008.

In addition there have been multiple days since the Program commenced when there have been two or more (but not simultaneous) open heart surgeries in Waterbury. In FY 2005 this occurred seven (7) times, in FY 2006 this occurred nine (9) times, in FY 2007 this occurred thirty-eight (38) times and in FY 2008 this occurred thirty-three (33) times for a total of 87 days.

This means that on these days two or more individuals were in need of open heart surgical services. To provide these services the operating rooms were used twice in one day at one campus or once or twice at one campus and then again at the other campus. A review of the open heart surgical cases that occur on the same day revealed that same day usage of the cardiovascular operating rooms was not typically due to more than one elective surgery being scheduled. 88% of the time multiple surgeries occurred for the purpose of urgently or emergently providing open heart surgery services to greater Waterbury residents. That is, at least one or both of the cases were for urgent, emergent or emergent salvage level of care. This demonstrates that it is not always possible to predict when the Program's operating rooms will be used and that there is a need for availability of operating room resources at both campuses.

Care Pathways:

3) For Each TWH and SMH, provide the following:

a) The number of patients who arrived at each hospital for cardiac-related services through the Emergency Department (ED) each year, for the last three fiscal years (FYs). Break out these volumes by the method of arrival to the ED (e.g. ambulance, personal transportation)

Response:

The following table illustrates the ED visits for cardiac related services to TWH and SMH. This data was gathered through the hospitals' medical record coding information system and includes ED visits with cardiac symptomology requiring a cardiac workup as well as cardiac admission diagnoses. The method of transportation to the ED is captured by the nurse at triage and is also included. Personal transport includes patients who transport themselves or have a family member or friend transport them via automobile or walking in. If the method of transportation could not be determined it was considered unknown.

Cardiac Related ED Visits

TWH	FY 06	FY 07	FY 08*
Emergency Dept Visits	**7,215**	**7,357**	**6,918**
Personal Transport	3,862	3,938	3,703
Ambulance Transport	2,916	2,974	2,796
Helicopter	-	-	-
Police	-	-	-
Unknown	437	445	419
SMH			
Emergency Dept Visits	**6,984**	**7,366**	**7,208**
Personal Transport	4,879	5,372	5,278
Ambulance Transport	2,028	1,752	1,647
Helicopter	1	0	2
Police	35	37	23
Unknown	41	205	258

* Fiscal Year 08 includes only those ED visit through September 15, 2008. At the time of data collection the medical record coding for the entire month of September had not been completed.

Citywide volumes in the ED for patients presenting with cardiac issues totals 14,000 to 15,000 visits per year. Any shifting of ED volume to the other hospital would have a serious negative impact on the receiving hospital.

ED data from TWH demonstrates that 55,000 visits per year are handled in an ED that has the capacity for 35,000 visits per year (TWH ED was last renovated 10 years ago). ED data from SMH demonstrates that approximately 70,000 visits per year are handled in a newly renovated ED that has the capacity for 58,000 visits. Clearly the volume already outweighs

the existing capacity. Any additional burden on either ED would not be in the best interests of the patients or the caregivers.

b) For the last three FYs, the number of patients admitted for cardiac catheterization, angioplasty and heart surgery broken out by scheduled and non-scheduled. Please use the following table.

Response:

	FY 06 Scheduled *	FY 06 Non-Scheduled**	FY07 Scheduled	FY07 Non-Scheduled	FY 08 Scheduled	FY 08 Non-Scheduled
TWH						
Cardiac Catheterizations	394	238	290	303	303	328
Angioplasty	152	229	105	296	118	228
Open Heart Surgery	63	55	58	62	63	75
Total	**609**	**522**	**453**	**661**	**484**	**631**
SMH						
Cardiac Catheterizations	263	222	272	240	279	201
Angioplasty	86	223	38	219	25	233
Open Heart Surgery	30	40	61	47	35	49
Total	**379**	**485**	**371**	**506**	**339**	**483**

In the table above the definitions below apply:

*Scheduled: Procedures were determined to be an elective status
**Non-scheduled: Procedures were determined to be urgent, emergent or emergent salvage status.

The Table above demonstrates that the majority of cases in the catheterization lab as well as the operating room are unscheduled or had an urgent, emergent or emergent salvage status. This demonstrates that the majority of individuals in need of advanced cardiac care, whether it is diagnostic or interventional care, do not schedule appointments. Most of the care is provided as needed in an urgent or emergent situation and available resources are necessary to provide this in the highest quality manner.

Staffing:

4) Is there a cardiac services team that rotates between TWH and SMH? If so, provide the following:

a) Type of staff the team is comprised of (provide specific titles, for example nurse, technician, etc.);

b) The number of staff by type of team; and

c) Provide a narrative on the function or duties of the team.

Response:

The entire Heart Center of Greater Waterbury (HCGW) physician team has privileges and practices at both TWH and SMH. This includes four cardiothoracic surgeons and the three surgical physician assistants who provide support to them, four cardiac anesthesiologists, five interventional cardiologists and twelve cardiologists. Each physician is able to treat his patients at the hospital of the patient's choice which means the patient can be treated at the hospital at which they sought care, without being transferred. Additionally the perfusion team, made up of four Perfusionists also has privileges and practice at both TWH and SMH. Each of these groups has an on-call schedule that covers the Program regardless of which campus care needs to be provided.

There is also a team of five Registered Nurses (RNs) that provide preoperative and intraoperative support to the cardiac anesthesiologist in the cardiovascular operating room (CVOR) for the Program. All of these RNs work at each campus based on the operating room schedule and the needs of the patient. This group has an on-call schedule that covers the Program regardless of which campus care needs to be provided.

5) Are any changes proposed for the staffing as a result of this proposal?

Response:
At this time there are no proposed changes for the staffing as a result of this proposal. However as with any Program, if issues related to staffing were identified as an area of improvement, this would be considered, studied and an appropriate workable plan would be put into place.

Capacity and Utilization:

6) For each TWH and SMH, provide the following:

   a) The bed capacity and occupancy rate by major service line for the past three FYs. Please use the following table and complete additional rows as needed for service lines

Response:

See table below. Each hospital has a total number of licensed beds indicated in the table. Physical beds in each unit of the hospital are not licensed separately by service area. Therefore there is only a total of licensed beds.

Demonstrated below is the average occupancy rate of each specific unit. This means that throughout the years, on an average, the units will be filled at this average rate. However demonstrated in the graphs on the following pages, OHCA will see that census fluctuates greatly and for example, in the CVU, there are many days when the units are nearly or completely full. Therefore, it would be not be possible to consolidate the patient population from one hospital into the other without adding the physical space and related resources necessary to accommodate this population.

Additionally, and not accounted for in the occupancy rates below, are the numbers of boarders that exist in the hospitals' EDs on a daily basis. Boarders are defined as an admitted patient waiting for an inpatient bed. These patients not only impact ED capacity but also the inpatient units as well. Board volumes per hospital are graphically displayed on the following pages as well.

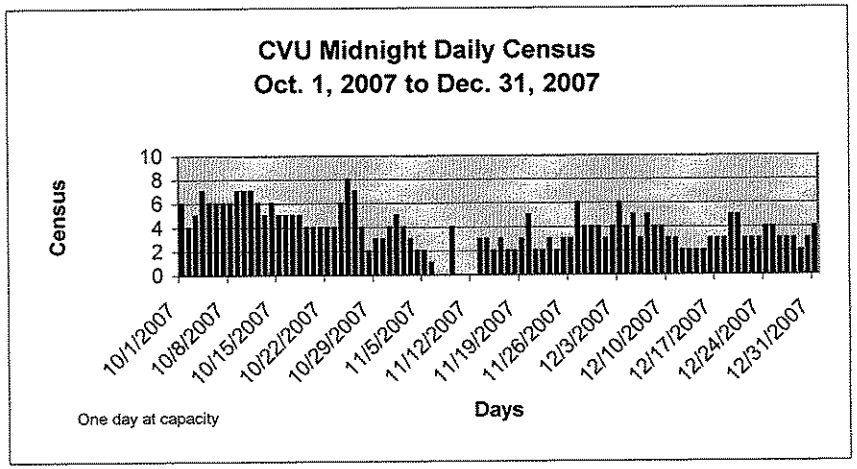
	Licensed Beds	Physical Beds	Net Clinically Available Beds*	Budgeted Staffed Beds **	Maximum Staffed Beds ***	Occupancy FY 06	Occupancy FY 07	Occupancy FY 08
TWH	357							
ICU	N/A	20	20	16	20	75%	75%	85%
CVU	N/A	8	8	6	8	63%	63%	63%
Telemetry	N/A	20	20	18	20	90%	90%	90%
Med-Surg	N/A	119	114	114	119	95%	90%	90%
Step-Down	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	357	167	162	154	167	87%	84%	86%
SMH	347							
ICU	N/A	16	15.5	12	16	80%	81%	74%
CVU	N/A	8	8	4	8	40%	51%	43%
Telemetry	N/A	20	20	19	20	84%	85%	86%
Med-Surg	N/A	103	100	97	103	93%	94%	87%
Step-Down	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	347	147	143.5	132	147	88%	89%	84%

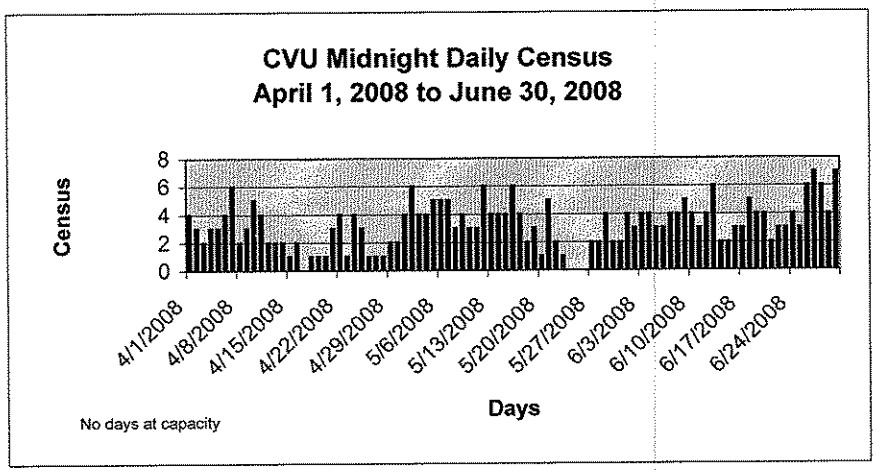
*Net Clinically Available Beds - Due to the lack of private room availability; semi-private rooms are converted to private rooms routinely to accommodate isolation patient needs. This number reflects average impact; the range can be as high as 10 beds closed due to the private room isolation needs.

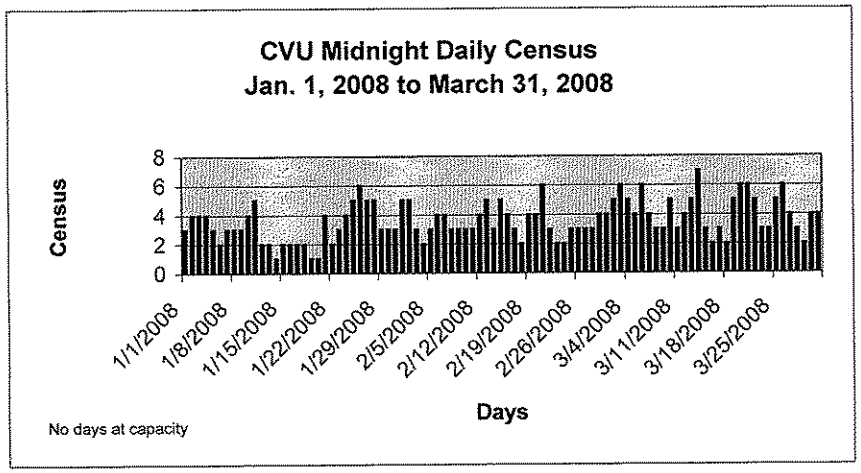
** Budgeted Staffed Beds - Each hospital budgets for a number of beds to staff.

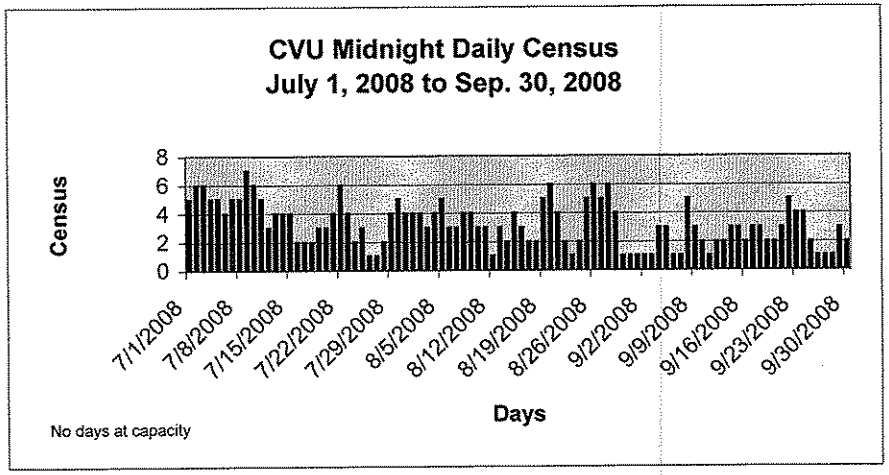
*** Maximum Staffed Beds - If the census requires, and the private room availability allows, staffing is provided for this maximum number of beds.

SMH CVU AVERA DAILY CENSUS
FY 2008 BY QUARTER



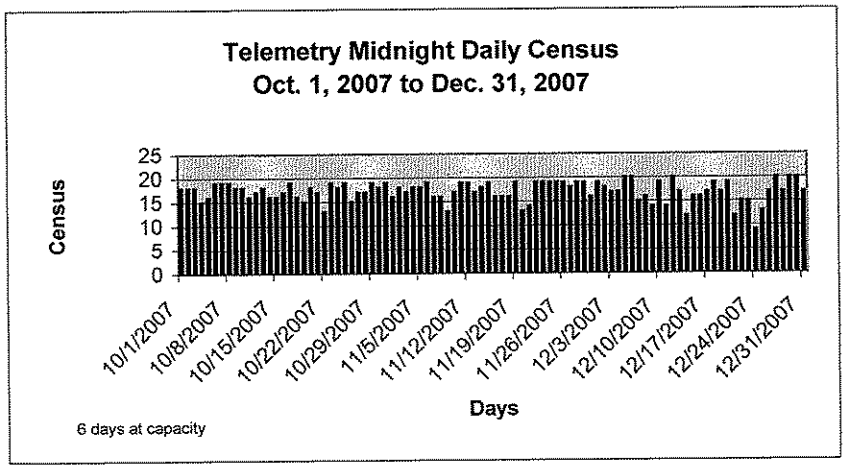


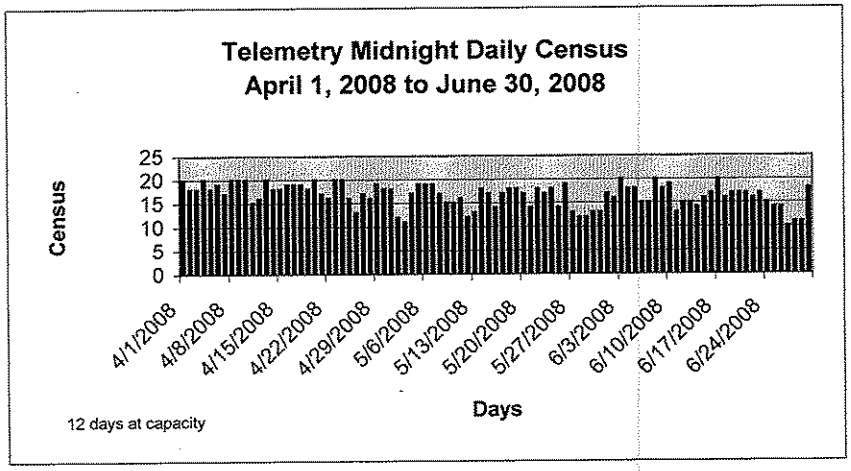


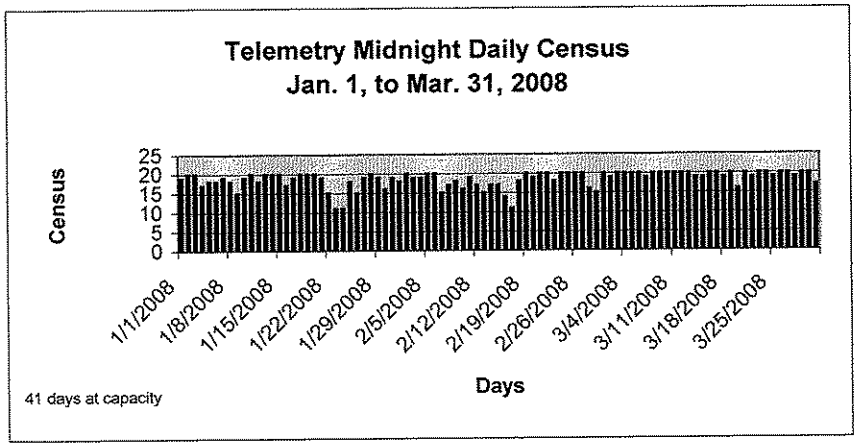


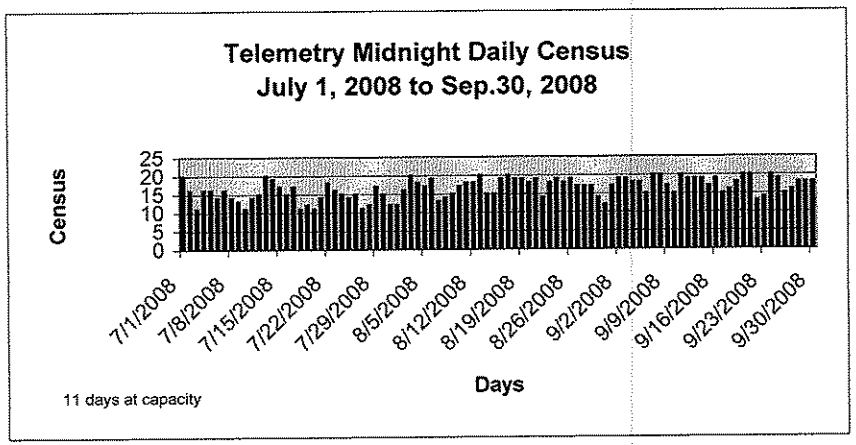
CVU Maximum Capacity: 8 Patients
The CVU was at maximum capacity 1 day in FY 2008
The CVU was at near maximum capacity (6-7 patients) 39 days in FY 2008

SMH TELEMETRY AV_ _GE DAILY CENSUS
FY 2008 BY QUARTER



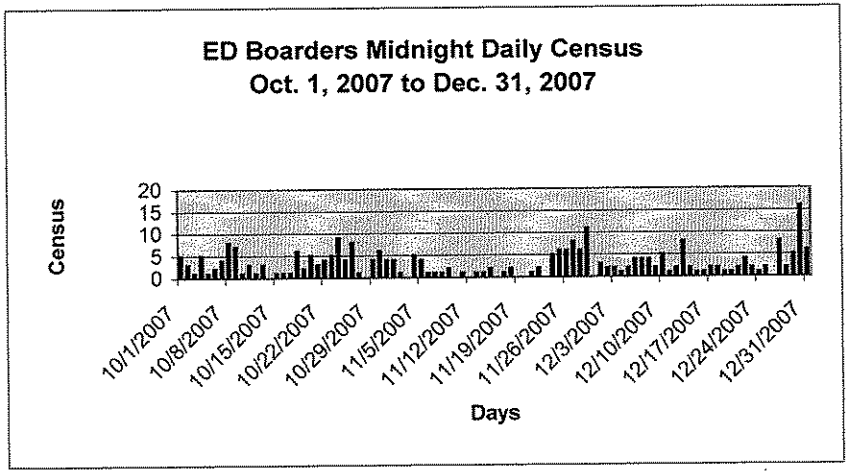


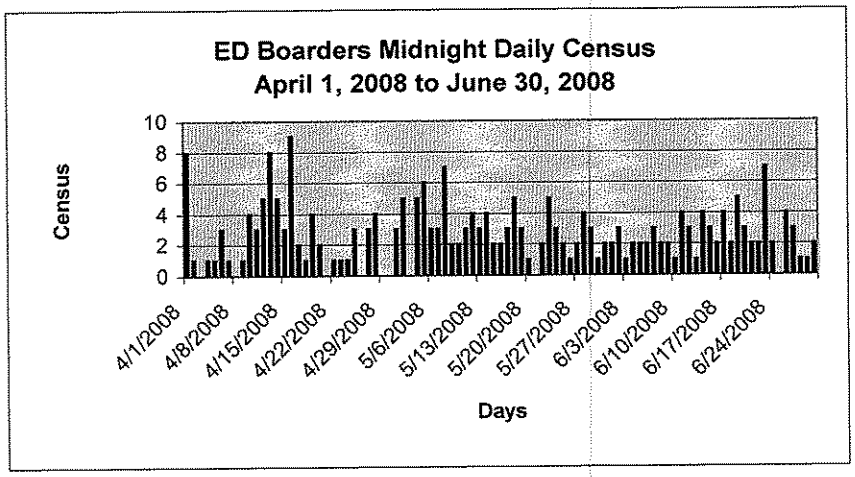


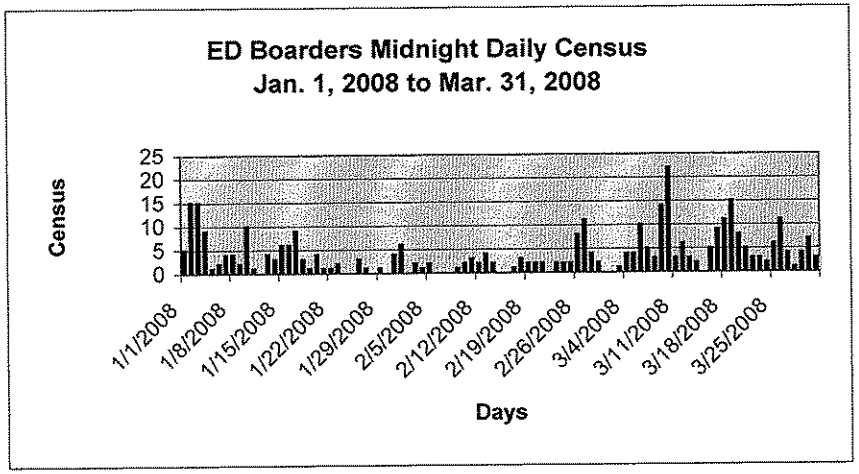


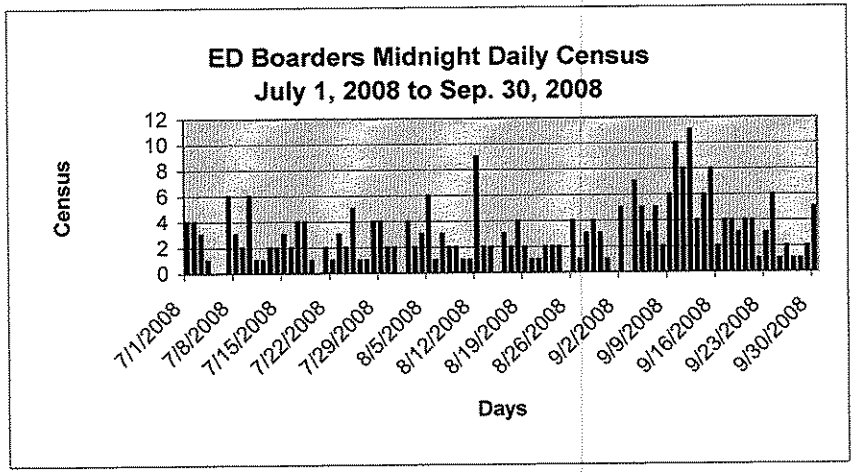
TELEMETRY Maximum Capacity: 20 Patients
Telemetry was at maximum capacity 70 days in FY2008

SMH ED BOARDERS A. .AGE DAILY CENSUS
FY 2008 BY QUARTER



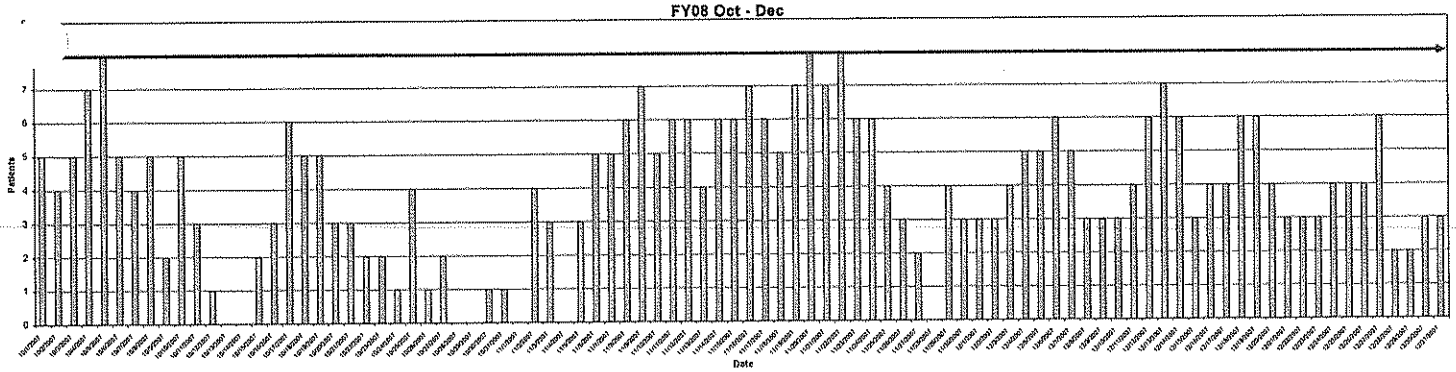




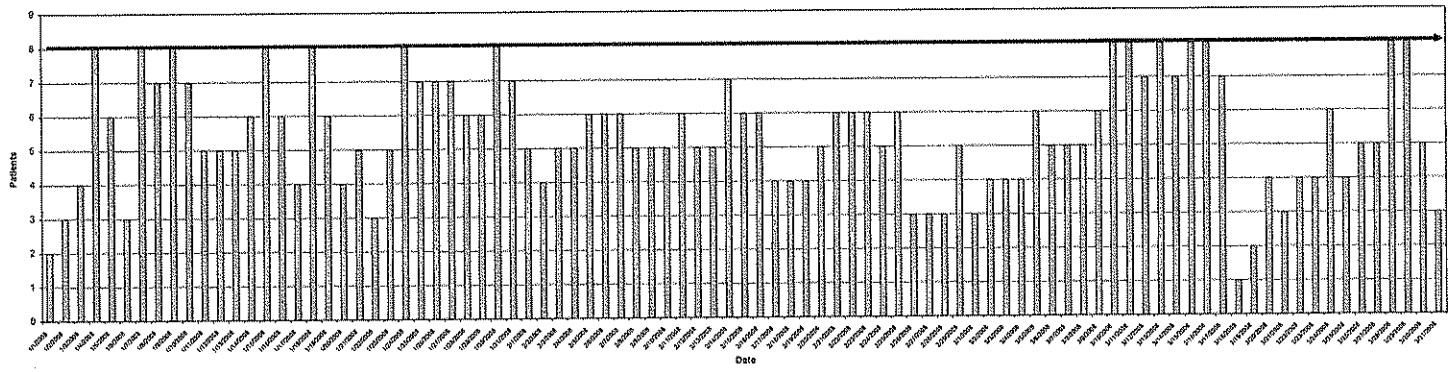


TWH CVU AVERAGE DAILY CENSUS
FY2008 BY QUARTER

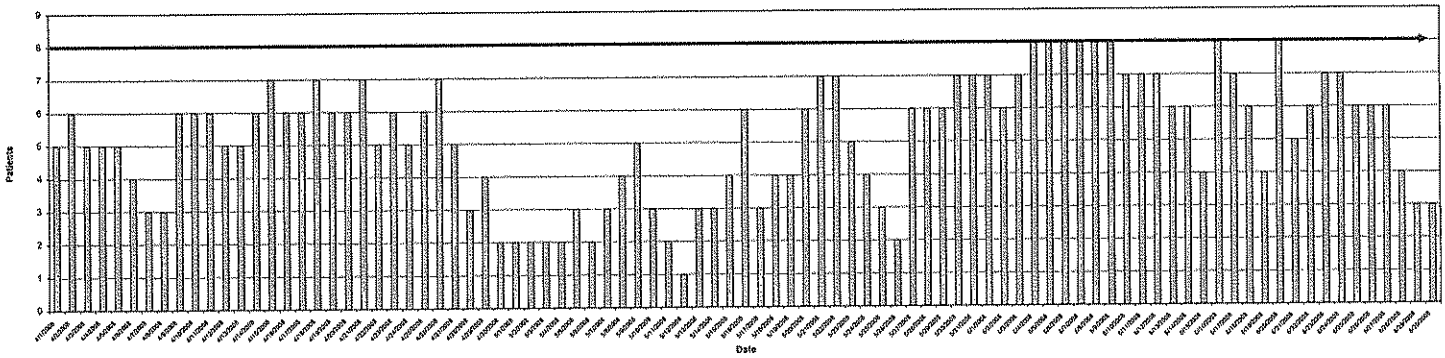
FY08 Oct - Dec



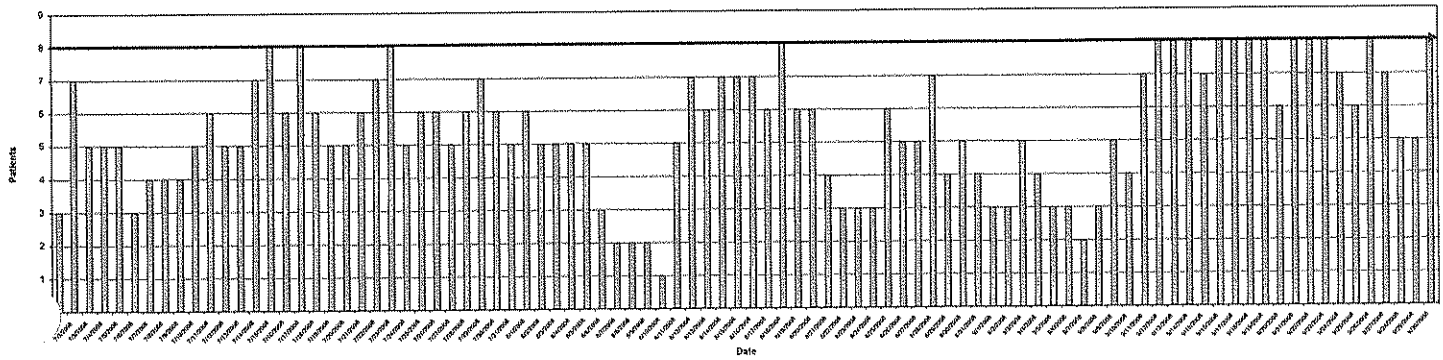
FY08 Jan-Mar



FY08 Apr-Jun



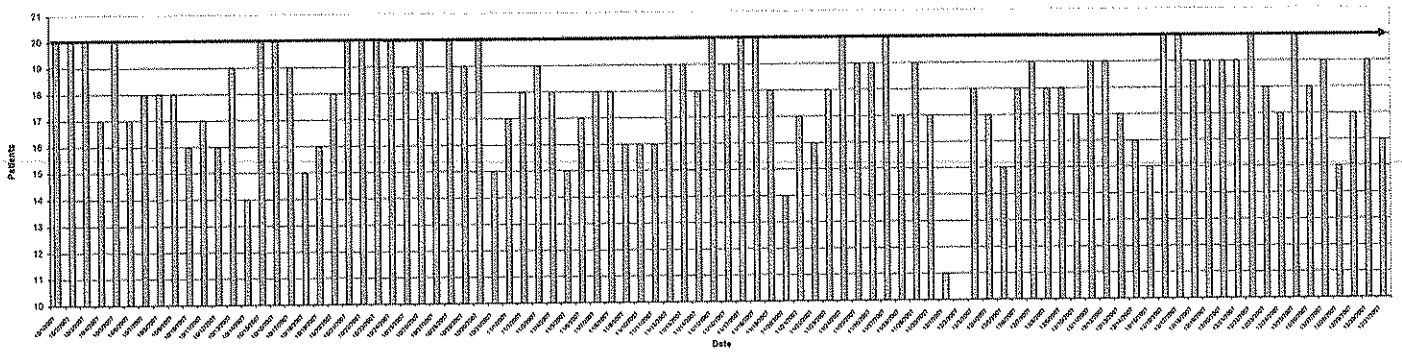
FY08 Jul-Sep



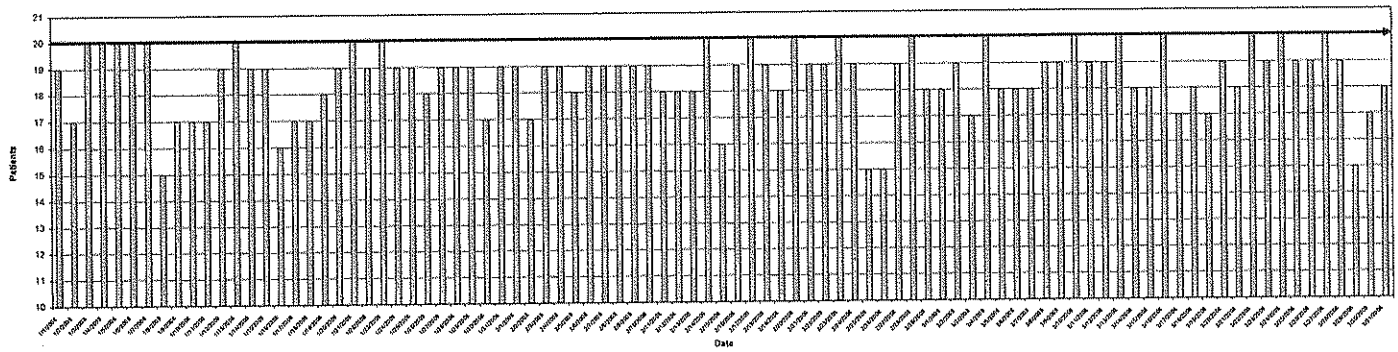
CVU Maximum Capacity: 8 Patients
The CVU was at maximum capacity 41 days in FY2008

TWH TELEMETRY AVERAGE DAILY CENSUS
FY2008 BY QUARTER

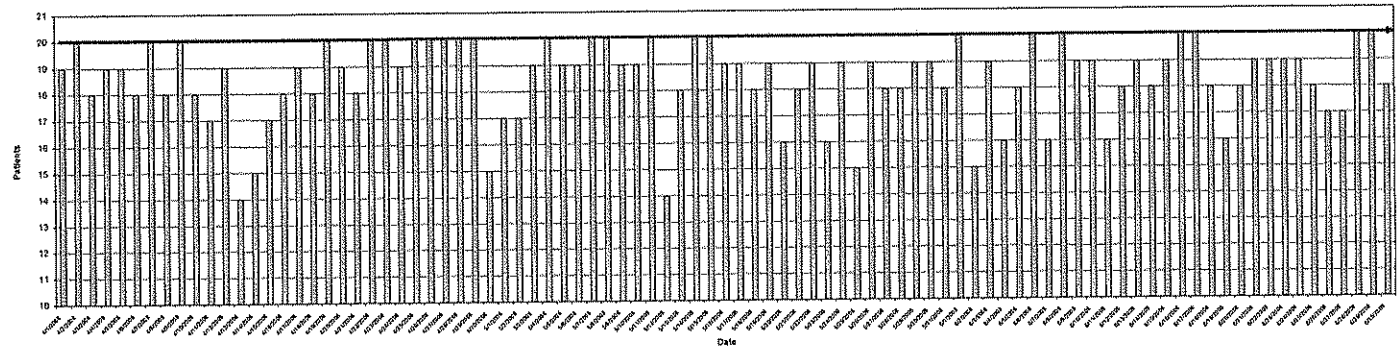
FY08 Oct-Dec



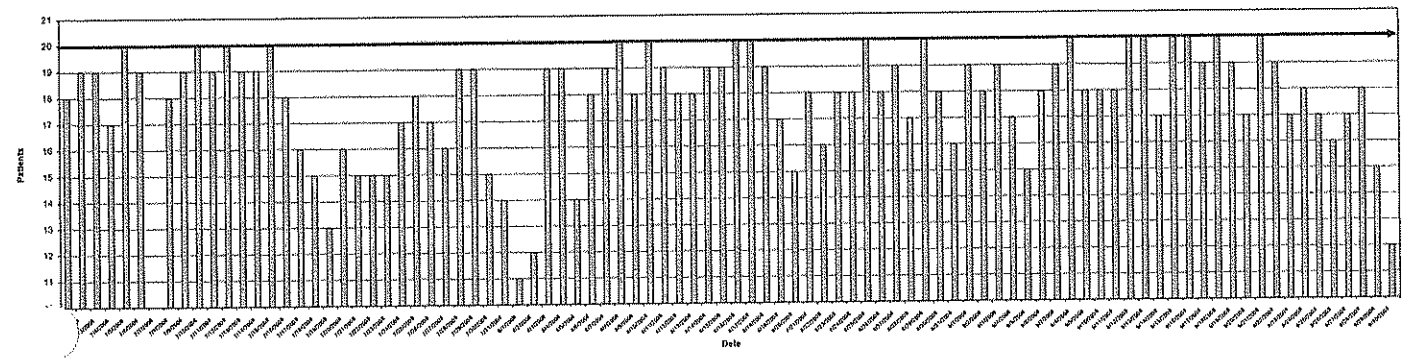
FY08 Jan-Mar



FY08 Apr-Jun



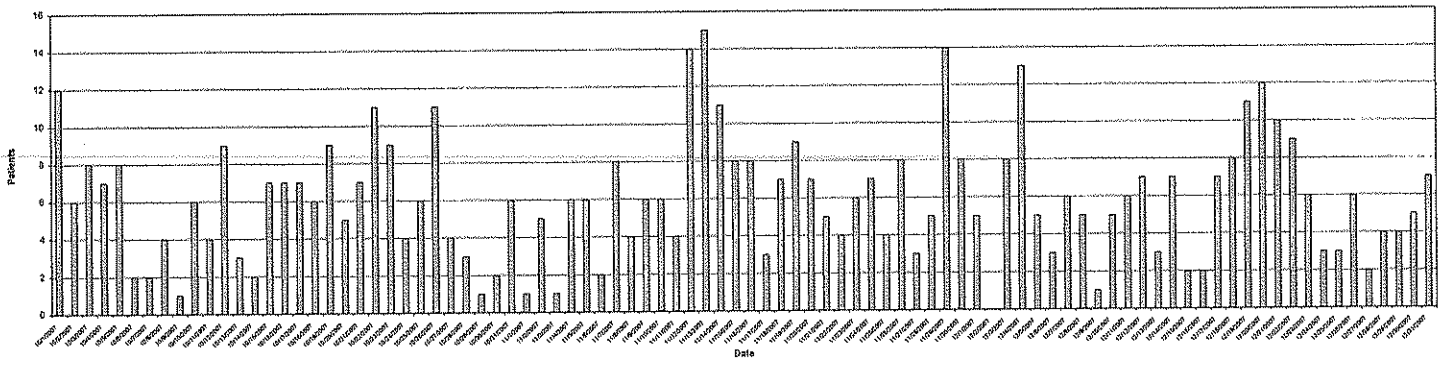
FY08 Jul-Sep



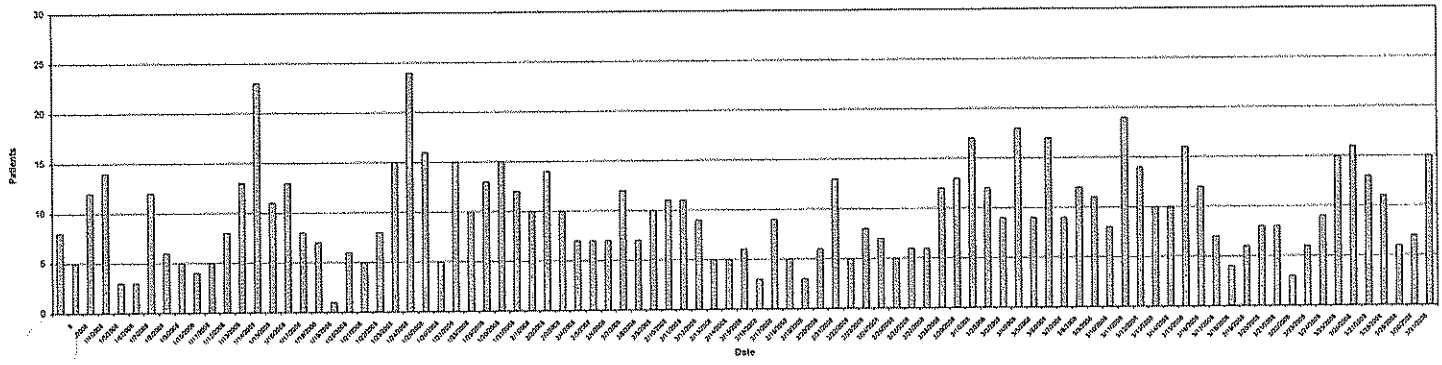
Telemetry Maximum Capacity: 20 Patients
Telemetry was at maximum capacity 83 days in FY2008

TWH ED BOARDERS AVERAGE DAILY CENSUS
FY2008 BY QUARTER

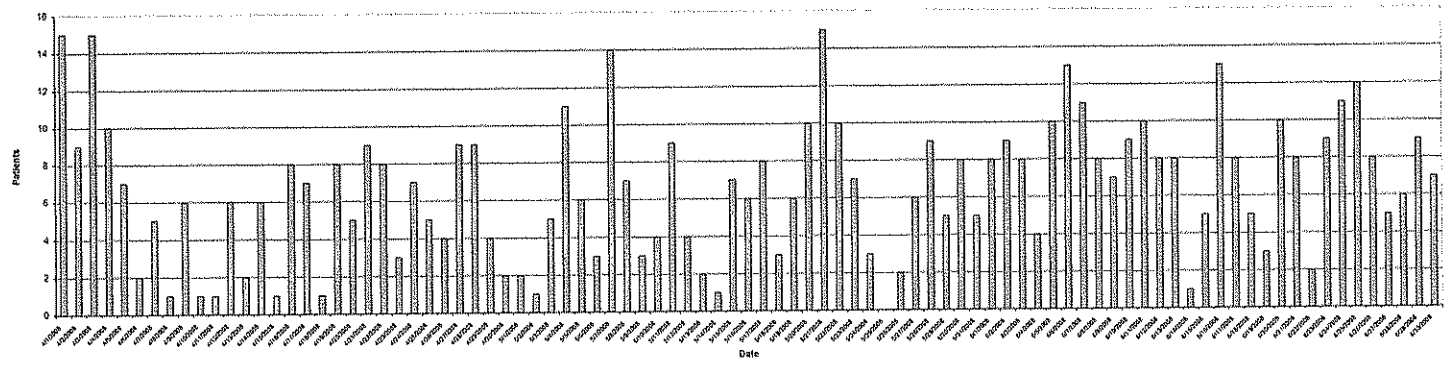
FY08 Oct-Dec



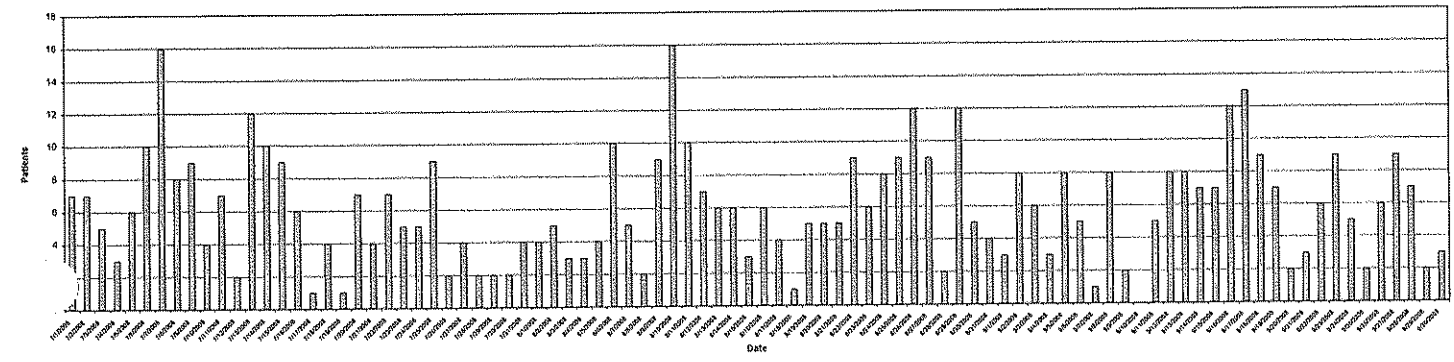
FY08 Jan-Mar



FY08 Apr-Jun



FY08 Jul-Sep



b) The average monthly census by inpatient unit for all services for the past three years

Response:
See Table below.

	Average Monthly Census FY 06	Average Monthly Census FY 07	Average Monthly Census FY 08
TWH			
ICU	447	463	510
CVU	139	144	153
Telemetry	542	541	553
Med-Surg	3,272	3,138	3,126
SMH			
ICU	391	396	360
CVU	97	124	105
Telemetry	514	514	523
Med Surg	2911	2,928	2,738

c) For the last year, the number of patients that were treated monthly at each hospital for cardiac services (OHS, Primary and Elective Angioplasty, Diagnostic Cardiac Catheterizations). Use the following table.

Response:
See Table below.

	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Total
TWH													
OHS	4	14	9	14	10	11	14	10	16	10	9	17	138
Angioplasty	34	29	26	39	27	28	20	21	30	29	30	33	346
Cardiac Cath	58	57	43	54	46	46	49	52	50	57	48	71	631
SMH													
OHS	10	4	6	6	6	6	5	6	12	9	7	7	84
Angioplasty	24	27	15	16	21	31	22	22	20	17	28	15	258
Cardiac Cath	52	31	25	34	38	40	39	44	53	42	37	45	480

Financial:

7) For FY 2009 through FY 2011, the Heart Center of Greater Waterbury (HCGW) is projected to provide a gain of approximately $2.3 million to TWH and $1.3 million to SMH ***(pgs. 1146 and 1150)***. The sum of these amounts is not consistent with the $10 million combined impact noted on page 108. Please reconcile these amounts.

Response:

The gain calculated on the schedules used on pages 1146 and 1150 is the "contribution margin" for the Program.

Contribution margin is defined as Net Revenue - (Direct Variable Cost + Direct Fixed Cost)

Direct expenses are an allocation of all the costs generated by direct care giving departments doing billable work. There are two major components in Direct Expenses. They include:

1) Direct variable costs, those costs which are driven by volume.
2) Direct fixed costs, those costs within direct departments which are not effected by volume changes.

When an impact analysis is conducted, it is assumed that all of the net revenue will be lost and only the direct variable expenses will be lost. The direct fixed expenses would remain with each of the hospitals.

For TWH the difference between the contribution margin of $2.3 million (from page 1146) and the portion of the $10 million impact was $3.8 million of direct fixed expenses. For SMH the difference between the contribution margin of $1.3 million (from page 1150) and the portion of the $10 million impact was $2.8 million of direct fixed expenses. This is the total estimated $10 million impact noted on page 108.

8) On page 104, the cash equivalent balances of SMH and TWH were reported as $30 million and 33.6 million, respectively. These amounts do not agree to the cash and cash equivalent balances of SMH and TWH reported on pages 1135 and 1140, of $9 and $14.8 million, respectively. Please reconcile these amounts.

Response:

For TWH: Page 1135 indicates the operating cash of $8,992,246.
Page 104 indicates a cash equivalent balance of $33,553,132 which is broken down as follows:

Operating Cash	$ 8,992,496
Debt Service Funds	$ 2,217,556
Network Investments	$22,343,080
Total	$33,553,132

For SMH: Page 1140 indicates the operating cash of $14,772.
Page 104 indicates a cash equivalent balance of $30,019,000 which is broken down as follows:

Operating Cash	$14,772,000
Additional consolidated from SMHS	$ 2,737,000
Debt Service Funds	$ 1,022,000
Network Investments	$11,488,000
Total	$ 30,019,000

9) Please provide the most recently completed annual financial statement of HCGW, which contain at a minimum a balance sheet and statement of operations.

Response:
See HCGW financial statement on the following pages.

HEART CENTER OF GREATER WATERBURY
BALANCE SHEET
September 30, 2008
(in thousands)

	Current Month	Prior Month	Prior Year End
CASH	$ 51	$ 75	$ 29
OTHER CURRENT ASSETS	63	8	22
TOTAL CURRENT ASSETS	114	83	51
PROPERTY AND EQUIPMENT, NET	12	14	36
TOTAL ASSETS	$ 127	$ 97	$ 87
ACCOUNTS PAYABLE	$ 142	$ 73	$ 34
DUE TO THIRD PARTIES	38	35	34
TOTAL CURRENT LIABILITIES	180	108	68
UNRESTRICTED FUND BALANCE	(53)	(11)	19
TOTAL FUND BALANCE	(53)	(11)	19
TOTAL LIABILITIES & FUND BALANCE	$ 127	$ 97	$ 87

HEART CENTER OF GREATER WATERBURY
STATEMENT OF REVENUES AND EXPENSES
For the Month and Twelve Months ended September 30, 2008
($ in Thousands)

Current Month to Budget				Prior Year		Current YTD to Budget YTD				Prior Year
Budget	Actual	$ Var	% Var	Actual		Budget	Actual	$ Var	% Var	Actual
$ 50	$ 194	$ 144	290.8%	$ 50	Other Operating Revenue	$ 595	$ 815	$ 219	36.8%	$ 591
50	194	144	290.8%	50	Net Revenues	595	815	219	36.8%	591
24	27	(3)	-14.4%	25	Salaries and Wages	300	302	(2)	-0.6%	290
7	8	(1)	-14.4%	7	Employee Benefits	84	84	-	-0.6%	81
30	35	(4)	-14.4%	31	Total Labor Costs	384	386	(2)	-0.6%	371
3	174	(171)	-5179.1%	1	Purchased Services	40	245	(205)	-517.6%	139
1	7	(6)	-833.8%	-	General Supplies	43	113	(70)	-162.3%	38
2	2	-	2.6%	2	Maintenance & Repair	19	21	(1)	-7.1%	18
1	1	-	1.6%	1	Utilities	7	7	-	1.6%	7
1	-	-	8.7%	-	Insurance	6	6	1	8.5%	5
2	2	-	0.5%	3	Depreciation	24	24	-	0.5%	39
8	15	(7)	-91.5%	10	Other Expenses	93	86	7	7.8%	81
16	201	(184)	-1118.5%	17	Non-Salary Expense	232	501	(269)	-115.8%	328
47	236	(189)	-404.4%	49	Operating Expenses	616	887	(271)	-44.0%	698
3	(42)	(45)	-1561.3%	1	Operating Income/(Loss)	(20)	(72)	(52)	251.5%	(108)
-	1	1	0.0%	-	Non-Operating Income/(Loss)	-	1	1	0.0%	4
-	1	1	0.0%	-	Non-Operating Income	-	1	1	0.0%	4
-	1	(1)	0.0%	-	Distributions	-	1	(1)	0.0%	4
-	1	(1)	0.0%	-	Distributions	-	1	(1)	0.0%	4
3	(42)	(45)	-1562.0%	1	Net Income/(Loss)	(20)	(72)	(52)	251.5%	(108)
5.8%	-21.6%	-27.4%	-473.9%	1.7%	Operating Margin	-3.4%	-8.8%	-5.4%	156.8%	-18.3%
5.8%	-21.6%	-27.4%	-474.1%	1.7%	Net Margin	-3.4%	-8.8%	-5.4%	156.8%	-18.2%

10) Please provide copies of HCGW Internal Revenue Service Form 990 for the fiscal years beginning October 1, 2006 and October 1, 2007.

Response:

The Internal Revenue Service Form 990 for Fiscal Year beginning on October 1, 2006 is provided on the following pages. The Internal Revenue Service Form 990 for Fiscal Year beginning on October 1, 2007 will not be completed until calendar years 2009.

mailed 8-13-08

COPY

Form **990**

Department of the Treasury
Internal Revenue Service

Return of Organization Exempt From Income Tax

Under section 501(c), 527, or 4947(a)(1) of the Internal Revenue Code (except black lung benefit trust or private foundation)

▶ The organization may have to use a copy of this return to satisfy state reporting requirements.

OMB No. 1545-0047

2006

Open to Public Inspection

A For the 2006 calendar year, or tax year beginning October 1 , 2006, and ending September 30 , 20 07

B Check if applicable:
- ☐ Address change
- ☐ Name change
- ☐ Initial return
- ☐ Final return
- ☐ Amended return
- ☐ Application pending

Please use IRS label or print or type. See Specific Instructions.

C Name of organization: Heart Center of Greater Waterbury

Number and street (or P.O. box if mail is not delivered to street address): PO BOX 2153 — Room/suite:

City or town, state or country, and ZIP + 4: Waterbury, CT 06722

D Employer identification number: 83 0416893

E Telephone number: (203) 575-5570

F Accounting method: ☐ Cash ☑ Accrual ☐ Other (specify) ▶

• Section 501(c)(3) organizations and 4947(a)(1) nonexempt charitable trusts must attach a completed Schedule A (Form 990 or 990-EZ).

G Website: ▶ www.heatcentergw.org

H and I are not applicable to section 527 organizations.

H(a) Is this a group return for affiliates? ☐ Yes ☑ No

H(b) If "Yes," enter number of affiliates ▶ N/A

H(c) Are all affiliates included? ☐ Yes ☐ No (If "No," attach a list. See instructions.)

H(d) Is this a separate return filed by an organization covered by a group ruling? ☐ Yes ☑ No

J Organization type (check only one) ▶ ☑ 501(c) ( ) ◀ (insert no.) ☐ 4947(a)(1) or ☐ 527

K Check here ▶ ☐ if the organization is not a 509(a)(3) supporting organization and its gross receipts are normally not more than $25,000. A return is not required, but if the organization chooses to file a return, be sure to file a complete return.

I Group Exemption Number ▶ N/A

L Gross receipts: Add lines 6b, 8b, 9b, and 10b to line 12 ▶ 590,570

M Check ▶ ☑ if the organization is not required to attach Sch. B (Form 990, 990-EZ, or 990-PF).

Part I Revenue, Expenses, and Changes in Net Assets or Fund Balances (See the instructions.)

Revenue	1	Contributions, gifts, grants, and similar amounts received:			
	a	Contributions to donor advised funds	1a		
	b	Direct public support (not included on line 1a)	1b	60	
	c	Indirect public support (not included on line 1a)	1c		
	d	Government contributions (grants) (not included on line 1a)	1d		
	e	**Total** (add lines 1a through 1d) (cash $ ____ noncash $ ____)			1e 60
	2	Program service revenue including government fees and contracts (from Part VII, line 93)			2 590,510
	3	Membership dues and assessments			3
	4	Interest on savings and temporary cash investments			4
	5	Dividends and interest from securities			5
	6a	Gross rents	6a		
	b	Less: rental expenses	6b		
	c	Net rental income or (loss). Subtract line 6b from line 6a			6c
	7	Other investment income (describe ▶)			7
	8a	Gross amount from sales of assets other than inventory — (A) Securities / (B) Other	8a		
	b	Less: cost or other basis and sales expenses	8b		
	c	Gain or (loss) (attach schedule)	8c		
	d	Net gain or (loss). Combine line 8c, columns (A) and (B)			8d
	9	Special events and activities (attach schedule). If any amount is from gaming, check here ▶ ☐			
	a	Gross revenue (not including $ ____ of contributions reported on line 1b)	9a		
	b	Less: direct expenses other than fundraising expenses	9b		
	c	Net income or (loss) from special events. Subtract line 9b from line 9a			9c
	10a	Gross sales of inventory, less returns and allowances	10a		
	b	Less: cost of goods sold	10b		
	c	Gross profit or (loss) from sales of inventory (attach schedule). Subtract line 10b from line 10a			10c
	11	Other revenue (from Part VII, line 103)			11
	12	**Total revenue.** Add lines 1e, 2, 3, 4, 5, 6c, 7, 8d, 9c, 10c, and 11			12 590,570
Expenses	13	Program services (from line 44, column (B))			13 552,230
	14	Management and general (from line 44, column (C))			14 146,080
	15	Fundraising (from line 44, column (D))			15 0
	16	Payments to affiliates (attach schedule)			16
	17	**Total expenses.** Add lines 16 and 44, column (A)			17 698,310
Net Assets	18	Excess or (deficit) for the year. Subtract line 17 from line 12			18 (107,740)
	19	Net assets or fund balances at beginning of year (from line 73, column (A))			19 126,526
	20	Other changes in net assets or fund balances (attach explanation)			20
	21	Net assets or fund balances at end of year. Combine lines 18, 19, and 20			21 18,786

Part II Statement of Functional Expenses All organizations must complete column (A). Columns (B), (C), and (D) are required for section 501(c)(3) and (4) organizations and section 4947(a)(1) nonexempt charitable trusts but optional for others. *(See the instructions.)*

Do not include amounts reported on line 6b, 8b, 9b, 10b, or 16 of Part I.		(A) Total	(B) Program services	(C) Management and general	(D) Fundraising
22a Grants paid from donor advised funds (attach schedule) (cash $ _____ noncash $ _____) If this amount includes foreign grants, check here ▶ ☐	22a				
22b Other grants and allocations (attach schedule) (cash $ _____ noncash $ _____) If this amount includes foreign grants, check here ▶ ☐	22b				
23 Specific assistance to individuals (attach schedule)	23				
24 Benefits paid to or for members (attach schedule)	24				
25a Compensation of current officers, directors, key employees, etc. listed in Part V-A (attach schedule)	25a				
b Compensation of former officers, directors, key employees, etc. listed in Part V-B (attach schedule)	25b				
c Compensation and other distributions, not included above, to disqualified persons (as defined under section 4958(f)(1)) and persons described in section 4958(c)(3)(B) (attach schedule)	25c				
26 Salaries and wages of employees not included on lines 25a, b, and c	26				
27 Pension plan contributions not included on lines 25a, b, and c	27				
28 Employee benefits not included on lines 25a – 27	28				
29 Payroll taxes	29				
30 Professional fundraising fees	30				
31 Accounting fees	31	9,996		9,996	
32 Legal fees	32	108,474		108,474	
33 Supplies	33	41,143	38,966	2,177	
34 Telephone	34	7,233	7,233		
35 Postage and shipping	35	619	619		
36 Occupancy	36	12,720	9,540	3,180	
37 Equipment rental and maintenance	37	21,626	18,196	3,430	
38 Printing and publications	38				
39 Travel	39	1,930	1,930		
40 Conferences, conventions, and meetings	40	6,628	3,879	2,749	
41 Interest	41				
42 Depreciation, depletion, etc. (attach schedule)	42	39,214	29,329	9,885	
43 Other expenses not covered above (itemize):					
a Outside Services	43a	381,727	381,727		
b Insurance	43b	5,471	5,471		
c Advertising	43c	46,669	46,669		
d Sponsored Events	43d	5,276	5,276		
e Dues/Subscriptions	43e	395	395		
f Consulting Fees	43f	9,189	3,000	6,189	
g	43g				
44 **Total functional expenses.** Add lines 22a through 43g. (Organizations completing columns (B)–(D), carry these totals to lines 13–15)	44	698,310	552,230	146,080	

Joint Costs. Check ▶ ☐ if you are following SOP 98-2.

Are any joint costs from a combined educational campaign and fundraising solicitation reported in (B) Program services? ▶ ☐ Yes ☑ No

If "Yes," enter (i) the aggregate amount of these joint costs $ _____; (ii) the amount allocated to Program services $ _____; (iii) the amount allocated to Management and general $ _____; and (iv) the amount allocated to Fundraising $ _____

Part III Statement of Program Service Accomplishments *(See the instructions.)*

Form 990 is available for public inspection and, for some people, serves as the primary or sole source of information about a particular organization. How the public perceives an organization in such cases may be determined by the information presented on its return. Therefore, please make sure the return is complete and accurate and fully describes, in Part III, the organization's programs and accomplishments.

What is the organization's primary exempt purpose? ▶ See Attached Statement All organizations must describe their exempt purpose achievements in a clear and concise manner. State the number of clients served, publications issued, etc. Discuss achievements that are not measurable. (Section 501(c)(3) and (4) organizations and 4947(a)(1) nonexempt charitable trusts must also enter the amount of grants and allocations to others.)	Program Service Expenses (Required for 501(c)(3) and (4) orgs., and 4947(a)(1) trusts; but optional for others.)
a See Attached Statement (Grants and allocations $) If this amount includes foreign grants, check here ▶ ☐	552,230
b (Grants and allocations $) If this amount includes foreign grants, check here ▶ ☐	
c (Grants and allocations $) If this amount includes foreign grants, check here ▶ ☐	
d (Grants and allocations $) If this amount includes foreign grants, check here ▶ ☐	
e Other program services (attach schedule) (Grants and allocations $) If this amount includes foreign grants, check here ▶ ☐	
f **Total of Program Service Expenses** (should equal line 44, column (B), Program services). . . . . ▶	552,230

Part IV Balance Sheets *(See the instructions.)*

Note: *Where required, attached schedules and amounts within the description column should be for end-of-year amounts only.*

				(A) Beginning of year		(B) End of year
Assets	45	Cash—non-interest-bearing		108,244	45	29,176
	46	Savings and temporary cash investments			46	
	47a	Accounts receivable	47a			
	b	Less: allowance for doubtful accounts	47b		47c	
	48a	Pledges receivable	48a			
	b	Less: allowance for doubtful accounts	48b		48c	
	49	Grants receivable			49	
	50a	Receivables from current and former officers, directors, trustees, and key employees (attach schedule)			50a	
	b	Receivables from other disqualified persons (as defined under section 4958(f)(1)) and persons described in section 4958(c)(3)(B) (attach schedule)			50b	
	51a	Other notes and loans receivable (attach schedule)	51a			
	b	Less: allowance for doubtful accounts	51b		51c	
	52	Inventories for sale or use			52	
	53	Prepaid expenses and deferred charges		20,998	53	21,537
	54a	Investments—publicly-traded securities ▶ ☐ Cost ☐ FMV			54a	
	b	Investments—other securities (attach schedule) ▶ ☐ Cost ☐ FMV			54b	
	55a	Investments—land, buildings, and equipment: basis	55a			
	b	Less: accumulated depreciation (attach schedule)	55b		55c	
	56	Investments—other (attach schedule)			56	
	57a	Land, buildings, and equipment: basis	57a 132,323			
	b	Less: accumulated depreciation (attach schedule)	57b 96,173	75,365	57c	36,150
	58	Other assets, including program-related investments (describe ▶)			58	
	59	**Total assets** (must equal line 74). Add lines 45 through 58		204,607	59	86,863
Liabilities	60	Accounts payable and accrued expenses		78,081	60	68,077
	61	Grants payable			61	
	62	Deferred revenue			62	
	63	Loans from officers, directors, trustees, and key employees (attach schedule)			63	
	64a	Tax-exempt bond liabilities (attach schedule)			64a	
	b	Mortgages and other notes payable (attach schedule)			64b	
	65	Other liabilities (describe ▶)			65	
	66	**Total liabilities.** Add lines 60 through 65		78,081	66	68,077
Net Assets or Fund Balances		**Organizations that follow SFAS 117, check here** ▶ ☐ and complete lines 67 through 69 and lines 73 and 74.				
	67	Unrestricted		126,526	67	18,786
	68	Temporarily restricted			68	
	69	Permanently restricted			69	
		Organizations that do not follow SFAS 117, check here ▶ ☐ and complete lines 70 through 74.				
	70	Capital stock, trust principal, or current funds			70	
	71	Paid-in or capital surplus, or land, building, and equipment fund			71	
	72	Retained earnings, endowment, accumulated income, or other funds			72	
	73	**Total net assets or fund balances.** Add lines 67 through 69 or lines 70 through 72. (Column (A) must equal line 19 and column (B) must equal line 21)		126,526	73	18,786
	74	**Total liabilities and net assets/fund balances.** Add lines 66 and 73		204,607	74	86,863

Part IV-A Reconciliation of Revenue per Audited Financial Statements With Revenue per Return *(See the instructions.)* N/A

a	Total revenue, gains, and other support per audited financial statements			a
b	Amounts included on line a but not on Part I, line 12:			
1	Net unrealized gains on investments	b1		
2	Donated services and use of facilities	b2		
3	Recoveries of prior year grants	b3		
4	Other (specify):	b4		
	Add lines b1 through b4			b
c	Subtract line b from line a			c
d	Amounts included on Part I, line 12, but not on line a:			
1	Investment expenses not included on Part I, line 6b	d1		
2	Other (specify):	d2		
	Add lines d1 and d2			d
e	**Total revenue** (Part I, line 12). Add lines c and d ▶			e

Part IV-B Reconciliation of Expenses per Audited Financial Statements With Expenses per Return N/A

a	Total expenses and losses per audited financial statements			a
b	Amounts included on line a but not on Part I, line 17:			
1	Donated services and use of facilities	b1		
2	Prior year adjustments reported on Part I, line 20	b2		
3	Losses reported on Part I, line 20	b3		
4	Other (specify):	b4		
	Add lines b1 through b4			b
c	Subtract line b from line a			c
d	Amounts included on Part I, line 17, but not on line a:			
1	Investment expenses not included on Part I, line 6b	d1		
2	Other (specify):	d2		
	Add lines d1 and d2			d
e	**Total expenses** (Part I, line 17). Add lines c and d ▶			e

Part V-A **Current Officers, Directors, Trustees, and Key Employees** (List each person who was an officer, director, trustee, or key employee at any time during the year even if they were not compensated.) *(See the instructions.)*

(A) Name and address	(B) Title and average hours per week devoted to position	(C) Compensation (If not paid, enter -0-.)	(D) Contributions to employee benefit plans & deferred compensation plans	(E) Expense account and other allowances
See Attached		0	0	0

Part V-A Current Officers, Directors, Trustees, and Key Employees *(continued)*

		Yes	No
75a	Enter the total number of officers, directors, and trustees permitted to vote on organization business at board meetings ▶		
b	Are any officers, directors, trustees, or key employees listed in Form 990, Part V-A, or highest compensated employees listed in Schedule A, Part I, or highest compensated professional and other independent contractors listed in Schedule A, Part II-A or II-B, related to each other through family or business relationships? If "Yes," attach a statement that identifies the individuals and explains the relationship(s) 75b		✓
c	Do any officers, directors, trustees, or key employees listed in Form 990, Part V-A, or highest compensated employees listed in Schedule A, Part I, or highest compensated professional and other independent contractors listed in Schedule A, Part II-A or II-B, receive compensation from any other organizations, whether tax exempt or taxable, that are related to the organization? See the instructions for the definition of "related organization." ▶ 75c	✓	
	If "Yes," attach a statement that includes the information described in the instructions.		
d	Does the organization have a written conflict of interest policy? 75d	✓	

Part V-B **Former Officers, Directors, Trustees, and Key Employees That Received Compensation or Other Benefits** (If any former officer, director, trustee, or key employee received compensation or other benefits (described below) during the year, list that person below and enter the amount of compensation or other benefits in the appropriate column. See the instructions.)

(A) Name and address	(B) Loans and Advances	(C) Compensation (if not paid, enter -0-)	(D) Contributions to employee benefit plans & deferred compensation plans	(E) Expense account and other allowances
NONE				

Part VI Other Information *(See the instructions.)*

		Yes	No
76	Did the organization make a change in its activities or methods of conducting activities? If "Yes," attach a detailed statement of each change 76		✓
77	Were any changes made in the organizing or governing documents but not reported to the IRS? 77		✓
	If "Yes," attach a conformed copy of the changes.		
78a	Did the organization have unrelated business gross income of $1,000 or more during the year covered by this return? 78a		✓
b	If "Yes," has it filed a tax return on **Form 990-T** for this year? 78b	-	
79	Was there a liquidation, dissolution, termination, or substantial contraction during the year? If "Yes," attach a statement 79		✓
80a	Is the organization related (other than by association with a statewide or nationwide organization) through common membership, governing bodies, trustees, officers, etc., to any other exempt or nonexempt organization? 80a	✓	
b	If "Yes," enter the name of the organization ▶ Saint Mary's Hospital, Inc. and The Waterbury Hospital and check whether it is ☐ exempt or ☐ nonexempt		
81a	Enter direct and indirect political expenditures. (See line 81 instructions.) 81a NONE		
b	Did the organization file **Form 1120-POL** for this year? 81b		✓

Part VI Other Information *(continued)*

			Yes	No
82a	Did the organization receive donated services or the use of materials, equipment, or facilities at no charge or at substantially less than fair rental value?	82a		✓
b	If "Yes," you may indicate the value of these items here. Do not include this amount as revenue in Part I or as an expense in Part II. (See instructions in Part III.) 82b			
83a	Did the organization comply with the public inspection requirements for returns and exemption applications?	83a	✓	
b	Did the organization comply with the disclosure requirements relating to *quid pro quo* contributions?	83b	✓	
84a	Did the organization solicit any contributions or gifts that were not tax deductible?	84a		✓
b	If "Yes," did the organization include with every solicitation an express statement that such contributions or gifts were not tax deductible?	84b	N/A	
85	*501(c)(4), (5), or (6) organizations.* a Were substantially all dues nondeductible by members?	85a	N/A	
b	Did the organization make only in-house lobbying expenditures of $2,000 or less?	85b	N/A	
	If "Yes" was answered to either 85a or 85b, **do not** complete 85c through 85h below unless the organization received a waiver for proxy tax owed for the prior year.			
c	Dues, assessments, and similar amounts from members 85c N/A			
d	Section 162(e) lobbying and political expenditures 85d N/A			
e	Aggregate nondeductible amount of section 6033(e)(1)(A) dues notices 85e N/A			
f	Taxable amount of lobbying and political expenditures (line 85d less 85e) 85f N/A			
g	Does the organization elect to pay the section 6033(e) tax on the amount on line 85f?	85g	N/A	
h	If section 6033(e)(1)(A) dues notices were sent, does the organization agree to add the amount on line 85f to its reasonable estimate of dues allocable to nondeductible lobbying and political expenditures for the following tax year?	85h	N/A	
86	*501(c)(7) orgs.* Enter: a Initiation fees and capital contributions included on line 12 86a N/A			
b	Gross receipts, included on line 12, for public use of club facilities 86b N/A			
87	*501(c)(12) orgs.* Enter: a Gross income from members or shareholders 87a N/A			
b	Gross income from other sources. (Do not net amounts due or paid to other sources against amounts due or received from them.) 87b N/A			
88a	At any time during the year, did the organization own a 50% or greater interest in a taxable corporation or partnership, or an entity disregarded as separate from the organization under Regulations sections 301.7701-2 and 301.7701-3? If "Yes," complete Part IX	88a		✓
b	At any time during the year, did the organization, directly or indirectly, own a controlled entity within the meaning of section 512(b)(13)? If "Yes," complete Part XI ▶	88b		✓
89a	*501(c)(3) organizations.* Enter: Amount of tax imposed on the organization during the year under: section 4911 ▶ 0 ; section 4912 ▶ 0 ; section 4955 ▶ 0			
b	*501(c)(3) and 501(c)(4) orgs.* Did the organization engage in any section 4958 excess benefit transaction during the year or did it become aware of an excess benefit transaction from a prior year? If "Yes," attach a statement explaining each transaction	89b		✓
c	Enter: Amount of tax imposed on the organization managers or disqualified persons during the year under sections 4912, 4955, and 4958 ▶ 0			
d	Enter: Amount of tax on line 89c, above, reimbursed by the organization ▶ 0			
e	*All organizations.* At any time during the tax year, was the organization a party to a prohibited tax shelter transaction?	89e		✓
f	*All organizations.* Did the organization acquire a direct or indirect interest in any applicable insurance contract?	89f		✓
g	*For supporting organizations and sponsoring organizations maintaining donor advised funds.* Did the supporting organization, or a fund maintained by a sponsoring organization, have excess business holdings at any time during the year?	89g		✓

90a List the states with which a copy of this return is filed ▶ N/A

b Number of employees employed in the pay period that includes March 12, 2006 (See instructions.) 90b NONE

91a The books are in care of ▶ Renee Warner Telephone no. ▶ (203) 709-3054

Located at ▶ Saint Mary's Hospital, 56 Franklin St., Waterbury, CT ZIP + 4 ▶ 06706

			Yes	No
b	At any time during the calendar year, did the organization have an interest in or a signature or other authority over a financial account in a foreign country (such as a bank account, securities account, or other financial account)?	91b		✓
	If "Yes," enter the name of the foreign country ▶			
	See the instructions for exceptions and filing requirements for **Form TD F 90-22.1,** Report of Foreign Bank and Financial Accounts.			

Part VI Other Information *(continued)*

		Yes	No
c	At any time during the calendar year, did the organization maintain an office outside of the United States? If "Yes," enter the name of the foreign country ▶	91c	✓
92	*Section 4947(a)(1) nonexempt charitable trusts filing Form 990 in lieu of* ***Form 1041***—Check here ▶ ☐ and enter the amount of tax-exempt interest received or accrued during the tax year ▶ 92		

Part VII Analysis of Income-Producing Activities *(See the instructions.)*

Note: *Enter gross amounts unless otherwise indicated.*

		Unrelated business income		Excluded by section 512, 513, or 514		(E)
		(A) Business code	(B) Amount	(C) Exclusion code	(D) Amount	Related or exempt function income
93	Program service revenue:					
a	Allocations from other 501(c)(3) orgs.					588,000
b	(Waterbury Hospital & Saint Mary's Hosp.)					
c	Program/Class Revenue					2,210
d						
e						
f	Medicare/Medicaid payments					
g	Fees and contracts from government agencies					
94	Membership dues and assessments					
95	Interest on savings and temporary cash investments					
96	Dividends and interest from securities					
97	Net rental income or (loss) from real estate:					
a	debt-financed property					
b	not debt-financed property					
98	Net rental income or (loss) from personal property					
99	Other investment income					
100	Gain or (loss) from sales of assets other than inventory					
101	Net income or (loss) from special events					
102	Gross profit or (loss) from sales of inventory					
103	Other revenue: a Miscellaneous					300
b						
c						
d						
e						
104	Subtotal (add columns (B), (D), and (E))		0		0	590,510
105	**Total** (add line 104, columns (B), (D), and (E)) ▶					590,510

Note: *Line 105 plus line 1e, Part I, should equal the amount on line 12, Part I.*

Part VIII Relationship of Activities to the Accomplishment of Exempt Purposes *(See the instructions.)*

Line No. ▼	Explain how each activity for which income is reported in column (E) of Part VII contributed importantly to the accomplishment of the organization's exempt purposes (other than by providing funds for such purposes).
93a	Revenue from allocations provided by the two area acute-care hospitals allow for the organization to fund the program services described in detail in the attachment to Part III.
93c	Program revenue from smoking cessation class
103a	Speaker fee reimbursement

Part IX Information Regarding Taxable Subsidiaries and Disregarded Entities *(See the instructions.)*

(A) Name, address, and EIN of corporation, partnership, or disregarded entity	(B) Percentage of ownership interest	(C) Nature of activities	(D) Total income	(E) End-of-year assets
N/A	%			
	%			
	%			
	%			

Part X Information Regarding Transfers Associated with Personal Benefit Contracts *(See the instructions.)*

(a) Did the organization, during the year, receive any funds, directly or indirectly, to pay premiums on a personal benefit contract? ☐ Yes ☑ No

(b) Did the organization, during the year, pay premiums, directly or indirectly, on a personal benefit contract? ☐ Yes ☑ No

Note: *If "Yes" to (b), file Form 8870 and Form 4720 (see instructions).*

Part XI **Information Regarding Transfers To and From Controlled Entities.** *Complete only if the organization is a controlling organization as defined in section 512(b)(13).*

		Yes	No
106	Did the reporting organization **make** any transfers **to** a controlled entity as defined in section 512(b)(13) of the Code? If "Yes," complete the schedule below for each controlled entity.		✓

	(A) Name, address, of each controlled entity	(B) Employer Identification Number	(C) Description of transfer	(D) Amount of transfer
a				
b				
c				
	Totals			

		Yes	No
107	Did the reporting organization **receive** any transfers **from** a controlled entity as defined in section 512(b)(13) of the Code? If "Yes," complete the schedule below for each controlled entity.		✓

	(A) Name, address, of each controlled entity	(B) Employer Identification Number	(C) Description of transfer	(D) Amount of transfer
a				
b				
c				
	Totals			

		Yes	No
108	Did the organization have a binding written contract in effect on August 17, 2006, covering the interest, rents, royalties, and annuities described in question 107 above?		✓

Please Sign Here

Under penalties of perjury, I declare that I have examined this return, including accompanying schedules and statements, and to the best of my knowledge and belief, it is true, correct, and complete. Declaration of preparer (other than officer) is based on all information of which preparer has any knowledge.

Sandra Roosa — Signature of officer

8-12-08 — Date

SANDRA ROOSA SECRETARY — Type or print name and title

Paid Preparer's Use Only

Preparer's signature	Date	Check if self-employed ▶ ☐	Preparer's SSN or PTIN (See Gen. Inst. X)
Firm's name (or yours if self-employed), address, and ZIP + 4		EIN ▶	
		Phone no. ▶ ( )	

Printed on recycled paper

SCHEDULE A (Form 990 or 990-EZ)

Department of the Treasury
Internal Revenue Service

Organization Exempt Under Section 501(c)(3)

(Except Private Foundation) and Section 501(e), 501(f), 501(k), 501(n), or 4947(a)(1) Nonexempt Charitable Trust

Supplementary Information—(See separate instructions.)

▶ MUST be completed by the above organizations and attached to their Form 990 or 990-EZ

OMB No. 1545-0047

2006

Name of the organization

Heart Center of Greater Waterbury, Inc.

Employer identification number

83 : 0416893

Part I Compensation of the Five Highest Paid Employees Other Than Officers, Directors, and Trustees

(See page 2 of the instructions. List each one. If there are none, enter "None.")

(a) Name and address of each employee paid more than $50,000	(b) Title and average hours per week devoted to position	(c) Compensation	(d) Contributions to employee benefit plans & deferred compensation	(e) Expense account and other allowances
NONE				
Total number of other employees paid over $50,000 ▶				

Part II-A Compensation of the Five Highest Paid Independent Contractors for Professional Services

(See page 2 of the instructions. List each one (whether individuals or firms). If there are none, enter "None.")

(a) Name and address of each independent contractor paid more than $50,000	(b) Type of service	(c) Compensation
Franklin Medical Group (see attached statement) 56 Franklin St., Waterbury, CT 06706	Outsourced Payroll	$370,579
Total number of others receiving over $50,000 for professional services ▶ 0		

Part II-B Compensation of the Five Highest Paid Independent Contractors for Other Services

(List each contractor who performed services other than professional services, whether individuals or firms. If there are none, enter "None." See page 2 of the instructions.)

(a) Name and address of each independent contractor paid more than $50,000	(b) Type of service	(c) Compensation
NONE		
Total number of other contractors receiving over $50,000 for other services ▶ 0		

Part III **Statements About Activities** (See page 2 of the instructions.)

			Yes	No
1	During the year, has the organization attempted to influence national, state, or local legislation, including any attempt to influence public opinion on a legislative matter or referendum? If "Yes," enter the total expenses paid or incurred in connection with the lobbying activities ▶ $ _____ (Must equal amounts on line 38, Part VI-A, or line i of Part VI-B.)	1		✓
	Organizations that made an election under section 501(h) by filing Form 5768 must complete Part VI-A. Other organizations checking "Yes" must complete Part VI-B AND attach a statement giving a detailed description of the lobbying activities.			
2	During the year, has the organization, either directly or indirectly, engaged in any of the following acts with any substantial contributors, trustees, directors, officers, creators, key employees, or members of their families, or with any taxable organization with which any such person is affiliated as an officer, director, trustee, majority owner, or principal beneficiary? *(If the answer to any question is "Yes," attach a detailed statement explaining the transactions.)*			
a	Sale, exchange, or leasing of property?	2a		✓
b	Lending of money or other extension of credit?	2b		✓
c	Furnishing of goods, services, or facilities?	2c	✓	
d	Payment of compensation (or payment or reimbursement of expenses if more than $1,000)?	2d		✓
e	Transfer of any part of its income or assets?	2e		✓
3a	Did the organization make grants for scholarships, fellowships, student loans, etc.? (If "Yes," attach an explanation of how the organization determines that recipients qualify to receive payments.)	3a		✓
b	Did the organization have a section 403(b) annuity plan for its employees?	3b		✓
c	Did the organization receive or hold an easement for conservation purposes, including easements to preserve open space, the environment, historic land areas or historic structures? If "Yes," attach a detailed statement	3c		✓
d	Did the organization provide credit counseling, debt management, credit repair, or debt negotiation services?	3d		✓
4a	Did the organization maintain any donor advised funds? If "Yes," complete lines 4b through 4g. If "No," complete lines 4f and 4g	4a		✓
b	Did the organization make any taxable distributions under section 4966?	4b		✓
c	Did the organization make a distribution to a donor, donor advisor, or related person?	4c		✓
d	Enter the total number of donor advised funds owned at the end of the tax year ▶			0
e	Enter the aggregate value of assets held in all donor advised funds owned at the end of the tax year ▶			0
f	Enter the total number of separate funds or accounts owned at the end of the tax year (excluding donor advised funds included on line 4d) where donors have the right to provide advice on the distribution or investment of amounts in such funds or accounts ▶			0
g	Enter the aggregate value of assets held in all funds or accounts included on line 4f at the end of the tax year ▶			0

Part IV **Reason for Non-Private Foundation Status** (See pages 4 through 7 of the instructions.)

I certify that the organization is not a private foundation because it is: (Please check only **ONE** applicable box.)

5 ☐ A church, convention of churches, or association of churches. Section 170(b)(1)(A)(i).

6 ☐ A school. Section 170(b)(1)(A)(ii). (Also complete Part V.)

7 ☐ A hospital or a cooperative hospital service organization. Section 170(b)(1)(A)(iii).

8 ☐ A federal, state, or local government or governmental unit. Section 170(b)(1)(A)(v).

9 ☐ A medical research organization operated in conjunction with a hospital. Section 170(b)(1)(A)(iii). **Enter the hospital's name, city, and state** ▶ .....

10 ☐ An organization operated for the benefit of a college or university owned or operated by a governmental unit. Section 170(b)(1)(A)(iv). (Also complete the **Support Schedule** in Part IV-A.)

11a ☐ An organization that normally receives a substantial part of its support from a governmental unit or from the general public. Section 170(b)(1)(A)(vi). (Also complete the **Support Schedule** in Part IV-A.)

11b ☐ A community trust. Section 170(b)(1)(A)(vi). (Also complete the **Support Schedule** in Part IV-A.)

12 ☐ An organization that normally receives: **(1) more than 33⅓%** of its support from contributions, membership fees, and gross receipts from activities related to its charitable, etc., functions—subject to certain exceptions, and **(2) no more than 33⅓%** of its support from gross investment income and unrelated business taxable income (less section 511 tax) from businesses acquired by the organization after June 30, 1975. See section 509(a)(2). (Also complete the **Support Schedule** in Part IV-A.)

13 ☑ An organization that is not controlled by any disqualified persons (other than foundation managers) and otherwise meets the requirements of section 509(a)(3). Check the box that describes the type of supporting organization:

☑ Type I ☐ Type II ☐ Type III-Functionally Integrated ☐ Type III-Other

Provide the following information about the supported organizations. (See page 7 of the instructions.)

(a) Name(s) of supported organization(s)	(b) Employer identification number (EIN)	(c) Type of organization (described in lines 5 through 12 above or IRC section)	(d) Is the supported organization listed in the supporting organization's governing documents?		(e) Amount of support
			Yes	No	
Saint Mary's Hospital, Inc.	06-0646844	Hospital 7	✓		294,000
The Waterbury Hospital	06-0665979	Hospital 7	✓		294,000
Total ▶					588,000

14 ☐ An organization organized and operated to test for public safety. Section 509(a)(4). (See page 7 of the instructions.)

Part IV-A Support Schedule (Complete only if you checked a box on line 10, 11, or 12.) ***Use cash method of accounting.*** N/A

Note: *You may use the worksheet in the instructions for converting from the accrual to the cash method of accounting.*

Calendar year (or fiscal year beginning in) ▶	(a) 2005	(b) 2004	(c) 2003	(d) 2002	(e) Total
15 Gifts, grants, and contributions received. (Do not include unusual grants. See line 28.)					
16 Membership fees received					
17 Gross receipts from admissions, merchandise sold or services performed, or furnishing of facilities in any activity that is related to the organization's charitable, etc., purpose					
18 Gross income from interest, dividends, amounts received from payments on securities loans (section 512(a)(5)), rents, royalties, and unrelated business taxable income (less section 511 taxes) from businesses acquired by the organization after June 30, 1975					
19 Net income from unrelated business activities not included in line 18.					
20 Tax revenues levied for the organization's benefit and either paid to it or expended on its behalf					
21 The value of services or facilities furnished to the organization by a governmental unit without charge. Do not include the value of services or facilities generally furnished to the public without charge					
22 Other income. Attach a schedule. Do not include gain or (loss) from sale of capital assets					
23 Total of lines 15 through 22					
24 Line 23 minus line 17					
25 Enter 1% of line 23					

26	**Organizations described on lines 10 or 11:** a Enter 2% of amount in column (e), line 24 ▶	26a	
	b Prepare a list for your records to show the name of and amount contributed by each person (other than a governmental unit or publicly supported organization) whose total gifts for 2002 through 2005 exceeded the amount shown in line 26a. **Do not file this list with your return.** Enter the total of all these excess amounts ▶	26b	
	c Total support for section 509(a)(1) test: Enter line 24, column (e) ▶	26c	
	d Add: Amounts from column (e) for lines: 18 _____ 19 _____ 22 _____ 26b _____ ▶	26d	
	e Public support (line 26c minus line 26d total) ▶	26e	
	f **Public support percentage (line 26e (numerator) divided by line 26c (denominator))** ▶	26f	%

27 **Organizations described on line 12:** a For amounts included in lines 15, 16, and 17 that were received from a "disqualified person," prepare a list for your records to show the name of, and total amounts received in each year from, each "disqualified person." **Do not file this list with your return.** Enter the sum of such amounts for each year:

(2005) ..... (2004) ..... (2003) ..... (2002) .....

b For any amount included in line 17 that was received from each person (other than "disqualified persons"), prepare a list for your records to show the name of, and amount received for each year, that was more than the **larger** of **(1)** the amount on line 25 for the year or **(2)** $5,000. (Include in the list organizations described in lines 5 through 11b, as well as individuals.) **Do not file this list with your return.** After computing the difference between the amount received and the larger amount described in **(1)** or **(2)**, enter the sum of these differences (the excess amounts) for each year:

(2005) ..... (2004) ..... (2003) ..... (2002) .....

	c Add: Amounts from column (e) for lines: 15 _____ 16 _____ 17 _____ 20 _____ 21 _____ ▶	27c	
	d Add: Line 27a total _____ and line 27b total _____ ▶	27d	
	e Public support (line 27c total minus line 27d total) ▶	27e	
	f Total support for section 509(a)(2) test: Enter amount from line 23, column (e) ▶ 27f		
	g **Public support percentage (line 27e (numerator) divided by line 27f (denominator))** ▶	27g	%
	h **Investment income percentage (line 18, column (e) (numerator) divided by line 27f (denominator))** ▶	27h	%

28 **Unusual Grants:** For an organization described in line 10, 11, or 12 that received any unusual grants during 2002 through 2005, prepare a list for your records to show, for each year, the name of the contributor, the date and amount of the grant, and a brief description of the nature of the grant. **Do not file this list with your return.** Do not include these grants in line 15.

Part V **Private School Questionnaire** (See page 9 of the instructions.)
(To be completed ONLY by schools that checked the box on line 6 in Part IV) N/A

			Yes	No
29	Does the organization have a racially nondiscriminatory policy toward students by statement in its charter, bylaws, other governing instrument, or in a resolution of its governing body?	29		
30	Does the organization include a statement of its racially nondiscriminatory policy toward students in all its brochures, catalogues, and other written communications with the public dealing with student admissions, programs, and scholarships?	30		
31	Has the organization publicized its racially nondiscriminatory policy through newspaper or broadcast media during the period of solicitation for students, or during the registration period if it has no solicitation program, in a way that makes the policy known to all parts of the general community it serves?	31		
	If "Yes," please describe; if "No," please explain. (If you need more space, attach a separate statement.)			
32	Does the organization maintain the following:			
a	Records indicating the racial composition of the student body, faculty, and administrative staff?	32a		
b	Records documenting that scholarships and other financial assistance are awarded on a racially nondiscriminatory basis?	32b		
c	Copies of all catalogues, brochures, announcements, and other written communications to the public dealing with student admissions, programs, and scholarships?	32c		
d	Copies of all material used by the organization or on its behalf to solicit contributions?	32d		
	If you answered "No" to any of the above, please explain. (If you need more space, attach a separate statement.)			
33	Does the organization discriminate by race in any way with respect to:			
a	Students' rights or privileges?	33a		
b	Admissions policies?	33b		
c	Employment of faculty or administrative staff?	33c		
d	Scholarships or other financial assistance?	33d		
e	Educational policies?	33e		
f	Use of facilities?	33f		
g	Athletic programs?	33g		
h	Other extracurricular activities?	33h		
	If you answered "Yes" to any of the above, please explain. (If you need more space, attach a separate statement.)			
34a	Does the organization receive any financial aid or assistance from a governmental agency?	34a		
b	Has the organization's right to such aid ever been revoked or suspended? If you answered "Yes" to either 34a or b, please explain using an attached statement.	34b		
35	Does the organization certify that it has complied with the applicable requirements of sections 4.01 through 4.05 of Rev. Proc. 75-50, 1975-2 C.B. 587, covering racial nondiscrimination? If "No," attach an explanation	35		

Part VI-A **Lobbying Expenditures by Electing Public Charities** (See page 10 of the instructions.)
(To be completed **ONLY** by an eligible organization that filed Form 5768) N/A

Check ▶ a ☐ if the organization belongs to an affiliated group. Check ▶ b ☐ if you checked "a" and "limited control" provisions apply.

Limits on Lobbying Expenditures (The term "expenditures" means amounts paid or incurred.)		(a) Affiliated group totals	(b) To be completed for all electing organizations
36 Total lobbying expenditures to influence public opinion (grassroots lobbying)	36		
37 Total lobbying expenditures to influence a legislative body (direct lobbying)	37		
38 Total lobbying expenditures (add lines 36 and 37)	38		
39 Other exempt purpose expenditures	39		
40 Total exempt purpose expenditures (add lines 38 and 39)	40		
41 Lobbying nontaxable amount. Enter the amount from the following table—			
If the amount on line 40 is— / **The lobbying nontaxable amount is—**			
Not over $500,000 / 20% of the amount on line 40	41		
Over $500,000 but not over $1,000,000 / $100,000 plus 15% of the excess over $500,000			
Over $1,000,000 but not over $1,500,000 / $175,000 plus 10% of the excess over $1,000,000			
Over $1,500,000 but not over $17,000,000 / $225,000 plus 5% of the excess over $1,500,000			
Over $17,000,000 / $1,000,000			
42 Grassroots nontaxable amount (enter 25% of line 41)	42		
43 Subtract line 42 from line 36. Enter -0- if line 42 is more than line 36	43		
44 Subtract line 41 from line 38. Enter -0- if line 41 is more than line 38	44		

Caution: *If there is an amount on either line 43 or line 44, you must file Form 4720.*

4-Year Averaging Period Under Section 501(h)

(Some organizations that made a section 501(h) election do not have to complete all of the five columns below. See the instructions for lines 45 through 50 on page 13 of the instructions.)

	Lobbying Expenditures During 4-Year Averaging Period				
Calendar year (or fiscal year beginning in) ▶	(a) 2006	(b) 2005	(c) 2004	(d) 2003	(e) Total
45 Lobbying nontaxable amount					
46 Lobbying ceiling amount (150% of line 45(e))					
47 Total lobbying expenditures					
48 Grassroots nontaxable amount					
49 Grassroots ceiling amount (150% of line 48(e))					
50 Grassroots lobbying expenditures					

Part VI-B **Lobbying Activity by Nonelecting Public Charities**
(For reporting only by organizations that did not complete Part VI-A) (See page 13 of the instructions.)

During the year, did the organization attempt to influence national, state or local legislation, including any attempt to influence public opinion on a legislative matter or referendum, through the use of:	Yes	No	Amount
a Volunteers		✓	
b Paid staff or management (Include compensation in expenses reported on lines c through h.)		✓	
c Media advertisements		✓	0
d Mailings to members, legislators, or the public		✓	0
e Publications, or published or broadcast statements		✓	0
f Grants to other organizations for lobbying purposes		✓	0
g Direct contact with legislators, their staffs, government officials, or a legislative body		✓	0
h Rallies, demonstrations, seminars, conventions, speeches, lectures, or any other means		✓	0
i Total lobbying expenditures (Add lines c through h.)			0

If "Yes" to any of the above, also attach a statement giving a detailed description of the lobbying activities.

Part VII **Information Regarding Transfers To and Transactions and Relationships With Noncharitable Exempt Organizations** (See page 13 of the instructions.)

51 Did the reporting organization directly or indirectly engage in any of the following with any other organization described in section 501(c) of the Code (other than section 501(c)(3) organizations) or in section 527, relating to political organizations?

		Yes	No
a	Transfers from the reporting organization to a noncharitable exempt organization of:		
	(i) Cash	51a(i)	✓
	(ii) Other assets	a(ii)	✓
b	Other transactions:		
	(i) Sales or exchanges of assets with a noncharitable exempt organization	b(i)	✓
	(ii) Purchases of assets from a noncharitable exempt organization	b(ii)	✓
	(iii) Rental of facilities, equipment, or other assets	b(iii)	✓
	(iv) Reimbursement arrangements	b(iv)	✓
	(v) Loans or loan guarantees	b(v)	✓
	(vi) Performance of services or membership or fundraising solicitations	b(vi)	✓
c	Sharing of facilities, equipment, mailing lists, other assets, or paid employees	c	✓

d If the answer to any of the above is "Yes," complete the following schedule. Column (b) should always show the fair market value of the goods, other assets, or services given by the reporting organization. If the organization received less than fair market value in any transaction or sharing arrangement, show in column (d) the value of the goods, other assets, or services received:

(a) Line no.	(b) Amount involved	(c) Name of noncharitable exempt organization	(d) Description of transfers, transactions, and sharing arrangements

52a Is the organization directly or indirectly affiliated with, or related to, one or more tax-exempt organizations described in section 501(c) of the Code (other than section 501(c)(3)) or in section 527? ▶ ☐ Yes ☑ No

b If "Yes," complete the following schedule:

(a) Name of organization	(b) Type of organization	(c) Description of relationship

Printed on recycled paper

Heart Center of Greater Waterbury

Year Ended 9/30/07

EIN 83-041689

HEART CENTER of Greater Waterbury

Attachment to Form 990 Part III – Organization's Primary Exempt Purpose:

Organization Description: The Heart Center of Greater Waterbury, Inc. is a managed service organization that provides administrative support and management functions to the advanced cardiac care program which offers patients at Saint Mary's Hospital and Waterbury Hospital immediate access to services such as angioplasty and open-heart surgery. In the support of the missions and charitable functions of Saint Mary's Hospital and Waterbury Hospital, the primary purpose of the Heart Center of Greater Waterbury Inc. includes quality assurance and management, community outreach, coordination of services, strategic planning with the partner hospitals and marketing.

Quality Assurance and Management: The Heart Center of Greater Waterbury Inc. is responsible for managing and reporting data related to the advanced cardiac care services provided at Saint Mary's Hospital and Waterbury Hospital. This includes managing the software system, maintaining data validity, producing management reports for the organizations for the purpose of identifying areas of process improvement and reporting program data to national and state registries. Analysis of cardiac service data as a component of the quality process is a function of the Heart Center.

Community Outreach: The Heart Center of Greater Waterbury Inc. is responsible for assessing the needs of the community as it relates to knowledge of cardiac health and services. As such the Heart Center will provide education to various individuals/groups free of charge as a service to the community.

Coordination of Services: The Heart Center of Greater Waterbury Inc. provides coordination and oversight of services for the purpose of consistency, to foster ongoing communication and to minimize duplication of services. This includes physician services, community activities/education and clinical services.

Strategic Planning: The Heart Center of Greater Waterbury Inc. will establish an Advisory Board made of hospital leadership, Heart Center leadership, community physicians and clinical leadership. The purpose of this Advisory Board will be to coordinate information and to identify and recommend issues related to cardiac care for consideration in strategic planning

Marketing: The Heart Center of Greater Waterbury Inc. is responsible for providing physicians, healthcare providers and community members of the greater Waterbury area with accurate information related to the advanced cardiac care services provided at Saint Mary's Hospital and Waterbury Hospital.

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

Heart Center of Greater Waterbury EIN: 83-0416893
Form 990 Part VIII Line 93a Attachment
For Year Ended 09/30/07

FY 2007 Accomplishments

Administrative Accomplishments:

- Facilitated renewal of UCONN Clinical Service Agreement
- Applied for and received grant dollars from the American Heart Association for Community Outreach Activities
- Facilitated a process for correct billing from WAA to the hospitals
- Facilitated negotiations for new Anesthesia contract
- Reviewed usage and discontinued answering call service for ED physicians desiring to transfer patients to Waterbury

Program Coordination Accomplishments:

- Met all requirements for OHCA reporting requirements
- Coordinated and organized three presentations before the Commissioner of OHCA
- Coordinated the efforts for the CON modification process including writing several drafts, interviewing physicians from around the country, and coordinating several meetings internally for CON planning and strategy.
- Ongoing quarterly Advisory Board meetings
- Ongoing monthly case conference review meetings with physician and clinical representation from both hospitals
- Ongoing joint meeting of data collection teams for the purpose of sharing data issues/registry definitions and internal processes
- Continued publication of an Internal Newsletter for physicians and staff of HCGW (X4 per year)

Marketing Accomplishments:

- Published 3 issues of "The Beat Goes On" , the Heart Center newsletter distributed 3x/year to over 21,000 Greater Waterbury households
- Updated and revised program website
- Organized a joint team from WH and SMH at the New Haven Heart Walk
- Chose and engaged a new marketing firm
- Implemented a marketing plan including billboard and print advertising as well as event sponsorship
- Representation on Waterbury Regional Chamber Health Care Council Board of Directors
- Representation on Waterbury Regional Chamber Health Care Council Public Relations Committee
- Direct involvement in naming the HCC's biannual healthcare supplement to the Waterbury Republican- American newspaper

Heart Center of Greater Waterbury EIN: 83-0416893
Form 990 Part VIII Line 93a Attachment
For Year Ended 09/30/07

- Celebrated HC 2nd anniversary by recognizing hospital based staff with a Heart pin and thank you note
- Continued with Physician office visits to promote Heart Center services

Community Outreach Accomplishments:

- Continued with a collaborative relationship with the American Heart Association
- Facilitated/managed three Freedom from Smoking Clinics (7 weeks each)
- Maintained working relationships with greater Waterbury Senior Centers, Neighborhood Associations, churches, and community groups for regular Heart Health Programs
- Provided **199** community outreach programs including blood pressure screenings, health fairs, individual patient consults, heart health educational presentations by physicians and APRN and community relations activities
- Provided staff education at local nursing facilities as it relates to the cardiac patient
- Developed and implemented a four week series on Diabetes as a primary risk factor for heart disease
- Developed an implemented group education programs for PCP offices
- Attended several corporate wellness fairs for area business' employees and colleges
- Continued a quarterly mailing to Heart Center patients to maintain connection and for information on community outreach activities

Quality Accomplishments:

- Served as a resource to hospitals regarding registry definitions, reporting and compliance to standards
- Transitioned to paperless data collection systems throughout the program
- Submitted all required data elements to three separate registries (ACC, STS and OHCA) per requirements. Communicated reported results to key stakeholders
- Facilitated Heart Center's enrollment in the D2B Alliance a national forum supporting the guidelines applied in practice to reducing door-to-balloon time
- Prepared for STS data base revisions by educating staff, determining data collection responsibilities and working with software company
- Conducted over 400 chart reviews for retrospective EUROSCORE data collection in preparation of CON modification
- Improved use of the quality software at all three sites including education to staff, ongoing monitoring and upgrades as needed and installation of new reporting software.
- Began a new joint quality oversight meeting with physicians, hospital based staff and directors.

Heart Center of Greater Waterbury Inc. 2006-2007 Officers and Directors , EIN 83-0416893

Form 990 Part V-A

Board of Directors	Address	Compensation	Qualifications	# Hours Worked
Robert P. Ritz (Co-President)	H: 105 Copper Beech Dr. Cheshire, CT 06410 B: 56 Franklin St. Waterbury, CT 06707	None	FACHE President/CEO Saint Mary's Hospital	4/month
John H. Tobin (Co-President)	H: 189 Hunters Ridge Rd. Southbury, CT 06488 B: 64 Robbins St. Waterbury, CT 06721	None	D.Man President/CEO Waterbury Hospital	4/month
Steven Schneider, M.D.	H: 156 Nob Hill Rd. Cheshire, CT 06410 B: 64 Robbins St. Waterbury, CT 06721	None	VP of Medical Affairs Waterbury Hospital	4/month
Sandra Roosa (Secretary)	H: 67 South Ridge Dr. Waterbury, CT 06708 B: 56 Franklin St. Waterbury, CT 06706	None	RN, VP Patient Care Services Saint Mary's Hospital	4/month
Mary Prybylo (Treasurer)	H: 95 Roxbury Court Southington, CT 06489 B: 64 Robbins St. Waterbury, CT 06721	None	RN, Chief Operating Officer Waterbury Hospital	4/month
Chad Wable	H: 136 Talmadge Rd. Cheshire, CT 06410 B: 56 Franklin St. Waterbury, CT 06706	None	VP Marketing and Business Development, St. Mary's Hosp.	4/month
Colleen Scott	H: 7 Beaverview Court Woodbury, CT 06798 B: 64 Robbins St. Waterbury, CT 06721	None	Chief Financial Officer, Waterbury Hospital	4/month
Eugene Bunnell, MD	H: 214 Lansdowne Lane Cheshire, CT 06410 B: 56 Franklin St. Waterbury, CT 06706	None	Director Intensive Care, Saint Mary's Hospital	4/month
Loraine C. Shea	H: 88 Rockwell Ave. Naugatuck, CT 06770 B: 56 Franklin St. Waterbury, CT 06706	None, compensated by Franklin Medical Group-see statement	MSM, Executive Director, Heart Center of Greater Waterbury	40/week 160/ month

Heart Center of Greater Waterbury **EIN 83-0416893**
Depreciation Schedule F/Y/E 09/30/2007
Form 990 Part IV Line 57b

		Total Cost	09/30/07
Movable Furniture/Equipment		**1800-185000**	
06/22/05	Telephone Equipment	1,325.20	265.04
05/15/05	Executive Chair and File	845.00	84.50
Total	**Movable Furniture/Equipment**	**2,170.20**	**349.54**
Computer Equipment/Software		**1800-186500**	
04/09/05	CDW Computers - Printer	251.01	50.20
04/16/05	Dell Optiplex GX170L	866.07	173.21
06/22/05	Lumedx Cardiomanager Software	81,300.00	27,100.00
07/01/05	6 3.2GHz/1MB Cache for Dell Power Edge Computers	26,618.15	5,323.63
07/03/05	Dell Power Edge 4210	3,894.63	778.93
08/01/05	Green Pages Excec v10 MS Sql, Remote Agent	2,085.00	695.00
08/15/05	Compucom - Micr. Office, Windows Server 2003	2,105.00	701.67
08/15/05	Green Pages Presentation Server 3.0/4.0 Advanced	2,575.00	858.33
08/15/05	Dell SQL Server License	3,964.62	1,321.54
10/28/05	Lumedx Software-Related Costs	1,493.19	497.73
10/28/05	Dell Optiplex Desktop PC	2,268.40	453.68
01/19/06	Green Pages Crystal Reports	533.11	177.70
02/01/06	Compucom - Micr. Exchange Sequel SW	2,199.00	733.00
Total	**Computer Equipment/Software**	**130,153.18**	**38,864.63**
Total PPE		**132,323.38**	

Total Depreciation - Movable Furniture & Equipment	**349.54**
Total Depreciation - Computer Equipment & Software	**38,864.63**
TOTAL DEPR. EXPENSE (PER YEAR)	**39,214.17**
Accum Depreciation - Movable Furniture & Equipment	**873.85**
Accum Depreciation - Computer Equipment & Software	**95,299.45**
ACCUMULATED DEPRECIATION @ 9/30	**96,173.30**

ACCUMULATED DEPRECIATION @ 9/30/07	**96,173.30**

Heart Center of Greater Waterbury, Inc. EIN 83-0416893

Attachment to Form 990 Schedule A Part II and Schedule A Part III Line 2c Transactions with Parties connected with our Board of Directors And Explanation of Compensation Arrangement Fye 9/30/07

Heart Center of Greater Waterbury Inc. (HCGW) has entered into an arms-length agreement with Franklin Medical Group of 56 Franklin St., Waterbury CT. HCGW purchases administrative services from Franklin Medical Group (FMG). The administrators who provide these services include the executive director, her administrative assistant, data analyst and clinical nurse specialist. FMG is a taxable entity wholly owned by Saint Mary's Hospital, one of the two members of HCGW. All applicable payroll taxes are remitted by FMG. At the end of September 30, 2007, there were four such employees dedicated towards running the operations of HCGW.

HCGW has a written lease for rental of office space and phone line with the Harold Leever Regional Cancer Center of Waterbury, CT (HLRCC). HLRCC is a joint venture between Saint Mary's Hospital and Waterbury Hospital and has six board members that also sit on the board of directors at HCGW. The terms of the lease were negotiated at arm's length by the Executive Director of the Heart center and the Director of Finance at the Cancer Center based on the amount of space and utilities that would be utilized. This lease will be reevaluated yearly for any necessary changes due to market value, increase in utility costs or the possible need for the area by patient care providers. For the year ended September 30, 2007, HCGW paid HLRCC $18,720 at $1,060 per month for rent and $500 per month for the phone line from the inception of the lease.

One of the co-presidents of HCGW, Robert P. Ritz is also the CEO of Saint Mary's Hospital, a member of HCGW and also serves on the Board of Directors of FMG. The other co-president of HCGW, John H. Tobin is also CEO of Waterbury Hospital, the other member of HCGW. In total there are eight individuals on the HCGW Board of Directors, with four representing each member hospital.

Waterbury Hospital and Saint Mary's Hospital jointly fund the operations of HCGW. During the year ended September 30, 2007, each hospital allocated $294,000 to HCGW for a total of $588,000. There is no borrowing activity between the hospitals and its two members or any individuals connected with the three entities and its other affiliates.

HCGW has its business checking account with Sovereign Bank in Waterbury, CT. HCGW incurred no bank fees, did not conduct any borrowings or engage in any other business activity with Sovereign Bank or its affiliates.

Heart C er of Greater Waterbury, Inc. EIN: 83-0416893
Form 990 Part V-A Line 75c Attachment For Year Ended 9/30/07
Information on Compensation of Employees Who Serve as Officers and/or Directors
of Heart Center of Greater Waterbury and are paid over $100,000 by entities meeting control test

Employee Name	Job Position at other entity	Name and EIN of Other Entity	Gross Salary	Employer Contributions to Benefits	Expense Accounts
Ritz, Robert c/o Saint Mary's Hospital 56 Franklin St. Waterbury, CT 06706	President/CEO	Saint Mary's Hospital Inc. EIN: 06-0646844	$582,591	$182,460	none
Sandra Roosa, RN c/o Saint Mary's Hospital 56 Franklin St. Waterbury, CT 06706	VP, Patient Care Services	Saint Mary's Hospital Inc. EIN: 06-0646844	$224,315	$34,874	none
Eugene Bunnell, MD c/o Saint Mary's Hospital 56 Franklin St. Waterbury, CT 06706	Physician, Critical Care	Franklin Medical Group, Inc. EIN: 06-1470493	$300,694	$47,149	none
Chad Wable c/o Saint Mary's Hospital 56 Franklin St. Waterbury, CT 06706	V.P. Marketing and Business Development	Saint Mary's Hospital Inc. EIN: 06-0646844	$194,574	$29,732	none
Colleen Scott c/o Waterbury Hospital 64 Robbins St. Waterbury, CT 06721	CFO of Waterbury Hospital	Greater Waterbury Health Network, Inc. EIN: 22-2572044 Waterbury Hospital, EIN: 06-0665979	$160,386 $106,924	$17,210 $11,473	$0 $0
John Tobin c/o Waterbury Hospital 64 Robbins St. Waterbury, CT 06721	President/CEO of Waterbury Hospital	Greater Waterbury Health Network, Inc. EIN: 22-2572044 Waterbury Hospital, EIN: 06-0665979	$274,600 $173,138	$15,528 $104,102	$0 $9,928
Steven Schneider, MD c/o Waterbury Hospital 64 Robbins St. Waterbury, CT 06721	VP of Medical Affairs of Waterbury Hospital	Greater Waterbury Health Network, Inc. EIN: 22-2572044 Waterbury Hospital, EIN: 06-0665979	$190,987 $127,324	$17,408 $11,605	$0 $0
Mary Prybylo, RN c/o Waterbury Hospital 64 Robbins St. Waterbury, CT 06721	COO of Waterbury Hospital	Greater Waterbury Health Network, Inc. EIN: 22-2572044 Waterbury Hospital, EIN: 06-0665979	$167,407 $111,604	$13,213 $8,809	$0 $0

11) Provide a copy of Audited or in unavailable, Unaudited FY 2008, Financial statements for each TWH and SMH

Response:

Fiscal Year 2008 financial statements are currently in process and will be available after November 2008. Provided on the following pages are the un-audited financial statements for TWH and SMH fiscal year to date through August 2008.

10/22/08
12:50 PM
FRX-AA Balance Sheet

SAINT MARY'S HEALTH SYSTEM
SAINT MARY'S HOSPITAL
BALANCE SHEET
August 31, 2008
(in thousands)

	Current Month	Prior Month	Prior Year End
CASH	$13,184	$14,772	$4,476
SHORT TERM INVESTMENTS	22	21	60
CURRENT PORTION OF ASSETS WHOSE USE IS LIMITED	3,977	3,712	4,206
ACCOUNTS RECEIVABLES, GROSS	24,787	24,674	23,578
BAD DEBT RESERVE	(5,707)	(6,186)	(4,287)
OTHER CURRENT ASSETS	4,120	3,834	3,820
TOTAL CURRENT ASSETS	40,382	40,827	31,853
MARKETABLE SECURITIES	11,607	11,488	11,959
ASSETS WHOSE USE IS LIMITED:			
BY DONOR AND HELD IN TRUST BY OTHERS	14,073	14,145	15,975
FOR ESTIMATED SELF - INSURANCE LIABILITY	25,059	28,870	27,372
BY BOND INDENTURE	4,799	4,533	4,977
INTEREST IN FOUNDATION	4,117	4,079	4,904
OTHER	6	6	5
TOTAL ASSETS WHOSE USE IS LIMITED	48,052	51,634	53,233
LESS CURRENT PORTION OF ASSETS WHOSE USE IS LIMITED	(3,977)	(3,712)	(4,206)
NONCURRENT ASSETS WHOSE USE IS LIMITED	44,075	47,922	49,028
PROPERTY AND EQUIPMENT, NET	48,019	47,617	50,377
OTHER ASSETS:			
INVESTMENTS IN JOINT VENTURES	15,184	15,073	14,778
DEFERRED FINANCING COSTS, NET	286	290	334
OTHER NONCURRENT ASSETS	963	1,010	1,907
	16,432	16,373	17,018
TOTAL ASSETS	$160,515	$164,226	$160,235
CURRENT PORTION OF LT OBLIGATIONS	$3,006	$3,055	$3,112
ACCOUNTS PAYABLE	11,411	11,782	12,881
ACCRUED PAYROLL EXPENSES	3,061	3,407	3,122
DUE TO THIRD PARTIES	5,532	5,422	4,179
ACCRUED OTHER EXPENSES	7,502	7,671	7,581
TOTAL CURRENT LIABILITIES	30,512	31,337	30,876
LONG TERM OBLIGATIONS	30,563	30,580	33,485
ESTIMATED SELF-INSURANCE LIABILITY	16,205	19,198	17,643
ACCRUED COMPENSATIONS & BENEFITS	18,539	18,399	17,095
MINIMUM PENSION LIABILITY	44,870	44,639	37,308
OTHER LONG TERM LIABILITIES	7,325	8,210	5,118
TOTAL OTHER LIABILITIES	117,502	121,026	110,649
UNRESTRICTED FUND BALANCE	(4,795)	(5,557)	(1,326)
TEMPORARILY FUND BALANCE	2,234	2,287	3,034
RESTRICTED FUND BALANCE	15,062	15,134	17,002
TOTAL FUND BALANCE	12,502	11,864	18,710
TOTAL LIABILITIES & FUND BALANCE	$160,515	$164,226	$160,235

10/22/08
12:52 PM
FRX-AB Bal Sht Trend

SAINT MARY'S HEAL STEM
SAINT MARY'S HO AL
BALANCE SHEET
August 31, 2008
(in thousands)

	Aug FY2008	Jul FY2008	Jun FY2008	May FY2008	Apr FY2008	Mar FY2008	Feb FY2008	Jan FY2008	Dec FY2008	Nov FY2008	Oct FY2008	Sep FY2007	Aug FY2007
CASH	$13,184	$14,772	$12,263	$11,850	$12,846	$8,275	$5,813	$5,295	$4,540	$4,145	$5,600	$4,476	$3,656
SHORT TERM INVESTMENTS	22	21	21	21	64	64	61	59	60	62	61	60	55
CURRENT PORTION OF ASSETS WHOSE US	3,977	3,712	5,652	5,410	5,121	4,860	4,601	4,341	4,932	4,695	4,449	4,206	3,961
ACCOUNTS RECEIVABLES, GROSS	24,787	24,674	24,937	25,086	27,020	26,457	25,229	24,914	24,244	24,997	24,286	23,578	22,163
BAD DEBT RESERVE	(5,707)	(6,186)	(5,995)	(5,529)	(5,633)	(5,728)	(5,578)	(5,723)	(5,495)	(5,161)	(4,820)	(4,287)	(4,227)
OTHER CURRENT ASSETS	4,120	3,834	3,933	5,102	4,613	4,606	5,839	5,148	4,131	5,439	4,344	3,820	4,790
TOTAL CURRENT ASSETS	40,382	40,827	40,811	41,940	44,030	38,535	35,965	34,033	32,413	34,177	33,920	31,853	30,398
MARKETABLE SECURITIES	11,607	11,488	11,597	12,047	11,845	11,485	11,535	11,619	11,934	11,985	12,212	11,959	11,196
ASSETS WHOSE USE IS LIMITED:													
BY DONOR AND HELD IN TRUST BY OTHER:	14,073	14,145	14,392	15,144	15,029	14,577	14,640	14,912	15,573	15,765	16,241	15,975	15,490
FOR ESTIMATED SELF - INSURANCE LIABILI	25,059	28,870	28,319	27,869	27,183	27,021	26,860	27,210	27,242	27,859	27,691	27,372	26,284
BY BOND INDENTURE	4,799	4,533	6,473	6,206	5,917	5,657	5,398	5,137	5,728	5,466	5,220	4,977	4,732
INTEREST IN FOUNDATION	4,117	4,079	4,115	4,317	4,156	4,100	4,379	4,617	4,573	4,879	4,991	4,904	4,760
OTHER	6	6	5	5	5	5	5	5	5	5	5	5	5
TOTAL ASSETS WHOSE USE IS LIMITED	48,052	51,634	53,304	53,541	52,291	51,360	51,281	51,882	53,122	53,974	54,150	53,233	51,272
LESS CURRENT PORTION OF ASSETS WHOSE USE IS LIMITED	(3,977)	(3,712)	(5,652)	(5,410)	(5,121)	(4,860)	(4,601)	(4,341)	(4,932)	(4,695)	(4,449)	(4,206)	(3,961)
NONCURRENT ASSETS WHOSE USE IS LIM	44,075	47,922	47,652	48,131	47,170	46,499	46,680	47,541	48,190	49,279	49,701	49,028	47,311
PROPERTY AND EQUIPMENT, NET	48,019	47,617	47,728	47,919	48,113	48,097	48,318	49,576	49,936	49,788	49,946	50,377	50,350
OTHER ASSETS:													
INVESTMENTS IN JOINT VENTURES	15,184	15,073	15,213	15,173	15,004	15,139	14,905	14,652	15,028	14,829	14,512	14,778	14,612
DEFERRED FINANCING COSTS, NET	286	290	294	299	303	307	312	316	321	325	330	334	335
OTHER NONCURRENT ASSETS	963	1,010	1,060	1,127	1,154	1,217	1,257	1,296	1,865	1,907	1,907	1,907	1,927
	16,432	16,373	16,567	16,598	16,461	16,664	16,474	16,264	17,213	17,061	16,748	17,018	16,875
TOTAL ASSETS	$160,515	$164,226	$164,355	$166,635	$167,620	$161,280	$158,971	$159,032	$159,685	$162,290	$162,527	$160,235	$156,130
CURRENT PORTION OF LT OBLIGATIONS	$3,006	$3,055	$2,997	$3,008	$3,015	$3,032	$3,050	$3,067	$3,085	$3,102	$3,099	$3,112	$3,470
ACCOUNTS PAYABLE	11,411	11,782	10,772	11,224	11,790	12,160	12,504	12,606	13,497	13,167	12,546	12,881	11,188
ACCRUED PAYROLL EXPENSES	3,061	3,407	2,704	2,647	2,988	2,472	2,512	3,560	2,894	2,803	3,358	3,122	2,643
DUE TO THIRD PARTIES	5,532	5,422	5,335	5,225	5,115	3,555	3,635	4,328	4,218	4,399	4,289	4,179	3,931
ACCRUED OTHER EXPENSES	7,502	7,671	8,534	8,359	8,262	8,062	7,830	7,448	7,947	7,903	7,740	7,581	7,461
TOTAL CURRENT LIABILITIES	30,512	31,337	30,342	30,463	31,169	29,281	29,531	31,010	31,641	31,375	31,033	30,876	28,693
LONG TERM OBLIGATIONS	30,563	30,580	32,023	32,057	32,635	32,678	32,720	32,763	32,814	32,847	33,439	33,485	33,530
ESTIMATED SELF-INSURANCE LIABILITY	16,205	19,198	18,792	18,542	17,898	17,685	17,473	17,923	17,711	17,790	17,856	17,643	18,042
ACCRUED COMPENSATIONS & BENEFITS	18,539	18,399	18,317	18,176	18,094	17,950	17,790	17,683	17,523	17,415	17,255	17,095	16,930
MINIMUM PENSION LIABILITY	44,870	44,639	43,709	40,943	41,451	43,282	42,192	41,354	38,814	37,966	36,263	37,308	41,988
OTHER LONG TERM LIABILITIES	7,325	8,210	8,891	9,677	11,421	9,297	6,519	5,917	5,387	6,221	5,994	5,118	4,906
TOTAL OTHER LIABILITIES	117,502	121,026	121,733	119,395	121,498	120,893	116,695	115,640	112,248	112,239	110,807	110,649	115,396
UNRESTRICTED FUND BALANCE	(4,795)	(5,557)	(5,400)	(1,699)	(3,374)	(6,762)	(5,416)	(6,220)	(3,549)	(1,179)	345	(1,326)	(7,630)
TEMPORARILY FUND BALANCE	2,234	2,287	2,299	2,344	2,265	2,260	2,495	2,664	2,742	3,061	3,072	3,034	3,159
RESTRICTED FUND BALANCE	15,062	15,134	15,381	16,133	16,061	15,609	15,666	15,939	16,603	16,794	17,270	17,002	16,513
TOTAL FUND BALANCE	12,502	11,864	12,280	16,777	14,952	11,106	12,746	12,383	15,796	18,677	20,687	18,710	12,042
TOTAL LIABILITIES & FUND BALANCE	$160,515	$164,226	$164,355	$166,635	$167,620	$161,280	$158,971	$159,032	$159,685	$162,290	$162,527	$160,235	$156,130

10/22/08 12:55 PM
AD INC STMT ROLL

S IARY'S HOSPITAL
STATEMENT OF REVENUES AND EXPENSES TREND REPORT
Last Twelve Months From August 31, 2008

	Aug FY2008	JulFY2008	JunFY2008	May FY2008	Apr FY2008	MarFY2008	Feb FY2008	Jan FY2008	Dec FY2008	Nov FY2008	Oct FY2008	Sep FY2007	Aug FY2007
Inpatient	$16,924	$16,767	$16,169	$17,631	$17,463	$19,606	$17,536	$17,765	$16,626	$18,132	$18,503	$15,660	$16,642
Outpatient	17,401	17,613	17,440	17,197	17,560	17,104	16,507	17,239	14,467	16,081	17,141	15,085	15,720
Patient Revenues	**34,325**	**34,379**	**33,609**	**34,829**	**35,023**	**36,710**	**34,043**	**35,004**	**31,093**	**34,213**	**35,643**	**30,745**	**32,362**
Contractual Allowances	17,915	18,290	17,812	18,800	18,872	20,106	18,841	19,568	16,291	19,387	19,721	16,160	16,703
Net Patient Revenue	**16,410**	**16,090**	**15,797**	**16,028**	**16,151**	**16,604**	**15,202**	**15,436**	**14,801**	**14,826**	**15,923**	**14,585**	**15,659**
Other Operating Revenue	535	305	365	333	370	346	407	303	443	306	287	300	350
Net Revenues	**16,945**	**16,394**	**16,162**	**16,361**	**16,521**	**16,950**	**15,609**	**15,740**	**15,245**	**15,133**	**16,210**	**14,885**	**16,009**
Salaries and Wages	6,083	6,004	5,977	6,067	5,984	6,228	5,903	6,463	5,995	5,834	6,187	6,070	6,021
Employee Benefits	1,548	1,774	1,892	1,885	1,755	1,948	1,956	1,621	1,855	1,742	1,985	1,743	1,934
Total Labor Costs	**7,632**	**7,778**	**7,869**	**7,953**	**7,739**	**8,177**	**7,858**	**8,083**	**7,850**	**7,575**	**8,172**	**7,814**	**7,955**
Physician Fees	791	758	787	785	836	787	773	1,040	765	747	814	806	707
Purchased Services	1,714	1,653	1,583	1,620	1,506	1,803	1,601	1,621	1,616	1,538	1,621	1,529	1,703
Medical Supplies	1,605	1,546	1,472	1,512	1,525	1,528	1,526	1,482	1,366	1,497	1,564	1,062	1,499
Pharmaceuticals	375	458	442	454	430	474	376	438	429	438	516	418	465
General Supplies	248	262	267	282	217	224	224	238	228	239	223	143	227
Maintenance & Repair	314	343	352	277	413	314	297	302	311	307	329	383	296
Utilities	360	436	320	301	371	246	332	332	343	325	267	231	422
Insurance	546	408	497	311	236	229	224	221	218	253	215	110	160
Bad Debts	581	972	975	764	874	916	850	918	926	1,040	1,131	656	691
Depreciation	607	604	612	626	681	681	550	681	679	679	674	739	509
Interest	166	166	175	175	176	176	177	193	178	177	179	178	188
Other Expenses	553	552	567	552	554	498	548	552	459	420	485	639	500
Non-Salary Expense	7,861	8,158	8,051	7,659	7,818	7,877	7,476	8,016	7,518	7,658	8,018	6,892	7,366
Operating Expenses	**15,493**	**15,936**	**15,920**	**15,611**	**15,557**	**16,054**	**15,335**	**16,099**	**15,369**	**15,233**	**16,189**	**14,706**	**15,321**
Operating Income/(Loss)	**1,452**	**458**	**242**	**750**	**964**	**897**	**274**	**(360)**	**(124)**	**(101)**	**20**	**180**	**688**
Minority Interest	80	511	602	498	184	450	1,714	593	1,177	460	324	400	297
Non-Operating Income/(Loss)													
Subtotal	80	511	602	498	184	450	1,714	593	1,177	460	324	400	297
Net Income/(Loss)	**$1,532**	**$969**	**$844**	**$1,247**	**$1,148**	**$1,346**	**$1,988**	**$233**	**$1,052**	**$359**	**$344**	**$580**	**$985**
Operating Margin	**8.6%**	**2.8%**	**1.5%**	**4.6%**	**5.8%**	**5.3%**	**1.8%**	**(2.3%)**	**(0.8%)**	**(0.7%)**	**0.1%**	**1.2%**	**4.3%**
Net Margin	**9.0%**	**5.9%**	**5.2%**	**7.6%**	**7.0%**	**7.9%**	**12.7%**	**1.5%**	**6.9%**	**2.4%**	**2.1%**	**3.9%**	**6.2%**

FINAL

AC INCOME ST
10/22/08 12:5

SAINT MARY'S HOSPITAL
STATEMENT OF REVENUES AND EXPENSES
For the Month and Eleven Months ended August 31, 2008
($ in Thousands)

Current Month to Budget				Prior Year		Current YTD to Budget YTD				Prior Year
Budget	Actual	$ Var	% Var	Actual		Budget	Actual	$ Var	% Var	Actual
$19,060	$16,924	($2,135)	(11.2%)	$16,642	Inpatient	$207,890	$193,122	($14,767)	(7.1%)	$187,302
16,420	17,401	980	6.0%	15,720	Outpatient	176,206	185,750	9,543	5.4%	164,895
35,480	**34,325**	**(1,155)**	**(3.3%)**	**32,362**	Patient Revenues	**384,096**	**378,872**	**(5,224)**	**(1.4%)**	**352,197**
19,247	17,915	1,332	6.9%	16,703	Contractual Allowances	212,694	205,602	7,092	3.3%	187,702
16,233	**16,410**	**177**	**1.1%**	**15,659**	Net Patient Revenue	**171,402**	**173,270**	**1,868**	**1.1%**	**164,495**
330	535	205	62.0%	350	Other Operating Revenue	3,584	4,000	416	11.6%	3,421
16,563	**16,945**	**382**	**2.3%**	**16,009**	Net Revenues	**174,986**	**177,270**	**2,284**	**1.3%**	**167,916**
6,115	6,083	32	0.5%	6,021	Salaries and Wages	65,340	66,725	(1,384)	(2.1%)	63,565
1,887	1,548	339	18.0%	1,934	Employee Benefits	20,408	19,961	447	2.2%	20,184
8,002	**7,632**	**371**	**4.6%**	**7,955**	Total Labor Costs	**85,748**	**86,685**	**(937)**	**(1.1%)**	**83,750**
774	791	(17)	(2.2%)	707	Physician Fees	8,528	8,883	(355)	(4.2%)	6,858
1,554	1,714	(161)	(10.4%)	1,703	Purchased Services	17,163	17,876	(713)	(4.2%)	17,468
1,469	1,605	(135)	(9.2%)	1,499	Medical Supplies	15,978	16,622	(644)	(4.0%)	16,016
497	375	122	24.6%	465	Pharmaceuticals	5,308	4,830	478	9.0%	5,077
246	248	(2)	(0.8%)	227	General Supplies	2,614	2,653	(40)	(1.5%)	2,475
313	314	(1)	(0.4%)	296	Maintenance & Repair	3,491	3,558	(67)	(1.9%)	3,350
368	360	8	2.1%	422	Utilities	3,751	3,633	118	3.2%	3,616
277	546	(269)	(97.4%)	160	Insurance	2,917	3,357	(440)	(15.1%)	1,894
925	581	344	37.2%	691	Bad Debts	9,952	9,947	5	0.0%	8,459
681	607	74	10.8%	509	Depreciation	7,489	7,074	414	5.5%	7,374
202	166	36	18.0%	188	Interest	2,145	1,938	207	9.7%	2,433
517	553	(36)	(7.0%)	500	Other Expenses	5,677	5,740	(63)	(1.1%)	4,657
7,824	7,861	(38)	(0.5%)	7,366	Non-Salary Expense	85,013	86,111	(1,099)	(1.3%)	79,678
15,826	**15,493**	**333**	**2.1%**	**15,321**	Operating Expenses	**170,761**	**172,797**	**(2,036)**	**(1.2%)**	**163,428**
737	**1,452**	**715**	**97.0%**	**688**	Operating Income/(Loss)	**4,225**	**4,473**	**248**	**5.9%**	**4,489**
					Minority Interest					
493	80	(413)	(83.8%)	297	Non-Operating Income/(Loss)	6,087	6,591	505	8.3%	6,788
493	80	(413)	(83.8%)	297	Subtotal	6,087	6,591	505	8.3%	6,788
$1,230	**$1,532**	**$302**	**24.6%**	**$985**	Net Income/(Loss)	**$10,312**	**$11,064**	**$752**	**7.3%**	**$11,277**
4.5%	**8.6%**	**4.1%**	**92.5%**	**4.3%**	Operating Margin	**2.4%**	**2.5%**	**0.1%**	**4.5%**	**2.7%**
7.4%	**9.0%**	**1.6%**	**21.8%**	**6.2%**	Net Margin	**5.9%**	**6.2%**	**0.3%**	**5.9%**	**6.7%**

WATERBURY HOSPITAL
COMPARATIVE INCOME STATEMENT
8/31/08

		YEAR TO DATE	
	FY 08 ACTUAL	FY 08 BUDGET	FY 07 ACTUAL
GROSS REVENUE	649,842,824	650,442,151	608,386,844
Contractual Allowances	442,821,710	434,614,953	406,248,260
NET CONTRACTED REVENUE	207,021,114	215,827,198	202,138,584
Bad Debt	17,341,781	18,976,126	18,223,098
Free Care	3,652,770	2,451,304	3,091,700
UCP	(2,861,187)	(3,116,667)	(2,999,838)
OTHER ALLOWANCES	18,133,364	18,310,763	18,314,960
NET REVENUE	188,887,750	197,516,435	183,823,624
EXPENSES			
Payroll Expenses	99,692,792	97,616,631	96,280,721
Employee Benefits	26,750,405	26,970,767	25,135,735
Professional/Legal Fees	11,643,581	10,819,698	10,727,429
Med & Surg Supplies	19,637,687	21,801,405	18,283,757
Other Supplies	10,914,007	10,999,299	10,125,789
Purchased Services	12,895,010	12,942,715	11,970,050
Depreciation	9,625,335	9,625,000	9,441,307
Interest	1,463,985	1,650,000	1,649,823
Insurances	4,866,992	5,479,708	4,311,026
Drugs	6,905,067	7,510,261	6,479,474
Food	1,224,238	1,196,135	1,144,593
Utilities	3,435,559	3,492,757	3,465,862
TOTAL EXPENSES	209,054,658	210,104,376	199,015,566
OTHER OPERATING INCOME	4,998,091	5,837,200	6,406,279
PARTNERSHIP INCOME	1,885,084	2,025,833	2,309,545
NET ASSETS RELEASED FROM RESTRICTION (PROGRAM EXPENSES)	3,838,229	N/A	N/A
SUBTOTAL	10,721,404	7,863,033	8,715,824
NET EXPENSES	198,333,254	202,241,343	190,299,742
INCOME/(LOSS) FROM OPERATIONS	(9,445,504)	(4,724,908)	(6,476,118)
NON-OPERATING INCOME	1,796,126	2,640,458	2,445,083
NET INCOME/(LOSS) BEFORE CHANGE IN UNREALIZED GAINS AND LOSSES	(7,649,378)	(2,084,450)	(4,031,035)
CHANGE IN UNREALIZED GAINS AND LOSSES	5,576	N/A	N/A
NET INCOME/(LOSS)	(7,643,802)	N/A	N/A

WATERBURY HOSPITAL
INCOME STATEMENT
August 31, 2008

	OCT 07	NOV 07	DEC 07	JAN 08	FEB 08	MAR 08	APR 08	MAY 08	JUN 08	JUL 08	AUG 08	YTD TOTAL
GROSS REVENUE	61,703,761	58,641,733	51,942,452	62,571,636	55,732,536	61,668,453	57,905,412	59,752,341	59,918,820	61,319,387	58,686,293	649,842,824
TOTAL ALLOWANCES	42,797,466	42,662,460	36,683,629	43,827,963	38,409,778	43,603,982	41,716,009	44,227,316	42,497,152	42,957,716	41,571,603	460,955,074
NET REVENUE	18,906,295	15,979,273	15,258,823	18,743,673	17,322,758	18,064,471	16,189,403	15,525,025	17,421,668	18,361,671	17,114,690	188,887,750
EXPENSES												
Payroll Expenses	9,324,307	8,931,687	9,167,269	9,229,246	8,586,966	9,375,897	9,287,686	8,873,117	9,022,705	9,218,423	8,675,489	99,692,792
Employee Benefits	2,199,475	2,147,555	2,358,219	2,372,582	2,318,341	2,652,025	2,261,244	2,183,868	2,549,579	2,268,753	3,438,764	26,750,405
Professional/Legal Fees	1,046,274	1,149,099	1,095,585	1,029,279	1,178,059	1,009,297	1,050,849	1,024,201	986,005	1,070,322	1,004,611	11,643,581
Med & Surg Supplies	1,930,855	1,907,766	1,572,490	2,090,513	1,607,970	1,155,428	1,853,974	1,857,986	1,905,871	2,196,142	1,558,692	19,637,687
Other Supplies	968,501	1,048,214	879,033	992,815	1,000,162	915,509	1,038,551	978,184	1,027,634	1,068,060	997,344	10,914,007
Purchased Services	997,277	1,086,888	1,129,498	1,065,975	1,076,046	1,020,491	1,274,322	1,293,767	1,195,782	1,334,016	1,420,948	12,895,010
Depreciation	875,000	875,000	875,000	875,000	875,000	875,000	875,000	875,335	875,000	875,000	875,000	9,625,335
Interest	123,600	124,494	123,989	172,202	148,592	133,813	129,841	129,182	128,988	124,705	124,579	1,463,985
Insurances	660,810	661,105	131,276	579,394	667,076	989,584	585,548	567,374	568,028	570,413	(1,113,616)	4,866,992
Drugs	670,431	544,987	569,476	602,317	552,685	750,041	661,768	553,389	678,365	671,362	650,246	6,905,067
Food	111,693	113,882	104,339	106,508	107,715	110,950	114,196	114,722	123,158	105,976	111,099	1,224,238
Utilities	305,203	303,230	313,660	245,729	328,057	455,187	294,138	291,555	277,482	292,144	329,174	3,435,559
TOTAL EXPENSES	19,213,426	18,893,907	18,319,834	19,361,560	18,446,669	19,443,222	19,427,117	18,742,680	19,338,597	19,795,316	18,072,330	209,054,658
OTHER OPERATING INCOME	586,022	512,124	522,468	843,608	457,492	929,746	273,046	255,167	266,504	138,595	213,319	4,998,091
PARTNERSHIP INCOME	184,167	184,167	184,167	113,221	184,167	184,167	114,360	184,167	184,167	184,167	184,167	1,885,084
NET ASSETS RELEASED FROM RESTRICTION (PROGRAM EXPENSES)	N/A	N/A	N/A	N/A	N/A	1,852,519	680,377	130,894	570,283	279,751	324,405	3,838,229
SUBTOTAL	770,189	696,291	706,635	956,829	641,659	2,966,432	1,067,783	570,228	1,020,954	602,513	721,891	10,721,404
NET EXPENSES	18,443,237	18,197,616	17,613,199	18,404,731	17,805,010	16,476,790	18,359,334	18,172,452	18,317,643	19,192,803	17,350,439	198,333,254
INCOME/(LOSS) FROM OPERATIONS	463,058	(2,218,343)	(2,354,376)	338,942	(482,252)	1,587,681	(2,169,931)	(2,647,427)	(895,975)	(831,132)	(235,749)	(9,445,504)
NON-OPERATING INCOME												
Endowment Income	195,492	194,593	193,852	196,274	194,593	199,559	(181,903)	143,862	144,615	142,098	143,862	1,566,897
Donations	3,190	2,511	40,150	54,192	2,048	(6,367)	567	2,940	1,412	4,026	675	105,344
Board-Restricted Income	(1,781)	(2,374)	74,660	(2)	(592)	(1,337)	2	312	50,542	(146)	(399)	118,885
Partnership Income	0	0	0	0	0	0	0	0	0	0	5,000	5,000
TOTAL NON-OPERATING INCOME	196,901	194,730	308,662	250,464	196,049	191,855	(181,334)	147,114	196,569	145,978	149,138	1,796,126
NET INCOME/(LOSS) BEFORE CHANG IN UNREALIZED GAINS AND LOSSES	659,959	(2,023,613)	(2,045,714)	589,406	(286,203)	1,779,536	(2,351,265)	(2,500,313)	(699,406)	(685,154)	(86,611)	(7,649,378)
CHANGE IN UNREALIZED GAINS AND LOSSES	N/A	N/A	N/A	N/A	N/A	96,761	(7,555)	(33,992)	(52,619)	(12,873)	15,854	5,576
NET INCOME/(LOSS)	659,959	(2,023,613)	(2,045,714)	589,406	(286,203)	1,876,297	(2,358,820)	(2,534,305)	(752,025)	(698,027)	(70,757)	(7,643,802)

N:LEDGER\FY2008\FINSTMTS\BALSHEET.XLS

WATERBURY HOSPITAL
GENERAL FUND
COMPARATIVE BALANCE SHEET

CURRENT ASSETS	9/30/2007	10/31/2007	11/30/2007	12/31/2007	1/31/2008	2/29/2008	3/31/2008	4/30/2008	5/31/2008	6/30/2008	7/31/2008	8/31/2008
Cash & Cash Equivalents	$4,036,670	$8,259,694	$6,282,817	$3,778,942	$5,730,752	$1,299,072	$5,250,620	$7,141,897	$6,856,972	$3,480,187	$8,992,496	$3,804,486
Assets whose use is Limited	$3,058,221	$3,210,505	$3,362,197	$3,590,923	$3,125,088	$2,661,417	$2,813,932	$3,003,991	$3,174,266	$3,383,509	$2,166,352	$2,314,181
Accounts Receivable - Patients	$42,920,866	$44,187,421	$44,671,777	$43,232,911	$44,937,656	$45,555,281	$47,281,202	$45,805,738	$41,842,874	$42,127,052	$40,819,969	$42,642,448
Less: Allow. for Doubtful Accounts	$9,500,000	$9,416,187	$10,889,624	$9,155,582	$8,737,091	$8,595,565	$8,355,066	$8,546,867	$8,914,266	$8,603,457	$7,991,893	$8,465,310
Net Accounts Receivable	$33,420,866	$34,771,234	$33,782,153	$34,077,329	$36,200,565	$36,959,716	$38,926,136	$37,258,871	$32,928,608	$33,523,595	$32,828,076	$34,177,138
Grants Receivable & Other Receivables	$1,417,154	$922,951	$1,167,589	$1,570,473	$1,094,301	$1,480,670	$1,703,604	$1,732,072	$1,861,542	$1,913,431	$1,989,890	$2,339,244
Inventory of Supplies	$478,384	$486,292	$492,559	$500,278	$500,706	$505,319	$492,630	$500,205	$502,683	$501,655	$507,481	$502,505
Prepaid Insurance & Expense	$1,272,851	$4,452,599	$4,284,840	$4,001,623	$3,934,938	$3,487,108	$3,188,118	$3,035,163	$2,559,288	$2,233,813	$2,419,687	$1,880,035
Due From Affiliates	$4,025,599	($1,946,114)	($1,559,802)	($1,134,245)	($800,362)	($1,397,672)	($756,375)	($19,772)	$481,205	$1,160,530	($1,795,123)	($1,130,124)
TOTAL CURRENT ASSETS	$47,709,745	$50,157,161	$47,812,353	$46,385,323	$49,785,988	$44,995,630	$51,618,665	$52,652,427	$48,364,564	$46,196,720	$47,108,859	$43,887,465
ASSETS LIMITED AS TO USE:												
Investments - Self-Insurance	$9,816,451	$9,701,963	$9,749,849	$9,956,577	$7,363,150	$7,308,088	$5,225,497	$5,052,399	$5,020,225	$5,157,751	$4,981,232	$5,087,981
Investments - Cap Purch/Repl	$0	$0	$4,320	$4,320	$0	$0	$0	$0	$0	$0	$0	$0
Debt Service Fund	$536,274	$688,558	$840,250	$1,068,976	$603,141	$756,401	$908,442	$1,060,008	$1,230,508	$1,441,275	$226,418	$382,713
Debt Service Reserve Fund	$1,991,138	$1,991,138	$1,991,138	$1,991,138	$1,991,138	$1,991,138	$1,991,138	$1,991,138	$1,991,138	$1,991,138	$1,991,138	$1,991,138
TOTAL CHEFA ASSETS	$2,527,412	$2,679,696	$2,831,388	$3,060,114	$2,594,279	$2,747,539	$2,899,580	$3,051,146	$3,221,646	$3,432,413	$2,217,556	$2,373,851
TOTAL ASSETS WITH LIMITED USE	$12,343,863	$12,381,659	$12,585,557	$13,021,011	$9,957,429	$10,055,627	$8,125,077	$8,103,545	$8,241,871	$8,590,164	$7,198,788	$7,461,832
Less: CP Assets With Limited Use	$3,058,221	$3,210,505	$3,362,197	$3,590,923	$3,125,088	$2,661,417	$2,813,932	$3,003,991	$3,174,266	$3,383,509	$2,166,352	$2,314,181
TOTAL N/C ASSETS WITH LIMITED USE	$9,285,642	$9,171,154	$9,223,360	$9,430,088	$6,832,341	$7,394,210	$5,311,145	$5,099,554	$5,067,605	$5,206,655	$5,032,436	$5,147,651
Note Receivable - Cancer Center	$1,277,492	$1,286,275	$1,295,058	$1,239,004	$1,199,218	$1,159,193	$1,119,509	$1,079,586	$1,038,838	$998,427	$955,900	$914,495
Other Investments	$5,109,903	$5,388,174	$4,593,207	$4,717,512	$4,831,905	$5,016,072	$5,173,603	$5,337,986	$4,378,269	$4,540,810	$4,722,932	$4,909,200
Prepaid Pension Asset	$1,795,780	$1,745,780	$1,695,780	$1,645,780	$1,595,780	$1,545,780	$1,495,780	$1,445,780	$1,395,780	$1,345,780	$1,517,780	$1,682,780
Bond Issuance & Discount Costs - Net	$1,163,324	$1,158,867	$1,154,410	$1,149,952	$1,145,495	$1,141,038	$1,136,581	$1,132,124	$1,127,667	$1,123,209	$1,118,752	$1,114,295
TOTAL OTHER ASSETS	$9,346,499	$9,579,096	$8,738,455	$8,752,248	$8,772,398	$8,862,083	$8,925,473	$8,995,476	$7,940,554	$8,008,226	$8,315,364	$8,620,770
FIXED ASSETS												
Property, Plant & Equipment	$236,040,404	$236,247,716	$236,442,374	$236,498,189	$236,556,298	$236,698,298	$236,723,320	$236,805,634	$236,718,741	$236,893,137	$237,208,680	$237,255,021
Less: Accumulated Depreciation	$179,321,783	$180,196,783	$181,071,783	$181,946,783	$182,821,783	$183,696,783	$184,571,783	$185,446,783	$186,214,224	$187,089,224	$187,964,224	$188,839,224
Net Property, Plant & Equipment	$56,718,621	$56,050,933	$55,370,591	$54,551,406	$53,734,515	$53,001,515	$52,151,537	$51,358,851	$50,504,517	$49,803,913	$49,244,456	$48,415,797
Projects in Progress	$282,268	$357,586	$655,636	$665,701	$831,273	$1,077,687	$1,302,577	$1,550,161	$1,572,361	$1,603,316	$1,675,424	$1,784,527
TOTAL FIXED ASSETS	$57,000,889	$56,408,519	$56,026,227	$55,217,107	$54,565,788	$54,079,202	$53,454,114	$52,909,012	$52,076,878	$51,407,229	$50,919,880	$50,200,324
TOTAL ASSETS	$123,342,775	$125,315,930	$121,800,395	$119,784,766	$119,956,515	$115,331,125	$119,309,397	$119,656,469	$113,449,601	$110,818,839	$111,376,539	$107,856,210

WATERBURY HOSPITAL
GENERAL FUND
COMPARATIVE BALANCE SHEET

CURRENT LIABILITIES	9/30/2007	10/31/2007	11/30/2007	12/31/2007	1/31/2008	2/29/2008	3/31/2008	4/30/2008	5/31/2008	6/30/2008	7/31/2008	8/31/2008
Accounts Payable	$7,725,388	$9,316,918	$8,506,643	$8,492,281	$7,877,999	$7,174,033	$7,032,637	$8,815,648	$7,594,123	$8,224,765	$10,000,702	$8,512,653
Accrued Interest - CHEFA	$309,843	$413,123	$516,404	$619,685	$103,281	$206,562	$309,843	$413,123	$516,404	$619,685	$100,093	$200,187
Miscellaneous Payable	$642,316	$607,646	$471,698	$658,571	$578,485	$626,152	$596,059	$632,214	$700,371	$680,151	$593,381	$505,922
Current Portion - Res for Self Ins	$2,521,947	$2,521,947	$2,521,947	$2,521,947	$2,521,947	$1,905,016	$1,955,016	$1,943,983	$1,943,758	$1,942,234	$1,939,934	$1,931,467
TOTAL AP & ACCRUED EXPENSES	$11,199,494	$12,859,634	$12,016,692	$12,292,484	$11,081,712	$9,911,763	$9,893,555	$11,804,968	$10,754,656	$11,466,835	$12,634,110	$11,150,229
Accrued Salaries & Taxes	$2,200,761	$3,180,603	$1,880,197	$2,799,752	$2,904,359	$1,713,501	$2,558,077	$3,243,321	$1,934,481	$2,563,254	$3,500,745	$2,322,348
Accrued Vacation	$5,607,913	$5,732,835	$5,800,913	$5,925,677	$5,990,472	$6,254,971	$6,486,166	$6,507,907	$6,606,166	$6,669,252	$6,414,488	$5,926,649
Accrued Unemployment	$12,001	$32,977	$65,177	$84,040	$23,897	$26,315	$22,854	$26,783	$31,040	$43,040	$34,008	$31,424
Accrued Benefits	$584,103	$499,495	$425,278	$357,171	$296,216	$235,260	$174,304	$145,254	$116,204	$87,154	$58,104	$29,054
TOTAL SAL, WAGES & TAXES	$8,404,778	$9,445,910	$8,171,565	$9,166,640	$9,214,944	$8,230,047	$9,241,401	$9,923,265	$8,687,891	$9,362,700	$10,007,345	$8,309,475
Notes Payable - Line	$1,687,615	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Current Portion L/T Debt	$3,085,351	$3,062,539	$3,039,726	$3,016,914	$3,016,914	$1,956,540	$1,956,540	$1,837,105	$1,673,166	$1,508,620	$1,343,465	$1,177,697
TOTAL C/P LONG TERM DEBT	$4,772,966	$3,062,539	$3,039,726	$3,016,914	$3,016,914	$1,956,540	$1,956,540	$1,837,105	$1,673,166	$1,508,620	$1,343,465	$1,177,697
Due to Restricted Funds	$1,369,400	$1,411,857	$1,338,457	$1,349,067	$1,357,416	$1,333,704	$1,472,305	$2,096,426	$2,090,668	$1,786,278	$2,388,585	$2,377,067
Due to Third-Party Payors	$2,350,453	$2,830,594	$3,417,935	$2,601,362	$3,389,898	$3,796,851	$4,493,608	$4,049,686	$2,669,430	($300,190)	($644,426)	($648,434)
Current Portion - CHEFA Obligations	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000	$790,000	$790,000
TOTAL CURRENT LIABILITIES	$28,847,091	$30,360,534	$28,734,375	$29,176,467	$28,810,884	$25,978,905	$27,807,409	$30,461,450	$26,625,811	$24,574,243	$26,519,079	$23,156,034
Long-Term Debt	$1,011,316	$851,566	$691,225	$530,290	$368,759	$206,629	$43,898	$0	$0	$0	$0	$0
CHEFA Obligations	$21,045,000	$21,045,000	$21,045,000	$21,045,000	$21,045,000	$21,045,000	$21,045,000	$21,045,000	$21,045,000	$21,045,000	$20,255,000	$20,255,000
Other Long-Term Liabilities	$8,704,801	$8,651,114	$8,804,994	$8,537,322	$8,422,242	$7,018,525	$7,688,465	$7,784,290	$7,945,735	$8,105,406	$8,206,306	$8,069,779
TOTAL LONG-TERM LIABILITIES	$30,761,117	$30,547,680	$30,541,219	$30,112,612	$29,836,001	$28,270,154	$28,777,363	$28,829,290	$28,990,735	$29,150,406	$28,461,306	$28,324,779
FUND BALANCE	$63,734,567	$64,407,716	$62,524,801	$60,495,687	$61,309,630	$61,082,066	$62,724,625	$60,365,729	$57,833,055	$57,094,181	$56,396,154	$56,375,397
TOTAL LIABILITIES & FUND BALANCE	$123,342,775	$125,315,930	$121,800,395	$119,784,766	$119,956,515	$115,331,125	$119,309,397	$119,656,469	$113,449,601	$110,818,830	$111,376,539	$107,856,210

12) Please provide revised appendices 11.b.i. and 11.c.i, which includes the incremental FTEs and volume statistics including primary angioplasty, elective angioplasty and open heart surgery cases.

Response:

See spreadsheets on the following pages for TWH. The spreadsheets filed in the CON Application on pages 1150 and 1151 have the incremental FTEs and volume statistics requested.

The Waterbury Hospital

11. B (i). Please provide three years of projections of Total Facility revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Facility: Description	FY 2009 Projected W/out CON	FY 2009 Projected Incremental	FY 2009 Projected With CON	FY 2010 Projected W/out CON	FY 2010 Projected Incremental	FY 2010 Projected With CON	FY 2011 Projected W/out CON	FY 2011 Projected Incremental	FY 2011 Projected With CON
NET PATIENT REVENUE									
Non-Government	$84,255,586	$4,796,368	$89,051,953	$87,811,937	$4,802,095	$92,614,032	$91,324,414	$4,994,178	$96,318,593
Medicare	$107,776,010	$6,050,529	$113,826,538	$112,316,042	$6,063,558	$118,379,600	$116,808,684	$6,306,100	$123,114,784
Medicaid and Other Medical Assistance	$40,494,741	$471,109	$40,965,849	$42,123,610	$480,874	$42,604,483	$43,808,554	$500,109	$44,308,663
Other Government			$0			$0			$0
Total Net Patient Patient Revenue	$232,526,336	$11,318,005	$243,844,341	$242,251,589	$11,346,526	$253,598,115	$251,941,652	$11,800,387	$263,742,039
Other Operating Revenue	$12,479,392		$12,479,392	$12,978,568		$12,978,568	$13,497,711		$13,497,711
Revenue from Operations	$245,005,728	$11,318,005	$256,323,733	$255,230,156	$11,346,526	$266,576,683	$265,439,363	$11,800,387	$277,239,750
OPERATING EXPENSES									
Salaries and Fringe Benefits	$135,921,111	$4,182,918	$140,104,028	$140,813,464	$4,194,205	$145,007,669	$145,720,964	$4,361,973	$150,082,938
Professional / Contracted Services	$27,232,789	$0	$27,232,789	$28,322,100	$0	$28,322,100	$29,454,984	$0	$29,454,984
Supplies and Drugs	$38,982,764	$3,597,665	$42,580,429	$41,102,077	$3,607,373	$44,709,450	$43,193,255	$3,751,668	$46,944,923
Bad Debts	$24,402,643	$0	$24,402,643	$25,134,723	$0	$25,134,723	$25,888,764	$0	$25,888,764
Other Operating Expense	$11,194,760	$1,244,573	$12,439,333	$11,564,581	$1,247,932	$12,812,513	$11,899,039	$1,297,849	$13,196,888
Subtotal	$237,734,067	$9,025,156	$246,759,222	$246,936,946	$9,049,510	$255,986,456	$256,157,007	$9,411,490	$265,568,498
Depreciation/Amortization	$10,500,402		$10,500,402	$10,500,402		$10,500,402	$10,500,402		$10,500,402
Interest Expense	$1,607,287		$1,607,287	$1,607,287		$1,607,287	$1,607,287		$1,607,287
Lease Expense			$0			$0			$0
Total Operating Expense	$249,841,756	$9,025,156	$258,866,912	$259,044,635	$9,049,510	$268,094,145	$268,264,697	$9,411,490	$277,676,187
Gain/(Loss) from Operations	($4,836,028)	$2,292,850	($2,543,178)	($3,814,479)	$2,297,016	($1,517,462)	($2,825,334)	$2,388,897	($436,437)
Plus: Non-Operating Revenue	$1,855,248		$1,855,248	$1,910,906		$1,910,906	$1,968,233		$1,968,233
Revenue Over/(Under) Expense	($2,980,779)	$2,292,850	($687,930)	($1,903,573)	$2,297,016	$393,444	($857,101)	$2,388,897	$1,531,796
FTEs	1,546	42	1,588	1,546	42	1,588	1,546	42	1,588
Volume									
Primary PCI's		48			46			46	
Elective PCI's		273			264			264	
OHS		131			126			126	

*Volume Statistics:
Provide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

Greater Waterbury Health Network

11. C (i). Please provide one year of actual results and three years of Total Hospital Health System projections of revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Hospital Health System: Description	FY 2009 Projected W/out CON	FY 2009 Projected Incremental	FY 2009 Projected With CON	FY 2010 Projected W/out CON	FY 2010 Projected Incremental	FY 2010 Projected With CON	FY 2011 Projected W/out CON	FY 2011 Projected Incremental	FY 2011 Projected With CON
NET PATIENT REVENUE									
Non-Government	$84,255,586	$4,796,368	$89,051,953	$87,811,937	$4,802,095	$92,614,032	$91,324,414	$4,994,178	$96,318,593
Medicare	$107,776,010	$6,050,529	$113,826,538	$112,316,042	$6,063,558	$118,379,600	$116,808,684	$6,306,100	$123,114,784
Medicaid and Other Medical Assistance	$40,494,741	$471,109	$40,965,849	$42,123,610	$480,874	$42,604,483	$43,808,554	$500,109	$44,308,663
Other Government			$0			$0			$0
Total Net Patient Patient Revenue	$232,526,336	$11,318,005	$243,844,341	$242,251,589	$11,346,526	$253,598,115	$251,941,652	$11,800,387	$263,742,039
Other Operating Revenue	$14,399,392		$14,399,392	$15,052,168		$15,052,168	$15,737,199		$15,737,199
Revenue from Operations	$246,925,728	$11,318,005	$258,243,733	$257,303,756	$11,346,526	$268,650,283	$267,678,851	$11,800,387	$279,479,238
OPERATING EXPENSES									
Salaries and Fringe Benefits	$137,921,111	$4,182,918	$142,104,028	$142,883,464	$4,194,205	$147,077,669	$147,863,414	$4,361,973	$152,225,388
Professional / Contracted Services	$28,342,789	$0	$28,342,789	$28,726,500	$0	$28,726,500	$29,875,560	$0	$29,875,560
Supplies and Drugs	$38,982,764	$3,597,665	$42,580,429	$41,102,077	$3,607,373	$44,709,450	$43,193,255	$3,751,668	$46,944,923
Bad Debts	$24,402,643	$0	$24,402,643	$25,134,723	$0	$25,134,723	$25,888,764	$0	$25,888,764
Other Operating Expense	$11,194,760	$1,244,573	$12,439,333	$11,564,581	$1,247,932	$12,812,513	$11,899,039	$1,297,849	$13,196,888
Subtotal	$240,844,067	$9,025,156	$249,869,222	$249,411,346	$9,049,510	$258,460,856	$258,720,033	$9,411,490	$268,131,524
Depreciation/Amortization	$10,500,402		$10,500,402	$10,500,402		$10,500,402	$10,500,402		$10,500,402
Interest Expense	$1,800,013		$1,800,013	$1,800,013		$1,800,013	$1,800,013		$1,800,013
Lease Expense			$0			$0			$0
Total Operating Expense	$253,144,482	$9,025,156	$262,169,638	$261,711,761	$9,049,510	$270,761,271	$271,020,449	$9,411,490	$280,431,939
Gain/(Loss) from Operations	($6,218,754)	$2,292,850	($3,925,904)	($4,408,005)	$2,297,016	($2,110,988)	($3,341,598)	$2,388,897	($952,701)
Plus: Non-Operating Revenue	$1,855,248		$1,855,248	$1,910,906		$1,910,906	$1,968,233		$1,968,233
Revenue Over/(Under) Expense	($4,363,505)	$2,292,850	($2,070,656)	($2,497,099)	$2,297,016	($200,082)	($1,373,365)	$2,388,897	$1,015,532
FTEs	1,546	42	1,588	1,546	42	1,588	1,546	42	1,588
Volume									
Primary PCI's		48			46			46	
Elective PCI's		273			264			264	
OHS		131			126			126	

*Volume Statistics:
Provide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

50 Leavenworth Street
Post Office Box 1110
Waterbury, Connecticut
06721-1110
Telephone: 203 573-1200
Facsimile: 203 575-2600
www.carmodylaw.com

CARMODY & TORRANCE LLP

Attorneys at Law

Kristin Connors
Partner

Direct: 203-578-4202
Kconnors@carmodylaw.com

RECEIVED
2008 OCT 24 P 1:55
CONNECTICUT OFFICE OF
HEALTHCARE ACCESS

October 21, 2008

The Honorable Christine A. Vogel
Commissioner
Office of Health Care Access
410 Capitol Avenue, MS #13HCA
Hartford, CT 06134

Re: Docket No. 08-31202

Dear Commissioner Vogel:

The Waterbury Hospital, Saint Mary's Hospital, Inc. and John Dempsey Hospital (the "Applicants") would like to enter the appearance of the following attorneys for any and all actions related to Docket No. 08-31202.

Kristin Connors, Esq.
Carmody & Torrance LLP
50 Leavenworth Street
Waterbury, CT 06721
T. 203.578.4202
F. 203.575.2600
E. kconnors@carmodylaw.com

Douglas A. Cohen, Esq.
Brown Rudnick, LLP
CityPlace 1
185 Asylum Street
Hartford, CT 06103
T. 860-509.6511
F. 860-509.6611
E. dcohen@brownrudnick.com

John D. Blair, Esq.
Brown Rudnick, LLP
City Place 1
185 Asylum Street
Hartford, CT 06103
T. 860.509.6567
F. 860-860-509.6667
E. jblair@brownrudnick.com

Thank you for your assistance in this matter.

Very truly yours,

Kristin Connors

KC/pmb
C: Service List – Attached

Service List

Heart Center of Greater Waterbury

Loraine Shea
Executive Director
Heart Center of Greater Waterbury
P.O. Box 2153
Waterbury, CT 06722

St. Mary's Hospital

Chad Wable
Interim President & CEO
56 Franklin Street
Waterbury, CT 06706

Waterbury Hospital

John Tobin
President & CEO
Waterbury Hospital
64 Robbins Street
Waterbury, CT 06708

John Dempsey Hospital

James Thornton
Director
University of Connecticut Health Center
263 Farmington Avenue
Farmington, CT 06030

Olejarz, Barbara

From: Greer, Leslie
Sent: Monday, September 15, 2008 3:56 PM
To: Olejarz, Barbara
Subject: FW: Docket No.: 08-31202, Electronic copies- email 1

Barbara,
Per Steve can you burn this to a cd for file

From: Lazarus, Steven
Sent: Monday, September 15, 2008 3:30 PM
To: Greer, Leslie
Cc: Martone, Kim; Durdy, Barbara; Fedorjaczenko, Alexis
Subject: FW: Docket No.: 08-31202, Electronic copies- emial 1

Leslie,

Please add to the original file.

Thank you,

-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

From: Loraine Shea (HCGW) [mailto:lshea@hcogw.org]
Sent: Monday, September 15, 2008 2:30 PM
To: Lazarus, Steven
Subject: RE: Docket No.: 08-31202, Electronic copies- emial 1

Steve, here are several documents pertaining to the CON. I'm sending them in separate emails so they don't bounce back. Each is clearly titled but please call me if you determine you are missing anything.

Loraine Shea

From: Lazarus, Steven [mailto:Steven.Lazarus@ct.gov]
Sent: Wednesday, July 30, 2008 11:53 AM
To: Loraine Shea (HCGW)
Subject: RE: Docket No.: 08-31202, CON Application Forms

Loraine,

I mistyped, I do meant the Table 9, should be "Projected" Cardiac Cath. Volume by Operator as titled on the table itself. The question leading to is misstated (question "o") and should ask for three years projected.

Hopefully that answers your question.

-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

From: Loraine Shea (HCGW) [mailto:lshea@hcogw.org]
Sent: Wednesday, July 30, 2008 11:45 AM
To: Lazarus, Steven
Subject: RE: Docket No.: 08-31202, CON Application Forms

Steven,
I was inquiring about table 9 (below) and these answers refer to table 8. could you review again?

From: Lazarus, Steven [mailto:Steven.Lazarus@ct.gov]
Sent: Wednesday, July 30, 2008 11:41 AM
To: Loraine Shea (HCGW)
Cc: Martone, Kim; Fedorjaczenko, Alexis; Durdy, Barbara
Subject: RE: Docket No.: 08-31202, CON Application Forms

Hi Loraine,

I reviewed our CON Application forms that were sent out and in Questions vi) m, Table 8, OHCA is requesting the "Projected Operator Volume for each Facility." The wording in the written question m should state "projected" not "historical." In the question and the table prior this question (vi)k, we are requesting the "Historical" Operator volume for each Applicant.

So to clarify the Table 8 is correct and the question leading to Table 8 should have requested "projected" volume not "historical" volume.

Please let me know you have require any further clarification and sorry for the confusion.

-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

From: Loraine Shea (HCGW) [mailto:lshea@hcogw.org]
Sent: Wednesday, July 30, 2008 11:10 AM
To: Lazarus, Steven
Subject: RE: Docket No.: 08-31202, CON Application Forms

Steven,
Thank you for forwarding these documents. In reveiw of the application I have one question.

Page 6 or 12 of the application: (at the bottom) It appears to ask for historical volume however the table is referring to projected volume. Could you clarify that for me? (I have cut and pasted from the application)

> o) In the following table format, please provide last three years of cardiac catheterization volume by inpatient and outpatient, by operator and facility.

Table 9: *Projected* Cardiac Cath. Volume by Operator

Physician	Facility	FY 2009 (# of Patients)	I/P	O/P	FY 2010 (# of Patients)	I/P	O/P	FY 2011 (# of Patients)	I/P	O/P

Key: Inpatient= I/P, Outpatient= O/P

thanks very much

Loraine Shea
Executive Director HCGW

From: Lazarus, Steven [mailto:Steven.Lazarus@ct.gov]
Sent: Friday, July 25, 2008 8:36 AM
To: Loraine Shea (HCGW)
Cc: Fedorjaczenko, Alexis; Durdy, Barbara; Martone, Kim
Subject: Re: Docket No.: 08-31202, CON Application Forms

Good Morning Ms. Shea,

Attached you will find the CON Application forms for St. Mary's Hospital, The Waterbury Hospital and John Dempsey Hospital's proposal filed with OHCA under CON Docket No.: 08-31202-CON. Please feel free to contact Alexis Fedorjaczenko at (860) 418-7067 or me if you have any questions. The hard copies were mailed out to your attention yesterday.

-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012

Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

Olejarz, Barbara

From: Greer, Leslie
Sent: Monday, September 15, 2008 3:56 PM
To: Olejarz, Barbara
Subject: FW: Docket No.: 08-31202, electronic copies- email 2

These also

From: Lazarus, Steven
Sent: Monday, September 15, 2008 3:31 PM
To: Greer, Leslie
Cc: Durdy, Barbara; Fedorjaczenko, Alexis; Malinowski, Sharon; Martone, Kim
Subject: FW: Docket No.: 08-31202, electronic copies- email 2

Leslie,

Please add to the original file.

Thank you,

-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

From: Loraine Shea (HCGW) [mailto:lshea@hcogw.org]
Sent: Monday, September 15, 2008 2:32 PM
To: Lazarus, Steven
Cc: Loraine Shea (HCGW)
Subject: RE: Docket No.: 08-31202, electronic copies- email 2

Steve,
Some more documents.
Loraine

From: Lazarus, Steven [mailto:Steven.Lazarus@ct.gov]
Sent: Wednesday, July 30, 2008 11:53 AM
To: Loraine Shea (HCGW)
Subject: RE: Docket No.: 08-31202, CON Application Forms

Loraine,

I mistyped, I do meant the Table 9, should be "Projected" Cardiac Cath. Volume by Operator as titled on the table itself. The question leading to is misstated (question "o") and should ask for three years projected.

Hopefully that answers your question.

-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

From: Loraine Shea (HCGW) [mailto:lshea@hcogw.org]
Sent: Wednesday, July 30, 2008 11:45 AM
To: Lazarus, Steven
Subject: RE: Docket No.: 08-31202, CON Application Forms

Steven,
I was inquiring about table 9 (below) and these answers refer to table 8. could you review again?

From: Lazarus, Steven [mailto:Steven.Lazarus@ct.gov]
Sent: Wednesday, July 30, 2008 11:41 AM
To: Loraine Shea (HCGW)
Cc: Martone, Kim; Fedorjaczenko, Alexis; Durdy, Barbara
Subject: RE: Docket No.: 08-31202, CON Application Forms

Hi Loraine,

I reviewed our CON Application forms that were sent out and in Questions vi) m, Table 8, OHCA is requesting the "Projected Operator Volume for each Facility." The wording in the written question m should state "projected" not "historical." In the question and the table prior this question (vi)k, we are requesting the "Historical" Operator volume for each Applicant.

So to clarify the Table 8 is correct and the question leading to Table 8 should have requested "projected" volume not "historical" volume.

Please let me know you have require any further clarification and sorry for the confusion.

-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

From: Loraine Shea (HCGW) [mailto:lshea@hcogw.org]
Sent: Wednesday, July 30, 2008 11:10 AM
To: Lazarus, Steven
Subject: RE: Docket No.: 08-31202, CON Application Forms

Steven,
Thank you for forwarding these documents. In reveiw of the application I have one question.

Page 6 or 12 of the application: (at the bottom) It appears to ask for historical volume however the table is referring to projected volume. Could you clarify that for me? (I have cut and pasted from the application)

o) In the following table format, please provide last three years of cardiac catheterization volume by inpatient and outpatient, by operator and facility.

Table 9: *Projected* Cardiac Cath. Volume by Operator

Physician	Facility	FY 2009 (# of Patients)	I/P	O/P	FY 2010 (# of Patients)	I/P	O/P	FY 2011 (# of Patients)	I/P	O/P

Key: Inpatient= I/P, Outpatient= O/P

thanks very much

Loraine Shea
Executive Director HCGW

From: Lazarus, Steven [mailto:Steven.Lazarus@ct.gov]
Sent: Friday, July 25, 2008 8:36 AM
To: Loraine Shea (HCGW)
Cc: Fedorjaczenko, Alexis; Durdy, Barbara; Martone, Kim
Subject: Re: Docket No.: 08-31202, CON Application Forms

Good Morning Ms. Shea,

Attached you will find the CON Application forms for St. Mary's Hospital, The Waterbury Hospital and John Dempsey Hospital's proposal filed with OHCA under CON Docket No.: 08-31202-CON. Please feel free to contact Alexis Fedorjaczenko at (860) 418-7067 or me if you have any questions. The hard copies were mailed out to your attention yesterday.

-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053

Website: www.ct.gov/ohca

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

Lazarus, Steven

From: Lazarus, Steven
Sent: Monday, October 27, 2008 11:49 AM
To: 'Loraine Shea (HCGW)'
Cc: Martone, Kim; Durdy, Barbara; Fedorjaczenko, Alexis; Malinowski, Sharon
Subject: RE: party or intervenor status

Hi Loraine,

As of this morning, no one has filed a request for any type of status in this matter. If someone does file for status, we'll forward you a copy as soon as possible.

Further, can you provide us with an update of the number of people from the general public that have signed up to speak at the hearing so far and also the total number of people (general public) that have signed up to attend. Daily updates on these over the next couple of days will be very helpful to us as we finalize our logistics, including need for an overflow room and length of the hearing.

Sincerely,
-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

From: Loraine Shea (HCGW) [mailto:lshea@hcogw.org]
Sent: Monday, October 27, 2008 8:27 AM
To: Lazarus, Steven
Subject: party or intervenor status

Steven,
Can you please let me know today if you are aware of anyone who has applied for Party or Intervenor status in our matter?

thank you
Loraine Shea

Executive Director
Heart Center of Greater Waterbury
203-575-5571

We're Saving Hearts in Waterbury

lshea@hcogw.org

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

Lazarus, Steven

From: Lazarus, Steven
Sent: Monday, October 27, 2008 12:33 PM
To: 'Loraine Shea (HCGW)'
Cc: Martone, Kim; Fedorjaczenko, Alexis; Malinowski, Sharon; Durdy, Barbara
Subject: RE: party or intervenor status

Loraine,

Typically, we send out the Tentative Agenda, the Table of the Record and Directions, the day before the hearing. We might be able to send this information out as early as tomorrow, but it won't be any later than Wednesday.

-Steven

Ps. Do you have any information on the number of public attending as requested in my earlier email?

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

From: Loraine Shea (HCGW) [mailto:lshea@hcogw.org]
Sent: Monday, October 27, 2008 12:26 PM
To: Lazarus, Steven
Subject: RE: party or intervenor status

Thank you Steven,

Can you let me know when we can anticipate an agenda? We are making our final preparations and would like to have a sense of the time that will be alotted to us. thanks again

Loraine Shea

From: Lazarus, Steven [mailto:Steven.Lazarus@ct.gov]
Sent: Monday, October 27, 2008 11:49 AM
To: Loraine Shea (HCGW)
Cc: Martone, Kim; Durdy, Barbara; Fedorjaczenko, Alexis; Malinowski, Sharon
Subject: RE: party or intervenor status

Hi Loraine,

As of this morning, no one has filed a request for any type of status in this matter. If someone does file for status, we'll forward you a copy as soon as possible.

Further, can you provide us with an update of the number of people from the general public that have signed up to speak at the hearing so far and also the total number of people (general public) that have signed up to attend.

Daily updates on these over the next couple of days will be very helpful to us as we finalize our logistics, including need for an overflow room and length of the hearing.

Sincerely,
-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

From: Loraine Shea (HCGW) [mailto:lshea@hcogw.org]
Sent: Monday, October 27, 2008 8:27 AM
To: Lazarus, Steven
Subject: party or intervenor status

Steven,
Can you please let me know today if you are aware of anyone who has applied for Party or Intervenor status in our matter?

thank you
Loraine Shea

Executive Director
Heart Center of Greater Waterbury
203-575-5571

We're Saving Hearts in Waterbury

lshea@hcogw.org

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

RICHARD BLUMENTHAL
ATTORNEY GENERAL

55 Elm Street
P.O. Box 120
Hartford, CT 06141-0120

Office of The Attorney General
State of Connecticut

October 29, 2008

RECEIVED
OCT 30 2008
OFFICE OF
HEALTH CARE ACCESS

Christine Vogel, Commissioner
Office of Health Care Access
410 Capitol Avenue, MS #13HCA
Hartford, CT 06134-0308

Dear Commissioner Vogel:

Attached is my testimony in support of the certificate of need application of St. Mary's Hospital, the Waterbury Hospital and the University of Connecticut Health Center (Docket 08-31202-CON). My office emailed a copy of this testimony to your office today.

Thank you.

Very truly yours,

Richard Blumenthal

RB/RFK/sk

Attachment

RICHARD BLUMENTHAL
ATTORNEY GENERAL

55 Elm Street
P.O. Box 120
Hartford, CT 06141-0120

RECEIVED
OCT 30 2008
OFFICE OF
HEALTH CARE ACCESS

Office of The Attorney General
State of Connecticut

TESTIMONY OF
ATTORNEY GENERAL RICHARD BLUMENTHAL
BEFORE THE OFFICE OF HEALTH CARE ACCESS
OCTOBER 30, 2008

I appreciate the opportunity to urge approval of the certificate of need application (Docket 08-31202-CON) of St. Mary's Hospital, Waterbury Hospital and the University of Connecticut Health Center for a permanent primary and elective angioplasty and open heart surgery program known as the Heart Center of Greater Waterbury.

I have long supported and worked to achieve this program for effective lifesaving cardiac care. The time required to transport patients needing immediate hospital heart care can be literally the difference between life and death. Waterbury area residents deserve no less than the highly skilled and caring professionals and Heart Center programs provided by these hospitals. This heart care program should be made permanent under the extraordinary professional leadership team at both hospitals. If Greater Waterbury residents become ill -- especially in a heart threatening emergency -- they should be treated in Waterbury. As the 2004 agreement between the Office of Health Care Access (OHCA) and the hospitals indicates, transportation times from Waterbury to Bridgeport or New Haven are more than 40 minutes, and longer for residents in more distant towns in the Greater Waterbury area.

Approval of this certificate of need (CON) application will maintain a life-saving program in the city of Waterbury while enhancing the overall goal of Waterbury Hospital and St. Mary's Hospital to combine their assets and expertise for the benefit of Waterbury area residents. OHCA has strongly encouraged hospitals to use their limited financial resources more efficiently. Support for this CON is consistent with that overall goal.

The Heart Center of Greater Waterbury has already achieved its paramount goal -- providing residents of the 18 towns in the Greater Waterbury region with superb, world class cardiac care. Heart patients receive timely and seamless care in one facility from emergency room care to recovery. As OHCA acknowledged in its approval of the 2004 agreement, patients whose time of arrival to angioplasty exceeds two hours -- known as door to balloon time -- have a 40-60 percent increased risk of mortality.

This program's life saving benefits have been immeasurable and miraculous -- as testimony from patients as well as professionals irrefutably establishes.

The hospitals have committed over $7 million -- providing critical cardiac care to over 2400 patients, including the provision of more than 1800 angioplasty procedures and

approximately 600 open heart surgeries. But the real benefits of this investment have only begun. Its results in lives saved and enhanced are rising -- not only in numbers of successful medical outcomes but quality of life.

In 2004, OHCA established several benchmarks for this program of heart surgery services, using the best available information at that time. Since then, the Heart Center of Waterbury has met every condition except the volume target for open heart surgeries.

- As required by the agreement, the Heart Center has established a relationship with an experienced partner in providing cardiac services -- the University of Connecticut Medical Center and John Dempsey Hospital. Cardiac surgeons and perfusionists who work at John Dempsey Hospital are provided under contract to the Heart Center. The Chief Cardiac Surgeon at the Heart Center is the Chief of Cardiothoracic Surgery for John Dempsey Hospital. The University of Connecticut Medical Center and John Dempsey Hospital regularly perform oversight and hold case conferences with the Heart Center.

- As required under the agreement with OHCA, the Heart Center regularly submits data to the databases operated by the Society of Thoracic Surgeons Database and the American College of Cardiology. The Heart Center's outcomes meet or exceed the criteria and standards of these nationally recognized organizations.

- In each year since 2004, the Heart Center has exceeded the angioplasty target numbers -- in the past year by more than 50%.

Even if the Heart Center has not reached the overall volume targets for open heart surgery, the outcomes of its surgeries have met national standards. OHCA should consider that nationally and in Connecticut, the number of open heart surgeries has declined since 2004 while for the past three years, the combined number of open heart surgeries at St. Mary's Hospital and Waterbury Hospital has grown steadily -- countering the statewide downward trend.

The volume of surgeries target was established by OHCA to ensure that there would be sufficient operations to maintain surgical skill and expertise levels. As the CON application clearly and comprehensively demonstrates, there is a large body of recent research concluding that there is limited correlation between volume and expertise and skill level maintenance.

I urge OHCA's approval of the CON application.

State of Connecticut

SENATE

STATE CAPITOL
HARTFORD, CONNECTICUT 06106-1591

SENATOR ROBERT J. KANE
ASSISTANT MINORITY LEADER
THIRTY-SECOND DISTRICT

LEGISLATIVE OFFICE BUILDING
SUITE 3204
HARTFORD, CONNECTICUT 06106-1591
CAPITOL: (860) 240-8800
TOLL FREE: 1-800-842-1421
CELL: (203) 217-1333
FAX: (860) 240-8306
E-MAIL: Rob.Kane@cga.ct.gov

RECEIVED
OCT 30 2008
OFFICE OF
HEALTH CARE ACCESS

RANKING MEMBER
BANKS

MEMBER
APPROPRIATIONS
COMMERCE
PROGRAM REVIEW

Heart Center of Greater Waterbury Application for Permanent Status
Testimony of Senator Rob Kane
October 30, 2008

The Heart Center of Greater Waterbury deserves without question to be granted permanent status. The collaboration of Waterbury Hospital and St. Mary's Hospital to create the Heart Center has been exceptional. As evidenced from the outpouring of support at the hearing in August and various rallies in the Waterbury area, this is a vital resource for our community which has aided in saving the lives of many people.

Life or death can depend on mere minutes or even seconds. Without the Heart Center of Greater Waterbury, patients in our community who suffer from a heart attack are put at far greater risk. Delay of treatment due to transportation to another city such as New Haven, Hartford or Bridgeport could be detrimental and can lead to death. The Heart Center of Greater Waterbury is and should be very proud of its ability to treat patients in an average of 66 minutes well below the national average of 90 minutes. To think of what can happen in those additional twenty plus minutes is terrifying to patients and their families.

Additionally, the location of this facility is not only beneficial to those in our area suffering from heart disease, but also to their loved ones. It allows families and friends who provide so much love and support to their ailing family members to visit more frequently or assist in transportation to the Heart Center without time away from commitments such as work. Ultimately if the distance for care is too far, the sick family member may have to go without this essential support system.

In the three years since its doors have opened the Heart Center has treated thousands of area residents. Their programs rival any in the State of Connecticut and around the country. Many residents in my district have contacted me personally to express their

support for the Heart Center of Greater Waterbury. It is a facility that they and their families have come to know and trust for the quality of care they receive. It would be wrong to deprive them of this comfort when they are already suffering from so much discomfort.

Simply put, what started as a "demonstration project" in 2005 is working. The community can access equal care at either facility, as the "one program/two campus" model provides maximum access to those suffering from cardiovascular disease. More than 2400 hearts have been treated in this period of time, over 600 open heart surgeries and 1800 angioplasties. This is an impressive number and clearly demonstrates the need for this facility in our community.

The Office of Health Care Access saw fit to extend the Heart Center's certification this past August via an oral decision at the conclusion of the meeting. It is clear that the Office of Health Care Access saw the benefit of this program at that point and it is my sincere hope that you will see it today and grant the permanent status that the Heart Center of Waterbury so greatly deserves.

Thank you for your time and thoughtful consideration of this very important application.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4161
RECIPIENT ADDRESS	912037093238
DESTINATION ID	
ST. TIME	10/28 16:09
TIME USE	01'45
PAGES SENT	5
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: CHAD W. WABLE

FAX: 203 709 3238

AGENCY: SAINT MARY'S HOSPITAL

FROM: STEVEN LAZARUS

DATE: 10/28/08 **Time:**

NUMBER OF PAGES:
(including transmittal sheet

Comments:

Information regarding 08-31202 for the public hearing scheduled on October 30, 2008

PLEASE PHONE Barbara K. Olejarz IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4158
RECIPIENT ADDRESS	96794515
DESTINATION ID	
ST. TIME	10/28 16:01
TIME USE	01'56
PAGES SENT	5
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: MONTE GIANNINI

FAX: 860 679 4515

AGENCY: JOHN DEMPSEY HOSPITAL

FROM: STEVEN LAZARUS

DATE: 10/28/08 **Time:**

NUMBER OF PAGES:
(including transmittal sheet

Comments:

Information regarding 08-31202 for the public hearing scheduled on October 30, 2008

PLEASE PHONE Barbara K. Olejarz IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4160
RECIPIENT ADDRESS	912035737325
DESTINATION ID	
ST. TIME	10/28 16:08
TIME USE	01'14
PAGES SENT	5
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: COLLEEN SCOTT

FAX: 203 573-7325

AGENCY: THE WATERBURY HOSPITAL

FROM: STEVEN LAZARUS

DATE: 10/28/08 **Time:**

NUMBER OF PAGES:
(including transmittal sheet

Comments:

Information regarding 08-31202 for the public hearing scheduled on October 30, 2008

PLEASE PHONE Barbara K. Olejarz IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4159
RECIPIENT ADDRESS	912035755575
DESTINATION ID	
ST. TIME	10/28 16:03
TIME USE	03'39
PAGES SENT	5
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: LORAINE SHEA

FAX: 203 575 5575

AGENCY: HEART CENTER OF GREATER WATERBURY

FROM: STEVEN LAZARUS

DATE: 10/28/08 **Time:**

NUMBER OF PAGES:
(including transmittal sheet

Comments:

Information regarding 08-31202 for the public hearing scheduled on October 30, 2008

PLEASE PHONE Barbara K. Olejarz IF THERE ARE ANY TRANSMISSION PROBLEMS.

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

Tentative Agenda

PUBLIC HEARING

Certificate of Need Application, Docket Number 08-31202

Waterbury Hospital and Saint Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital

Establish a Primary and Elective Angioplasty and Open Heart Surgery Program at Waterbury Hospital and Saint Mary's Hospital

October 30, 2008 at 9:00 a.m.

Legislative Office Building, Room 2C, Hartford, CT

Convening of the Public Hearing

Comments by Legislators and Municipal Officials

Comments from the General Public

Applicants' Presentation of the CON Proposal (15 minutes)

OHCA's Questions

Commissioner's Concluding Remarks

Public Hearing Recessed/Closed

An Affirmative Action / Equal Opportunity Employer
410 Capitol Avenue, MS #13HCA, P.O. Box 340308, Hartford, Connecticut 06134-0308
Telephone: (860) 418-7001 • Toll free (800) 797-9688
Fax: (860) 418-7053

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

TABLE OF THE RECORD

APPLICANTS: Waterbury Hospital and Saint Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital

DOCKET NUMBER: 08-31202-CON

PUBLIC HEARING: October 30, 2008 at 9:00 a.m.

PLACE: Conference Room 2C, Legislative Office Building
300 Capitol Ave. Hartford, CT

EXHIBIT	DESCRIPTION
A	Letter from Waterbury Hospital and Saint Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital ("Applicants") dated July 8, 2008, enclosing Letter of Intent forms to Establish a Primary and Elective Angioplasty and Open Heart Surgery Program at Waterbury Hospital and Saint Mary's Hospital, received by the Office of Health Care Access ("OHCA") on July 8, 2008.
B	OHCA's request for legal notification in the *Waterbury Republican American* and notification to Applicant of receipt of the Letter of Intent in the matter of the CON application under Docket Number 08-31202, dated July 18, 2008.
C	OHCA's letter to the Applicant dated July 24, 2008, enclosing the Certificate of Need ("CON") application forms under Docket Number 08-31202.
D	E-mail between OHCA and the Applicants dated July 30, 2008 in the matter of the CON application under Docket Number 08-31202.
E	Letter from the Applicant dated September 15, 2008, enclosing the CON application under Docket Number 08-31202, received by OHCA on September 15, 2008. E-Mail copy received on September 15, 2008.
F	E-mail between OHCA and the Applicants dated October 1, 2008 in the matter of the CON application under Docket Number 08-31202.
G	OHCA's email to the Applicants dated October 7, 2008 regarding the hearing date in the matter of the CON application under Docket Number 08-31202.
H	OHCA's email to the Applicants dated October 8, 2008 regarding the hearing date in the matter of the CON application under Docket Number 08-31202.

I	OHCA's request for legal notification in the *Waterbury Republican American* and OHCA's Notice to the Applicant of the public hearing scheduled for October 30, 2008, in the matter of the CON application under Docket Number 08-31202, dated October 9, 2008.
J	OHCA's letter to the Applicant dated October 9, 2008, requesting prefile testimony and interrogatories in the matter of the CON application under Docket Number 08-31202.
K	Letter from the Applicant enclosing Prefile Testimony dated October 24, 2008 in the matter of the CON application under Docket Number 08-31202 , received by OHCA on October 24, 2008.
L	Letter from the Applicants to OHCA dated October 21, 2008 noticing the appearance of Kristin Connors, Esq. of Carmody & Torrance LLP, Douglas A. Cohen, Esq. of Brown Rudnick, LLP and John D. Blair, Esq. of Brown Rudnick, LLP in the matter of the CON application under Docket Number 08-31202, received by OHCA on October 24, 2008/
M	E-mail dated October 27, 2008 between the Applicants and OHCA in the matter of the CON application under Docket Number: 08-31202.

Administrative Notice is taken of the following items:

1. Saint Mary's Hospital, Docket Number 07-019AR, FY 2007 Annual Reporting.
2. Waterbury Hospital, Docket Number 07-021AR, FY 2007 Annual Reporting.
3. John Dempsey Hospital, Docket Number 07-026AR, FY 2007 Annual Reporting.
4. OHCA's Administrative Folder containing opinion letters, Agenda, Table of the Record etc. in the matter of the CON application under Docket Number: 08-31202-CON

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

Agenda

PUBLIC HEARING

Certificate of Need Application, Docket Number 08-31202

Waterbury Hospital and Saint Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital

Establish a Primary and Elective Angioplasty and Open Heart Surgery Program at Waterbury Hospital and Saint Mary's Hospital

October 30, 2008 at 9:00 a.m.

Legislative Office Building, Room 2C, Hartford, CT

Convening of the Public Hearing

Comments by Legislators and Municipal Officials

Comments from the General Public

Applicants' Presentation of the CON Proposal (15 minutes)

OHCA's Questions

Commissioner's Concluding Remarks

Public Hearing Recessed/Closed

An Affirmative Action / Equal Opportunity Employer
410 Capitol Avenue, MS #13HCA, P.O. Box 340308, Hartford, Connecticut 06134-0308
Telephone: (860) 418-7001 • Toll free (800) 797-9688
Fax: (860) 418-7053

OHCA HEARINGS - EXHIBIT AND LATE FILE FORM

Applicant: Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital

DN: 08-31202-CON

Hearing Date: October 30, 2008

Time: 9:00 a.m.

Proposal: Establish a Primary and Elective Angioplasty and Open Heart Surgery Program at Waterbury Hospital and Saint Mary's Hospital

OHCA Exhibit #	Description
1	
2	
3	
4	
5	

Applicant Late File #	Description	Due Date	Rec'd
1	Resubmit to OHCA revised historical volumes to include Complete FY 2008 volumes as stated on page 42 of the CON App.	11/14/08	
2	Explanation regarding the incremental FTE's for SMH+TWH and resubmit revised Financial Attachments.	11/14/08	
3	Submit revised pages 1145+1147 of the CON Application w/ FTEs and volumes for TWH (Historical)	11/14/08	
4	Explanation of the $6.6 Million of the Direct Fixed Expenses and if Necessary Submit revised financial attachment.	11/14/08	
5	Provide FY 2008 AFS for TWH+SMH including consolidating Financial Statements.	~~12/30/08~~ 12/30/08 or sooner	
6			

PUBLIC HEARING

PUBLIC OFFICIAL

SIGN UP SHEET

October 30, 2008
9:00 a.m.

Applicant: Docket Number: 08-31202-CON
Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital
Establish a Primary and Elective Angioplasty and Open Heart Surgery Program at Waterbury Hospital and Saint Mary's Hospital

	PRINT NAME	PHONE	FAX	POSITION HELD
1	Rep. Selim NOUJAIM			State Rep. 74TH DIST
2	Rep Jeffrey Berger			State Rep 73rd Dist
3	Rep. Kevin DelGobbo			State Rep 70th
4	Sen Caligiuri			
5	Rep Tony D'amelio			State Rep 71st

Public Hearing
Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital

PRINT NAME	PHONE	FAX	POSITION HELD
@10:30 Am Attorney General Richard Blumenthal			Attorney General
Christopher Murphy			U.S. Congressman - 5th District
Arthur O'Neill			State Rep - 69th District
Larry Butler			State Rep 72nd Distect
Mayor Michael J Jarjura			City of Waterbury
JOAN Hartley			State Senate 15th Dist.

(1)

PUBLIC HEARING

APPLICANT

SIGN UP SHEET

October 30, 2008
9:00 a.m.

Applicant: Docket Number: 08-31202-CON
Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital
Establish a Primary and Elective Angioplasty and Open Heart Surgery Program at Waterbury Hospital and Saint Mary's Hospital

Name	Phone	Fax	Representing Organization/Self
Lorraine Shea	203 575 5571	203 575 5575	HCGW
James Thurston	860-679-4568		Uconn Health Ctr
Monte Giannini	860-679-3707		UConn
JOHN H. TOBIN	203-573-7334	203-573-6161	WATERBURY HOSPITAL
John Blair	8605096567		Brown Rudnick

(2)

Public Hearing
Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital

Name	Phone	Fax	Representing Organization/Self
James Thibeault	860-679-8750	860-679-1135	UCHC
CHAD WABLE	203-709-3368		HCGW
Maryanne Volkringer	203-573-6298	203-573-6161	WH
[illegible]	203-573 6266		WH
Sandra Roosa	203-709-6095		SMH
Colleen Scott	2035737280		WH
Mary Pryhlo Pryhlo	203/573-7278		WH
Paul Pleissler Pleissler MD	860/534-5908		WH/SMH/HCGW
CHRIS MICHOS, MD	203-573-6215		WH
HENRY BORKOWSKI MD Henry Borkowski MD	203-573-1437		HCGW

(3)

Public Hearing
Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital

Name	Phone	Fax	Representing Organization/Self
STEPHEN C WISMAN	592-2722		HCGW
DAVID UNDERHILL.	(860) 524-5905		HCGW.

PUBLIC HEARING
INFORMAL PARTICIPANT
SIGN UP SHEET

October 30, 2008
9:00 a.m.

Applicant: Docket Number: 08-31202-CON
Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital
Establish a Primary and Elective Angioplasty and Open Heart Surgery Program at Waterbury Hospital and Saint Mary's Hospital

PRINT NAME	TOWN	REPRESENTING ORGANIZATION/SELF
✓ Sandra Micalizzi	Southington	Heart Center - public
✓ Sam Dambrosi	Waterbury	President of Waterbury Board of Health
✓ Juan Serret	Waterbury	Self
✓ Bob Potz	~~Southbury~~ Southbury	Self
✓ John Marinaro	watertown	Self

PRINT NAME	TOWN	REPRESENTING ORGANIZATION/SELF
✓ Jaye Howes	Wolcott	Heart Center Employee
✓ Patricia Kinzly	Watertown	Self + Employee
✓ George Bouley	Thomaston	Self
✓ Augie Grazuna	Wolcott	Self

PRINT NAME	TOWN	REPRESENTING ORGANIZATION/SELF
✓ Donald Piombo	Waterbury	N/A

RECEIVED
2008 NOV 14 P 3:57
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

November 14, 2008

Via Hand Delivery

Office of Health Care Access
c/o Commissioner Cristine Vogel
410 Capitol Avenue
MS #13 HCA
Hartford, CT 06134

Re: Application of the Waterbury Hospital and Saint Mary's Hospital d/b/a Heart Center of Greater Waterbury and John Dempsey Hospital to Establish a Primary and Elective Angioplasty and Open Heart Program
Docket No. 08-31202-CON
Submission of Late Filed Exhibits

Dear Commissioner Vogel:

On behalf of Saint Mary's Hospital (SMH), the Waterbury Hospital (TWH), and John Dempsey Hospital (JDH), (collectively the Applicants) enclosed are late filed exhibits requested by the Office of Health Care Access (OHCA or Agency) at the public hearing held on October 30, 2008 regarding the above-referenced docket. We appreciate the additional time granted by OHCA to submit these late filed exhibits and the opportunity to clarify and revise certain information contained in our Certificate of Need (CON or Application). The Applicants have submitted the CON and late filed exhibits for the continued provision of primary and elective angioplasty and open heart surgery as a single, integrated and unified program (Program) through the Heart Center of Greater Waterbury (HCGW) on the campuses of SMH and TWH.

We would have liked the opportunity to more fully discuss the core issues concerning the Program at our hearing on October 30, 2008. The Applicants desired to have the best possible information available to the Agency to arrive at the most appropriate decision for the State, the Applicants, and the patients in the greater Waterbury area. We would welcome the opportunity to answer any questions the Agency may have, in any format deemed appropriate, including an additional hearing, concerning the Application.

This Program is a model for how hospitals across the state could collaborate to streamline and make more cost effective delivery of care, while maintaining excellent outcomes.

Requested Late Filed Exhibits:

1. *Table 1: Update Historical Volume FY 2008 (Page 42)*

	A=Primary Angioplasty	B= Elective Angioplasty	C= Open Heart Surgery	D=Cardiac Catheterizations
WH	49	297	138	631
SMH	35	223	84	480
HCGW Total	**84**	**520**	**222**	**1111**
JDH	**	391	79	487

FY 2008 for JDH is July 1- June 30
FY 2008 for HCGW is Oct 1- Sept 30
** JDH is unable to separately split out primary angioplasty

2. Full Time Equivalent (FTE) Clarification, Revised Financials/Impact Analysis

A. FTE Clarification

In the revised financials the Applicants have recalculated the FTEs for each campus using the methodology noted below under "Revised Financials." With this methodology the FTEs for the Program at SMH are 20.3 and are 23.8 for TWH. The Applicants believe this revised method is an accurate way of calculating incremental FTEs and these revisions are reflected in the revised financials.

On pages 1149 and 1150 of the Application the FTE total for SMH only included the FTEs for the Cardiovascular Unit and did not include the FTEs for other areas within the cardiac Program as did the WH FTEs (Cardiology, Cardiovascular Operating Room and other FTEs that are allocated to the cardiac Program such as Emergency Department, Pharmacy, and Laboratory, etc.). The SMH financials, however, appropriately included both the salary and benefit dollars for the total number of FTEs.

The original financials for SMH showing an FTE total of 16 should have been 26.01. To reiterate, the SMH financials included the salary and benefit dollars for the total number of FTEs.

B. Financials and Impact Analysis

Using our usual financial process and models, the financials included in the CON application utilized two different methodologies to answer two different questions. As expected, the different methodologies, while usual and customary, produced two different financial results. In response to the questions raised by OHCA at the hearing, we have prepared revised schedules 11.B.(i) and 11.C.(i) that show the impact of the service on the hospitals with and without the project. In addition, the detailed financial statements 11.b.(iv) have also been revised.

The following provides an explanation of the two methodologies used in the CON submission.

C. Program Impact - Method 1: Traditional Cost Accounting

Typically, when completing CON schedules to evaluate new services (the "with and without project analysis"), an applicant estimates what 'new' costs will be added to the system to provide the service. These would include, for example, the costs of either building or leasing new space for the service. Indirect costs are typically not allocated to the new service because these costs are truly, not incremental, in that they already exist in the hospital.

Since the Program is an existing, fully functioning program, SMH and TWH used traditional cost accounting methodology to account for the new service submitted in the original financials on pages 1145-1152. The methodology tracks costs for each patient utilizing services across the institution, including everything from entry through the emergency department, through the ancillary departments and inpatient units, etc. This represents a more accurate picture of the resources utilized to treat any given patient by service type. Since the advanced cardiac services program has been operational for the past three years and this type of data was in fact available, it is an accurate methodology to calculate the incremental cost of the new service. Most often, hospitals estimate the new costs based on assumptions of what service utilization and costs will be. The aforementioned are two very different methods of determining impact of a program. One is based on projections and estimates, and the other is based on actual allocated cost methodology. Our path was to use actual allocated cost methodology.

D. Impact of Closing the Program - Method 2

The financial model used by hospitals to estimate the impact of the closing of a program is a different model altogether and different from that typically used for CON analysis. Once a program is established in an organization, the program revenue serves to offset the fixed costs of the organization, including services such as billing, maintenance, medical records, etc. If a hospital closes a program, the resulting reduction in program revenue leaves those 'fixed' costs uncovered. Unless the hospital has other programs to utilize that space, those fixed costs must be absorbed by the remaining programs. If those indirect costs cannot be covered by other profitable programs, the hospital decreases its overall profitability. It is not uncommon for hospitals to use different financial models to evaluate impact of the closing of a program and the adding of a new service. We hope this clarifies the different methodologies used for each particular inquiry in our original application.

E. Revised Financials

As noted above, the revised financials are found on the following pages. You will note that the methodology utilized in the revised financials is different from the traditional cost accounting method (Method 1) used in our original submission and consequently, produces slightly different results. With this submission, we are utilizing the same methodology to answer both questions raised by OHCA staff.

In this methodology, the impact of losing the project is estimated to be $8 million compared to the $10 million reported in our previous response. The difference is that the professional contract costs have been included as direct costs and would be eliminated if the program were to close. These were not included in the original impact analysis.

The financial impact is a conservative estimate as previously noted. This revised methodology does not take into account the loss of revenue from cardiology services that would inevitably be shifted elsewhere based on the services available. For example, the Applicants believe other outpatient cardiology services would be shifted to full service providers. For two financially fragile hospitals, a multimillion dollar negative impact could place the hospitals in a more fiscally precarious position from which they may not recover and one that would severely impact the public's access to health care.

Not only is this financial impact conservative, but it reflects many cost savings built into the design of the Program. The following represents areas in which SMH and TWH were able to streamline administrative resources in order to reduce costs:

First, the HCGW, Inc. was formed as a separate, non-stock, 501(c)(3) corporation whose sole members are SMH and TWH for the purpose of: (1) program coordination and quality oversight; (2) community outreach and education; (3) maintaining compliance with all of the stipulations set forth in OHCA's order, dated July 23, 2004, in Docket No. 03-30167-CON (the 2004 Order); and (4) marketing. There are four FTE's in this corporation, including the Executive Director, Data Analyst, Advanced Practice Registered Nurse, and Assistant. (These FTEs are not included in the revised financials as these FTEs are not at either of the hospitals)

Second, the HCGW, Inc. Board of Directors (the Board) is comprised of ten members consisting of four members each from the administration of SMH and TWH. Additionally, the Medical Director and Executive Director of HCGW, Inc. are ex-officio members of the Board. These individuals oversee the operations of the Program and review data, oversee community outreach, assess quality of care, and assure compliance with the OHCA stipulated orders. The Executive Director reports to the Board and the administration at both SMH and TWH. The primary responsibility of the Executive Director is to coordinate the Program between SMH and TWH.

Third, the Board appointed an internal subgroup to form a joint quality committee that consists of staff from both hospitals and Program physicians to review all quality

data and process improvements throughout the Program. The purpose of the subgroup is to ensure the highest quality patient care and to implement uniform protocols and processes between the two campuses.

Fourth, HCGW, Inc. negotiates contracts with physician groups on behalf of the Hospital's. SMH, TWH, HCGW Inc. and the applicable physician group are all parties to the physician contracts. This results in the Program having one set of cardiologists, surgeons, perfusionists and anesthesiologists.

Fifth, with regard to data management, HCGW, Inc. purchased software that provides a combined database of patient information for Program patients at both campuses. The database is on a single server and is connected and accessible to SMH, TWH and HCGW Inc. The data is currently split by campus because OHCA's 2004 Order required the Hospitals to maintain the data separately; however, we can easily combine the data at any time. In fact, the data is routinely combined internally to measure overall Program performance.

Sixth, every physician or professional group has one on-call schedule that covers both hospital campuses 24 hours a day, 365 days a year. Therefore, one single, unified schedule covers the whole Program.

Finally, SMH and TWH amended their respective bylaws to allow for the joint sharing of patient outcome data in a combined manner, related specifically to the Program.

This sharing of administrative resources reflects that this is one Program established on two separate campuses and yields a significant savings over the establishment of two separate programs. Compare this with the situation in other cities such as, Hartford, New Haven and Bridgeport. Those programs must incur, for each program, the above mentioned administrative resources. In addition, built into our Program are many cost saving measures which relate to the clinical aspects of our Program. As discussed at the public hearing, the Agency stated it clearly understands the clinical benefits of the way in which the Program is structured. Therefore, we do not find it necessary to detail those accomplishments here. Notwithstanding, we wanted to clarify how our unified Program allows for administrative cost reduction that go beyond the cost saving measures associated with the clinical aspects of the Program.

3. Resubmit historical 11b.i. and 11.ci (Pages, 1145 - 1147)

See the following pages.

11. B (i). Please provide FY 2008 (Annualized) and four years of historical actual results of Total Facility revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

The Waterbury Hospital

Total Facility:	FY 2008 Actual	FY 2007 Historical	FY 2007 Historical	FY 2007 Historical	FY 2006 Historical	FY 2006 Historical	FY 2006 Historical	FY 2005 Historical	FY 2005 Historical	FY 2005 Historical	FY 2004 Historical	FY 2004 Historical	FY 2004 Historical
Description	Annualized	W/out HCGW	Incremental	With HCGW	W/out HCGW	Incremental	With HCGW	W/out HCGW	Incremental	With HCGW	W/out HCGW	Incremental	With HCGW
NET PATIENT REVENUE													
Non-Government	$84,222,263	$80,727,688	$5,574,782	$86,302,470	$78,490,792	$5,149,377	$83,640,169	$74,785,519	$1,250,813	$76,036,332	$71,225,720		$71,225,720
Medicare	$107,653,210	$95,284,612	$6,645,663	$101,930,275	$93,642,338	$6,138,540	$99,780,878	$89,052,961	$1,491,086	$90,544,048	$86,564,628		$86,564,628
Medicaid and Other Medical Assistance	$38,744,086	$37,157,478	$119,236	$37,276,714	$30,820,864	$110,137	$30,931,001	$32,128,706	$26,753	$32,155,459	$29,497,899		$29,497,899
Other Government	$0	$0	$0		$0			$0			$0		
Total Net Patient Patient Revenue	$230,619,559	$213,169,778	$12,339,681	$225,509,459	$202,953,994	$11,398,054	$214,352,048	$195,967,186	$2,768,652	$198,735,838	$187,288,247	$0	$187,288,247
Other Operating Revenue	$11,999,416	$10,790,913	$0	$10,790,913	$10,052,871	$0	$10,052,871	$10,973,709	$0	$10,973,709	$8,289,308		$8,289,308
Revenue from Operations	$242,618,974	$223,960,691	$12,339,681	$236,300,372	$213,006,865	$11,398,054	$224,404,919	$206,940,895	$2,768,652	$209,709,547	$195,577,555	$0	$195,577,555
OPERATING EXPENSES													
Salaries and Fringe Benefits	$137,194,733	$131,913,158	$2,187,757	$134,100,915	$127,190,389	$2,032,514	$129,222,903	$120,934,086	$355,588	$121,289,674	$113,722,170		$113,722,170
Professional / Contracted Services	$26,535,638	$23,799,744	$1,440,600	$25,240,344	$26,437,063	$1,411,788	$27,848,851	$22,454,048	$352,947	$22,806,995	$18,646,633		$18,646,633
Supplies and Drugs	$41,100,575	$36,019,545	$2,451,045	$38,470,589	$33,984,373	$2,277,119	$36,261,492	$33,046,430	$398,382	$33,444,812	$28,684,582		$28,684,582
Bad Debts	$23,691,887	$25,096,401	$0	$25,096,401	$17,502,772	$0	$17,502,772	$14,608,168	$0	$14,608,168	$15,020,924		$15,020,924
Other Operating Expense	$12,240,158	$8,669,788	$0	$8,669,788	$8,282,287	$0	$8,282,287	$6,933,105	$0	$6,933,105	$7,196,993		$7,196,993
Subtotal	$240,762,991	$225,498,636	$6,079,401	$231,578,037	$213,396,884	$5,721,421	$219,118,305	$197,975,837	$1,106,917	$199,082,754	$183,271,302	$0	$183,271,302
Depreciation/Amortization	$10,500,402	$10,056,129	$0	$10,056,129	$9,533,985	$0	$9,533,985	$8,773,671	$0	$8,773,671	$9,465,000		$9,465,000
Interest Expense	$1,607,287	$1,642,933	$0	$1,642,933	$1,683,030	$0	$1,683,030	$1,628,380	$0	$1,628,380	$1,598,408		$1,598,408
Lease Expense	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0
Total Operating Expense	$252,870,680	$237,197,698	$6,079,401	$243,277,099	$224,613,899	$5,721,421	$230,335,320	$208,377,888	$1,106,917	$209,484,805	$194,334,710	$0	$194,334,710
Gain/(Loss) from Operations	($10,251,706)	($13,237,007)	$6,260,280	($6,976,727)	($11,607,034)	$5,676,633	($5,930,401)	($1,436,993)	$1,661,735	$224,742	$1,242,845	$0	$1,242,845
Plus: Non-Operating Revenue	$1,801,212	$2,637,808	$0	$2,637,808	$3,617,853	$0	$3,617,853	$2,783,101	$0	$2,783,101	$3,753,342		$3,753,342
Revenue Over/(Under) Expense	($8,450,494)	($10,599,199)	$6,260,280	($4,338,919)	($7,989,181)	$5,676,633	($2,312,548)	$1,346,108	$1,661,735	$3,007,843	$4,996,187	$0	$4,996,187
FTEs	1,615	1,621	27	1,648	1,665	26	1,691	1,618	5	1,622	1,561		1,561
Volume													
Primary PCI's	50		60			50			8				
Elective PCI's	289		341			331			59				
OHS	134		120			118			23				

Greater Waterbury Health Network

11. C (i). Please provide one year of actual results and three years of Total Hospital Health System projections of revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Facility: / Description	FY 2008 Actual Annualized	FY 2007 Historical W/out HCGW	FY 2007 Historical Incremental	FY 2007 Historical With HCGW	FY 2006 Historical W/out HCGW	FY 2006 Historical Incremental	FY 2006 Historical With HCGW	FY 2005 Historical W/out HCGW	FY 2005 Historical Incremental	FY 2005 Historical With HCGW	FY 2004 Historical W/out HCGW	FY 2004 Historical Incremental	FY 2004 Historical With HCGW
NET PATIENT REVENUE													
Non-Government	$84,222,263	$80,727,688	$5,574,782	$86,302,470	$78,490,792	$5,149,377	$83,640,169	$74,785,519	$1,250,813	$76,036,332	$71,225,720		$71,225,720
Medicare	$107,653,210	$95,284,612	$6,645,663	$101,930,275	$93,642,338	$6,138,540	$99,780,878	$89,052,961	$1,491,086	$90,544,048	$86,564,628		$86,564,628
Medicaid and Other Medical Assistance	$38,744,086	$37,157,478	$119,235	$37,276,714	$30,820,864	$110,137	$30,931,001	$32,128,706	$26,753	$32,155,459	$29,497,899		$29,497,899
Other Government	$0		$0	$0		$0	$0		$0	$0			$0
Total Net Patient Patient Revenue	$230,619,559	$213,169,778	$12,339,681	$225,509,459	$202,953,994	$11,398,054	$214,352,048	$195,967,186	$2,768,652	$198,735,838	$187,288,247	$0	$187,288,247
Other Operating Revenue	$11,280,367	$14,912,551		$14,912,551	$12,582,156		$12,582,156	$14,245,758		$14,245,758	$11,023,244		$11,023,244
Revenue from Operations	$241,899,925	$228,082,329	$12,339,681	$240,422,010	$215,536,150	$11,398,054	$226,934,204	$210,212,944	$2,768,652	$212,981,596	$198,311,491	$0	$198,311,491
OPERATING EXPENSES													
Salaries and Fringe Benefits	$139,175,537	$133,747,227	$2,187,757	$135,934,984	$128,277,499	$2,032,514	$130,310,013	$122,000,530	$355,588	$122,356,118	$114,730,073		$114,730,073
Professional / Contracted Services	$29,374,262	$25,763,592	$1,440,600	$27,204,192	$27,775,525	$1,411,788	$29,187,313	$24,538,488	$352,947	$24,891,435	$20,266,628		$20,266,628
Supplies and Drugs	$41,100,575	$36,019,545	$2,451,045	$38,470,589	$33,984,373	$2,277,119	$36,261,492	$33,046,430	$398,382	$33,444,812	$28,684,582		$28,684,582
Bad Debts	$23,691,887	$25,096,401		$25,096,401	$17,502,772		$17,502,772	$14,608,168		$14,608,168	$15,020,924		$15,020,924
Other Operating Expense	$12,240,158	$8,669,788		$8,669,788	$8,282,287		$8,282,287	$6,933,105		$6,933,105	$7,196,993		$7,196,993
Subtotal	$245,582,419	$229,296,553	$6,079,401	$235,375,954	$215,822,456	$5,721,421	$221,543,877	$201,126,721	$1,106,917	$202,233,638	$185,899,200	$0	$185,899,200
Depreciation/Amortization	$10,500,402	$10,056,129		$10,056,129	$9,533,985		$9,533,985	$8,773,671		$8,773,671	$9,465,000		$9,465,000
Interest Expense	$1,800,013	$1,697,714		$1,697,714	$1,737,126		$1,737,126	$1,681,190		$1,681,190	$1,638,411		$1,638,411
Lease Expense	$0			$0			$0			$0			$0
Total Operating Expense	$257,882,834	$241,050,396	$6,079,401	$247,129,797	$227,093,567	$5,721,421	$232,814,988	$211,581,582	$1,106,917	$212,688,499	$197,002,611	$0	$197,002,611
Gain/(Loss) from Operations	($15,982,909)	($12,968,067)	$6,260,280	($6,707,787)	($11,557,417)	$5,676,633	($5,880,784)	($1,368,638)	$1,661,735	$293,097	$1,308,880	$0	$1,308,880
Plus: Non-Operating Revenue	$1,801,212	$2,637,808		$2,637,808	$3,617,853		$3,617,853	$2,783,101		$2,783,101	$3,753,342		$3,753,342
Revenue Over/(Under) Expense	($14,181,697)	($10,330,259)	$6,260,280	($4,069,979)	($7,939,564)	$5,676,633	($2,262,931)	$1,414,463	$1,661,735	$3,076,198	$5,062,222	$0	$5,062,222
FTEs	1,615	1,621	27	1,648	1,665	26	1,691	1,618	5	1,622	1,561		1,561
Volume													
Primary PCI's	50		60			50			8				
Elective PCI's	289		341			331			59				
OHS	134		120			118			23				

The Waterbury Hospital

11. B (i). Please provide three years of projections of Total Facility revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Facility: **Description**	**FY 2009 Projected W/out CON**	**FY 2009 Projected Incremental**	**FY 2009 Projected With CON**	**FY 2010 Projected W/out CON**	**FY 2010 Projected Incremental**	**FY 2010 Projected With CON**	**FY 2011 Projected W/out CON**	**FY 2011 Projected Incremental**	**FY 2011 Projected With CON**
NET PATIENT REVENUE									
Non-Government	$84,168,631	$4,883,323	$89,051,953	$87,704,491	$4,909,541	$92,614,032	$91,212,670	$5,105,922	$96,318,593
Medicare	$107,657,600	$6,168,938	$113,826,538	$112,195,368	$6,184,232	$118,379,600	$116,683,182	$6,431,602	$123,114,784
Medicaid and Other Medical Assistance	$40,471,478	$494,371	$40,965,849	$42,118,583	$485,900	$42,604,483	$43,803,326	$505,337	$44,308,663
Other Government			$0			$0			$0
Total Net Patient Patient Revenue	$232,297,709	$11,546,632	$243,844,341	$242,018,441	$11,579,673	$253,598,115	$251,699,179	$12,042,860	$263,742,039
Other Operating Revenue	$12,479,392		$12,479,392	$12,978,568		$12,978,568	$13,497,711		$13,497,711
Revenue from Operations	$244,777,101	$11,546,632	$256,323,733	$254,997,009	$11,579,673	$266,576,683	$265,196,890	$12,042,860	$277,239,750
OPERATING EXPENSES									
Salaries and Fringe Benefits	$138,046,628	$2,057,400	$140,104,028	$142,962,096	$2,045,573	$145,007,669	$147,975,997	$2,106,940	$150,082,938
Professional / Contracted Services	$25,732,789	$1,500,000	$27,232,789	$26,777,100	$1,545,000	$28,322,100	$27,863,634	$1,591,350	$29,454,984
Supplies and Drugs	$40,275,429	$2,305,000	$42,580,429	$42,417,700	$2,291,750	$44,709,450	$44,584,420	$2,360,503	$46,944,923
Bad Debts	$24,402,643	$0	$24,402,643	$25,134,723	$0	$25,134,723	$25,888,764	$0	$25,888,764
Other Operating Expense	$12,439,333	$0	$12,439,333	$12,812,513	$0	$12,812,513	$13,196,888	$0	$13,196,888
Subtotal	$240,896,822	$5,862,400	$246,759,222	$250,104,132	$5,882,323	$255,986,456	$259,509,705	$6,058,793	$265,568,498
Depreciation/Amortization	$10,500,402		$10,500,402	$10,500,402		$10,500,402	$10,500,402		$10,500,402
Interest Expense	$1,607,287		$1,607,287	$1,607,287		$1,607,287	$1,607,287		$1,607,287
Lease Expense			$0			$0			$0
Total Operating Expense	$253,004,512	$5,862,400	$258,866,912	$262,211,822	$5,882,323	$268,094,145	$271,617,394	$6,058,793	$277,676,187
Gain/(Loss) from Operations	($8,227,410)	$5,684,232	($2,543,178)	($7,214,812)	$5,697,350	($1,517,462)	($6,420,504)	$5,984,067	($436,437)
Plus: Non-Operating Revenue	$1,855,248		$1,855,248	$1,910,906		$1,910,906	$1,968,233		$1,968,233
Revenue Over/(Under) Expense	($6,372,162)	$5,684,232	($687,930)	($5,303,907)	$5,697,350	$393,444	($4,452,271)	$5,984,067	$1,531,796
FTEs	1,546	23.8	1,588	1,546	23.0	1,588	1,546	23.0	1,588
Volume									
Primary PCI's		52			50			50	
Elective PCI's		275			266			266	
OHS		134			129			129	

Greater Waterbury Health Network

11. C (i). Please provide one year of actual results and three years of Total Hospital Health System projections of revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Hospital Health System: Description	FY 2009 Projected W/out CON	FY 2009 Projected Incremental	FY 2009 Projected With CON	FY 2010 Projected W/out CON	FY 2010 Projected Incremental	FY 2010 Projected With CON	FY 2011 Projected W/out CON	FY 2011 Projected Incremental	FY 2011 Projected With CON
NET PATIENT REVENUE									
Non-Government	$84,168,631	$4,883,323	$89,051,953	$87,704,491	$4,909,541	$92,614,032	$91,212,670	$5,105,922	$96,318,593
Medicare	$107,657,600	$6,168,938	$113,826,538	$112,195,368	$6,184,232	$118,379,600	$116,683,182	$6,431,602	$123,114,784
Medicaid and Other Medical Assistance	$40,471,478	$494,371	$40,965,849	$42,118,583	$485,900	$42,604,483	$43,803,326	$505,337	$44,308,663
Other Government			$0			$0			$0
Total Net Patient Patient Revenue	$232,297,709	$11,546,632	$243,844,341	$242,018,441	$11,579,673	$253,598,115	$251,699,179	$12,042,860	$263,742,039
Other Operating Revenue	$14,399,392		$14,399,392	$15,052,168		$15,052,168	$15,737,199		$15,737,199
Revenue from Operations	$246,697,101	$11,546,632	$258,243,733	$257,070,609	$11,579,673	$268,650,283	$267,436,378	$12,042,860	$279,479,238
OPERATING EXPENSES									
Salaries and Fringe Benefits	$140,046,628	$2,057,400	$142,104,028	$145,032,096	$2,045,573	$147,077,669	$150,118,447	$2,106,940	$152,225,388
Professional / Contracted Services	$26,842,789	$1,500,000	$28,342,789	$27,181,500	$1,545,000	$28,726,500	$28,284,210	$1,591,350	$29,875,560
Supplies and Drugs	$40,275,429	$2,305,000	$42,580,429	$42,417,700	$2,291,750	$44,709,450	$44,584,420	$2,360,503	$46,944,923
Bad Debts	$24,402,643	$0	$24,402,643	$25,134,723	$0	$25,134,723	$25,888,764	$0	$25,888,764
Other Operating Expense	$12,439,333	$0	$12,439,333	$12,812,513	$0	$12,812,513	$13,196,888	$0	$13,196,888
Subtotal	$244,006,822	$5,862,400	$249,869,222	$252,578,532	$5,882,323	$258,460,856	$262,072,731	$6,058,793	$268,131,524
Depreciation/Amortization	$10,500,402		$10,500,402	$10,500,402		$10,500,402	$10,500,402		$10,500,402
Interest Expense	$1,800,013		$1,800,013	$1,800,013		$1,800,013	$1,800,013		$1,800,013
Lease Expense			$0			$0			$0
Total Operating Expense	$256,307,238	$5,862,400	$262,169,638	$264,878,948	$5,882,323	$270,761,271	$274,373,146	$6,058,793	$280,431,939
Gain/(Loss) from Operations	($9,610,136)	$5,684,232	($3,925,904)	($7,808,338)	$5,697,350	($2,110,988)	($6,936,768)	$5,984,067	($952,701)
Plus: Non-Operating Revenue	$1,855,248		$1,855,248	$1,910,906		$1,910,906	$1,968,233		$1,968,233
Revenue Over/(Under) Expense	($7,754,888)	$5,684,232	($2,070,656)	($5,897,433)	$5,697,350	($200,082)	($4,968,535)	$5,984,067	$1,015,532
FTEs	1,564	23.8	1,588	1,565	23.0	1,588	1,565	23.0	1,588
Volume									
Primary PCI's		52			50			50	
Elective PCI's		275			266			266	
OHS		134			129			129	

The Waterbury Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

of Service Description: Primary PCI
of Unit Description: Cases
Months in Operation: 12

FY _2009_____ FY Projected Incremental Total Incremental Expenses: 306,101	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Total Facility by Payer Category:										
Medicare		58,844	28	$1,647,626	$1,176,993			470,633	$164,285	$306,348
Medicaid			2	$117,688	$79,381			38,307	$11,735	$26,572
CHAMPUS/TriCare				$0				$0	$0	$0
Total Governmental			30	$1,765,314	$1,256,374	$0	$0	$508,940	$176,020	$332,920
Commericial Insurers			21	$1,235,720	$863,592			372,128	$123,214	$248,914
Uninsured		$0	1	$58,844			$58,844	$0	$5,867	($5,867)
Total NonGovernment			22	$1,294,563	$863,592	$0	$58,844	$372,128	$129,081	$243,047
Total All Payers		$58,844	52	$3,059,877	$2,119,965	$0	$58,844	$881,068	$305,101	$575,967

The Waterbury Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Primary PCI
Type of Unit Description: Cases
# of Months in Operation: 12

FY _2010_____ FY Projected Incremental Total Incremental Expenses: 306,138	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Total Facility by Payer Category:										
Medicare		61,198	26	$1,591,136	$1,118,752			472,384	$159,192	$313,192
caid			2	$122,395	$85,401			36,994	$12,246	$24,748
MPUS/TriCare				$0				$0	$0	$0
Governmental			28	$1,713,531	$1,204,153	$0	$0	$509,378	$171,437	$337,941
Commericial Insurers			21	$1,285,148	$909,518			375,630	$128,578	$247,052
Uninsured		$0	1	$61,198			$61,198	$0	$6,123	($6,123)
Total NonGovernment			22	$1,346,346	$909,518	$0	$61,198	$375,630	$134,701	$240,929
Total All Payers		$61,198	50	$3,059,877	$2,113,671	$0	$61,198	$885,008	$306,138	$578,870

The Waterbury Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Primary PCI
Type of Unit Description: Cases
# of Months in Operation: 12

FY _2011_____ FY Projected Incremental Total Incremental Expenses: 316,322	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Total Facility by Payer Category:										
Medicare		63,645	26	$1,654,781	$1,163,502			491,279	$163,968	$327,311
Medicaid			2	$127,291	$88,817			38,474	$12,613	$25,861
CHAMPUS/TriCare				$0				$0	$0	$0
Total Governmental			28	$1,782,072	$1,252,319	$0	$0	$529,753	$176,580	$353,173
Commericial Insurers			21	$1,336,554	$945,898			390,656	$132,435	$258,221
Uninsured		$0	1	$63,645			$63,645	$0	$6,306	($6,306)
Total NonGovernment			22	$1,400,200	$945,898	$0	$63,645	$390,656	$138,742	$251,914
Total All Payers		$63,645	50	$3,182,272	$2,198,218	$0	$63,645	$920,409	$315,322	$605,087

The Waterbury Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Elective PCI
Type of Unit Description: Cases
# of Months in Operation: 12

FY _2009_____ FY Projected Incremental Total Incremental Expenses: 1,728,906	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Total Facility by Payer Category:										
Medicare		58,844	144	$8,473,505	$5,806,588			2,666,918	$905,318	$1,761,599
Medicaid			12	$706,125	$489,050			217,075	$75,443	$141,632
CHAMPUS/TriCare								$0	$0	$0
Total Governmental			156	$9,179,631	$6,295,638	$0	$0	$2,883,993	$980,761	$1,903,231
Commericial Insurers			115	$6,767,035	$4,658,309			2,108,726	$722,997	$1,385,729
Uninsured		$0	4	$235,375			$235,375	0	$25,148	($25,148)
Total NonGovernment		$58,844	119	$7,002,411	$4,658,309	$0	$235,375	$2,108,726	$748,145	$1,360,581
Total All Payers		$58,844	275	$16,182,041	$10,953,947	$0	$235,375	$4,992,719	$1,728,906	$3,263,812

The Waterbury Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Elective PCI
Type of Unit Description: Cases
# of Months in Operation: 12

FY _2010_____ FY Projected Incremental Total Incremental Expenses: 1,734,782	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Total Facility by Payer Category:										
Medicare		61,198	140	$8,238,130	$5,561,289			2,676,841	$913,043	$1,763,798
Medicaid			11	$647,282	$437,650			209,632	$71,739	$137,893
CHAMPUS/TriCare				$0				$0	$0	$0
Total Governmental			151	$8,885,412	$5,998,938	$0	$0	$2,886,473	$984,782	$1,901,691
Commericial Insurers			111	$6,531,660	$4,403,087			2,128,573	$723,913	$1,404,660
Uninsured		$0	4	$235,375			$235,375	0	$26,087	($26,087)
Total NonGovernment		$61,198	115	$6,767,035	$4,403,087	$0	$235,375	$2,128,573	$750,000	$1,378,574
Total All Payers		$61,198	266	$15,652,447	$10,402,025	$0	$235,375	$5,015,047	$1,734,782	$3,280,265

The Waterbury Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Elective PCI
Type of Unit Description: Cases
# of Months in Operation: 12

FY _2011_____ FY Projected Incremental Total Incremental Expenses: 1,786,825	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Total Facility by Payer Category:										
Medicare		63,645	140	$8,238,130	$5,454,215			2,783,915	$940,434	$1,843,481
Medicaid			11	$647,282	$429,265			218,017	$73,891	$144,126
CHAMPUS/TriCare				$0				$0	$0	$0
Total Governmental			151	$8,885,412	$5,883,479	$0	$0	$3,001,932	$1,014,326	$1,987,607
Commericial Insurers			111	$6,531,660	$4,317,945			2,213,715	$745,630	$1,468,085
Uninsured		$0	4	$235,375			$235,375	0	$26,870	($26,870)
Total NonGovernment		$63,645	115	$6,767,035	$4,317,945	$0	$235,375	$2,213,715	$772,500	$1,441,216
Total All Payers		$63,645	266	$15,652,447	$10,201,424	$0	$235,375	$5,215,648	$1,786,825	$3,428,822

The Waterbury Hospital (Financial Attachment II)

11.B(vi): Please provide three years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: OHS
Type of Unit Description: Cases
# of Months in Operation: 12

FY _2009_____ FY Projected Incremental Total Incremental Expenses: 3,828,393	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Total Facility by Payer Category:										
Medicare		138,683	71	$9,778,669	$6,747,282			3,031,387	$2,014,504	$1,016,884
Medicaid			6	$770,932	$531,943			238,989	$158,820	$80,169
CHAMPUS/TriCare				$0				$0	$0	$0
Total Governmental			76	$10,549,601	$7,279,225	$0	$0	$3,270,376	$2,173,323	$1,097,053
Commericial Insurers			56	$7,749,899	$5,347,431			2,402,469	$1,596,557	$805,912
Uninsured		$0	2	$284,028			$284,028	-	$58,513	($58,513)
Total NonGovernment			58	$8,033,927	$5,347,431	$0	$284,028	$2,402,469	$1,655,069	$747,400
Total All Payers		$138,683	134	$18,583,528	$12,626,656	$0	$284,028	$5,672,845	$3,828,393	$1,844,453

The Waterbury Hospital (Financial Attachment II)

11.B(vi): Please provide three years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: OHS
Type of Unit Description: Cases
# of Months in Operation: 12

FY _2010_____ FY Projected Incremental Total Incremental Expenses: 3,841,403	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Total Facility by Payer Category:										
Medicare		144,230	68	$9,790,345	$6,755,338			3,035,007	$2,021,350	$1,013,657
dicaid			5	$771,853	$532,579			239,274	$159,360	$79,915
MPUS/TriCare				$0				$0	$0	$0
tal Governmental			73	$10,562,198	$7,287,917	$0	$0	$3,274,281	$2,180,709	$1,093,572
Commericial Insurers			54	$7,759,153	$5,353,816			2,405,337	$1,601,983	$803,355
Uninsured		$0	2	$284,367			$284,367	-	$58,711	($58,711)
Total NonGovernment			56	$8,043,520	$5,353,816	$0	$284,367	$2,405,337	$1,660,694	$744,643
Total All Payers		$144,230	129	$18,605,718	$12,641,732	$0	$284,367	$5,679,619	$3,841,403	$1,838,215

The Waterbury Hospital (Financial Attachment II)

11.B(vi): Please provide three years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: OHS
Type of Unit Description: Cases
# of Months in Operation: 12

FY _2011_____ FY Projected Incremental Total Incremental Expenses: 3,956,645	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Total Facility by Payer Category:										
Medicare		150,000	68	$10,181,959	$7,025,552			3,156,407	$2,081,990	$1,074,417
Medicaid			5	$802,727	$553,882			248,845	$164,140	$84,705
CHAMPUS/TriCare				$0				$0	$0	$0
Total Governmental			73	$10,984,686	$7,579,433	$0	$0	$3,405,253	$2,246,131	$1,159,122
Commericial Insurers			54	$8,069,519	$5,567,968			2,501,551	$1,650,042	$851,509
Uninsured		$0	2	$295,742			$295,742	-	$60,473	($60,473)
Total NonGovernment			56	$8,365,261	$5,567,968	$0	$295,742	$2,501,551	$1,710,515	$791,036
Total All Payers		$150,000	129	$19,349,946	$13,147,401	$0	$295,742	$5,906,804	$3,956,645	$1,950,158

St. Mary's Hospital (Obligated Group)

11. B (i). Please provide FY 2008 (Annualized) and four years of historical actual results of **Total Facility** revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Facility: Description	FY 2008 Actual Annualized	FY 2007 Historical W/out HCGW	FY 2007 Historical Incremental	FY 2007 Historical With HCGW	FY 2006 Historical W/out HCGW	FY 2006 Historical Incremental	FY 2006 Historical With HCGW	FY 2005 Historical W/out HCGW	FY 2005 Historical Incremental	FY 2005 Historical With HCGW	FY 2004 Historical W/out HCGW	FY 2004 Historical Incremental	FY 2004 Historical With HCGW
NET PATIENT REVENUE													
Non-Government	$85,680,000	$79,115,000	$2,604,000	$81,719,000	$71,249,000	$2,755,000	$74,004,000	$63,505,000	$569,000	$64,074,000	$65,386,000	$0	$65,386,000
Medicare	$91,853,000	$84,192,000	$4,247,000	$88,439,000	$75,985,000	$4,104,000	$80,089,000	$68,298,000	$1,045,000	$69,343,000	$70,762,000	$0	$70,762,000
Medicaid and Other Medical Assi	$47,953,000	$45,940,000	$230,000	$46,170,000	$41,710,000	$101,000	$41,811,000	$36,179,000	$22,000	$36,201,000	$36,942,000	$0	$36,942,000
Other Government	$450,000	$434,000	$0	$434,000	$393,000	$0	$393,000	$340,000	$0	$340,000	$347,000	$0	$347,000
Total Net Patient Patient Revenu	$225,936,000	$209,681,000	$7,081,000	$216,762,000	$189,337,000	$6,960,000	$196,297,000	$168,322,000	$1,636,000	$169,958,000	$173,437,000	$0	$173,437,000
Other Operating Revenue	$7,172,000	$5,274,000	$0	$5,274,000	$5,192,000	$0	$5,192,000	$5,337,000	$0	$5,337,000	$5,195,000	$0	$5,195,000
Revenue from Operations	$233,108,000	$214,955,000	$7,081,000	$222,036,000	$194,529,000	$6,960,000	$201,489,000	$173,659,000	$1,636,000	$175,295,000	$178,632,000	$0	$178,632,000
OPERATING EXPENSES													
Salaries and Fringe Benefits	$128,392,000	$121,677,000	$1,798,000	$123,475,000	$117,894,000	$1,748,000	$119,642,000	$111,204,000	$258,000	$111,462,000	$101,916,000	$0	$101,916,000
Professional / Contracted Service	$28,448,000	$26,293,000	$949,000	$27,242,000	$22,314,000	$1,314,000	$23,628,000	$18,410,000	$620,000	$19,030,000	$15,552,000	$0	$15,552,000
Supplies and Drugs	$33,330,000	$29,250,000	$1,846,000	$31,096,000	$28,175,000	$1,790,000	$29,965,000	$25,489,000	$445,000	$25,934,000	$25,014,000	$0	$25,014,000
Bad Debts	$12,735,000	$11,406,000	$0	$11,406,000	$8,787,000	$0	$8,787,000	$9,189,000	$0	$9,189,000	$7,291,000	$0	$7,291,000
Other Operating Expense	$17,119,000	$14,370,000	$0	$14,370,000	$15,990,000	$0	$15,990,000	$15,471,000	$0	$15,471,000	$12,963,000	$0	$12,963,000
Subtotal	$220,024,000	$202,996,000	$4,593,000	$207,589,000	$193,160,000	$4,852,000	$198,012,000	$179,763,000	$1,323,000	$181,086,000	$162,736,000	$0	$162,736,000
Depreciation/Amortization	$8,944,000	$9,554,000	$0	$9,554,000	$9,639,000	$0	$9,639,000	$9,576,000	$0	$9,576,000	$8,471,000	$0	$8,471,000
Interest Expense	$2,158,000	$2,645,000	$0	$2,645,000	$2,620,000	$0	$2,620,000	$2,710,000	$0	$2,710,000	$2,496,000	$0	$2,496,000
Lease Expense	$1,679,000	$734,000	$0	$734,000	$912,000	$0	$912,000	$674,000	$0	$674,000	$760,000	$0	$760,000
Total Operating Expense	$232,805,000	$215,929,000	$4,593,000	$220,522,000	$206,331,000	$4,852,000	$211,183,000	$192,723,000	$1,323,000	$194,046,000	$174,463,000	$0	$174,463,000
Gain/(Loss) from Operations	$303,000	($974,000)	$2,488,000	$1,514,000	($11,802,000)	$2,108,000	($9,694,000)	($19,064,000)	$313,000	($18,751,000)	$4,169,000	$0	$4,169,000
Plus: Non-Operating Revenue	$4,728,000	$4,503,000	$0	$4,503,000	$3,497,000	$0	$3,497,000	$4,930,000	$0	$4,930,000	$1,799,000	$0	$1,799,000
Revenue Over/(Under) Expense	$5,031,000	$3,529,000	$2,488,000	$6,017,000	($8,305,000)	$2,108,000	($6,197,000)	($14,134,000)	$313,000	($13,821,000)	$5,968,000	$0	$5,968,000
FTEs	1,493	1,460	20.3	1,480	1,460	20.3	1,480	1,459	3.0	1,462	1,404	-	1,404
Cases													
PCI	236	-	232	232	-	282	282	-	59	59	-	-	-
OHS	78	-	97	97	-	70	70	-	18	18	-	-	-

Note: The "Incremental" should include revenues and expenses from the operation of the Heart Center of Greater Waterbury ("HCGW")

*Volume Statistics:
Provide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

Saint Mary's Health System, Inc.

11. C (i). Please provide one year of actual results and three years of ***Total Hospital Health System*** projections of revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Facility: Description	FY 2008 Actual Annualized	FY 2007 Historical W/out HCGW	FY 2007 Historical Incremental	FY 2007 Historical With HCGW	FY 2006 Historical W/out HCGW	FY 2006 Historical Incremental	FY 2006 Historical With HCGW	FY 2005 Historical W/out HCGW	FY 2005 Historical Incremental	FY 2005 Historical With HCGW	FY 2004 Historical W/out HCGW	FY 2004 Historical Incremental	FY 2004 Historical With HCGW
NET PATIENT REVENUE													
Non-Government	$85,680,000	$79,115,000	$2,604,000	$81,719,000	$71,249,000	$2,755,000	$74,004,000	$63,505,000	$569,000	$64,074,000	$65,386,000	$0	$65,386,000
Medicare	$91,853,000	$84,192,000	$4,247,000	$88,439,000	$75,985,000	$4,104,000	$80,089,000	$68,298,000	$1,045,000	$69,343,000	$70,762,000	$0	$70,762,000
Medicaid and Other Medical Assistar	$47,953,000	$45,940,000	$230,000	$46,170,000	$41,710,000	$101,000	$41,811,000	$36,179,000	$22,000	$36,201,000	$36,942,000	$0	$36,942,000
Other Government	$450,000	$434,000	$0	$434,000	$393,000	$0	$393,000	$340,000	$0	$340,000	$347,000	$0	$347,000
Total Net Patient Patient Revenue	$225,936,000	$209,681,000	$7,081,000	$216,762,000	$189,337,000	$6,960,000	$196,297,000	$168,322,000	$1,636,000	$169,958,000	$173,437,000	$0	$173,437,000
Other Operating Revenue	$7,249,000	$6,344,000	$0	$6,344,000	$6,282,000	$0	$6,282,000	$6,090,000	$0	$6,090,000	$5,899,000	$0	$5,899,000
Revenue from Operations	$233,185,000	$216,025,000	$7,081,000	$223,106,000	$195,619,000	$6,960,000	$202,579,000	$174,412,000	$1,636,000	$176,048,000	$179,336,000	$0	$179,336,000
OPERATING EXPENSES													
Salaries and Fringe Benefits	$126,429,000	$122,125,000	$1,798,000	$123,923,000	$118,257,000	$1,748,000	$120,005,000	$111,557,000	$258,000	$111,815,000	$102,278,000	$0	$102,278,000
Professional / Contracted Services	$28,448,000	$26,293,000	$949,000	$27,242,000	$22,314,000	$1,314,000	$23,628,000	$18,410,000	$620,000	$19,030,000	$15,552,000	$0	$15,552,000
Supplies and Drugs	$33,330,000	$29,250,000	$1,846,000	$31,096,000	$28,175,000	$1,790,000	$29,965,000	$25,489,000	$445,000	$25,934,000	$25,014,000	$0	$25,014,000
Bad Debts	$12,735,000	$11,429,000	$0	$11,429,000	$8,804,000	$0	$8,804,000	$9,193,000	$0	$9,193,000	$7,300,000	$0	$7,300,000
Other Operating Expense	$17,165,000	$14,773,000	$0	$14,773,000	$16,302,000	$0	$16,302,000	$15,744,000	$0	$15,744,000	$13,300,000	$0	$13,300,000
Subtotal	$220,107,000	$203,870,000	$4,593,000	$208,463,000	$193,852,000	$4,852,000	$198,704,000	$180,393,000	$1,323,000	$181,716,000	$163,444,000	$0	$163,444,000
Depreciation/Amortization	$8,999,000	$9,624,000	$0	$9,624,000	$9,705,000	$0	$9,705,000	$9,640,000	$0	$9,640,000	$8,536,000	$0	$8,536,000
Interest Expense	$2,158,000	$2,651,000	$0	$2,651,000	$2,627,000	$0	$2,627,000	$2,723,000	$0	$2,723,000	$2,492,000	$0	$2,492,000
Lease Expense	$1,679,000	$734,000	$0	$734,000	$912,000	$0	$912,000	$674,000	$0	$674,000	$760,000	$0	$760,000
Total Operating Expense	$232,943,000	$216,879,000	$4,593,000	$221,472,000	$207,096,000	$4,852,000	$211,948,000	$193,430,000	$1,323,000	$194,753,000	$175,232,000	$0	$175,232,000
Gain/(Loss) from Operations	$242,000	($854,000)	$2,488,000	$1,634,000	($11,477,000)	$2,108,000	($9,369,000)	($19,018,000)	$313,000	($18,705,000)	$4,104,000	$0	$4,104,000
Plus: Non-Operating Revenue	$0	$4,269,000	$0	$4,269,000	$3,088,000	$0	$3,088,000	$4,784,000	$0	$4,784,000	$1,923,000	$0	$1,923,000
Revenue Over/(Under) Expense	$242,000	$3,415,000	$2,488,000	$5,903,000	($8,389,000)	$2,108,000	($6,281,000)	($14,234,000)	$313,000	($13,921,000)	$6,027,000	$0	$6,027,000
FTEs	1,498	1,469	20.3	1,485	1,468	20.3	1,485	1,464	3.0	1,467	1,409	-	1,409
Cases													
PCI	236	-	232	232	-	282	282	-	59	59	-	-	-
OHS	78	-	97	97	-	70	70	-	18	18	-	-	-

Note: The "Incremental" should include revenues and expenses from the operation of the Heart Center of Greater Waterbury ("HCGW")

*Volume Statistics:
Provide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

St. Mary's Hospital (Obligated Group)

11. B (i). Please provide three years of projections of **Total Facility** revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Facility: Description	FY 2009 Projected W/out CON	FY 2009 Projected Incremental	FY 2009 Projected With CON	FY 2010 Projected W/out CON	FY 2010 Projected Incremental	FY 2010 Projected With CON	FY 2011 Projected W/out CON	FY 2011 Projected Incremental	FY 2011 Projected With CON
NET PATIENT REVENUE									
Non-Government	$84,219,000	$2,060,000	$86,279,000	$86,694,000	$2,071,000	$88,765,000	$89,274,000	$2,154,000	$91,428,000
Medicare	$88,114,000	$5,260,000	$93,374,000	$90,756,000	$5,308,000	$96,064,000	$93,426,000	$5,520,000	$98,946,000
Medicaid and Other Medical Assistance	$48,605,000	$142,000	$48,747,000	$50,010,000	$141,000	$50,151,000	$51,510,000	$146,000	$51,656,000
Other Government	$458,000	$0	$458,000	$472,000	$0	$472,000	$485,000	$0	$485,000
Total Net Patient Patient Revenue	$221,396,000	$7,462,000	$228,858,000	$227,932,000	$7,520,000	$235,452,000	$234,695,000	$7,820,000	$242,515,000
Other Operating Revenue	$7,814,000	$0	$7,814,000	$8,048,000	$0	$8,048,000	$8,290,000	$0	$8,290,000
Revenue from Operations	$229,210,000	$7,462,000	$236,672,000	$235,980,000	$7,520,000	$243,500,000	$242,985,000	$7,820,000	$250,805,000
OPERATING EXPENSES									
Salaries and Fringe Benefits	$129,683,000	$1,908,000	$131,591,000	$133,642,000	$1,966,000	$135,608,000	$137,652,000	$2,024,000	$139,676,000
Professional / Contracted Services	$27,851,000	$1,450,000	$29,301,000	$28,727,000	$1,453,000	$30,180,000	$29,622,000	$1,463,000	$31,085,000
Supplies and Drugs	$30,300,000	$1,734,000	$32,034,000	$31,231,000	$1,764,000	$32,995,000	$32,133,000	$1,852,000	$33,985,000
Bad Debts	$13,325,000	$0	$13,325,000	$13,725,000	$0	$13,725,000	$14,136,000	$0	$14,136,000
Other Operating Expense	$17,656,000	$0	$17,656,000	$18,824,000	$0	$18,824,000	$19,390,000	$0	$19,390,000
Subtotal	$218,815,000	$5,092,000	$223,907,000	$226,149,000	$5,183,000	$231,332,000	$232,933,000	$5,339,000	$238,272,000
Depreciation/Amortization	$9,049,000	$0	$9,049,000	$10,063,000	$0	$10,063,000	$11,904,000	$0	$11,904,000
Interest Expense	$1,978,000	$0	$1,978,000	$1,798,000	$0	$1,798,000	$1,618,000	$0	$1,618,000
Lease Expense	$1,729,000	$0	$1,729,000	$1,781,000	$0	$1,781,000	$1,834,000	$0	$1,834,000
Total Operating Expense	$231,571,000	$5,092,000	$236,663,000	$239,791,000	$5,183,000	$244,974,000	$248,289,000	$5,339,000	$253,628,000
Gain/(Loss) from Operations	($2,361,000)	$2,370,000	$9,000	($3,811,000)	$2,337,000	($1,474,000)	($5,304,000)	$2,481,000	($2,823,000)
Plus: Non-Operating Revenue	$3,179,000	$0	$3,179,000	$3,274,000	$0	$3,274,000	$3,373,000	$0	$3,373,000
Revenue Over/(Under) Expense	$818,000	$2,370,000	$3,188,000	($537,000)	$2,337,000	$1,800,000	($1,931,000)	$2,481,000	$550,000
FTEs	1,473	20.3	1,493	1,473	20.3	1,493	1,473	20.3	1,493
Cases									
PCI	-	239	239	-	232	232	-	232	232
OHS	-	81	81	-	78	78	-	78	78

*Volume Statistics:
Provide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

Saint Mary's Health System, Inc

11. C (i). Please provide one year of actual results and three years of ***Total Hospital Health System*** projections of revenue, expense and volume statistics without, incremental to and with the CON proposal in the following reporting format:

Total Hospital Health System: Description	FY 2009 Projected W/out CON	FY 2009 Projected Incremental	FY 2009 Projected With CON	FY 2010 Projected W/out CON	FY 2010 Projected Incremental	FY 2010 Projected With CON	FY 2011 Projected W/out CON	FY 2011 Projected Incremental	FY 2011 Projected With CON
NET PATIENT REVENUE									
Non-Government	$84,219,000	$2,060,000	$86,279,000	$86,694,000	$2,071,000	$88,765,000	$89,274,000	$2,154,000	$91,428,000
Medicare	$88,114,000	$5,260,000	$93,374,000	$90,756,000	$5,308,000	$96,064,000	$93,426,000	$5,520,000	$98,946,000
Medicaid and Other Medical Assistance	$48,605,000	$142,000	$48,747,000	$50,010,000	$141,000	$50,151,000	$51,510,000	$146,000	$51,656,000
Other Government	$458,000	$0	$458,000	$472,000	$0	$472,000	$485,000	$0	$485,000
Total Net Patient Patient Revenue	$221,396,000	$7,462,000	$228,858,000	$227,932,000	$7,520,000	$235,452,000	$234,695,000	$7,820,000	$242,515,000
Other Operating Revenue	$7,893,000	$0	$7,893,000	$8,129,000	$0	$8,129,000	$8,374,000	$0	$8,374,000
Revenue from Operations	$229,289,000	$7,462,000	$236,751,000	$236,061,000	$7,520,000	$243,581,000	$243,069,000	$7,820,000	$250,889,000
OPERATING EXPENSES									
Salaries and Fringe Benefits	$129,721,000	$1,908,000	$131,629,000	$133,681,000	$1,966,000	$135,647,000	$137,692,000	$2,024,000	$139,716,000
Professional / Contracted Services	$27,851,000	$1,450,000	$29,301,000	$28,727,000	$1,453,000	$30,180,000	$29,622,000	$1,463,000	$31,085,000
Supplies and Drugs	$30,300,000	$1,734,000	$32,034,000	$31,231,000	$1,764,000	$32,995,000	$32,133,000	$1,852,000	$33,985,000
Bad Debts	$13,325,000	$0	$13,325,000	$13,725,000	$0	$13,725,000	$14,136,000	$0	$14,136,000
Other Operating Expense	$17,703,000	$0	$17,703,000	$18,872,000	$0	$18,872,000	$19,440,000	$0	$19,440,000
Subtotal	$218,900,000	$5,092,000	$223,992,000	$226,236,000	$5,183,000	$231,419,000	$233,023,000	$5,339,000	$238,362,000
Depreciation/Amortization	$9,102,000	$0	$9,102,000	$10,114,000	$0	$10,114,000	$11,953,000	$0	$11,953,000
Interest Expense	$1,978,000	$0	$1,978,000	$1,798,000	$0	$1,798,000	$1,618,000	$0	$1,618,000
Lease Expense	$1,729,000	$0	$1,729,000	$1,781,000	$0	$1,781,000	$1,834,000	$0	$1,834,000
Total Operating Expense	$231,709,000	$5,092,000	$236,801,000	$239,929,000	$5,183,000	$245,112,000	$248,428,000	$5,339,000	$253,767,000
Gain/(Loss) from Operations	($2,420,000)	$2,370,000	($50,000)	($3,868,000)	$2,337,000	($1,531,000)	($5,359,000)	$2,481,000	($2,878,000)
Plus: Non-Operating Revenue	$3,179,000	$0	$3,179,000	$3,274,000	$0	$3,274,000	$3,373,000	$0	$3,373,000
Revenue Over/(Under) Expense	$759,000	$2,370,000	$3,129,000	($594,000)	$2,337,000	$1,743,000	($1,986,000)	$2,481,000	$495,000
FTEs	1,482	20.3	1,498	1,482	20.3	1,498	1,482	20.3	1,498
Cases									
PCI	-	239	239	-	232	232	-	232	232
OHS	-	81	81	-	78	78	-	78	78

*Volume Statistics:
Provide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for any existing services which will change due to the proposa

St. Mary's Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Primary Angio
Type of Unit Description: Cases
# of Months in Operation: 12

FY 2009 FY Projected Incremental Total Incremental Expenses: $434,000 Total Facility by Payer Category:	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Medicare		$47,879	18	$861,822	$532,822			$329,000	$236,727	$92,273
Medicaid		$47,879	2	$95,758	$87,758			$8,000	$26,303	($18,303)
CHAMPUS/TriCare		$47,879		$0				$0	$0	$0
Total Governmental			20	$957,580	$620,580	$0	$0	$337,000	$263,030	$73,970
Commericial Insurers		$47,879	13	$622,427	$433,427			$189,000	$170,970	$18,030
Uninsured		$47,879		$0				$0	$0	$0
Total NonGovernment		$47,879	13	$622,427	$433,427	$0	$0	$189,000	$170,970	$18,030
Total All Payers		$47,879	33	$1,580,007	$1,054,007	$0	$0	$526,000	$434,000	$92,000

St. Mary's Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Primary Angio
Type of Unit Description: Cases
# of Months in Operation: 12

FY 2010 FY Projected Incremental Total Incremental Expenses: $523,000 Total Facility by Payer Category:	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Medicare		$50,905	23	$1,170,815	$733,815			$437,000	$286,405	$150,595
Medicaid		$50,905	2	$101,810	$89,810			$12,000	$24,905	($12,905)
CHAMPUS/TriCare		$50,905		$0				$0	$0	$0
Total Governmental			25	$1,272,625	$823,625	$0	$0	$449,000	$311,310	$137,690
Commericial Insurers		$50,905	17	$865,385	$608,385			$257,000	$211,690	$45,310
Uninsured		$50,905		$0				$0	$0	$0
Total NonGovernment		$50,905	17	$865,385	$608,385	$0	$0	$257,000	$211,690	$45,310
Total All Payers		$50,905	42	$2,138,010	$1,432,010	$0	$0	$706,000	$523,000	$183,000

St. Mary's Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Primary Angio
Type of Unit Description: Cases
# of Months in Operation: 12

FY 2011 FY Projected Incremental Total Incremental Expenses: $640,000 Total Facility by Payer Category:	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.6 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Medicare		$52,952	23	$1,217,896	$763,896			$454,000	$295,714	$158,286
Medicaid		$52,952	2	$105,904	$93,904			$12,000	$25,714	($13,714)
CHAMPUS/TriCare		$52,952		$0				$0	$0	$0
Total Governmental			25	$1,323,800	$857,800	$0	$0	$466,000	$321,429	$144,571
Commericial Insurers		$52,952	17	$900,184	$633,184			$267,000	$218,571	$48,429
Uninsured		$52,952		$0				$0	$0	$0
Total NonGovernment		$52,952	17	$900,184	$633,184	$0	$0	$267,000	$218,571	$48,429
Total All Payers		$52,952	42	$2,223,984	$1,490,984	$0	$0	$733,000	$540,000	$193,000

St. Mary's Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Elective Angio
Type of Unit Description: Cases
# of Months in Operation: 12

FY 2009 FY Projected Incremental Total Incremental Expenses: $2,084,000 Total Facility by Payer Category:	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Medicare		$41,660	123	$5,124,180	$3,137,180			$1,987,000	$1,244,330	$742,670
Medicaid		$41,660	21	$874,860	$768,660			$106,000	$212,447	($106,447)
CHAMPUS/TriCare		$41,660		$0				$0	$0	$0
Total Governmental			144	$5,999,040	$3,906,040	$0	$0	$2,093,000	$1,456,777	$636,223
Commericial Insurers		$41,660	62	$2,582,920	$1,431,920			$1,151,000	$627,223	$523,777
Uninsured		$41,660		$0				$0	$0	$0
Total NonGovernment		$41,660	62	$2,582,920	$1,431,920	$0	$0	$1,151,000	$627,223	$523,777
Total All Payors		$41,660	206	$8,581,960	$5,337,960	$0	$0	$3,244,000	$2,084,000	$1,160,000

St. Mary's Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Elective Angio
Type of Unit Description: Cases
# of Months in Operation: 12

FY 2010 FY Projected Incremental Total Incremental Expenses: $2,049,000 Total Facility by Payer Category:	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Medicare		$43,321	114	$4,938,594	$3,023,594			$1,915,000	$1,229,400	$685,600
Medicaid		$43,321	19	$823,099	$723,099			$100,000	$204,900	($104,900)
CHAMPUS/TriCare		$43,321		$0				$0	$0	$0
Total Governmental			133	$5,761,693	$3,746,693	$0	$0	$2,015,000	$1,434,300	$580,700
Commericial Insurers		$43,321	57	$2,469,297	$1,368,297			$1,101,000	$614,700	$486,300
Uninsured		$43,321		$0				$0	$0	$0
Total NonGovernment		$43,321	57	$2,469,297	$1,368,297	$0	$0	$1,101,000	$614,700	$486,300
Total All Payers		$43,321	190	$8,230,990	$5,114,990	$0	$0	$3,116,000	$2,049,000	$1,067,000

St. Mary's Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: Elective Angio
Type of Unit Description: Cases
# of Months in Operation: 12

FY 2011 FY Projected Incremental Total Incremental Expenses: $2,114,000 Total Facility by Payer Category:	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Medicare		$45,058	114	$5,136,612	$3,144,612			$1,992,000	$1,268,400	$723,600
Medicaid		$45,058	19	$856,102	$752,102			$104,000	$211,400	($107,400)
CHAMPUS/TriCare		$45,058		$0				$0	$0	$0
Total Governmental			133	$5,992,714	$3,896,714	$0	$0	$2,096,000	$1,479,800	$616,200
Commericial Insurers		$45,058	57	$2,568,306	$1,423,306			$1,145,000	$634,200	$510,800
Uninsured		$45,058		$0				$0	$0	$0
Total NonGovernment		$45,058	57	$2,568,306	$1,423,306	$0	$0	$1,145,000	$634,200	$510,800
Total All Payers		$45,058	190	$8,561,020	$5,320,020	$0	$0	$3,241,000	$2,114,000	$1,127,000

St. Mary's Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: OHS
Type of Unit Description: Cases
# of Months in Operation: 12

FY 2009 FY Projected Incremental Total Incremental Expenses: $2,574,000 Total Facility by Payer Category:	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Medicare		$125,963	58	$7,305,854	$4,361,854			$2,944,000	$1,843,111	$1,100,889
Medicaid		$125,963	2	$251,926	$223,926			$28,000	$63,556	($35,556)
CHAMPUS/TriCare		$125,963		$0				$0	$0	$0
Total Governmental			60	$7,557,780	$4,585,780	$0	$0	$2,972,000	$1,906,667	$1,065,333
Commericial Insurers		$125,963	21	$2,645,223	$1,925,223			$720,000	$667,333	$52,667
Uninsured		$125,963		$0				$0	$0	$0
Total NonGovernment		$125,963	21	$2,645,223	$1,925,223	$0	$0	$720,000	$667,333	$52,667
Total All Payers		$125,963	81	$10,203,003	$6,511,003	$0	$0	$3,692,000	$2,574,000	$1,118,000

St. Mary's Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: OHS
Type of Unit Description: Cases
# of Months in Operation: 12

FY 2010 FY Projected Incremental Total Incremental Expenses: $2,611,000 Total Facility by Payer Category:	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Medicare		$131,192	56	$7,346,752	$4,390,752			$2,956,000	$1,874,564	$1,081,436
Medicaid		$131,192	2	$262,384	$233,384			$29,000	$66,949	($37,949)
CHAMPUS/TriCare		$131,192		$0				$0	$0	$0
Total Governmental			58	$7,609,136	$4,624,136	$0	$0	$2,985,000	$1,941,513	$1,043,487
Commericial Insurers		$131,192	20	$2,623,840	$1,910,840			$713,000	$669,487	$43,513
Uninsured		$131,192		$0				$0	$0	$0
Total NonGovernment		$131,192	20	$2,623,840	$1,910,840	$0	$0	$713,000	$669,487	$43,513
Total All Payers		$131,192	78	$10,232,976	$6,534,976	$0	$0	$3,698,000	$2,611,000	$1,087,000

St. Mary's Hospital (Financial Attachment II)

11.B(vi): Please provide **three** years of projections of incremental revenue, expense and volume statistics **attributable to the proposal** in the following reporting format:

Type of Service Description: OHS
Type of Unit Description: Cases
# of Months in Operation: 12

FY 2011 FY Projected Incremental Total Incremental Expenses: $2,685,000 Total Facility by Payer Category:	(1)	(2) Rate	(3) Units	(4) Gross Revenue Col. 2 * Col. 3	(5) Allowances/ Deductions	(6) Charity Care	(7) Bad Debt	(8) Net Revenue Col.4 - Col.5 -Col.6 - Col.7	(9) Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total	(10) Gain/(Loss) from Operations Col. 8 - Col. 9
Medicare		$136,436	56	$7,640,416	$4,566,416			$3,074,000	$1,927,692	$1,146,308
Medicaid		$136,436	2	$272,872	$242,872			$30,000	$68,846	($38,846)
CHAMPUS/TriCare		$136,436		$0				$0	$0	$0
Total Governmental			58	$7,913,288	$4,809,288	$0	$0	$3,104,000	$1,996,538	$1,107,462
Commericial Insurers		$136,436	20	$2,728,720	$1,986,720			$742,000	$688,462	$53,538
Uninsured		$136,436		$0				$0	$0	$0
Total NonGovernment		$136,436	20	$2,728,720	$1,986,720	$0	$0	$742,000	$688,462	$53,538
Total All Payers		$136,436	78	$10,642,008	$6,796,008	$0	$0	$3,846,000	$2,685,000	$1,161,000

4. Explanation of the 6.6 million direct fixed expenses from question 7. (Page 1241)

See above narrative in Section 2.

5. Audited Financials

The hospitals are still working with each of the hospitals' independent auditors for the completion of year end audits, and consequently, audited financial statements for the fiscal year ended September 30, 2008 are not yet available. We have included internal, unaudited financial statements through the end of the fiscal year on the final pages of this document. The report formats for internal statements are different from those used in audited financial reports. While the report formats differ, the results should closely approximate final audited results.

The audit process is complex and time consuming. The internal staff must complete detailed analysis and work papers for all balance sheet accounts. The work efforts, including inventories, reconciliations and confirmations are much more time consuming than those techniques used to close out the records on a monthly basis. The auditors are scheduled months in advance (to coordinate work with multiple clients with similar fiscal year ends) to be available to complete their independent audit once the internal staff has completed their work. They must also obtain confirmations from outside vendors, legal counsel, and banks and complete their test of transactions and validate systems of control. After all work has been completed, financial statements must be prepared according to GAAP and footnotes completed. The draft statements are then reviewed by the respective Audit Committees from each hospital board and approved to be issued. Once approved and prior to issue, the statements must be finalized and printed. Both hospitals are putting its best efforts into completing their audits on a timely basis.

It is our hope that the unaudited year end financials statements will answer the necessary questions related to the financial status of the hospitals. The audited financials will be submitted to OHCA as soon as they are available to the hospitals from their respective independent auditor.

Conclusion

The Program's unique structure provides the Agency an opportunity to issue a visionary decision that will improve patient access to health care while reducing health care costs. This CON involves an unprecedented collaboration of two competing hospitals to provide full cardiac services as one, unified program. This model does not exist in any of Connecticut's major cities. In Hartford, New Haven, and Bridgeport, each city has two competing hospitals with two separate, full service cardiac programs. Such competitive programs increase healthcare costs due to duplication of services, without added value or clinical superiority.

We believe that our unified, dual campus model should be emulated by other hospitals and encouraged by the State. As currently structured, our Program has had a

positive financial impact on both hospitals and the community and has resulted in outstanding patient outcomes that rival any cardiac program in the state. Access to life saving health care via a dual campus program creates more accessibility for patients than would a single campus model, a stand alone model, or any other alternative model. We believe that a positive ruling on our Application would be visionary because it would demonstrate that OHCA supports and encourages other competing hospitals across the State to collaborate, thereby providing better access to patients and reducing health care costs.

We urge OHCA to look favorably upon the Application. Should there be any questions or additional information needed, please contact me at 203-575-5571.

Best regards,

Loraine C. Shea
Executive Director, HCGW

WATERBURY HOSPITAL
COMPARATIVE INCOME STATEMENT
9/30/08

DRAFT

	YEAR TO DATE			VARIANCE			
	FY 08 ACTUAL	FY 08 BUDGET	FY 07 ACTUAL	FY 08 ACT VS BUD	PERCENT CHANGE	FY 08 vs 07 ACT VS ACT	PERCENT CHANGE
GROSS REVENUE	709,569,122	709,573,268	661,400,371	(4,146)	0.00%	48,168,751	7.28%
Contractual Allowances	485,776,970	474,125,403	439,108,285	11,651,567	2.46%	46,668,685	10.63%
NET CONTRACTED REVENUE	223,792,152	235,447,865	222,292,086	(11,655,713)	-4.95%	1,500,066	0.67%
Bad Debt	17,740,966	20,701,228	21,806,479	(2,960,262)	-14.30%	(4,065,513)	-18.64%
Free Care	3,956,734	2,674,150	3,289,922	1,282,584	47.96%	666,812	20.27%
UCP	(3,120,672)	(3,400,000)	(3,217,373)	279,328	8.22%	96,701	3.01%
OTHER ALLOWANCES	18,577,028	19,975,378	21,879,028	(1,398,350)	-7.00%	(3,302,000)	-15.09%
NET REVENUE	205,215,124	215,472,487	200,413,058	(10,257,363)	-4.76%	4,802,066	2.40%
EXPENSES							
Payroll Expenses	108,698,013	106,455,174	105,736,402	2,242,839	2.11%	2,961,611	2.80%
Employee Benefits	28,812,349	29,438,659	28,364,513	(626,310)	-2.13%	447,836	1.58%
Professional/Legal Fees	12,450,092	11,800,125	11,798,037	649,967	5.51%	652,055	5.53%
Med & Surg Supplies	21,863,946	23,783,352	20,237,164	(1,919,406)	-8.07%	1,626,782	8.04%
Other Supplies	12,014,689	11,998,238	11,084,382	16,451	0.14%	930,307	8.39%
Purchased Services	14,246,180	14,119,191	13,442,307	126,989	0.90%	803,873	5.98%
Depreciation	9,513,112	10,500,000	10,056,129	(986,888)	-9.40%	(543,017)	-5.40%
Interest	1,526,874	1,800,000	1,642,933	(273,126)	-15.17%	(116,059)	-7.06%
Insurances	5,429,125	5,977,862	3,961,707	(548,737)	-9.18%	1,467,418	37.04%
Drugs	7,384,127	8,193,012	7,149,043	(808,885)	-9.87%	235,084	3.29%
Food	1,324,460	1,304,875	1,238,069	19,585	1.50%	86,391	6.98%
Utilities	3,921,516	3,810,280	3,798,766	111,236	2.92%	122,750	3.23%
TOTAL EXPENSES	227,184,483	229,180,768	218,509,452	(1,996,285)	-0.87%	8,675,031	3.97%
OTHER OPERATING INCOME	5,377,088	6,367,853	8,410,142	(990,765)	-15.56%	(3,033,054)	-36.06%
PARTNERSHIP INCOME	1,955,698	2,210,000	2,380,771	(254,302)	-11.51%	(425,073)	-17.85%
NET ASSETS RELEASED FROM RESTRICTION (PROGRAM EXPENSES)	4,505,264	N/A	N/A	N/A	N/A	N/A	N/A
SUBTOTAL	11,838,050	8,577,853	10,790,913	3,260,197	38.01%	1,047,137	9.70%
NET EXPENSES	215,346,433	220,602,915	207,718,539	(5,256,482)	-2.38%	7,627,894	3.67%
INCOME/(LOSS) FROM OPERATIONS	(10,131,309)	(5,130,428)	(7,305,481)	(5,000,881)	-97.47%	(2,825,828)	-38.68%
NON-OPERATING INCOME	1,960,905	2,880,500	2,637,808	(919,595)	-31.92%	(676,903)	-25.66%
NET INCOME/(LOSS) BEFORE CHANGE IN UNREALIZED GAINS AND LOSSES	(8,170,404)	(2,249,928)	(4,667,673)	(5,920,476)	-263.14%	(3,502,731)	-75.04%
CHANGE IN UNREALIZED GAINS AND LOSSES	(85,583)	N/A	N/A	N/A	N/A	N/A	N/A
NET INCOME/(LOSS)	(8,255,987)	N/A	N/A	N/A	N/A	N/A	N/A

DRAFT

WATERBURY HOSPITAL
GENERAL FUND
COMPARATIVE BALANCE SHEET

CURRENT ASSETS	9/30/2007	9/30/2008
Cash & Cash Equivalents	$4,036,670	$10,458,199
Assets whose use is Limited	$3,058,221	$2,575,518
Accounts Receivable - Patients	$42,920,866	$42,407,909
Less: Allow. for Doubtful Accounts	$9,500,000	$8,753,763
Net Accounts Receivable	$33,420,866	$33,654,146
Grants Receivable & Other Receivables	$1,417,154	$1,132,393
Inventory of Supplies	$478,384	$608,211
Prepaid Insurance & Expense	$1,272,851	$1,683,526
Due From Affiliates	$4,025,599	($708,304)
TOTAL CURRENT ASSETS	$47,709,745	$49,403,689
ASSETS LIMITED AS TO USE:		
Investments - Self-Insurance	$9,816,451	$4,809,699
Investments - Cap Purch/Repl	$0	$0
Debt Service Fund	$536,274	$539,691
Debt Service Reserve Fund	$1,991,138	$2,020,003
TOTAL CHEFA ASSETS	$2,527,412	$2,559,694
TOTAL ASSETS WITH LIMITED USE	$12,343,863	$7,369,393
Less: CP Assets With Limited Use	$3,058,221	$2,575,518
TOTAL N/C ASSETS WITH LIMITED USE	$9,285,642	$4,793,875
Note Receivable - Cancer Center	$1,277,492	$872,917
Other Investments	$5,109,903	$4,957,696
Prepaid Pension Asset	$1,795,780	$0
Bond Issuance & Discount Costs - Net	$1,163,324	$1,109,838
TOTAL OTHER ASSETS	$9,346,499	$6,940,451
FIXED ASSETS		
Property, Plant & Equipment	$236,040,404	$238,997,802
Less: Accumulated Depreciation	$179,321,783	$188,689,241
Net Property, Plant & Equipment	$56,718,621	$50,308,561
Projects in Progress	$282,268	$193,299
TOTAL FIXED ASSETS	$57,000,889	$50,501,860
TOTAL ASSETS	$123,342,775	$111,639,875

DRAFT
DRAFT

WATERBURY HOSPITAL
GENERAL FUND
COMPARATIVE BALANCE SHEET

CURRENT LIABILITIES	9/30/2007	9/30/2008
Accounts Payable	$7,725,388	$14,717,101
Accrued Pension		$1,437,922
Accrued Interest - CHEFA	$309,843	$300,280
Miscellaneous Payable	$642,316	$586,968
Current Portion - Res for Self Ins	$2,521,947	$2,197,486
TOTAL AP & ACCRUED EXPENSES	$11,199,494	$19,239,757
Accrued Salaries & Taxes	$2,200,761	$2,888,016
Accrued Vacation	$5,607,913	$5,922,083
Accrued Unemployment	$12,001	$22,620
Accrued Benefits	$584,103	$156,177
TOTAL SAL, WAGES & TAXES	$8,404,778	$8,988,896
Notes Payable - Line	$1,687,615	
Current Portion L/T Debt	$3,085,351	$1,011,316
TOTAL C/P LONG TERM DEBT	$4,772,966	$1,011,316
Due to Restricted Funds	$1,369,400	$1,937,414
Due to Third-Party Payors	$2,350,453	($810,405)
Current Portion - CHEFA Obligations	$750,000	$790,000
TOTAL CURRENT LIABILITIES	$28,847,091	$31,156,978
Long-Term Debt	$1,011,316	$0
CHEFA Obligations	$21,045,000	$20,255,000
Other Long-Term Liabilities	$8,704,801	$7,590,300
TOTAL LONG-TERM LIABILITIES	$30,761,117	$27,845,300
FUND BALANCE	$63,734,567	$52,637,597
TOTAL LIABILITIES & FUND BALANCE	$123,342,775	$111,639,875

DRAFT
DRAFT

SAINT MARY'S HEALTH [illegible]TEM (Obligated Group)
CONSOLIDATED STATEMEN[illegible] REVENUE AND EXPENSES
For the Month and Twelve Months ended September 30, 2008
($ in Thousands)

CURRENT MONTH				PY		YEAR-TO-DATE				PY
BUDGET	ACTUAL	$ VAR	% VAR	ACTUAL		BUDGET	ACTUAL	$ VAR	% VAR	ACTUAL
$ 41,755	$ 41,071	$ (684)	-1.6%	$ 37,147	Total Patient Revenues	$496,607	$489,675	$ (6,932)	-1.4%	$459,214
(22,995)	(20,469)	2,526	11.0%	(19,406)	Contractual Allowances	(270,704)	(261,370)	9,334	3.4%	(242,454)
18,760	20,602	1,842	9.8%	17,741	Net Patient Revenue	225,903	228,305	2,402	1.1%	216,760
602	697	95	15.8%	624	Other Operating Revenue	7,148	7,584	436	6.1%	6,834
19,362	21,299	1,937	10.0%	18,365	Total Operating Revenues	233,051	235,889	2,838	1.2%	223,594
8,372	9,292	(920)	-11.0%	8,336	Salaries and Wages	100,286	102,442	(2,156)	-2.1%	96,717
2,577	2,428	149	5.8%	2,118	Employee Benefits	27,959	27,100	859	3.1%	26,758
10,949	11,720	(771)	-7.0%	10,454	Total Labor Costs	128,245	129,541	(1,296)	-1.0%	123,475
493	507	(14)	-2.8%	622	Physician Fees	5,870	6,146	(276)	-4.8%	5,304
1,862	2,444	(582)	-31.3%	1,762	Purchased Services	21,683	23,067	(1,384)	-6.4%	21,856
1,595	1,210	385	24.1%	1,298	Medical Supplies	19,689	20,231	(542)	-2.8%	19,509
541	498	43	7.9%	422	Pharmaceuticals	5,954	5,483	471	7.9%	5,607
371	289	82	22.1%	185	General Supplies	3,377	3,358	19	0.6%	3,066
387	444	(57)	-14.7%	453	Maintenance & Repair	4,687	4,886	(199)	-4.3%	4,564
452	383	69	15.3%	275	Utilities	4,719	4,510	209	4.5%	4,377
450	488	(38)	-8.4%	(298)	Insurance	3,966	4,061	(95)	-2.6%	2,394
1,039	640	399	38.4%	1,223	Bad Debts	12,309	11,892	417	3.5%	11,406
774	773	1	0.1%	871	Depreciation	9,284	9,014	270	2.9%	9,554
319	156	163	51.1%	180	Interest	2,668	2,097	571	21.3%	2,645
894	1,191	(297)	-33.2%	882	Other Expenses	9,448	9,656	(208)	-2.2%	8,325
9,177	9,023	154	1.7%	7,875	Non-Salary Expenses	103,654	104,401	(747)	-0.7%	98,607
20,126	20,743	(617)	-3.1%	18,329	Operating Expenses	231,899	233,943	(2,044)	-0.9%	222,082
(764)	557	1,321	-172.9%	36	Operating Income/(Loss)	1,152	1,947	795	69.0%	1,512
(62)	(54)	8	13.2%	(47)	Minority Interest	(737)	(888)	(151)	-20.1%	(874)
434	(1,947)	(2,381)	-548.6%	340	Non-Operating Income/(Loss)	4,986	3,049	(1,937)	-39.1%	5,379
372	(2,001)	(2,373)	-637.9%	293	Subtotal	4,249	2,160	(2,089)	-49.3%	4,505
$ (392)	$ (1,444)	$ (1,052)	268.3%	$ 329	Net Income/(Loss)	$ 5,401	$ 4,107	$ (1,294)	-24.0%	$ 6,017
-3.9%	2.6%	6.6%	-166.3%	0.2%	OPERATING MARGIN	0.5%	0.8%	0.3%	67.1%	0.7%
-2.0%	-6.8%	-4.8%	234.8%	1.8%	NET MARGIN	2.3%	1.7%	-0.6%	-24.9%	2.7%

SAINT MARY'S HEALTH SYSTEM (Obligated Group)
CONSOLIDATING BALANCE SHEET
September 30, 2008
($ in Thousands)

	Saint Mary's Hospital	Naugatuck Valley Surgical Center	Diagnostic Imaging of Southbury	Scovill Medical Group	Franklin Medical Group	Eliminations	Consolidated Totals	Prior Year End
Cash	$ 13,310	$ 1,377	$ 835	$ 512	$ 215	$ -	$ 16,249	$ 8,214
Short-term Investments	25	1,000	-	-	-	-	1,025	60
Current Portion of Assets Whose Use is Limited	4,244	-	-	-	-	-	4,244	4,206
Accounts Receivable (net)	19,664	1,409	508	317	1,814	-	23,712	23,378
Other Current Assets	5,217	378	33	45	120	(582)	5,211	3,766
Total Current Assets	42,460	4,164	1,376	874	2,149	(582)	50,441	39,624
Marketable Securities	10,864	-	-	-	-	-	10,864	11,959
Asset Whose Use is Limited:								
By Donor and Held in Trust by Others	13,048	-	-	-	-	-	13,048	15,975
For Estimated Self-Insurance Liability	24,153	-	-	-	-	-	24,153	27,372
By Bond Indenture	5,066	-	-	-	-	-	5,066	4,977
Interest In Foundation	3,860	-	-	-	-	-	3,860	4,904
Other	6	-	-	-	-	-	6	6
Total Assets Whose Use is Limited	46,133	-	-	-	-	-	46,133	53,234
Less Current Portion of Assets Whose Use is Limited	(4,244)	-	-	-	-	-	(4,244)	(4,206)
Noncurrent Assets Whose Use is Limited	41,889	-	-	-	-	-	41,889	49,028
Net, Property, Plant & Equip.	48,898	3,049	1,631	119	830	-	54,527	56,158
Other Assets:								
Investments in Joint Ventures	15,268	-	-	-	-	(7,936)	7,332	6,808
Deferred Financing Costs, Net	291	-	-	-	-	-	291	334
Other Noncurrent Assets	677	-	-	539	-	-	1,216	2,603
	16,236	-	-	539	-	(7,936)	8,839	9,745
TOTAL ASSETS	$ 160,347	$ 7,213	$ 3,007	$ 1,532	$ 2,979	$ (8,518)	$ 166,560	$166,515

SAINT MARY'S HEALTH SYSTEM (Obligated Group)
CONSOLIDATING BALANCE SHEET
September 30, 2008
($ in Thousands)

	Saint Mary's Hospital	Naugatuck Valley Surgical Center	Diagnostic Imaging of Southbury	Scovill Medical Group	Franklin Medical Group	Eliminations	Consolidated Totals	Prior Year End
Current Portion of LT Obligations	$ 2,958	$ -	$ -	$ -	$ -	$ -	$ 2,958	$ 3,357
Accounts Payable	13,168	171	23	3	305	-	13,670	13,521
Accrued Payroll Expenses	4,263	124	250	327	1,260	-	6,224	4,787
Due to Third Parties	4,466	-	-	-	-	-	4,466	4,179
Accrued Other Expenses	7,687	429	148	582	394	(582)	8,658	8,482
Total Current Liabilities	32,542	724	421	912	1,959	(582)	35,976	34,326
Long Term Obligations	30,566	-	-	1,000	-	(1,000)	30,566	33,485
Estimated Self-Insurance Liability	15,888	-	-	-	-	-	15,888	17,643
Accrued Compensation & Benefits	18,617	-	-	-	-	-	18,617	17,095
Minimum Pension Liability	41,225	-	-	-	-	-	41,225	37,308
Other Long term Liabilities	7,769	-	76	-	59	-	7,904	5,265
Total Other Liabilities	114,065	-	76	1,000	59	(1,000)	114,200	110,796
Minority Interest in Subsidiaries	-	-	-	-	-	2,064	2,064	2,075
Unrestricted Fund Balance	(3,068)	6,489	2,510	(380)	961	(9,000)	(2,488)	(719)
Temporarily Restricted Fund Balance	2,767	-	-	-	-	-	2,767	3,034
Restricted Fund Balance	14,041	-	-	-	-	-	14,041	17,002
Total Fund Balance	13,740	6,489	2,510	(380)	961	(9,000)	14,320	19,317
TOTAL LIABILITIES AND FUND BALANCE	$ 160,347	$ 7,213	$ 3,007	$ 1,532	$ 2,979	$ (8,518)	$ 166,560	$166,515

SAINT MARY'S HEALTH SYSTEM (OBLIGATED GROUP)
Consolidating Statement of Cash Flows
For the Twelve Months Ended September 30, 2008
($ in Thousands)

	Saint Mary's Hospital	Naugatuck Valley Surgical Center	Diagnostic Imaging of Southbury	Scovill Medical Group	Franklin Medical Group	Eliminations	Consolidated
Cash Flows From Operating Activities							
Profit (Loss)	$ 9,905	$ 522	$ 2,007	$ (45)	$ (5,753)	$ (2,530)	$ 4,107
Adjustments to reconcile to net cash:							
Depreciation and amortization	7,744	386	549	175	160	-	9,014
Change in unrealized (gains) losses on marketable securities	(2,927)	-	-	-	-	-	(2,927)
Distributions	(5,411)	(550)	(2,025)	-	5,769	2,575	358
(Increase) decrease in operating assets:							
Net asset recognition for Foundation	(638)	-	-	-	-	-	(638)
Accounts receivable, net	(373)	1	77	15	(54)	-	(334)
Other current assets	(1,397)	(44)	3	(19)	9	3	(1,445)
Other non-current assets	6,391	(1)	-	6	2	-	6,398
Increase (decrease) in operating liabilities:							
Accounts payable and other current liabilities	392	33	34	(9)	(122)	(4)	324
Due to third party payors, net	287	-	-	-	-	-	287
Estimated self-insurance liability	(1,755)	-	-	-	-	-	(1,755)
Other long term liabilities	2,651	-	(11)	-	(1)	-	2,639
Pension and accrued compensation	2,663	58	27	4	207	-	2,959
Minority interest in subsidiaries	-	-	-	-	-	(11)	(11)
Net Cash Provided by Operating Activities	17,532	406	661	127	217	33	18,976
Cash Flows From Investing Activities							
Purchases of property and equipment, net	(6,265)	(612)	(204)	(24)	(126)	-	(7,231)
Investments in joint venture arrangements	(490)	-	-	-	-	(34)	(524)
Net (increase) decrease in investments	1,130	(1,000)	-	-	-	-	130
Net cash provided by (used in) investing activities	(5,625)	(1,612)	(204)	(24)	(126)	(34)	(7,625)
Cash Flows From Financing Activities							
Net (payments) borrowings in long-term obligations	(3,073)	-	(245)	-	-	-	(3,318)
Net cash provided by (used in) financing activities	(3,073)	-	(245)	-	-	-	(3,318)
Net Increase (decrease) in Cash and Cash Equivalents	8,834	(1,207)	212	103	92	(0)	8,035
Cash and Cash Equivalents - Beginning of the Period	4,476	2,584	623	409	123	-	8,214
Cash and Cash Equivalents - End of the Period	$ 13,310	$ 1,377	$ 835	$ 512	$ 215	$ (0)	$ 16,249

Lazarus, Steven

RECEIVED
2008 NOV 20 P 2:31
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

From: Lazarus, Steven
Sent: Thursday, November 20, 2008 2:30 PM
To: 'Loraine Shea (HCGW)'
Subject: RE: please confirm date

Loraine,

Yes, you are correct, as stated on the record during the public hearing, the 2008 AFS for The Waterbury Hospital and St. Mary's Hospital are due by December 30, 2008.

-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

From: Loraine Shea (HCGW) [mailto:lshea@hcogw.org]
Sent: Thursday, November 20, 2008 1:54 PM
To: Lazarus, Steven
Subject: please confirm date

Steven,

Could you confirm the date that the Commissioner is expecting the Audited Financials.

When you and I spoke after the hearing I belive you said 12/30/08. Is that accurate?

Thanks
Loraine

Executive Director
Heart Center of Greater Waterbury
203-575-5571

We're Saving Hearts in Waterbury

lshea@hcogw.org

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

Docket #
08-31202-
CoN

Lazarus, Steven

RECEIVED
2008 NOV 24 A 11: 20
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

From: Lazarus, Steven
Sent: Monday, November 24, 2008 11:18 AM
To: 'Loraine Shea (HCGW)'
Cc: cscott@wtbyhosp.org; Chad Wable; Giampini-Monte; Martone, Kim
Subject: RE: please confirm date

Hi Loraine,

I went back and listened to the public hearing recording and even though there is no specific date for the FY 2008 Audited Financial Statements for St. Mary's Hospital and Waterbury Hospital other than end December or sooner. OHCA requested December 15th. OHCA Commissioner did make a statement that the public hearing will remain open until all Late Files have been filed and reviewed by OHCA.

I hope this further helps clarify your question regarding the requested Late Files.

-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

From: Lazarus, Steven
Sent: Thursday, November 20, 2008 2:30 PM
To: 'Loraine Shea (HCGW)'
Subject: RE: please confirm date

Loraine,

Yes, you are correct, as stated on the record during the public hearing, the 2008 AFS for The Waterbury Hospital and St. Mary's Hospital are due by December 30, 2008.

-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

From: Loraine Shea (HCGW) [mailto:lshea@hcogw.org]
Sent: Thursday, November 20, 2008 1:54 PM
To: Lazarus, Steven
Subject: please confirm date

Steven,

Could you confirm the date that the Commissioner is expecting the Audited Financials.

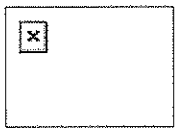
When you and I spoke after the hearing I belive you said 12/30/08. Is that accurate?

Thanks
Loraine

Executive Director
Heart Center of Greater Waterbury
203-575-5571

We're Saving Hearts in Waterbury

lshea@hcogw.org



Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

November 26, 2008

Colleen Scott
Chief Financial Officer
The Waterbury Hospital
64 Robbins Street
Waterbury, CT 06708

Chad W. Wable
Executive VP, Strategy Development
and System Operations
St. Mary's Hospital
56 Franklin Street
Waterbury, CT 06706

Monte Giannini
Planning Analyst
John Dempsey Hospital
263 Farmington Ave.
Farmington, CT 06030

Re: Certificate of Need Application, Docket Number 08-31202-CON
The Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital
Establish a Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and St. Mary's Hospital
Notice of Reconvening of the Hearing

Dear Ms. Scott, Mr. Wable and Mr. Giannini:

As part of the late filed exhibits received on November 14, 2008, by the Office of Health Care Access from The Waterbury Hospital, St. Mary's Hospital and John Dempsey Hospital (collectively known as "Applicants"), the Applicants stated in the second paragraph of the cover letter that "[w]e would welcome the opportunity to answer any questions the Agency may have, in any format deemed appropriate, including an additional hearing, concerning the Application."

OHCA has carefully considered the Applicants' request and will reconvene the October 30, 2008 hearing on December 16, 2008, at 9:00 am in OHCA's Hearing Room at 410 Capitol Avenue, Hartford, CT 06134.

OHCA requests that all persons that filed prefiled testimony in the hearing held on October 30, 2008, make every effort possible to be present at the hearing to be held on December 16, 2008; however, OHCA requests that the following persons specifically be present at the December 16, 2008, hearing:

By Applicant:	*By Position*
The Waterbury Hospital:	Chief Executive Officer/President Chief Financial Officer Chairman of the Board Administrator of Clinical Operations
St. Mary's Hospital	Chief Executive Officer/President Chief Financial Officer Chairman of the Board Administrator of Clinical Operations
John Dempsey Hospital	Chief Executive Officer/President Administrator of Clinical Operations

If the Applicants or any of the aforementioned individuals are unable to attend the December 16, 2008 hearing, the Applicants shall provide a written explanation detailing why they are unable to attend (i.e. time of day, date, etc.).

Please be advised, OHCA will send the Applicants a copy of the newspaper notice for the reconvening of the hearing under a separate cover letter.

Sincerely,

Cristine A. Vogel
Commissioner

Enclosure

cc: Thomas J. Ring, Esq., Office of the Attorney General
Douglas A. Cohen, Esq., Brown Rudnick, LLP
Kristin Connors, Esq., Carmody & Torrance, LLP

CV:krm:sl

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4393
RECIPIENT ADDRESS	95096501
DESTINATION ID	
ST. TIME	11/26 15:25
TIME USE	00'33
PAGES SENT	3
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: DOUGLAS A. COHEN, ESQ.

FAX: 860 509-6501

AGENCY: BROWN RUDNICK, LLP

FROM: STEVEN LAZARUS

DATE: 11/26/08 **Time:**

NUMBER OF PAGES: 3
(including transmittal sheet

Comments:

Please see attached regarding reconvening of the hearing for Docket Number: 08-31202

PLEASE PHONE Barbara K. Oleiarz IF THERE ARE ANY TRANSMISSION

****
*** ERROR TX REPORT ***
****

TX FUNCTION WAS NOT COMPLETED

TX/RX NO	4391
RECIPIENT ADDRESS	95096611
DESTINATION ID	
ST. TIME	11/26 15:16
TIME USE	00'00
PAGES SENT	0
RESULT	NG STOP

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: DOUGLAS A. COHEN, ESQ.

FAX: 860 509-6501

AGENCY: BROWN RUDNICK, LLP

FROM: STEVEN LAZARUS

DATE: 11/26/08 **Time:**

NUMBER OF PAGES: 3
(including transmittal sheet

Comments:

Please see attached regarding reconvening of the hearing for Docket Number: 08-31202

PLEASE PHONE Barbara K. Olejarz IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4387
RECIPIENT ADDRESS	912037093238
DESTINATION ID	
ST. TIME	11/26 15:08
TIME USE	00'34
PAGES SENT	3
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: CHAD W. WABLE

FAX: 203 709-7238

AGENCY: SAINT MARY'S HOSPITAL

FROM: STEVEN LAZARUS

DATE: 11/26/08 **Time:**

NUMBER OF PAGES: 3
(including transmittal sheet

Comments:

Please see attached regarding reconvening of the hearing for Docket Number: 08-31202

PLEASE PHONE Barbara K. Olejarz IF THERE ARE ANY TRANSMISSION

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4389
RECIPIENT ADDRESS	912035737325
DESTINATION ID	
ST. TIME	11/26 15:10
TIME USE	00'31
PAGES SENT	3
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: COLLEEN SCOTT

FAX: 203 573-7325

AGENCY: THE WATERUBRY HOSPITAL

FROM: STEVEN LAZARUS

DATE: 11/26/08 **Time:**

NUMBER OF PAGES: 3
(including transmittal sheet

Comments:

Please see attached regarding reconvening of the hearing for Docket Number: 08-31202

PLEASE PHONE Barbara K. Oleiarz IF THERE ARE ANY TRANSMISSION

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4388
RECIPIENT ADDRESS	96794515
DESTINATION ID	
ST. TIME	11/26 15:09
TIME USE	00'29
PAGES SENT	3
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: MONTE GIANNINI

FAX: 860 679-9515

AGENCY: JOHN DEMPSEY HOSPITAL

FROM: STEVEN LAZARUS

DATE: 11/26/08 **Time:**

NUMBER OF PAGES: 3
(including transmittal sheet

Comments:

Please see attached regarding reconvening of the hearing for Docket Number: 08-31202

PLEASE PHONE Barbara K. Olejarz IF THERE ARE ANY TRANSMISSION

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4390
RECIPIENT ADDRESS	912035752600
DESTINATION ID	
ST. TIME	11/26 15:11
TIME USE	00'28
PAGES SENT	3
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: KRISTIN CONNORS, ESQ.

FAX: 203 575 2600

AGENCY: CARMODY & TORRANCE LLP

FROM: STEVEN LAZARUS

DATE: 11/26/08 **Time:**

NUMBER OF PAGES: 3
(including transmittal sheet

Comments:

Please see attached regarding reconvening of the hearing for Docket Number: 08-31202

PLEASE PHONE Barbara K. Olsian IF THERE ARE ANY TRANSMISSION

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4394
RECIPIENT ADDRESS	912035755575
DESTINATION ID	
ST. TIME	11/26 16:15
TIME USE	00'54
PAGES SENT	3
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: LORAINE SHEA

FAX: 203 575 5575

AGENCY: HEART CENTER OF GREATER WATERBURY

FROM: STEVEN LAZARUS

DATE: 11/26/08 **Time:**

NUMBER OF PAGES: 3
(including transmittal sheet

Comments:
Regarding reconvening of the hearing for Docket Number: 08-31202

PLEASE PHONE Barbara K. Olejarz IF THERE ARE ANY TRANSMISSION PROBLEMS.

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

December 2, 2008

Ms. Loraine C. Shea
Executive Director
Heart Center of Greater Waterbury
1075 Chase Parkway
Waterbury, CT 06708

RE: Docket Number 08-31202-CON
The Waterbury Hospital and Saint Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital
Establish Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and St. Mary's Hospital
Response to the Interrogatories

Dear Ms. Shea:

The Office of Health Care Access ("OHCA") will reconvene the October 30, 2008 hearing on December 16, 2008, at 9:00 a.m. in OHCA's third floor Hearing Room at 410 Capitol Avenue, Hartford, regarding the Certificate of Need ("CON") application identified above.

Attached are OHCA's interrogatories that must be addressed at the hearing. Please submit an original and six (6) copies of your paginated response to additional completeness questions pertaining to the Applicants Late-File. In responding to these questions, please repeat each question prior to providing a response. If a response is continued in an attachment or an appendix, the response must clearly list the page number of the attachment or appendix in which the response is continued. Conversely, the attachment or appendix should contain a page number reference to the original question.

The Applicants' responses to OHCA's interrogatories will be provided in person at the reconvened hearing. The written responses to OHCA's questions regarding the Late-File material must be submitted to OHCA either prior to or at the public hearing on December 16, 2008.

If the Applicants are unable to meet the specified time for the responses to the questions regarding the Late-File material, the Applicants must request a time extension in writing to the OHCA Commissioner detailing the reasons for not being able to meet the specified deadline.

Please contact Alexis G. Fedorjaczenko or Steven W. Lazarus at (860) 418-7001 if you have any questions concerning this request.

Sincerely,

Cristine A. Vogel
Commissioner

Attachment

CAV:swl

INTERROGATORIES

for Reconvened Hearing on December 16, 2008:

Certificate of Need Application, Docket Number: 08-31202-CON

The Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital

Establish Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and St. Mary's Hospital

Please be fully prepared to discuss topics as described below:

1. At the hearing held on October 30, 2008, The Waterbury Hospital ("TWH") and St. Mary's Hospital ("SMH") d/b/a Heart Center of Greater Waterbury ("HCGW") and John Dempsey Hospital (herein referred to as "Applicants") stated that the main reason why the HCGW cannot become one entity (as in the example of Harold Leever Cancer Center) is because of the two separate inpatient units located at each hospital. Given the situation of two separate hospitals and the fact that the American College of Cardiology requires individual institutions to file data (as the case with TWH and SMH); describe how OHCA can reasonably consider the HCGW as one institution when filing data with Office of Health Care Access ("OHCA").

2. Provide detailed and specific evidence that demonstrates "actual" cost savings referenced in the Applicants' proposal by the design of this program having one clinical team and two separate hospitals.

3. Describe what monitoring and by what state agency the Applicants recommend when an institution performs less than a hundred (<100) (as referenced on pages 27 & 29 of the CON Application) open heart surgery procedures.

4. Be prepared to discuss the proposed merger agreement and other related topics.

Additional Completeness Questions Pertaining to Applicants Late-File:

Please address the following questions related to the Applicants late-file submissions received by OHCA on November 14, 2008:

(Written response to these questions may be filed with OHCA in advance of the December 16, 2008 Hearing or be submitted at the Hearing itself)

1. In the original CON application the assumptions utilized in developing the projections on pages 1145 through 1155, were provided on page 107. Please provide the assumptions utilized in developing the revised projections on pages 1287 through 1299 of the late file.

2. Please explain why The Waterbury Hospital ("TWH") FY 2007 actual results for revenue was unchanged but the FY 2007 expenses was reduced by $3.5 million (late file, page 1287). Include in your response an explanation of each expense category change.

3. Please explain why page 1294 of the late file, St. Mary's Hospital's FY 2007 actual results for revenue was unchanged but the FY 2007 expenses was reduced by $1.2 million (late file, page 1294). Include in your response an explanation of each expense category change.

4. For FY 2009, TWH bad debt associated with Primary PCI, Elective PCI and OHS was $58,844, $235,375 and $284,028, respectively (late file, pages 1291 – 1293. Please explain where the total bad debt of $578,247 is accounted for in the FY 2009 projected incremental column on page 1289.

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

Tentative Agenda

RECONVENING OF PUBLIC HEARING FROM OCTOBER 30, 2008

Certificate of Need Application, Docket Number 08-31202

Waterbury Hospital and Saint Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital

Establish a Primary and Elective Angioplasty and Open Heart Surgery Program at Waterbury Hospital and Saint Mary's Hospital

December 16, 2008 at 9:00 a.m.

Office of Health Care Access, Third Floor Hearing Room
410 Capitol Avenue, Hartford, CT

Reconvening of the Public Hearing

OHCA's Questions

Commissioner's Concluding Remarks

Public Hearing Recessed/Closed

An Affirmative Action / Equal Opportunity Employer
410 Capitol Avenue, MS #13HCA, P.O. Box 340308, Hartford, Connecticut 06134-0308
Telephone: (860) 418-7001 • Toll free (800) 797-9688
Fax: (860) 418-7053

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4406
RECIPIENT ADDRESS	95096667
DESTINATION ID	
ST. TIME	12/02 16:43
TIME USE	01'32
PAGES SENT	6
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: JOHN BLAIR

FAX: 509 6667

AGENCY: BROWN RUDNICK, LLP

FROM: STEVEN LAZARUS

DATE: 12/2/08 **Time:**

NUMBER OF PAGES:
(Including transmittal sheet

Comments:
Please see attached regarding Docket Number: 08-31202

PLEASE PHONE Barbara K. Olejarz IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4407
RECIPIENT ADDRESS	912035755575
DESTINATION ID	
ST. TIME	12/02 16:46
TIME USE	01'32
PAGES SENT	6
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: LORAINE SHEA

FAX: 203 575 5575

AGENCY: HEART CENTER OF GREATER WATERBURY

FROM: STEVEN LAZARUS

DATE: 12/2/08 **Time:**

NUMBER OF PAGES:
(including transmittal sheet

Comments:
Please see attached regarding Docket Number: 08-31202

PLEASE PHONE Barbara K. Olejarz IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4408
RECIPIENT ADDRESS	912035752600
DESTINATION ID	
ST. TIME	12/02 16:48
TIME USE	00'44
PAGES SENT	6
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: KRISTIN CONNORS

FAX: 203 575 2600

AGENCY: CARMODY & TORRANCE LLP

FROM: STEVEN LAZARUS

DATE: 12/2/08 **Time:**

NUMBER OF PAGES:
(including transmittal sheet

Comments:
Please see attached regarding Docket Number: 08-31202

PLEASE PHONE Barbara K. Olejarz IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4409
RECIPIENT ADDRESS	96784515
DESTINATION ID	
ST. TIME	12/02 16:49
TIME USE	00'47
PAGES SENT	6
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: MONTE GIANNINI

FAX: 679-4515

AGENCY: JOHN DEMPSEY HOSPITAL

FROM: STEVEN LAZARUS

DATE: 12/2/08 **Time:**

NUMBER OF PAGES:
(Including transmittal sheet

Comments:
Please see attached regarding Docket Number: 08-31202

PLEASE PHONE Barbara K. Olejarz IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4410
RECIPIENT ADDRESS	912037093238
DESTINATION ID	
ST. TIME	12/02 16:50
TIME USE	00'47
PAGES SENT	6
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: COLLEEN SCOTT

FAX: 203 573 7325

AGENCY: WATERBURY HOSPITAL

FROM: STEVEN LAZARUS

DATE: 12/2/08 **Time:**

NUMBER OF PAGES:
(including transmittal sheet

Comments:

Please see attached regarding Docket Number: 08-31202

PLEASE PHONE Barbara K. Olejarz IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4411
RECIPIENT ADDRESS	912037093238
DESTINATION ID	
ST. TIME	12/02 16:51
TIME USE	01'03
PAGES SENT	6
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: CHAD W. WABLE

FAX: 203 709 3238

AGENCY: SAINT MARY'S HOSPITAL

FROM: STEVEN LAZARUS

DATE: 12/2/08 **Time:**

NUMBER OF PAGES:
(including transmittal sheet

Comments:
Please see attached regarding Docket Number: 08-31202

PLEASE PHONE Barbara K. Olejarz IF THERE ARE ANY TRANSMISSION PROBLEMS

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4414
RECIPIENT ADDRESS	95096501
DESTINATION ID	
ST. TIME	12/02 17:09
TIME USE	00'52
PAGES SENT	6
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: DOUGLAS COHEN

FAX: 860 203 509-6501

AGENCY: BROWN RUDNICK, LLP

FROM: STEVEN LAZARUS

DATE: 12/2/08 **Time:**

NUMBER OF PAGES:
(including transmittal sheet

Comments:
Please see attached regarding Docket Number: 08-31202

PLEASE PHONE Barbara K. Olejarz IF THERE ARE ANY TRANSMISSION PROBLEMS.

ARCHDIOCESE OF HARTFORD
134 FARMINGTON AVENUE
HARTFORD, CONNECTICUT
06105-3784

RECEIVED
2008 DEC -8 P 1:16
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

OFFICE OF
THE ARCHBISHOP

December 4, 2008

Honorable Cristine A. Vogel, Commissioner
Office of Health Care Access
410 Capital Avenue, MS #13HCA
P.O. Box 340308
Hartford, Connecticut 06134-0308

Dear Commissioner Vogel:

In response to your letter dated November 26, 2008, as you requested I am providing a written explanation detailing why I regrettably will be unable to attend the December 16, 2008, hearing regarding The Saint Mary's Hospital ("SMH") and The Waterbury Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital proposed application to establish primary and elective angioplasty and open heart surgery program.

As the Chairman of the Boards of Directors for Saint Mary's Health System and Hospital this issue is of critical importance to me. I would have liked the opportunity to testify and provide the Office of Health Care Access ("OHCA") with any information it needs to arrive at a decision that is favorable for the patients within the Waterbury community. In fact, I would be willing to work on a mutually acceptable time for me to provide any information OHCA deems necessary.

As you may be able to anticipate, my schedule at this time of year is quite challenging. On December 16, I have a pre-existing commitment in New York, a meeting of the Board of Councilors for the Knights and Ladies of the Holy Sepulchre (Connecticut, New Jersey, and New York). This is a commitment made months ago which I cannot reschedule. In my absence, I have asked the Vice-Chair of the Saint Mary's Board of Directors, Monsignor James Coleman, to attend the hearing. Monsignor Coleman is actively involved in all issues related to this application and the merger discussions. I am confident any questions you may have will be answered thoroughly by Monsignor Coleman.

I thank you in advance for your understanding of my conflict. I truly wish I could be present to discuss with you this application. If you need to reach me please contact me at 860-541-6491.

Sincerely,

+ Henry J. Mansell

Most Reverend Henry J. Mansell
Archbishop of Hartford

(860) 541-6491/FAX (860) 541-6293

Martone, Kim

From: Loraine Shea (HCGW) [lshea@hcogw.org]
Sent: Tuesday, December 09, 2008 1:00 PM
To: Martone, Kim
Subject: RE: Waterbury/SMH cardiac hearing

Kim,

Per my earlier voicemail I am working on confirming all requested witnesses for December 18th (a.m) which is the date the Arch Bishop can attend. I need to also confirm all physicians, administrators and WH Board Chairperson but am wondering if this date will work for OHCA. (before I go much furhter) Please let me know as several patients' appointments will also need to be rescheduled. I will be off site after 1:45. Please reach me on my cell phone at 203-841-6380 rather than through email if you are responding after that time.

thanks very much
Loraine

From: Martone, Kim [mailto:Kimberly.Martone@ct.gov]
Sent: Tuesday, December 09, 2008 7:58 AM
To: Loraine Shea (HCGW)
Subject: Waterbury/SMH cardiac hearing

Loraine, I received your voice mail this morning and yes you interpreted this email correctly.

Kim

Loraine, we received the letter from Most Reverend Henry Mansell, the Archbishop of Hartford stating that he is unable to attend the reconvened hearing on December 16th. I spoke to the Commissioner who indicated that she would like to reach a "mutually acceptable time" as the Archbishop has stated in his letter to reconvene the hearing with his attendance. Please let me know at your earliest convenience the day and time by which that can happen ... even this week.

Kim Martone, CON Supervisor
State of Connecticut
Office of Health Care Access
410 Capitol Avenue
Hartford, CT 06134-0308
phone 860-418-7029
fax 860-418-7053

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

Martone, Kim

From: Loraine Shea (HCGW) [lshea@hcogw.org]
Sent: Wednesday, December 10, 2008 10:05 AM
To: Martone, Kim
Subject: RE: Waterbury/SMH cardiac hearing

Kim,

I have confirmed with all of the Applicants and the necessary witnesses for the reconvening of the Public hearing on Thursday 12/18 at 7:30 a.m. in the OHCA hearing room.

Thanks
Loraine Shea
Executive Director HCGW
203-575-5571

From: Martone, Kim [mailto:Kimberly.Martone@ct.gov]
Sent: Tuesday, December 09, 2008 7:58 AM
To: Loraine Shea (HCGW)
Subject: Waterbury/SMH cardiac hearing

Loraine, I received your voice mail this morning and yes you interpreted this email correctly.

Kim

Loraine, we received the letter from Most Reverend Henry Mansell, the Archbishop of Hartford stating that he is unable to attend the reconvened hearing on December 16th. I spoke to the Commissioner who indicated that she would like to reach a "mutually acceptable time" as the Archbishop has stated in his letter to reconvene the hearing with his attendance. Please let me know at your earliest convenience the day and time by which that can happen … even this week.

Kim Martone, CON Supervisor
State of Connecticut
Office of Health Care Access
410 Capitol Avenue
Hartford, CT 06134-0308
phone 860-418-7029
fax 860-418-7053

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

Martone, Kim

From: Loraine Shea (HCGW) [lshea@hcogw.org]
Sent: Wednesday, December 10, 2008 3:15 PM
To: Martone, Kim
Subject: list of hearing participants
Attachments: List of Hearing Participants for OHCA.doc

Kim,

See attached. Let me know if you have any questions. I will be out of the office on tomorrow 12/11 but can be reached by cell phone if necessary 203-841-6380.

Regards,

Loraine

Executive Director
Heart Center of Greater Waterbury
203-575-5571

We're Saving Hearts in Waterbury

lshea@hcogw.org

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

Requested Witnesses:

- John Tobin, President and CEO, Waterbury Hospital
- Chad Wable, President and CEO, Saint Mary's Hospital
- James Thornton, Hospital Director, John Dempsey Hospital
- Jane Sabatini, Chairwoman of the Board, Waterbury Hospital
- Arch Bishop Henry Mansell, Chairman of the Board, Saint Mary's Hospital and Saint Mary's Health System
- Joel Becker, Chairman of Board, Greater Waterbury Health Network
- Colleen Scott, CFO Waterbury Hospital
- Robert Halko, CFO Saint Mary's Hospital
- Steven Schnieder, MD, VP of Medical Affairs, Waterbury Hospital, Chairman of the Board, Heart Center of Greater Waterbury
- Mary Prybylo, COO, Waterbury Hospital
- Steve Holland, MD, Chief Medical Officer, Saint Mary's Hospital
- Sandra Roosa, VP of Patient Care Services, Saint Mary's Hospital
- James Thibeault, Director of Signature Programs, John Dempsey Hospital
- Monte Giannini, Planning Analyst, John Dempsey Hospital

Original Witnesses: (Submitted Pre-file)

- Henry Borkowski, MD, Medical Director Heart Center of Greater Waterbury
- Stephen Widman, MD, Medical Director Interventional Cardiology, HCGW
- David Underhill, MD, Cardiothoracic Surgeon
- Paul Preissler, MD, Chief of Cardiothoracic Surgery HCGW
- Christopher Michos, MD, Chairman of Emergency Medicine, Waterbury Hospital

Other Attendees:
Approximately 15 other individuals (attorneys, hospital senior leadership and board representation) will also attend.

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

December 10, 2008

Colleen Scott
Chief Financial Officer
The Waterbury Hospital
64 Robbins Street
Waterbury, CT 06708

Chad W. Wable
Executive VP, Strategy Development and System Operations
St. Mary's Hospital
56 Franklin Street
Waterbury, CT 06706

Monte Giannini
Planning Analyst
John Dempsey Hospital
263 Farmington Ave.
Farmington, CT 06030

Re: Certificate of Need Application, Docket Number 08-31202-CON
The Waterbury Hospital and St. Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital
Establish a Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and St. Mary's Hospital
Change in Date and Time of the Reconvening of the Hearing

Dear Ms. Scott, Mr. Wable and Mr. Giannini:

Please be advised, Office of Health Access ("OHCA") has changed the date and time of the reconvening of the hearing under Certificate of Need ("CON") Docket No.: 08-31202-CON from the original scheduled date of December 16, 2008, at 9:00 am to December 18, 2008, at 7:30 am. The hearing will be reconvened at 410 Capitol Avenue, Hartford, CT 06134.

If you have any further questions regarding this letter, please contact Kimberly Martone, Certificate of Need, Supervisor at (860) 418-7029.

Sincerely,

Cristine A. Vogel
Commissioner

Enclosure

cc: Thomas J. Ring, Esq., Office of the Attorney General
Douglas A. Cohen, Esq., Brown Rudnick, LLP
Kristin Connors, Esq., Carmody & Torrance, LLP
Loraine Shea, Executive Director, Heart Center of Greater Waterbury

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4521
RECIPIENT ADDRESS	912035755575
DESTINATION ID	
ST. TIME	12/12 16:09
TIME USE	00'46
PAGES SENT	2
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: **LORRAINE SHEA**

FAX: **(203) 575-5575**

AGENCY: **HEART CENTER OF GREATER WATERBURY**

FROM: **STEVEN LAZARUS**

DATE: **12/12/08** **TIME:**

NUMBER OF PAGES: **2**
(including transmittal sheet

Comments: Docket 08-31202 Change in Date and Time of the Reconvening of the Hearing

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4519
RECIPIENT ADDRESS	912037093238
DESTINATION ID	
ST. TIME	12/12 16:06
TIME USE	00'27
PAGES SENT	2
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: CHAD WABLE
(203) 709-3238

FAX:

AGENCY: ST. MARY'S HOSPITAL

FROM: STEVEN LAZARUS

DATE: 12/12/08 **TIME:**

NUMBER OF PAGES: 2
(including transmittal sheet

Comments: Docket 08-31202 Change in Date and Time of the Reconvening of the Hearing

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4518
RECIPIENT ADDRESS	912035737325
DESTINATION ID	
ST. TIME	12/12 16:05
TIME USE	00'29
PAGES SENT	2
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: **COLLEEN SCOTT**

FAX: **(203) 573-7325**

AGENCY: **THE WATERBURY HOSPITAL**

FROM: **STEVEN LAZARUS**

DATE: **12/12/08** **TIME:**

NUMBER OF PAGES: **2**
(including transmittal sheet

Comments: Docket 08-31202 Change in Date and Time of the Reconvening of the Hearing

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4532
RECIPIENT ADDRESS	96794515
DESTINATION ID	
ST. TIME	12/12 16:40
TIME USE	00'22
PAGES SENT	2
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: MONTE GIANNINI

FAX: (860) 679-~~3707~~ 4515

AGENCY: JOHN DEMPSEY HOSPITAL

FROM: STEVEN LAZARUS

DATE: 12/12/08 **TIME:**

NUMBER OF PAGES: 2
(including transmittal sheet

Comments: Docket 08-31202 Change in Date and Time of the Reconvening of the Hearing

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

HEART CENTER
of Greater Waterbury

VIA COURIER
Cristine A. Vogel, Commissioner
Office of Health Care Access
410 Capitol Avenue
MS# 13HCA
P.O. Box 340308
Hartford, CT 06134-0308

December 16, 2008

RE: **Additional Completeness Questions Pertaining to Applicants Late-File**

The Waterbury Hospital and Saint Mary's Hospital Corporation, d/b/a/ Heart Center of Greater Waterbury and University of Connecticut Health Center/John Dempsey Hospital

Dear Commissioner Vogel:

On behalf of the applicants enclosed please find an original and an additional six (6) copies of our Completeness Questions Pertaining to Late-filed documents. Should you require additional information or have any questions concerning this matter please contact:

Loraine C. Shea, Executive Director
Heart Center of Greater Waterbury
PO Box 2153
Waterbury, CT 06722
(P) 203-575-5571
(F) 203-575-5575

RECEIVED
2008 DEC 16 P 12:51
CONNECTICUT OFFICE OF HEALTH CARE ACCESS

Sincerely,

Loraine C. Shea
Executive Director, HCGW

WATERBURY HOSPITAL Saint Mary's HOSPITAL UConn Health Center

1310

Additional Completeness Questions Pertaining to Applicants Late-File:

1. In the original CON application the assumptions utilized in developing the projections on pages 1145 though 1155, were provided on page 107. Please provide the assumptions utilized in developing the revised projections on pages 1287 through 1299 of the late file.

Response:

The overall assumptions utilized in developing the original projections that were provided on page 107 remain unchanged for the revised projections provided on pages 1287 through 1299 of the late file and are noted below. There was a difference in the calculation methodology between the two sets of projections specific to the incremental cost of the program and these are outlined in detail on pages 1284-1286.

For TWH the overall assumptions utilized in developing projection are as follows:

- Salaries and fringe benefits will increase 3.5%
- Professional and contracted services will increase 4%
- Net patient revenue will increase 4%
- Supplies and drugs will increase 5%
- Bad debt will increase 3%
- Other operating expenses will increase 3%
- Non operating revenue will increase 3%
- Case volume was held constant
- FTE's will remain flat
- In order to mitigate operating losses for FY 2009, TWH Management Team will be engaging an independent consultant group to work with management on improving revenues and reducing expenses. We conservatively estimated a $5 million improvement in revenue and a $3 million improvement in expenses.

For SMH the overall assumptions utilized in developing projections are as follows:

- Salaries and Fringe benefits will increase 3.5%
- Net Patient revenues will increase 4%
- Supplies and non-salary expenses will increase 5%
- Case volume was held constant
- FTE's will remain flat

2. Please explain why The Waterbury Hospital (TWH) FY 2007 actual results for revenue was unchanged but the FY 2007 expenses was reduced by $3.5 million (Late file page 1287). Include in your response an explanation of each expense category changes.

Response:

We refer you to our discussion of change in methods used to calculate the costs related to the program, as presented in out late file submission sections B – E (Pages 1283-1286). We have restated the incremental program costs using an alternative method. Revenue was not affected by this change of method.

The $3.5 million reduction in expenses by category is as follows:

1) Salaries and fringes was decreased $2.25 million related to exclusion of the expenses represented by the FTEs in the ED, OR, Lab, Pharmacy, and Respiratory Therapy.

2) Supplies and drugs decreased by $1.35 million to reflect a change in estimate of the supply and drug cost per case.

3) Professional contracts were increased by $120,000 after being moved from the other operating expense line item.

3. Please explain why page 1294 of the late file, St. Mary's Hospital's FY 2007 actual results for revenue was unchanged but the FY 2007 expenses was reduced by $1.2 million (late file, page 1294). Include in your response an explanation of each expense category change.

Response:

We refer you to our discussion of change in methods used to calculate the costs related to the program, as presented in out late file submission sections B – E (Pages 1283-1286). We have restated the incremental program costs using an alternative method. Revenue was not affected by this change of method.

The $1.2 million reduction in expenses by category is as follows:

1) Salaries and Fringe Benefits was decreased by $539,000 related to exclusion of the expenses represented by the FTEs in the ED, OR, Lab, Pharmacy, and Respiratory Therapy.

2) Supplies, Drugs, and other operating expenses were reduced $383,000 to reflect a decrease in supply and drug costs per case.

3) Depreciation of $301,000 was removed from cost due to the change in methodology noted above.

4. For FY 2009, TWH bad debt associated with Primary PCI, Elective PCI and OHS was $58,844, $235,373 and $284,028, respectively (late file, pages 1291 - 1293). Please explain where the total bad debt of $578,247 is accounted for in the FY 2009 projected incremental column on page 1289.

Response:

As OHCA has formatted the above mentioned pages (1291- 1293) the bad debt amount is considered a reduction in revenue (See column 8). For consistency purposes we also showed the incremental bad debt as a reduction in revenue on page 1289.

Lazarus, Steven

From: Lazarus, Steven
Sent: Tuesday, December 16, 2008 3:50 PM
To: 'Loraine Shea (HCGW)'
Cc: Martone, Kim
Subject: Re: 08-31202-CON

Hi Loraine,

I wanted to send a quick email as a response to your phone message to let you know that OHCA did receive the Applicants' response to the Additional Completeness Questions, today.

See you Thursday at the hearing,

-Steven

Steven W. Lazarus
Associate Health Care Analyst
Certification, Financial Analysis & Forecasting
Office of Health Care Access
State Of Connecticut
410 Capitol Avenue
Hartford, Connecticut 06134
Phone (Direct Line): 860.418.7012
Fax (Primary Line): 860.418.7053
Website: www.ct.gov/ohca

RECEIVED
2008 DEC 16 P 4:15
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Martone, Kim

From: Martone, Kim
Sent: Monday, December 22, 2008 12:05 PM
To: 'Loraine Shea (HCGW)'
Cc: Lazarus, Steven
Subject: RE: Audited Financials

Loraine, no you are not expected to file the audited financials by the end of this month. The unaudited financials you submitted as late files and the hearing testimony is adequate.

Kim Martone, CON Supervisor
State of Connecticut
Office of Health Care Access
410 Capitol Avenue
Hartford, CT 06134-0308
phone 860-418-7029
fax 860-418-7053

From: Loraine Shea (HCGW) [mailto:lshea@hcogw.org]
Sent: Friday, December 19, 2008 10:35 AM
To: Lazarus, Steven; Martone, Kim
Subject: Audited Financials

Good morning,

Just to clarify re: the audited financials. With the hearing being closed yesterday, are we still expected to file these by the end of December? Thankyou and Happy Holidays.

Loraine Shea

Executive Director
Heart Center of Greater Waterbury
203-575-5571

We're Saving Hearts in Waterbury

lshea@hcogw.org

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

WAIVER

John Dempsey Hospital hereby stipulates and agrees that in connection with a meeting between the Office of Health Care Access and Saint Mary's Hospital, The Waterbury Hospital and John Dempsey Hospital on Thursday, January 15, 2009, no statement that is made during that meeting by any person shall be subject to discovery or the introduction into evidence in any subsequent legal action or claim relating to the Final Decision or Agreed Settlement issued by the Office of Health Care Access in Docket Number: 08-31202. John Dempsey Hospital enters into this waiver agreement freely and voluntarily, after having had the opportunity to consult with counsel concerning this matter.

Date

Duly Authorized Agent for
John Dempsey Hospital

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4631
RECIPIENT ADDRESS	96794515
DESTINATION ID	
ST. TIME	01/14 16:36
TIME USE	00'23
PAGES SENT	2
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: MONTE GIANNINI

FAX: (860) 679-4515

AGENCY: JOHN DEMPSEY HOSPITAL

FROM: STEVEN LAZARUS

DATE: 1/14/09 **TIME:**

NUMBER OF PAGES: 2
(including transmittal sheet

Comments: Attached is a copy of the waiver for tomorrow's meeting for your review. The original will be available at the meeting for signature.

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

WAIVER

Saint Mary's Hospital hereby stipulates and agrees that in connection with a meeting between the Office of Health Care Access and Saint Mary's Hospital, The Waterbury Hospital and John Dempsey Hospital on Thursday, January 15, 2009, no statement that is made during that meeting by any person shall be subject to discovery or the introduction into evidence in any subsequent legal action or claim relating to the Final Decision or Agreed Settlement issued by the Office of Health Care Access in Docket Number: 08-31202. Saint Mary's Hospital enters into this waiver agreement freely and voluntarily, after having had the opportunity to consult with counsel concerning this matter.

Date

Duly Authorized Agent for
Saint Mary's Hospital

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4630
RECIPIENT ADDRESS	912037093238
DESTINATION ID	
ST. TIME	01/14 16:35
TIME USE	00'39
PAGES SENT	2
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: CHAD WABLE
FAX: (203) 709-3238
AGENCY: SAINT MARY'S HOSPITAL
FROM: STEVEN LAZARUS
DATE: 1/14/09 **TIME:**
NUMBER OF PAGES: 2
(including transmittal sheet

Comments: Attached is a copy of the waiver for tomorrow's meeting for your review. The original will be available at the meeting for signature.

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

WAIVER

The Waterbury Hospital hereby stipulates and agrees that in connection with a meeting between the Office of Health Care Access and Saint Mary's Hospital, The Waterbury Hospital and John Dempsey Hospital on Thursday, January 15, 2009, no statement that is made during that meeting by any person shall be subject to discovery or the introduction into evidence in any subsequent legal action or claim relating to the Final Decision or Agreed Settlement issued by the Office of Health Care Access in Docket Number: 08-31202. The Waterbury Hospital enters into this waiver agreement freely and voluntarily, after having had the opportunity to consult with counsel concerning this matter.

Date

Duly Authorized Agent for
The Waterbury Hospital

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4629
RECIPIENT ADDRESS	912035737325
DESTINATION ID	
ST. TIME	01/14 16:34
TIME USE	00'23
PAGES SENT	2
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: COLLEEN SCOTT

FAX: (203) 573-7325

AGENCY: WATERBURY HOSPITAL

FROM: STEVEN LAZARUS

DATE: 1/14/09 **TIME:**

NUMBER OF PAGES: 2
(including transmittal sheet

Comments: Attached is a copy of the waiver for tomorrow's meeting for your review. The original will be available at the meeting for signature.

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

Tentative Agenda

PUBLIC HEARING

Certificate of Need Application, Docket Number 08-31164

Hartford Hospital and GSC Holding, LLC d/b/a Glastonbury Surgery Center

Establish and Operate an Ambulatory Orthopedic Surgery Center in Glastonbury

January 13, 2009

Convening of the Public Hearing

Applicants' Presentation of the CON Proposal (10 minutes)

Intervenors' Presentations
- Hartford Surgery Center (5 minutes)
- Eastern Connecticut Health Network (5 minutes)

Informal Participant
- The New England Regional Council of Carpenters (5 minutes)

Intervenors Cross-Examine Applicants
- Hartford Surgery Center

Applicants' Cross-Examination

OHCA's Questions

Commissioner's Concluding Remarks

Public Hearing Recessed/Closed

An Affirmative Action / Equal Opportunity Employer
410 Capitol Avenue, MS #13HCA, P.O. Box 340308, Hartford, Connecticut 06134-0308
Telephone: (860) 418-7001 • Toll free (800) 797-9688
Fax: (860) 418-7053

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

TABLE OF THE RECORD

APPLICANTS: **Hartford Hospital and GSC Holding, LLC d/b/a Glastonbury Surgery Center**

DOCKET NUMBER: **08-31164-CON**

PUBLIC HEARING: **January 13, 2009 at 10:00 a.m.**

PLACE: **410 Capitol Avenue, Third Floor Hearing Room Hartford, Connecticut**

EXHIBIT	DESCRIPTION
A	Letter from Hartford Hospital and GSC Holding, LLC d/b/a Glastonbury Surgery Center ("Applicants") dated May 8, 2008, enclosing Letter of Intent forms for the Glastonbury Surgery Center, received by the Office of Health Care Access ("OHCA") on May 13, 2008.
B	OHCA's request for legal notification in the *Hartford Courant* and notification to Applicants of receipt of the Letter of Intent in the matter of the CON application under Docket Number 07-31164, dated May 19, 2008.
C	OHCA's letter to the Applicants dated may 21, 2008, enclosing the Certificate of Need ("CON") application forms under Docket Number 08-31164.
D	Letter from the Applicants dated September 3, 2008, enclosing the CON application under Docket Number 08-31164, received by OHCA on September 8, 2008.
E	OHCA's letter to the Applicants dated September 12, 2008 returning the original check and requesting a corrected check in the matter of the CON application under Docket Number 08-31164.
F	A facsimile letter from Updike, Kelly & Spellacy, P.C. on behalf of Hartford Surgical Center dated September 17, 2008 requesting a hearing in the matter of the CON application under Docket Number 08-31164, received by OHCA on September 17, 2008. Hardcopy received on September 18, 2008
G	Applicant's letter to OHCA dated September 16, 2008 enclosing a corrected check in the matter of the CON application under Docket Number 08-31164, received by OHCA on September 17, 2008.

H	OHCA's letter to Updike, Kelly & Spellacy dated September 19, 2008 notifying them of a public hearing to be held in the matter of the CON application under Docket Number 08-31164.
I	OHCA's letter to the Applicants dated September 22, 2008, requesting additional information and/or clarification in the matter of the CON application under Docket Number 08-31164.
J	Applicants' letter to OHCA resubmitting the CON application with the revised attachments in the matter of the CON under Docket Number 08-31164, received by OHCA on November 17, 2008/
K	Applicants' responses to OHCA's letter of September 22, 2008, dated November 12, 2008, in the matter of the CON application under Docket Number 08-31164, received by OHCA on November 17, 2008.
L	A facsimile letter from Eastern Connecticut Health Network dated December 8, 2008 requesting a hearing and intervenor status in the matter of the CON application under Docket Number 08-31164, received by OHCA on December 8, 2008. Hardcopy received on December 12, 2008/
M	OHCA's request for legal notification in the *Hartford Courant* and OHCA's Notice to the Applicants of the public hearing scheduled for January 13, 2009, in the matter of the CON application under Docket Number 08-31164, dated December 9, 2008.
N	Letter from OHCA to the Applicants dated December 10, 2008 notifying them of a request for hearing in the matter of the CON application under Docket Number 08-31164
O	Letter from Shipman and Goodwin LLP on behalf of Hartford Hospital to OHCA dated December 11, 2008 noticing the appearance of Joan W. Feldman Esq. and Sheila A. Huddleston, Esq. in the matter of the CON application under Docket Number 08-31164, received by OHCA on December 11, 2008.
P	Letter from New England Regional Council of Carpenters dated December 11, 2008 to OHCA requesting a hearing in the matter of the CON application under Docket Number 08-31164, received by OHCA on December 11, 2008.
Q	OHCA's letter to the New England Regional Council of Carpenters dated December 16, 2008 informing them of the public hearing in the matter of the CON application under Docket Number 08-31164.
R	OHCA's Ruling on the Petition of Eastern Connecticut Health Network to be granted intervenor status with limited rights in the matter of the CON application under Docket Number 08-31164, dated December 16, 2008
S	OHCA's revised Ruling on the Petition of Eastern Connecticut Health Network to be granted intervenor status with limited rights in the matter of the CON application under Docket Number 08-31164, dated December 24, 2008

T	OHCA's letter to the Applicant dated December 24, 2008, requesting prefile testimony and interrogatories in the matter of the CON application under Docket Number 08-31164.
U	Letter from Eastern Connecticut Health Network to OHCA dated December 29, 2008 regarding status in the matter of the CON application under Docket Number 08-31164, received by OHCA on December 29, 2008.
V	Letter from Robinson and Cole LLP on behalf of Eastern Connecticut Health Network to OHCA dated January 5, 2009 noticing the appearance of Lisa M. Boyle, Esq. and Theodore J. Tucci, Esq. in the matter of the CON application under Docket Number 08-31164, received by OHCA on January 5, 2009.
W	Facsimile letter from New England Regional Council of Carpenters to OHCA dated January 5, 2009 noting their concerns in the matter of the CON application under Docket Number 08-31164, received by OHCA on January 5, 2009. Also email was received on January 5, 2009.
X	Facsimile Petition of New England Regional Council of Carpenters dated January 8, 2009, requesting intervenor status in the matter of the CON application under Docket Number 08-31164, received by OHCA on January 8, 2009. Hardcopy received on January 8, 2009.
Y	Facsimile letter from Updike, Kelly & Spellacy, P.C. on behalf of Hartford Surgical Center enclosing Notice of Appearance, Application for Party or In the Alternative, Intervenor Status and Prefile Testimony of William A. Heath and Joanne Roche dated January 8, 2009 in the matter of the CON application under Docket Number 08-31164, received by OHCA on January 8, 2009. Hardcopy received on January 8, 2009/
Z	Letter from the Applicant enclosing Appearance of Shipman & Goodwin LLP, Prefile Testimony of Kevin Kinsella, response to OHCA's interrogatories and CD with PDF version of all documents dated January 8, 2009 in the matter of the CON application under Docket Number 08-31164, received by OHCA on January 8, 2009.
A-1	Petition of Eastern Connecticut Health Network, Inc. dated January 8, 2009, requesting intervenor status with full rights of participation and prefile testimony of Dennis McConville in the matter of the CON application under Docket Number 08-31164, received by OHCA on January 9, 2009.

B-1	E-mail received from New England Regional Council of Carpenters to OHCA dated January 9, 2009 enclosing the prefile testimony of Rick Kronish in the matter of the CON application under Docket Number 08-31164, received by OHCA on January 9, 2009. Facsimile received on January 9, 2009.
C-1	OHCA's Ruling on the Petition of Eastern Connecticut Health Network to be granted intervenor status with full rights of participation in the matter of the CON application under Docket Number 08-31164, dated January 12, 2009.
D-1	OHCA's Ruling on the Petition of Hartford Surgical Center to be granted status in the matter of the CON application under Docket Number 08-31164, dated January 12, 2009.
E-1	OHCA's Ruling on the Petition of New England Regional Council of Carpenters to be granted intervenor status in the matter of the CON application under Docket Number 08-31164, dated January 12, 2009.

Administrative Notice is taken of the following items:

1. Hartford Hospital, Docket Number 07-022AR, FY 2007 Annual Reporting.

2. OHCA's Administrative Folder containing Agenda, Table of the Record etc. in the matter of the CON application under Docket Number: 08-31164.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4612
RECIPIENT ADDRESS	912037722037
DESTINATION ID	
ST. TIME	01/12 16:06
TIME USE	02'26
PAGES SENT	13
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: JENNIFER GROVES, ESQ.

FAX: (203) 772-2037

AGENCY: UPDIKE, KELLY & SPELLACY

FROM: LAURIE GRECI

DATE: 1/12/09 **TIME:**

NUMBER OF PAGES: 13
(including transmittal sheet

Comments: Docket 08-31164-CON Ruling on Petition of Status & Agenda for 1/13/09 Hearing

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4618
RECIPIENT ADDRESS	912037722037
DESTINATION ID	
ST. TIME	01/12 16:42
TIME USE	00'44
PAGES SENT	4
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: JENNIFER GROVES

FAX: (203) 772-2037

AGENCY: UPDIKE, KELLY & SPELLACY

FROM: LAURIE GRECI

DATE: 1/12/09 **TIME:**

NUMBER OF PAGES: 4
(including transmittal sheet

Comments: Directions & Shuttle Schedule for OHCA hearing on 1/13/09

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4614
RECIPIENT ADDRESS	95454193
DESTINATION ID	
ST. TIME	01/12 16:09
TIME USE	02'06
PAGES SENT	13
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: KEVIN KINSELLA

FAX: 545-4193

AGENCY: HARTFORD HOSPITAL

FROM: LAURIE GRECI

DATE: 1/12/09 **TIME:**

NUMBER OF PAGES: 13
(including transmittal sheet

Comments: Docket 08-31164-CON Ruling on Petition of Status & Agenda for 1/13/09 Hearing

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4619
RECIPIENT ADDRESS	95454193
DESTINATION ID	
ST. TIME	01/12 16:45
TIME USE	00'40
PAGES SENT	4
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: KEVIN KINSELLA

FAX: 545-4193

AGENCY: HARTFORD HOSPITAL

FROM: LAURIE GRECI

DATE: 1/12/09 **TIME:**

NUMBER OF PAGES: 4
(including transmittal sheet

Comments: Directions & Shuttle Schedule for OHCA hearing on 1/13/09

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4615
RECIPIENT ADDRESS	97283227
DESTINATION ID	
ST. TIME	01/12 16:20
TIME USE	02'53
PAGES SENT	13
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: DANIEL MASTELLA

FAX: 728-3227

AGENCY: HARTFORD HOSPITAL

FROM: LAURIE GRECI

DATE: 1/12/09 **TIME:**

NUMBER OF PAGES: 13
(including transmittal sheet

Comments: Docket 08-31164-CON Ruling on Petition of Status & Agenda for 1/13/09 Hearing

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4620
RECIPIENT ADDRESS	97283227
DESTINATION ID	
ST. TIME	01/12 16:46
TIME USE	00'52
PAGES SENT	4
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: DANIEL MASTELLA

FAX: 728-3227

AGENCY: GSC HOLDING, LLC

FROM: LAURIE GRECI

DATE: 1/12/09 **TIME:**

NUMBER OF PAGES: 4
(including transmittal sheet

Comments: Directions & Shuttle Schedule for OHCA hearing on 1/13/09

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4616
RECIPIENT ADDRESS	92758299
DESTINATION ID	
ST. TIME	01/12 16:27
TIME USE	08'21
PAGES SENT	16
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: LISA BOYLE, ESQ.

FAX: 275-8299

AGENCY: ROBINSON & COLE

FROM: LAURIE GRECI

DATE: 1/12/09 **TIME:**

NUMBER OF PAGES: 16
(including transmittal sheet

Comments: Docket 08-31164-CON Ruling on Petition of Status & Agenda for 1/13/09 Hearing

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4621
RECIPIENT ADDRESS	912032699117
DESTINATION ID	
ST. TIME	01/12 16:52
TIME USE	03'33
PAGES SENT	16
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: TIMOTHY SULLIVAN

FAX: (203) 269-9117

AGENCY: NEW ENGLAND REGIONAL COUNCIL OF CARPENTERS

FROM: LAURIE GRECI

DATE: 1/12/09 **TIME:**

NUMBER OF PAGES: 16
(including transmittal sheet

Comments: Docket 08-31164-CON Ruling on Petition of Status & Agenda for 1/13/09 Hearing

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

Agenda

PUBLIC HEARING

Certificate of Need Application, Docket Number 08-31164

Hartford Hospital and GSC Holding, LLC d/b/a Glastonbury Surgery Center

Establish and Operate an Ambulatory Orthopedic Surgery Center in Glastonbury

January 13, 2009

Convening of the Public Hearing

Applicants' Presentation of the CON Proposal (10 minutes)

Intervenors' Presentations
- Hartford Surgery Center (5 minutes)
- Eastern Connecticut Health Network (5 minutes)

Informal Participant
- The New England Regional Council of Carpenters (5 minutes)

Intervenors Cross-Examine Applicants
- Hartford Surgery Center

Applicants' Cross-Examination

OHCA's Questions

Commissioner's Concluding Remarks

Public Hearing Recessed/Closed

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

TABLE OF THE RECORD

APPLICANTS: **Hartford Hospital and GSC Holding, LLC d/b/a Glastonbury Surgery Center**

DOCKET NUMBER: **08-31164-CON**

PUBLIC HEARING: **January 13, 2009 at 10:00 a.m.**

PLACE: **410 Capitol Avenue, Third Floor Hearing Room Hartford, Connecticut**

EXHIBIT	DESCRIPTION
A	Letter from Hartford Hospital and GSC Holding, LLC d/b/a Glastonbury Surgery Center ("Applicants") dated May 8, 2008, enclosing Letter of Intent forms for the Glastonbury Surgery Center, received by the Office of Health Care Access ("OHCA") on May 13, 2008.
B	OHCA's request for legal notification in the *Hartford Courant* and notification to Applicants of receipt of the Letter of Intent in the matter of the CON application under Docket Number 07-31164, dated May 19, 2008.
C	OHCA's letter to the Applicants dated may 21, 2008, enclosing the Certificate of Need ("CON") application forms under Docket Number 08-31164.
D	Letter from the Applicants dated September 3, 2008, enclosing the CON application under Docket Number 08-31164, received by OHCA on September 8, 2008.
E	OHCA's letter to the Applicants dated September 12, 2008 returning the original check and requesting a corrected check in the matter of the CON application under Docket Number 08-31164.
F	A facsimile letter from Updike, Kelly & Spellacy, P.C. on behalf of Hartford Surgical Center dated September 17, 2008 requesting a hearing in the matter of the CON application under Docket Number 08-31164, received by OHCA on September 17, 2008. Hardcopy received on September 18, 2008
G	Applicant's letter to OHCA dated September 16, 2008 enclosing a corrected check in the matter of the CON application under Docket Number 08-31164, received by OHCA on September 17, 2008.

H	OHCA's letter to Updike, Kelly & Spellacy dated September 19, 2008 notifying them of a public hearing to be held in the matter of the CON application under Docket Number 08-31164.
I	OHCA's letter to the Applicants dated September 22, 2008, requesting additional information and/or clarification in the matter of the CON application under Docket Number 08-31164.
J	Applicants' letter to OHCA resubmitting the CON application with the revised attachments in the matter of the CON under Docket Number 08-31164, received by OHCA on November 17, 2008/
K	Applicants' responses to OHCA's letter of September 22, 2008, dated November 12, 2008, in the matter of the CON application under Docket Number 08-31164, received by OHCA on November 17, 2008.
L	A facsimile letter from Eastern Connecticut Health Network dated December 8, 2008 requesting a hearing and intervenor status in the matter of the CON application under Docket Number 08-31164, received by OHCA on December 8, 2008. Hardcopy received on December 12, 2008/
M	OHCA's request for legal notification in the *Hartford Courant* and OHCA's Notice to the Applicants of the public hearing scheduled for January 13, 2009, in the matter of the CON application under Docket Number 08-31164, dated December 9, 2008.
N	Letter from OHCA to the Applicants dated December 10, 2008 notifying them of a request for hearing in the matter of the CON application under Docket Number 08-31164
O	Letter from Shipman and Goodwin LLP on behalf of Hartford Hospital to OHCA dated December 11, 2008 noticing the appearance of Joan W. Feldman Esq. and Sheila A. Huddleston, Esq. in the matter of the CON application under Docket Number 08-31164, received by OHCA on December 11, 2008.
P	Letter from New England Regional Council of Carpenters dated December 11, 2008 to OHCA requesting a hearing in the matter of the CON application under Docket Number 08-31164, received by OHCA on December 11, 2008.
Q	OHCA's letter to the New England Regional Council of Carpenters dated December 16, 2008 informing them of the public hearing in the matter of the CON application under Docket Number 08-31164.
R	OHCA's Ruling on the Petition of Eastern Connecticut Health Network to be granted intervenor status with limited rights in the matter of the CON application under Docket Number 08-31164, dated December 16, 2008
S	OHCA's revised Ruling on the Petition of Eastern Connecticut Health Network to be granted intervenor status with limited rights in the matter of the CON application under Docket Number 08-31164, dated December 24, 2008

T	OHCA's letter to the Applicant dated December 24, 2008, requesting prefile testimony and interrogatories in the matter of the CON application under Docket Number 08-31164.
U	Letter from Eastern Connecticut Health Network to OHCA dated December 29, 2008 regarding status in the matter of the CON application under Docket Number 08-31164, received by OHCA on December 29, 2008.
V	Letter from Robinson and Cole LLP on behalf of Eastern Connecticut Health Network to OHCA dated January 5, 2009 noticing the appearance of Lisa M. Boyle, Esq. and Theodore J. Tucci, Esq. in the matter of the CON application under Docket Number 08-31164, received by OHCA on January 5, 2009.
W	Facsimile letter from New England Regional Council of Carpenters to OHCA dated January 5, 2009 noting their concerns in the matter of the CON application under Docket Number 08-31164, received by OHCA on January 5, 2009. Also email was received on January 5, 2009.
X	Facsimile Petition of New England Regional Council of Carpenters dated January 8, 2009, requesting intervenor status in the matter of the CON application under Docket Number 08-31164, received by OHCA on January 8, 2009. Hardcopy received on January 8, 2009.
Y	Facsimile letter from Updike, Kelly & Spellacy, P.C. on behalf of Hartford Surgical Center enclosing Notice of Appearance, Application for Party or In the Alternative, Intervenor Status and Prefile Testimony of William A. Heath and Joanne Roche dated January 8, 2009 in the matter of the CON application under Docket Number 08-31164, received by OHCA on January 8, 2009. Hardcopy received on January 8, 2009/
Z	Letter from the Applicant enclosing Appearance of Shipman & Goodwin LLP, Prefile Testimony of Kevin Kinsella, response to OHCA's interrogatories and CD with PDF version of all documents dated January 8, 2009 in the matter of the CON application under Docket Number 08-31164, received by OHCA on January 8, 2009.
A-1	Petition of Eastern Connecticut Health Network, Inc. dated January 8, 2009, requesting intervenor status with full rights of participation and prefile testimony of Dennis McConville in the matter of the CON application under Docket Number 08-31164, received by OHCA on January 9, 2009.

B-1	E-mail received from New England Regional Council of Carpenters to OHCA dated January 9, 2009 enclosing the prefile testimony of Rick Kronish in the matter of the CON application under Docket Number 08-31164, received by OHCA on January 9, 2009. Facsimile received on January 9, 2009.
C-1	OHCA's Ruling on the Petition of Eastern Connecticut Health Network to be granted intervenor status with full rights of participation in the matter of the CON application under Docket Number 08-31164, dated January 12, 2009.
D-1	OHCA's Ruling on the Petition of Hartford Surgical Center to be granted status in the matter of the CON application under Docket Number 08-31164, dated January 12, 2009.
E-1	OHCA's Ruling on the Petition of New England Regional Council of Carpenters to be granted intervenor status in the matter of the CON application under Docket Number 08-31164, dated January 12, 2009.
F-1	Facsimile letter from Applicants dated January 12, 2009 enclosing supplemental prefile testimony of Kevin Kinsella in rebuttal to statements by petitioning intervenors in the matter of the CON application under Docket Number 08-31164, received by OHCA on January 12, 2009. Hardcopy received on January 12, 2009.

Administrative Notice is taken of the following items:

1. Hartford Hospital, Docket Number 07-022AR, FY 2007 Annual Reporting.

2. OHCA's Administrative Folder containing Agenda, Table of the Record etc. in the matter of the CON application under Docket Number: 08-31164.

PUBLIC HEARING

APPLICANT

SIGN UP SHEET

January 13, 2009
10:00 a.m.

Applicant: Docket Number: 08-31164-CON
Hartford Hospital and GSC Holding, LLC d/b/a Glastonbury Surgery Center
Establish and Operate an Ambulatory Orthopedic Surgery Center in Glastonbury

Name	Phone	Fax	Representing Organization/Self
Mary Ann Nelligan	696-6265	696-6035	HH
Joan Feldmeier	251-5704	251-5211	HH / GSC
Sheila Huddleston	251-5723	251-5319	HH / GSC
Charles Owen	615-400-4851	615-771-1811	HH / GSC
Kevin Kinsella	595-4115	595-4193	HH

Public Hearing
Hartford Hospital and GSC Holding, LLC d/b/a Glastonbury Surgery Center

Name	Phone	Fax	Representing Organization/Self
CLINT CASSETTY	615 822 5711	615 824 9089	HH
Kevin Markowski	545-2358	545-3600	HH
Steve O'Neill	410 744 0155	410 744 0160	H-H
Dennis McCamille	860 537 3429	860 647 6860	ECHN
DEBORAH PARKER	860647-6875	860647 4727	ECHN
Linda Lemire	8600646 1222	8600647-4742	ECHN
Bob Tessier	860-249-6100	860-249-6500	CT Coal. for TH Hea/th Funds -
DANIEL J MASTELLA, MD	860 527 7161		The Hand Center
DEAN PALLOTTI	860 250 2565	296 9673	NERCC

PUBLIC HEARING
INTERVENORS
SIGN UP SHEET

January 13, 2009
10:00 a.m.

Applicant: Docket Number: 08-31164-CON
Hartford Hospital and GSC Holding, LLC d/b/a Glastonbury Surgery Center
Establish and Operate an Ambulatory Orthopedic Surgery Center in Glastonbury

Name	Phone	Fax	Representing Organization/Self
Gina Kline	533-3427	647-6860	ECHN
Joanne Rocha	545-7520	247-7337	Hartford Surgical Center
Liz Rogers	247-5555		Public
Connie Harvey	203-774-2351		Public
William Heath	205-545-2656		Hartford Surgical Center

PUBLIC HEARING

INFORMAL PARTICIPANT

SIGN UP SHEET

January 13, 2009
10:00 a.m.

Applicant: Docket Number: 08-31164-CON
Hartford Hospital and GSC Holding, LLC d/b/a Glastonbury Surgery Center
Establish and Operate an Ambulatory Orthopedic Surgery Center in Glastonbury

Name	Phone	Fax	Representing Organization/Self
Louise Le Chesser	860 231 6161	860 231 6184	Self
Bob Tessier	860-249-6000	860-249-6070	CT Coalition of FQHC Health Funds
RICHARD KRONISH	617 699 7914		NEHCC
Tim Sullivan	203 650 543	203 269 9514	NSRCC

Public Hearing
Hartford Hospital and GSC Holding, LLC d/b/a Glastonbury Surgery Center

Name	Phone	Fax	Representing Organization/Self
JENNIFER GROVES	203.786.8316	203.772.3027	HSC / UHS
Lorraine St Chassey	860 231 6184	860 231 6184	Hartford Hospital/Self

Intervenor. Sign up

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

January 21, 2009

IN THE MATTER OF:

An Application for a Certificate of Need filed pursuant to Section 19a-638, C.G.S. by	Notice of Final Decision Office of Health Care Access Docket Number: 08-31202-CON
The Waterbury Hospital, Saint Mary's Hospital, and John Dempsey Hospital	**Establish a Permanent Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and Saint Mary's Hospital**

Colleen Scott
Chief Financial Officer
The Waterbury Hospital
64 Robbins Street
Waterbury, CT 06708

Chad W. Wable
Executive VP, Strategy Development
and System Operations
St. Mary's Hospital
56 Franklin Street
Waterbury, CT 06706

Monte Giannini
Planning Analyst
John Dempsey Hospital
263 Farmington Avenue
Farmington, CT 06030

Dear Ms. Scott, Mr. Wable and Mr. Giannini:

This letter will serve as notice of the Agreed Settlement between the Office of Health Care Access and Saint Mary's Hospital, The Waterbury Hospital and John Dempsey Hospital in the above matter, as provided by Section 19a-638, C.G.S. On January 21, 2009, the Agreed Settlement was adopted as the finding and order of the Office of Health Care Access. A copy of the Agreed Settlement is attached hereto for your information.

By Order of the
Office of Health Care Access

Cristine A. Vogel
Commissioner

Enclosure
CAV:swl

Office of Health Care Access
Certificate of Need Application

Agreed Settlement

Applicants:	**The Waterbury Hospital and St. Mary's Hospital Corporation d/b/a Heart Center of Greater Waterbury and John Dempsey Hospital**
Docket Number:	**08-31202-CON**
Project Title:	**Establish Permanent Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and Saint Mary's Hospital**
Statutory Reference:	**Section 19a-638, Connecticut General Statutes**
Filing Date:	**September 15, 2008**
Hearing Dates:	**October 30, 2008 and December 18, 2008**
Commissioner & Presiding Officer:	**Cristine A. Vogel**
Decision Date:	**January 21, 2009**
Default Date:	**Not Applicable**
Staff:	**Alexis G. Fedorjaczenko** **Steven W. Lazarus** **Sharon Malinowski**

Project Description: The Waterbury Hospital ("TWH") and Saint Mary's Hospital ("SMH") d/b/a Heart Center of Greater Waterbury ("HCGW") and John Dempsey Hospital ("JDH") (herein referred to as "Applicants") propose to establish permanent primary and elective angioplasty and open-heart surgery programs at SMH and TWH, with no associated capital expenditure.

Nature of Proceedings: On September 15, 2008, the Office of Health Care Access ("OHCA") received the Applicants' Certificate of Need ("CON") application seeking authorization to establish permanent primary and elective angioplasty and open-heart surgery programs at SMH and TWH, with no associated capital expenditure. The Applicants are health care facilities or institutions as defined by Section 19a-630 of the Connecticut General Statutes ("C.G.S.").

Pursuant to Section 19a-638, C.G.S., a public hearing regarding the CON application was held on October 30, 2008. On October 9, 2008, the Applicants were notified of the date, time, and place of the hearing. On October 10, 2008, a notice to the public announcing the hearing was published in the *Republican American*. On November 28, 2008, OHCA informed the Applicants of its intention to reconvene the hearing on December 16, 2008 and on December 10, 2008, OHCA informed the Applicants of the change in date and time of the reconvened hearing from December 16, 2008 to December 18, 2008. On December 18, 2008, OHCA reconvened the hearing, originally convened on October 30, 2008. Commissioner Cristine A. Vogel served as Presiding Officer. The hearing was conducted as a contested case in accordance with the provisions of the Uniform Administrative Procedure Act (Chapter 54 of the Connecticut General Statutes) and Section 19a-638, C.G.S.

OHCA's authority to review and approve, modify or deny the CON application is established by Section 19a-638, C.G.S. The provisions of this section, as well as the principles and guidelines set forth in Section 19a-637, C.G.S., were fully considered by OHCA in its review.

Findings of Fact

Clear Public Need
Impact on the Applicants' Current Utilization Statistics
Proposal's Contribution to Accessibility and Quality of Health Care Delivery in the Region

1) St. Mary's Hospital ("SMH") is an acute care hospital with 347 acute care beds and 32 bassinets located at 56 Franklin Street, Waterbury, Connecticut. *(July 8, 2008, Letter of Intent & St. Mary's Hospital, 2007 Annual Reporting, Schedule 400)*

2) The Waterbury Hospital ("TWH") is an acute care hospital with 357 acute care beds and 36 basinets located at 64 Robbins Street, Waterbury, Connecticut. *(July 8, 2008, Letter of Intent & The Waterbury Hospital, 2007 Annual Reporting, Schedule 400)*

3) John Dempsey Hospital ("JDH") is an acute care hospital with 204 acute care beds and 20 bassinets located at 263 Farmington Avenue, Farmington, Connecticut. On April 29, 1994, JDH was approved under Docket Number 92-581 for the expansion of its cardiac services through addition of angioplasty and open-heart surgery

service. *(Agreed Settlement, April 29, 1994, DN 92-581, Letter of Intent and John Dempsey Hospital, 2007 Annual Reporting, Schedule 400)*

4) On July 23, 2004, under Office of Health Care Access ("OHCA") Agreed Settlement, Docket No: 03-30167-CON, TWH, SMH and JDH, together as Applicants were approved to establish a primary and elective angioplasty[1] ("PCI") and open heart surgery[2] ("OHS") program at TWH and SMH, at a total capital expenditure of $7,181,248. *(July 8, 2008, Agreed Settlement, Docket No.: 03-30167-CON)*

5) Under Agreed Settlement, Docket No.: 03-30167-CON, OHCA and the Applicants agreed to the following:

   a) The CON would be granted for and in effect for an initial period of three (3) years, starting on the date of the performance of the first elective or primary angioplasty procedure or open heart surgical procedure, but in no event later than July 23, 2005, in order to validate that the program can achieve the utilization that has been projected in the CON proposal;

   b) The Applicants must demonstrate that the service is achieving sufficient utilization for each of the three years of the authorized project period at St. Mary's Hospital and The Waterbury Hospital. Sufficient was defined as:

Table 1: Required Minimum Utilization Under Docket No.: 03-31067

PCI	Achieving 200 angioplasty procedures at each site.
OHS	125, 150 and 200 OHS procedures at each site for the first three years, respectively.

(July 8, 2008, Agreed Settlement, Docket No.: 03-30167-CON)

[1] Primary (Emergent) or Elective (Scheduled) Percutaneous Coronary Intervention (PCI) or Coronary Angioplasty (PCA) is an interventional procedure performed in a catheterization laboratory whereby a catheter, usually inserted into an artery in the groin, is threaded through the circulatory system to a previously diagnosed blockage in the heart. An expandable balloon is passed to this spot and inflated several times, thereby flattening the blockage-causing plaque, potentially widening the artery, and thus improving blood flow. National data show that 14-20% of all acute myocardial infarctions or heart attacks are eligible for treatment with primary angioplasty. Primary angioplasty is clinically indicated for patients with ST segment elevation MI (STEMI) or left bundle branch block (LBBB) who need immediate intervention to open an occlusion within 90-120 minutes. Recent studies have shown that primary angioplasty can be performed in hospitals without on-site cardiac surgery because the benefit to using primary angioplasty over thrombolytics or clot busting medications outweighs the risk of having a complication that may then require cardiac surgery. Non-ST Segment elevation MI (NSTEMI or high-risk) patients consist of 80% of all MIs and are considered for angioplasty on an elective basis within 72 hours. Performance of elective angioplasty without cardiac surgery back up is not recommended by the American College of Cardiology or the American Heart Association. (Source: MedicineNet.com, AHA &ACC)

[2] Open-heart surgery is a surgical intervention performed on the opened heart while the bloodstream is diverted through a heart-lung machine. Cardiac Surgery includes Coronary Artery Bypass Graft (CABG), Valvuloplasty, and Valve Replacement. CABG is where a vein from the chest or leg, or a prosthesis, is grafted onto either side of a blockage in the coronary artery. This reroutes blood flow around the blockage to the heart muscle. Valvuloplasty is where a balloon tipped catheter is inserted into plaque-blocked heart valves to widen and separate them through repeated balloon inflation. A Valve Replacement is a replacement of plaque-blocked heart valves with prosthetic or tissue graft. (Source: MedicineNet.com, AHA &ACC)

6) On September 11, 2008, under CON Modification, Docket No.: 03-30167-MD2, OHCA approved the Applicants' request to extend the initial period for the authorized demonstration project from three years to three and one-half years or until January 19, 2009. *(September 11, 2008, OHCA CON Modification, Docket No.: 03-30167-MD2)*

7) Under this CON proposal, TWH, SMH and JDH ("Applicants") propose to establish permanent PCI and OHS at SMH and TWH. The programs will be known as the Heart Center of Greater Waterbury ("HCGW"). *(September 15, 2008, CON Application, pages 2-33)*

8) The proposed cardiac services were designed as one program at the two hospital sites (TWH & SMH) due to its cost effectiveness. SMH and TWH initially invested approximately $7 million and currently the program offers identical catheterization laboratories, operating rooms suites and cardiovascular intensive care unit models. It also has single care-giving teams of cardiologists, interventional cardiologists, cardiothoracic surgeons, cardiac anesthesiologists, perfusionists and registered nurses. *(September 15, 2008, CON Application, page 16)*

9) According to the Applicants, they considered alternatives to the one program at two site model, including models such as primary angioplasty only at two campuses and full service advanced cardiac services jointly managed at one campus. The Applicants identified the one program at both campuses approach as being the most practical and cost effective way to provide advanced cardiac care services to the citizens of greater Waterbury. *(September 15, 2008, CON Application, pages 16-19)*

10) The proposed primary service area ("PSA") and secondary service area ("SSA") are based on the three year historical volume of the HCGW, as illustrated in the following table:

Table 2: Proposed PSA & SSA Towns

TOWN	2005	2006	2007	2008 YTD
	% of Total	*% of Total*	*% of Total*	*% of Total*
Beacon Falls	0.65	.025	1.28	1.31
Bethlehem	1.94	1.64	1.66	2.10
Cheshire	1.94	2.64	2.04	1.31
Middlebury	3.23	2.77	2.68	2.89
Naugatuck	11.61	12.70	11.86	12.34
Oakville	4.52	3.52	4.97	5.25
Prospect	2.58	4.40	2.81	3.41
Southbury	3.87	4.15	3.95	3.94
Thomaston	2.58	3.65	3.19	3.15
Waterbury	44.52	41.26	42.73	40.42
Watertown	6.45	5.41	5.74	5.77
Wolcott	5.16	7.17	5.74	4.20
Woodbury	4.52	3.52	3.44	3.67
PSA Total	**93.55**	**93.08**	**92.09**	**89.76**
Morris	0.0	0.13	0.13	0.0
Oxford	0.0	0.88	0.38	0.26
Plantsville	0.0	0.0	0.89	0.0
Plymouth	0.0	0.25	0.64	0.0
Seymour	0.0	0.50	0.13	0.79
Southington	0.0	0.25	0.77	0.79
Terryville	0.65	0.50	0.89	0.79
Torrington	0.65	0.25	0.51	2.10
SSA Total	**1.29**	**2.77**	**4.34**	**4.72**
Total Service Area	***94.84***	***95.85***	***96.43***	***94.49***
Other	***5.16***	***4.15***	***3.57***	***5.51***

Note: Applicants Source: CHIME Decision Support Tool
Data includes patient origin of patients admitted to SMH and TWH for the following:
Valve surgeries: DRGs: 105&105,
OHS: DRGs: 106, 547-550, and
Angioplasties: DRGs: 518, 555-558.
Fiscal year 2008 YTD data represents October 2007-March 2008
(September 15, 2008, CON Application, page 34)

11) SMH and TWH currently provide the following cardiac related services:

a) Non-Invasive Cardiology:
   i) EKG testing with extensive database of historic EKG tests,
   ii) Holter monitor testing,
   iii) Echocardiography including Trans Esophageal Echocardiography with extensive database of historic test,
   iv) Stress Testing (treadmill, pharmacologic), and
   v) Cardiology dedicated dual head nuclear cameras.

b) Invasive Cardiology:
   i) Diagnostic Cardiac Catheterizations,
   ii) Single room with Biplane imaging,
   iii) Intra-aortic balloon pump placement,
   iv) Implants Pacemaker, and
   v) Implants Defibrillators.

c) Cardiology Clinics:
   i) Pacemaker Clinic.

d) Cardiac Rehab:
   i) Phase I,
   ii) Phase II, and
   iii) Phase III.

e) Peripheral Vascular:
   i) Interventional and diagnostic procedures,
   ii) Minimally Invasive Abdominal Aneurysm Endovascular procedures,
   iii) CT/MRI angiography,
   iv) Endovascular and traditional open vascular surgery, and
   v) Peripheral angioplasty.

f) Critical Care Units:
   i) Critical care units directed by Board Certified Intensivists,
   ii) Cardiovascular unit-one stop post operative model for interventional cardiology patients,
   iii) Ongoing nursing education in collaboration with Advanced Practice Nurses,
   iv) High percentage of RON and CCRN certification,
   v) Telemetry and hemodynamic units available, and
   vi) 24 hour physician unit, coverage provided by on-site surgical and medical residency program.

g) Emergency Department:
   i) Cardiac care protocols, and
   ii) Cardiac monitors available in treatment rooms.

h) Other:
   i) CT calcium scoring, and
   ii) CT angiography.

i) Advanced Cardiac Services* :
   i) Elective angioplasty,
   ii) Primary angioplasty, and
   iii) Open heart surgery.

   *Approved provisionally under CON Agreed Settlement 03-31067-CON
   (September 15, 2008, CON Application, pages 11-12)

12) The Applicants based the need for the proposal on the three year historical volume of elective and primary angioplasty and OHS, as well as on the quality of the programs over the three years of operation as a demonstration project.
(September 15, 2008, CON Application, page 29)

13) The Applicants provided the three year historical volume by hospital as follows:

Table 3: Historical Utilization

	FY 2005				FY 2006				FY 2007				FY 2008 (YTD)			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
TWH	8	59	23	147	50	331	118	632	60	341	120	893	42	241	112	6
SMH	5	58	20	117	49	260	70	485	46	211	108	512	29	186	70	4
HCGW Total	***13***	***117***	***43***	***267***	***99***	***591***	***188***	***1,117***	***106***	***552***	***228***	***1,105***	***71***	***427***	***182***	***1,1***
JDH	-	540	160	561	-	419	123	469	-	356	74	459	-	391	79	4

Note: Cardiac service legend: *A*: Primary Angioplasty, *B*: Elective Angioplasty, *C*: Open Heart Service, and *D*: Cardiac Catheterizations. JDH unable to separate primary and elective angioplasty.
(September 15, 2008, CON Application, page 42 and November 14, 2008, Applicants' Late-File, page 1283)

14) According to the Applicants, the three years of historical advanced cardiac services at HCGW involved the following:

a) Over 2,400 patients have had these services;
b) 1,800 out of 2,400 patients had angioplasty;
c) 300 of the 2,400 patients received primary angioplasty;
d) 88% of patients requiring acute (primary) angioplasty are treated in 90 minutes or less, compared to the American College of Cardiology ("ACC") goal of 75%; and
e) 600 out of the 2,400 patients had OHS.
(September 15, 2008, CON Application, pages 31-32)

15) According to the Applicants, the cardiac services at both hospitals are currently capturing 80% of the market share for angioplasty, 84% of the market share for Coronary Artery Bypass Graft ("CABG") surgery, and 65% market share for heart valve surgery in the proposed PSA. *(September 15, 2008, CON Application, page 80)*

16) According to the Applicants, the following illustrates the actual and projected market share:

Table 4: Projected Market Share by Service

Service	Actual FY 2008	Projected FY 2009	Projected FY 2010	Projected FY 2011
PCI	80.5%	80.5%	80.5%	80.5%
OHS	75.8%	80.5%	80.5%	80.5%
I/P Cath	71.7%	71.7%	71.7%	71.7%
O/P Cath	49.3%	49.3%	49.3%	49.3%

Note: The Applicants project the market share from FY 2008 will remain constant for all services through FY 2011 except for OHS. According to the Applicants, the historical OHS market share has grown 58.6%, 68.3% and 75.8% for FYs 2006-2008, respectively. *(September 15, 2008, CON Application, page 63)*

17) SMH and TWH currently have 17 cardiologists including five (5) interventional cardiologists, four (4) cardiothoracic surgeons and four (4) cardiac anesthesiologists, all of whom actively practice at both hospitals. *(September 15, 2008, CON Application, page 12)*

18) The Applicants noted for the record that the historical individual operator volume for each interventional cardiologist has exceeded the recommended volume of 75 per year. *(September 15, 2008, CON Application, page 29)*

19) According to the Applicants, over the last three years, the number of community based dedicated cardiologists has grown from 14 to 17 and a new practice has opened, Naugatuck Valley Cardiology Associates ("NVCC"). *(September 15, 2008, CON Application, page 100)*

20) According to the Applicants, the number of physicians residing in the Waterbury area has grown and includes the following:
   a) Four (4) interventional cardiologists;
   b) Four (4) cardiothoracic surgeons; and
   c) Four (4) cardiac anesthesiologists.
   (September 15, 2008, CON Application, page 100)

21) According to the Applicants, JDH has been an active and formal participant in administrative, clinical and quality activities for HCGW sine July 2004. After the initial assistance and guidance in the development of the advanced cardiac program including input on protocols, staff training and equipment purchases, the relationship with JDH has evolved into a collegial partnership of shared learning. JDH continues to act in an advisory capacity in all aspects of the advanced cardiac program. In 2007 and 2008, the agreements between the SMH, TWH and JDH were formally renewed. *(September 15, 2008, CON Application, page 102)*

22) JDH's role is described as follows:

- JDH provides cardiothoracic surgical services and perfusion services via contract;
- JDH's director of cardiology is a member of HCGW Advisory Board, and as such has been involved in review and discussion of quality data.
- JDH participates in joint clinical case discussions held monthly at one of the partner hospitals;
- JDH's chief of cardiothoracic surgery is also the chief of cardiothoracic surgery for HCGW;
- The chief and his team review the HCGW program data, clinical processes and overall areas of improvement;
- The JDH and HCGW chief of perfusion also practices in these quality review committees; and
- JDH personnel continue to provide guidance to the HCGW as it relates to new technology (i.e. Robotics), equipment (i.e. new balloon pump), supplies and possible purchases related to these technologies.
  (September 15, 2008, CON Application, pages 102-103)

23) The Applicants are projecting the following utilization for each hospital by cardiac service:

Table 5: Projected Utilization

	FY 2009			FY 2010			FY 2011		
	A	**B**	**C**	**A**	**B**	**C**	**A**	**B**	**C**
TWH	327	134	624	316	129	638	316	129	638
SMH	240	81	472	232	78	481	232	78	481
HCGW *Total*	567	215	1,097	548	207	1,119	548	207	1,119

Note: Cardiac service legend: *A*: Total Angioplasties, B: Open Heart Service, and C: Cardiac Catheterizations. The Applicants based the projected volumes on the historical volumes at each hospital.
(September 15, 2008, CON Application, pages 62-63)

24) According to the ACC/AHA guidelines, monitoring should occur for hospitals or individuals performing less that 100 cases per year.
(American College of Cardiology [www.acc.org], September 15, 2008, CON Application, page 29)

25) The following table provides the number of patients that were treated monthly at each hospital for cardiac services, from October 2007 to September 2008.

Table 6: Cardiac Patients per Month for the period October 2007 to September 2008

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Total
TWH													
OHS	4	14	9	14	10	11	14	10	16	10	9	17	**138**
Angioplasty	34	29	26	39	27	28	20	21	30	29	30	33	**346**
Cardiac Cath	58	57	43	54	46	46	49	52	50	57	48	71	**631**
SMH													
OHS	10	4	6	6	6	6	5	6	12	9	7	7	**84**
Angioplasty	24	27	15	16	21	31	22	22	20	17	28	15	**258**
Cardiac Cath	52	31	25	34	38	40	39	44	53	42	37	45	**480**

(October 24, 2008, Interrogatories, page 1240)

26) Out of the 357 licensed beds at TWH and 347 licensed beds at SMH, the following table provides the beds available by major service line.

Table 7: Beds by Major Service Line

	Physical Beds	Net Clinically available Beds *	Budgeted Staffed Beds **	Maximum staffed Beds ***
TWH				
ICU	20	20	16	20
CVU	8	8	6	8
Telemetry	20	20	18	20
Med-Surg	119	114	114	119
Total	**167**	**162**	**154**	**167**
SMH				
ICU	16	15.5	12	16
CVU	8	8	4	8
Telemetry	20	20	19	20
Med-Surg	103	100	97	103
Total	**147**	**143.5**	**132**	**147**

** Net Clinically Available Beds: Due to the lack of private room availability, semi-private rooms are converted to private rooms routinely to accommodate isolation patient needs. This number reflects average impact; the range can be as high as 10 beds closed due to private room isolation needs.*
*** Budgeted Staffed Beds: Each Hospital budgets for a number of beds to staff.*
**** Maximum staffed beds: If the census requires, and the private room availability allows, staffing is provided for this maximum number of beds.*
(October 24, 2008, Interrogatories, page 1233)

27) The average occupancy rate for each unit is presented in the table below. The Applicants stated that this average does not reflect fluctuations in the census and provided data to show that the SMH CVU was at maximum capacity 1 day in FY 2008, at near-maximum capacity (6-7 patients) 39 days in FY 2008, and that TWH CVU was at maximum capacity 41 days in FY 2008.

Table 8: Average Occupancy Rate by Unit

	Occupancy FY 2006	Occupancy FY 2007	Occupancy FY 2008
TWH			
ICU	75%	75%	85%
CVU	63%	63%	63%
Telemetry	90%	90%	90%
Med-Surg	95%	90%	90%
Total	**87%**	**84%**	**86%**
SMH			
ICU	80%	81%	74%
CVU	40%	51%	43%
Telemetry	84%	85%	86%
Med-Surg	93%	94%	87%
Total	**88%**	**89%**	**84%**

(October 24, 2008, Interrogatories, pages 1233-1239)

28) The following tables provide the number and percentage of cardiac-related emergency department visits broken down by method of arrival and by hospital.

Table 9: Emergency Department Cardiac Related Population (By Number & Percentage)

	FY 2006		FY 2007		FY 2008	
	TWH	**SMH**	**TWH**	**SMH**	**TWH**	**SMH**
Personal Transport	3,682	4,874	3,938	5,372	3,703	5,278
Ambulance Transport	2,916	2,028	2,974	1,752	2,796	1,647
Helicopter	0	1	0	0	0	2
Police	0	35	0	37	0	23
Unknown	437	41	445	205	419	258
Cardiac-Related Emergency Department Visits	**7,215**	**6,984**	**7,357**	**7,366**	**6,918**	**7,208**

	FY 2006		FY 2007		FY 2008	
	TWH	**SMH**	**TWH**	**SMH**	**TWH**	**SMH**
Personal Transport	51%	70%	0%	73%	54%	73%
Ambulance Transport	40%	29%	40%	24%	40%	23%
Helicopter	0%	0%	0%	0%	0%	0%
Police	0%	1%	0%	1%	0%	0%
Unknown	6%	1%	6%	3%	6%	4%
Cardiac-Related Emergency Department Visits	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

(October 24, 2008, Interrogatories, page 1229)

29) The HCGW physician team is made up of 4 cardiothoracic surgeons, 3 surgical physician assistants, 4 cardiothoracic anesthesiologists, 5 interventional cardiologists, and 12 cardiologists. The entire team has privileges and practices at both TWH and SMH. *(October 24, 2008, Interrogatories, page 1231)*

30) The HCGW perfusion team is made up of 4 perfusionists. The entire team has privileges and practices at both TWH and SMH. *(October 24, 2008, Interrogatories, page 1231)*

31) The HCGW team of 5 registered nurses ("RNs") provides perioperative and intraoperative support to the cardiac anesthesiologist in the cardiovascular operating room. All of these RNs work at each campus based on the operating room schedule and the needs of the patient. *(October 24, 2008, Interrogatories, page 1231)*

32) The physician, perfusion, and nurse teams have on-call schedules that cover at each hospital regardless of which campus care needs to be provided. *(October 24, 2008, Interrogatories, page 1231)*

33) TWH and SMH each have a dedicated 8-bed intensive care Cardiovascular Unit ("CVU") used to provide inpatient care to post cardiac procedure patients receiving advanced cardiac services (angioplasty and open heart surgery). Each CVU is in space that was newly renovated when the program commenced in July 2005. *(October 24, 2008, Interrogatories, page 1225)*

34) Stephen Widman, M.D., director of interventional cardiology at the HCGW, testified that both catheterization laboratories are identically equipped and staffed, and that the post angioplasty recovery areas are identical. *(October 24, 2008, Pre-File Testimony, page 1185)*

35) The Applicants provided the following information regarding the cardiac operating room usage at TWH and SMH.

Table 10: Cardiac Operating Room Usage

	FY 2005	FY 2006	FY 2007	FY 2008
Simultaneous Use (1)	--	0	3	8
Two or more per day (2)	7	9	38	33

(1)Simultaneous Use refers to both operating rooms being used at the same time;
(2) Two or more per day reflects days that two or more individuals received open heart surgery between both campuses.
Note: 88% of the multiple surgeries were for urgently or emergently providing open heart surgery, rather than for elective surgery.
(October 24, 2008, Interrogatories, page 1228)

36) Dr. Widman testified that the program's mortality and procedural complications match or exceed the ACC standards in all areas, despite intervening on an older more urgent patient population and higher risk lesion subset. *(October 24, 2008, Pre-File Testimony, page 1184)*

37) Henry Borkowski, M.D., Medical Director of the HCGW, testified to the following with regard to the program's quality:

- The angiographic success is at or above the ACC mean of 99.3%;
- The risk adjusted mortality is lower than the ACC mean of 1.23%, ranging from 0.67% to 1.05%;

- The Door to Balloon time (time from arrival at the hospital to PCI) is at an average of 67 minutes, superior to the average of 2.5 to 4 hours+ hours that existed prior to July 2005; and
- Approximately 88% of patients arriving at SMH or TWH EDs are being treated with emergency angioplasty in less than 90 minutes, significantly better than the national target of 75% and the ACC mean of 72%.
  (October 24, 2008, Pre-File Testimony, pages 1180-1181, "Door-to-Balloon" definition source: Circulation (American Heart Association). 2006; 113:1079-1085.*)*

38) Dr. Widman testified that the HCGW's four interventional cardiologists each average approximately 150 cases per year; far exceeding the ACC recommended 75 cases per year. *(October 24, 2008, Pre-File Testimony, page 1184)*

39) David Underhill M.D., board certified cardiothoracic surgeon, testified that:

- Both Hospitals conformed to the Society of Thoracic Surgeons ("STS") standards in all categories assessed, and fell within the group of hospitals in the United States (77%) that are considered "equal" in performance and outcomes in their open heart surgical results;
- The actual mortality rate was far lower than the expected based on EuroSCORE rating; and
- Based on a comparison to the State of New York Adult Surgery Report published by the New York State Department of Health, outcomes are comparable to several of the higher and the lower volume programs in this neighboring state.
  (October 24, 2008, Pre-File Testimony, pages 1191-1196)

40) Dr. Underhill testified that each surgeon is considered to be a "high volume practitioner" and provided summaries of recent studies that suggest the importance of surgeon - procedure volume. *(October 24, 2008, Pre-File Testimony, page 1201)*

41) Chad Wable, CEO and President of SMH testified that the HCGW was established based on need, however, the way the cardiac program has been structured there have been cost savings as a result of the one program, two campus approach, which are made up of three parts:

i) Clinical: There is one perfusion team, one medical director, one anesthesia contract, one surgical chief and one chief of interventional laboratory, leading to approximately $1 million in annual savings.
ii) Administrative: There is one database, instead of two databases and two information technology support structures at two individual hospitals. Also, cost savings in the support infrastructure, which has lead to approximately $300,000 in annual savings.
iii) Any changes to the structure of the existing cardiac program, i.e., moving to a full service advanced cardiac program jointly managed at one campus, would lead to the following:

(a) Extensive renovations to an emergency department to accommodate the additional patient volume, which would cost several million dollars,
(b) Another cardiac catheterization laboratory at one of the hospitals would cost an additional $2-3 million,
(c) Another cardiovascular operating room at one of the hospitals, which would cost approximately, $2-3 million,
(d) There would be other administrative support required, leading the total cost to be upwards of $10-$20 million.
(December 18, 2008, Hearing Testimony of Mr. Chad Wable, President and CEO of Saint Mary's Hospital)

42) John Tobin, President and CEO of TWH testified to the following:

a) Any changes in the existing structure of the existing cardiac program may also involve costs related to duplication of services but the biggest savings is in the quality of care and accessibility, and
b) SMH and TWH are required to file cardiac related data to ACC and STS individually but can also file it collectively.
(December 18, 2008, Hearing Testimony of Mr. John Tobin, President and CEO of The Waterbury Hospital)

43) Chad Wable testified to the following regarding the quality of HCGW:

a) The existing cardiac program (HCGW) has an advisory board that monitors quality of the program;
b) The Applicants submit data to STS and ACC, which is utilized as a tool to monitor quality,
c) The Applicants are also reviewed by Connecticut's Department of Public Health and also by the Commission on the Accreditation of Healthcare Organizations and Connecticut Medical Society, and
d) The Applicants contend that the internal program (self) monitoring through the physicians should continue.
(December 18, 2008, Hearing Testimony of Mr. Chad Wable, President & CEO of Saint Mary's Hospital)

Financial Feasibility of the Proposal and its Impact on the Applicants' Rates and Financial Condition
Impact of the Proposal on the Interests of Consumers of Health Care Services and Payers for Such Services
Consideration of Other Section 19a-637, C.G.S. Principles and Guidelines

44) The Waterbury Hospital's originally projected three-year incremental revenue from operations, total operating expense and losses/gains from operations associated with the implementation of the new unit are presented in the table below:

Table 11: Waterbury Hospital's Original Incremental Financial Projections

Description	FY 2009	FY 2010	FY 2011
Incremental Revenue from Operations	$11,318,005	$11,346,526	$11,800,387
Incremental Total Operating Expense	$9,023,156	$9,049,510	$9,411,490
Incremental Gain from Operations	**$2,292,850**	**$2,297,016**	**$2,388,897**

(September 15, 2008, Certificate of Need, page 1146)

45) The Waterbury Hospital's revised projected three-year incremental revenue from operations, total operating expense and losses/gains from operations associated with the implementation of the new unit are presented in the table below:

Table 12: Waterbury Hospital's Revised Incremental Financial Projections

Description	FY 2009	FY 2010	FY 2011
Incremental Revenue from Operations	$11,546,632	$11,579,673	$12,042,860
Incremental Total Operating Expense	$5,684,232	$5,882,323	$6,058,793
Incremental Gain from Operations	**$5,684,232**	**$5,697,350**	**$5,984,067**

(November 14, 2008, Applicant's late file, page 1287)

46) Saint Mary's Hospital's originally projected three-year incremental revenue from operations, total operating expense and losses/gains from operations associated with the implementation of the new unit are presented in the table below:

Table 13: Saint Mary's Hospital's Original Incremental Financial Projections

Description	FY 2009	FY 2010	FY 2011
Incremental Revenue from Operations	$7,462,000	$7,520,000	$7,820,000
Incremental Total Operating Expense	$6,089,000	$6,156,000	$6,405,000
Incremental Gain from Operations	**$1,373,000**	**$1,364,000**	**$1,415,000**

(September 15, 2008, Certificate of Need, page 1150)

47) Saint Mary's Hospital's revised projected three-year incremental revenue from operations, total operating expense and losses/gains from operations associated with the implementation of the new unit are presented in the table below:

Table 14: Saint Mary's Hospital's Revised Incremental Financial Projections Project

Description	FY 2009	FY 2010	FY 2011
Incremental Revenue from Operations	$7,462,000	$7,520,000	$7,820,000
Incremental Total Operating Expense	$5,092,000	$5,183,000	$5,339,000
Incremental Gain from Operations	**$2,370,000**	**$2,337,000**	**$2,481,000**

(November 14, 2008 Applicant's late file, page 1294)

48) The following chart presents the original incremental FTEs for the proposed program:

Table 15: Original additional Incremental FTEs

Description	FY 2009	FY 2010	FY 2011
Waterbury Hospital	41.8	41.9	43.6
Saint Mary's Hospital	16	16	16
Total Incremental FTEs	**57.8**	**57.9**	**59.6**

(September 15, 2008, Certificate of Need, pages 1146 and 1150)

49) The following chart presents the revised incremental FTEs for the proposed programs:

Table 16: Revised additional Incremental FTEs

Description	FY 2009	FY 2010	FY 2011
Waterbury Hospital	23.8	23.0	23.0
Saint Mary's Hospital	20.3	20.3	20.3
Total Incremental FTEs	**44.1**	**43.3**	**43.3**

(November 14, 2008 Applicant's late file, pages 1289 and 1296)

50) The Waterbury Hospital's payer mix with the CON proposal is as follows:

Table 17: Three-Year Projected Payer Mix with the CON Proposal

Total TWH	**Current Payer Mix**	**FY 2009 Payer Mix**	**FY 2010 Payer Mix**	**FY 2011 Payer Mix**
Medicare	40.7%	40.7%	40.7%	40.7%
Medicaid (including other medical assistance)	21.3%	21.3%	21.3%	21.3%
TRICARE	.2%	.2%	.2%	.2%
Total Government	**62.2%**	**62.2%**	**62.2%**	**62.2%**
Commercial Insurers	33.1%	33.1%	33.1%	33.1%
Self Pay	2.5%	2.5%	2.5%	2.5%
Workers Compensation	2.2%	2.2%	2.2%	2.2%
Total Non-Government	**37.8%**	**37.8%**	**37.8%**	**37.8%**
Uncompensated Care	0%	0%	0%	0.0%
Total Payer Mix	**100%**	**100%**	**100%**	**100.0%**

(September 15, 2008, Initial CON Application, page 105)

51) Saint Mary's Hospital's payer mix with the CON proposal is as follows:

Table 18: Three-Year Projected Payer Mix with the CON Proposal

Total SMH	**Current Payer Mix**	**FY 2009 Payer Mix**	**FY 2010 Payer Mix**	**FY 2011 Payer Mix**
Medicare	46.7%	46.7%	46.7%	46.7%
Medicaid (including other medical assistance)	16.8%	16.8%	16.8%	16.8%
TRICARE	0.0%	0.0%	0.0%	0.0%
Total Government	**63.5%**	**63.5%**	**63.5%**	**63.5%**
Commercial Insurers	32.2%	32.2%	32.2%	32.2%
Self Pay	2.9%	2.9%	2.9%	2.9%
Workers Compensation	1.4%	1.4%	1.4%	1.4%
Total Non-Government	**36.5%**	**36.5%**	**36.5%**	**36.5%**
Uncompensated Care	0%	0%	0%	0%
Total Payer Mix	**100%**	**100%**	**100%**	**100%**

(September 15, 2008, Initial CON Application, page 105)

52) Bob Halko, CFO of SMH testified to the following:

a) For FY 2008, Saint Mary's Health System had a $4.3 million gain of which $3.5 million was a grant from the State's hardship fund. Without this grant the gain would only have been approximately $800,000;
b) For FY 2007, Saint Mary's Health System had a $6.1 million gain of which $5.5 million was a grant from the State's hardship fund. Without this grant the gain would only have been approximately $600,000;
c) For FY 2009, Saint Mary's Health System is projected to have a gain from operations of $175,000 and revenue in excess of expenses of $2.3 to $2.4 million. This takes into consideration changes such as Connecticut Children's Medical Center's pediatric department at SMH and associated renovations;
d) Pension funding for FY 2008 was approximately $3 million and for FY 2009 will be $5 million. The $5 million funding for FY 2009 was mandated; and
e) As of September 30, 2008, the unfunded portion of the pension plan was approximately $60 million.

(December 18, 2008, Hearing Testimony of Mr. Bob Halko, CFO of Saint Mary's Hospital)

53) Colleen Scott, CFO of TWH testified that for FY 2008, Waterbury Hospital had a loss of $9 million and the Health System had a total loss of $17 million.

(December 18, 2008, Hearing Testimony of Ms. Colleen Scott, CFO of Waterbury Hospital)

Rationale

The Office of Health Care Access ("OHCA") approaches community and regional need for Certificate of Need ("CON") proposals on a case by case basis. CON applications do not lend themselves to general applicability due to a variety of factors, which may affect any given proposal; e.g. the characteristics of the population to be served, the nature of the existing services, the specific types of services proposed to be offered, the current utilization of services and the financial feasibility of the proposal.

Saint Mary's Hospital ("SMH") is an acute care hospital located at 56 Franklin Street, Waterbury. The Waterbury Hospital ("TWH") is an acute care hospital located at 64 Robbins Street, Waterbury. John Dempsey Hospital ("JDH") is an acute care hospital located at 263 Farmington Avenue, Farmington. SMH, TWH, and JDH currently operate a primary and elective angioplasty ("PCI") and open heart surgery ("OHS") program at TWH and SMH as a demonstration project. Under this CON proposal, TWH, SMH and JDH (together, "Applicants") propose to establish permanent PCI and OHS programs at SMH and TWH.

The proposed cardiac services currently operate at two hospital sites, TWH and SMH. The cardiac services located at each hospital include catheterizations laboratories, operating rooms suites, and cardiovascular intensive care unit models that are identically equipped and staffed, along with single care-giving teams of cardiologists, interventional cardiologists, cardiothoracic surgeons, cardiac anesthesiologists, perfusionists and registered nurses which all have privileges and practice at both TWH and SMH. The on-call schedules of the care giving teams cover the program regardless of which campus may need care to be provided.

The Applicants provided facts to support their assertion that the OHS and PCI services cannot be accommodated solely at one location without significant renovations or construction of new space. OHCA has reviewed the financial situation at both organizations and concludes that neither hospital has the financial ability nor the access to capital that would be required to renovate and accommodate the entire service.

This CON proposal was presented to OHCA as one program; however, OHCA concludes that apart from the single clinical team model and the management of the services, the hospitals remain independent from each other in all other aspects. The Applicants did provide evidence that utilizing a single clinical team is cost-effective in a "two-hospital" scenario. Both SMH and TWH stated that having the capability to offer such services independently at each hospital does provide a financial gain.

There may be a point in time where the duplication of clinical space at each facility becomes less cost-effective especially if procedure volume remains steady or declines. Intuitively, having one appropriately-sized cardiac program at one location would appear to be most cost-effective and deliver the ideal continuity of care. It is reasonable to assume that the community would learn which facility offers inpatient cardiac services,

much like the hospitals' assertion with inpatient pediatric services being located at only one of the hospitals.

The Applicants testified at the hearing that the probability of a merger between the SMH and TWH is less likely now than in the recent past, especially in light of the current economic downturn. The reduced likelihood of the merger puts the long-term financial viability of the inpatient cardiac services in question. Given the fact that the two hospitals have come forward as co-applicants, and given the facilities' space constraints and financial circumstances, it is not reasonable for OHCA to separate the hospitals and modify the proposal to only one location. OHCA appreciates the efforts of collaboration; however, it remains concerned with the redundancy that results from providing all of the advanced cardiac services at both hospitals. The agency will continue to monitor the ongoing financial benefit of this proposal in light of OHCA's view that the long term financial viability of these programs would be enhanced if this were one legal partnership in all aspects, not just the clinical teams and management of the programs (as in the case of the Harold Lever Cancer Center).

OHCA does not consider this one program, as it involves two hospital organizations that operate independently of and competitively with each other. Since OHCA views these as two independent inpatient cardiac programs, OHCA will remain consistent with the data reporting requirements stipulated in the "demonstration project" which was the precursor to this application. OHCA recognizes that the evidence to date indicates that SMH and TWH are operating quality programs. This conclusion is a factor in deciding whether to approve this proposal. OHCA remains concerned, however, that utilization will remain low at SMH and TWH and that strict monitoring of these low-volume providers must continue. Professional cardiac associations suggest that cardiac programs with low utilization be monitored closely.

In conclusion, the Applicants presented evidence that supports the benefits of continuing the inpatient cardiac services as it currently exists. The procedure volumes and operational issues for both TWH and SMH, will remain under OHCA's close monitoring.

Order

NOW, THEREFORE, the Office of Health Care Access ("OHCA") and The Waterbury Hospital ("TWH") and Saint Mary's Hospital ("SMH") and John Dempsey Hospital ("JDH") (together referred to as "Applicants") hereby stipulate and agree to the terms of settlement with respect to the establishment of permanent primary and elective angioplasty and open-heart surgery programs at St. Mary's Hospital and at The Waterbury Hospital, with no associated capital expenditure, as follows:

1. The Applicants' request for a CON to establish permanent primary and elective angioplasty and open-heart surgery programs to be located at SMH and at TWH, with no associated capital expenditure, is hereby approved.

2. The scope of this CON authorization is being approved as was specifically presented in the Applicants' proposal, which consists of two full-service inpatient cardiac programs, one at SMH and one at TWH, but both served by the same clinical team. The Applicants agree that this CON authorization will become invalid and therefore null and void, if either of the following occurs in the future:

   (a) Any change to the structure of the single clinical team model serving both SMH and TWH (not including individual personnel changes), as highlighted in Finding of Facts numbers 17,29,30&31; or
   (b) Any changes in the ownership or control of one or both of the legal entities, SMH and TWH.

3. There is no associated capital expenditure approved. In the event that the Applicants learn of potential significant capital costs associated with start of operations of this program, the Applicants shall notify OHCA in a timely manner.

4. The Applicants agree that SMH and TWH are each required to file with OHCA, an annual utilization report containing specific data and/or information related to their separate full-service cardiac programs in a format to be defined by OHCA subsequent to the execution of this agreement. OHCA will provide the Applicants with the specific format for the annual filing within ninety days of the authorization date of this agreement. OHCA will also set forth the filing schedule related to the annual utilization reporting at that time. It is acceptable to OHCA that the legal entity, Heart Center of Greater Waterbury, Inc. coordinate such annual filings and directly submit the filings to OHCA on behalf of SMH and TWH.

5. The Applicants agree that it is the intent of SMH and TWH to participate in the American College of Cardiology National Cardiovascular Database Registry (ACC-NCDR). SMH and TWH are required to comply with the ACC/AHA criteria and standards. If SMH or TWH determines not to participate in the ACC-NCDR, the Applicants shall notify OHCA in a timely manner regarding such

decision not to participate and shall continue to comply with the ACC/AHA criteria and standards. Further, the Applicants agree that, if SMH and TWH do participate in ACC-NCDR, SMH and TWH are required to submit to OHCA any and all Executive Summary pages from the Institutional Outcomes Reports received by SMH or TWH from ACC-NCDR, such Executive Summary containing the PCI Quality Measures, PCI Utilization Measures, and Diagnostic Cath Quality Measures. All Executive Summaries received by SMH or TWH during the year, will be due to OHCA at the same time as the annual report specified and agreed upon in Stipulation #4 above. Further, SMH and TWH shall supply to OHCA the detail reports from ACC-NCDR to SMH and TWH only if OHCA specifically requests such detailed reporting. It is acceptable to OHCA that the legal entity, Heart Center of Greater Waterbury, Inc. coordinate such annual filings and directly submit the filings to OHCA on behalf of SMH and TWH.

6. The Applicants agree that it is the intent of SMH and TWH to participate in the Society of Thoracic Surgeons Database (STS-DB) database. If SMH or TWH determines not to participate in the STS-DB, the Applicants shall notify OHCA in a timely manner regarding such decision not to participate. Further, the Applicants agree that, if SMH and TWH do participate in STS-DB, SMH and TWH are required to submit to OHCA any and all Regional Outcomes Comparisons received by SMH or TWH from STS-DB, such Comparison Reports showing each Applicant hospital as compared to the Region. All Regional Outcomes Comparisons received by SMH or TWH during the year, will be due to OHCA at the same time as the annual report specified and agreed upon in Stipulation #4 above. Further, SMH and TWH shall supply to OHCA the detail reports from STS-DB to SMH and TWH, only if OHCA specifically requests such detailed reporting. It is acceptable to OHCA that the legal entity, Heart Center of Greater Waterbury, Inc. coordinate such annual filings and directly submit the filings to OHCA on behalf of SMH and TWH.

7. The Applicants each agree to attend meetings with OHCA on a semi-annual basis for the purposes of discussion on quality monitoring, clinical team structure, and overall organization structure for the programs and for SMH and TWH. Such meetings must include at least one member of executive management of the three Applicant hospitals. The number of meetings to be held will be at the discretion of OHCA and OHCA may discontinue the meetings in the future after written notification to the Applicant hospitals, without modification to this Order.

8. OHCA and SMH, TWH, and JDH agree that this Agreed Settlement represents a final agreement between OHCA and SMH and TWH, d/b/a Heart Center of Greater Waterbury and John Dempsey Hospital with respect to this request. The signing of this Agreed Settlement resolves all objections, claims and disputes, which may have been raised by the Applicants with regard to Docket Number 08-31202-CON.

9. This Agreed Settlement is an order of the Office of Health Care Access with all the rights and obligations attendant thereto, and the Office of Health Care Access may enforce this Agreed Settlement pursuant to the provisions of Sections 19a-642 and 19a-653 of the Connecticut General Statutes at the Applicants' expense, if the Applicants fail to comply with its terms.

January 16, 2009
Date

Duly Authorized Agent for
The Waterbury Hospital

JOHN H. TOBIN
PRESIDENT/CEO

January 16, 2009
Date

Duly Authorized Agent for Chad W. Wable
Saint Mary's Hospital

1/15/09
Date

Duly Authorized Agent for
John Dempsey Hospital
Cato Laurencin, M.D., Ph.D.

The above Agreed Settlement is hereby accepted and so ordered by the Office of Health Care Access on January 21, 2009.

January 21, 2009
Date

Cristine A. Vogel
Commissioner

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4640
RECIPIENT ADDRESS	912035752600
DESTINATION ID	
ST. TIME	01/21 16:52
TIME USE	05'18
PAGES SENT	28
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: KRISTIN CONNORS, ESQ.

FAX: (203) 575-2600

AGENCY: CARMODY & TORRANCE

FROM: STEVEN LAZARUS

DATE: 1/21/09 **TIME:**

NUMBER OF PAGES: 28
(including transmittal sheet

Comments: Docket 08-31202 Agreed Settlement

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4642
RECIPIENT ADDRESS	912037093238
DESTINATION ID	
ST. TIME	01/21 17:00
TIME USE	05'10
PAGES SENT	28
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: CHAD D. WABLE

FAX: (203) 709-3238

AGENCY: SAINT MARY'S HOSPITAL

FROM: STEVEN LAZARUS

DATE: 1/21/09 **TIME:**

NUMBER OF PAGES: 28
(including transmittal sheet

Comments: Docket 08-31202 Agreed Settlement

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4643
RECIPIENT ADDRESS	96794515
DESTINATION ID	
ST. TIME	01/21 17:05
TIME USE	05'33
PAGES SENT	28
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: MONTE GIANNINI

FAX: 679-4515

AGENCY: JOHN DEMPSEY HOSPITAL

FROM: STEVEN LAZARUS

DATE: 1/21/09 **TIME:**

NUMBER OF PAGES: 28
(including transmittal sheet

Comments: Docket 08-31202 Agreed Settlement

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4644
RECIPIENT ADDRESS	912035737325
DESTINATION ID	
ST. TIME	01/21 17:13
TIME USE	04'44
PAGES SENT	28
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: COLLEEN SCOTT

FAX: (203) 573-7325

AGENCY: THE WATERBURY HOSPITAL

FROM: STEVEN LAZARUS

DATE: 1/21/09 **TIME:**

NUMBER OF PAGES: 28
(including transmittal sheet

Comments: Docket 08-31202 Agreed Settlement

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4645
RECIPIENT ADDRESS	912035755575
DESTINATION ID	
ST. TIME	01/21 17:18
TIME USE	10'34
PAGES SENT	28
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: LORRAINE SHEA

FAX: (203) 575-5575

AGENCY: HEART CENTER OF GREATER WATERBURY

FROM: STEVEN LAZARUS

DATE: 1/21/09 **TIME:**

NUMBER OF PAGES: 28
(including transmittal sheet

Comments: Docket 08-31202 Agreed Settlement

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	4646
RECIPIENT ADDRESS	95096667
DESTINATION ID	
ST. TIME	01/21 17:29
TIME USE	10'39
PAGES SENT	28
RESULT	OK

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: DOUGLAS A COHEN, ESQ.
JOHN D. BLAIR, ESQ.

FAX: 509-~~6611~~ 96667

AGENCY: BROWN RUDNICK

FROM: STEVEN LAZARUS

DATE: 1/21/09 **TIME:**

NUMBER OF PAGES: 28
(including transmittal sheet

Comments: Docket 08-31202 Agreed Settlement

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

TOWN OF MIDDLEBURY

Selectmen's Office

RECEIVED
2009 JAN 22 A 11:19
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

January 16, 2009

Ms. Christine A. Vogel
Commissioner
Office of Health Care Access
410 Capitol Ave., MS #13HCA
Hartford, CT 06134

Re: Heart Center of Greater Waterbury

Dear Commissioner Vogel:

Kudos on the article in today's Waterbury Republican regarding the okay of the draft for the Heart Center of Greater Waterbury.

As I mentioned before, without this crucial cardiac program, people's lives will surely be lost, and personally, I believe that every heart matters.

I will continue to have strong support for the continuation of these services on a permanent basis.

Very truly yours,

Tom Gormley
First Selectman

cc: Mayor Michael Jarjura
Lisa Moody, Chief of Staff – Governor Rell's Office
John H. Tobin, President & Chief Executive Officer – Waterbury Hospital
Chad W. Wable, President & Chief Executive Officer – St. Mary's Hospital
Peter Dorpalen, COG

1212 Whittemore Road • P.O. Box 392 • Middlebury, Connecticut 06762
Phone: 203-758-2439 • Fax: 203-758-8629

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

February 19, 2009

Loraine C. Shea
Executive Director
Heart Center of Greater Waterbury
1075 Chase Parkway
Waterbury, CT 06708

RE: **Docket Number 08-31202-CON**; The establishment of permanent angioplasty and open-heart surgery programs located at SMH and TWH

Dear Ms. Shea:

On January 21, 2009, The Waterbury Hospital ("TWH"), Saint Mary's Hospital ("SMH") and John Dempsey Hospital ("JDH") (together referred to as "Applicants") and the Office of Health Care Access ("OHCA") entered into an Agreed Settlement wherein OHCA granted a Certificate of Need ("CON") for the establishment of permanent primary and elective angioplasty and open-heart surgery programs at St. Mary's Hospital and at The Waterbury Hospital.

Stipulation #4 of the Agreed Settlement states the following:

"4. *The Applicants agree that SMH and TWH are each required to file with OHCA, an annual utilization report containing specific data and/or information related to their separate full-service cardiac programs in a format to be defined by OHCA subsequent to the execution of this agreement. OHCA will provide the Applicants with the specific format for the annual filing within ninety days of the authorization date of this agreement. OHCA will also set forth the filing schedule related to the annual utilization reporting at that time. It is acceptable to OHCA that the legal entity, Heart Center of Greater Waterbury, Inc. coordinate such annual filings and directly submit the filings to OHCA on behalf of SMH and TWH.*"

At this time, OHCA is providing the Applicants with greater detail regarding the annual utilization reporting required pursuant to Stipulation #4. It is being sent to you because Health Center of Greater Waterbury, Inc. is the coordinating entity for the reporting submissions for the Applicant hospitals' cardiac programs.

Within one month subsequent to the end of the full operational year (July 18th to July 17th[1]), The Waterbury Hospital and Saint Mary's Hospital will submit to OHCA its separate PCI and Open Heart Surgery volume by procedure code and by date of procedure, using the following table format as an example:

[1] Operational year is based on the original commencement of the cardiac programs at the two hospitals.

Waterbury Hospital PCI Volume	Procedure Code X*	Procedure Code Y	Procedure Code Z
Operational Day 1**			
Operational Day 2			
Operational Day 365			
Operational Year Total			

*When filing the table with OHCA, the Hospital should identify each specific procedure code(s)
**When filing the table with OHCA, the Hospital should list specific dates (i.e., Operational Day 3 should be listed as the actual date in the final table)

Waterbury Hospital Open Heart Surgery Volume	Procedure Code X	Procedure Code Y	Procedure Code Z
Operational Day 1			
Operational Day 2			
Operational Day 365			
Operational Year Total			

Saint Mary's Hospital PCI Volume	Procedure Code X	Procedure Code Y	Procedure Code Z
Operational Day 1			
Operational Day 2			
Operational Day 365			
Operational Year Total			

Saint Mary's Hospital Open Heart Surgery volume	Procedure Code X	Procedure Code Y	Procedure Code Z
Operational Day 1			
Operational Day 2			
Operational Day 365			
Operational Year Total			

The required information should not include any patient record level data or any patient identifying information. If you have any questions regarding the above, please contact Karen Roberts, Compliance Officer at OHCA at (860) 418-7041.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:kr

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

WAIVER

Saint Mary's Hospital hereby stipulates and agrees that in connection with a meeting between the Office of Health Care Access and Saint Mary's Hospital, The Waterbury Hospital and John Dempsey Hospital on Thursday, January 15, 2009, no statement that is made during that meeting by any person shall be subject to discovery or the introduction into evidence in any subsequent legal action or claim relating to the Final Decision or Agreed Settlement issued by the Office of Health Care Access in Docket Number: 08-31202. Saint Mary's Hospital enters into this waiver agreement freely and voluntarily, after having had the opportunity to consult with counsel concerning this matter.

January 15, 2009
Date

Chad W. Wable
Duly Authorized Agent for
Saint Mary's Hospital

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

WAIVER

John Dempsey Hospital hereby stipulates and agrees that in connection with a meeting between the Office of Health Care Access and Saint Mary's Hospital, The Waterbury Hospital and John Dempsey Hospital on Thursday, January 15, 2009, no statement that is made during that meeting by any person shall be subject to discovery or the introduction into evidence in any subsequent legal action or claim relating to the Final Decision or Agreed Settlement issued by the Office of Health Care Access in Docket Number: 08-31202. John Dempsey Hospital enters into this waiver agreement freely and voluntarily, after having had the opportunity to consult with counsel concerning this matter.

1/15/2009
Date

Duly Authorized Agent for
John Dempsey Hospital

1/15/09

James Thibeault

An Affirmative Action / Equal Opportunity Employer
410 Capitol Avenue, MS #13HCA, P.O. Box 340308, Hartford, Connecticut 06134-0308
Telephone: (860) 418-7001 • Toll free (800) 797-9688
Fax: (860) 418-7053

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

WAIVER

The Waterbury Hospital hereby stipulates and agrees that in connection with a meeting between the Office of Health Care Access and Saint Mary's Hospital, The Waterbury Hospital and John Dempsey Hospital on Thursday, January 15, 2009, no statement that is made during that meeting by any person shall be subject to discovery or the introduction into evidence in any subsequent legal action or claim relating to the Final Decision or Agreed Settlement issued by the Office of Health Care Access in Docket Number: 08-31202. The Waterbury Hospital enters into this waiver agreement freely and voluntarily, after having had the opportunity to consult with counsel concerning this matter.

January 15, 2009
Date

John H. Tobin
Duly Authorized Agent for
The Waterbury Hospital

An Affirmative Action / Equal Opportunity Employer
410 Capitol Avenue, MS #13HCA, P.O. Box 340308, Hartford, Connecticut 06134-0308
Telephone: (860) 418-7001 • Toll free (800) 797-9688
Fax: (860) 418-7053

Meeting regarding Certificate of Need authorized under Docket Number 08-31202-CON
Waterbury Hospital, St. Mary's Hospital and John Dempsey Hospital

Meeting #1 on Friday, August 7, 2009 commencing at 8:00 AM

Present are as follows:

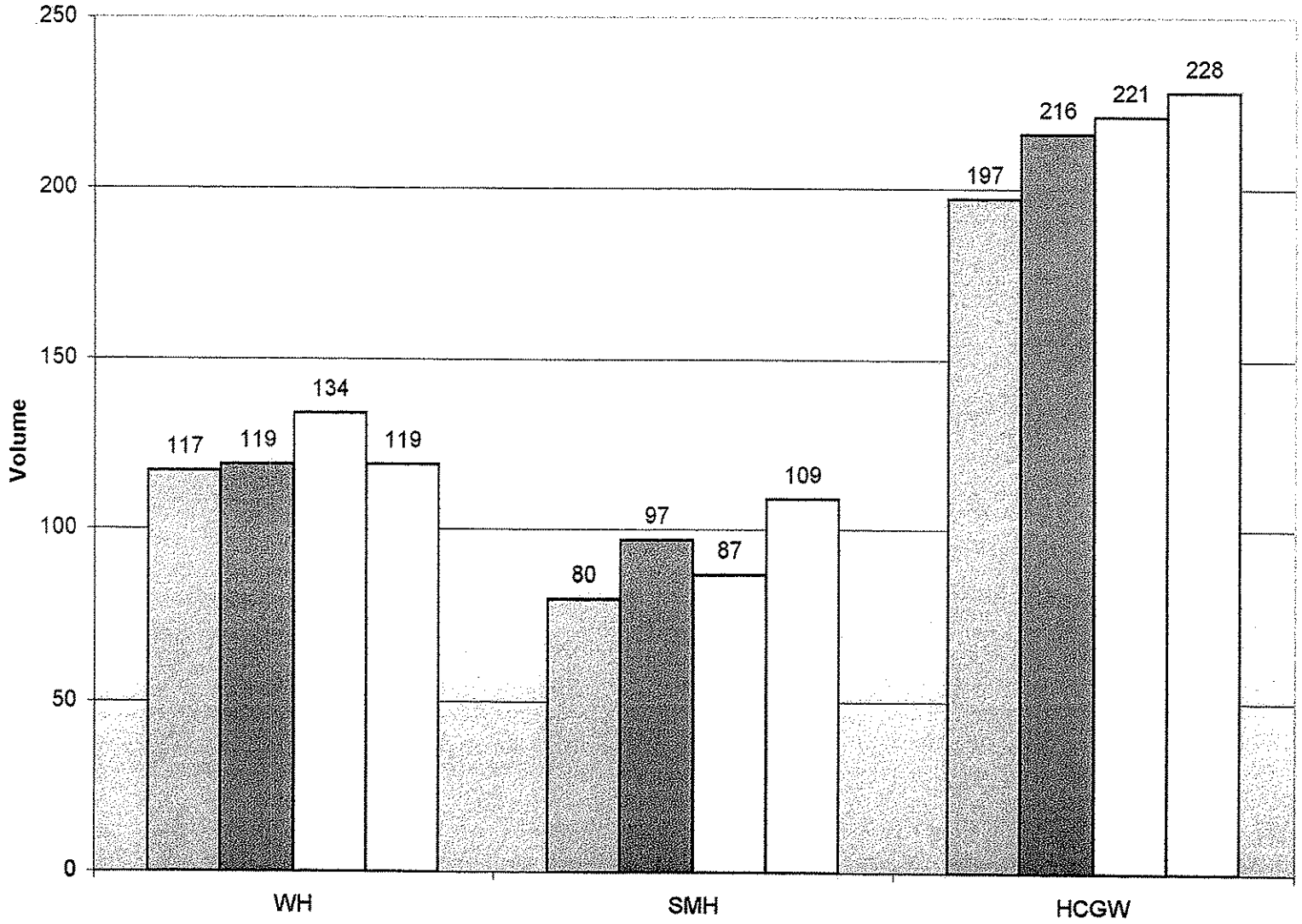
From the Applicant Hospitals

Print Name	Print Title	Print Affiliatiom
CHAD W. WASIE	CEO	SAINT MARY'S HOSPITAL
JOHN H. TOBIN	PRESIDENT/CSO	WATERBURY HOSPITAL
Lorraine Shea	Executive Director	Heart Center of Gtr Wtby
Carlo T Lavenia MD	VP Health Affairs/Dean	Univ. Connecticut

From the Office of Health Care Access

Print Name	Print Title	Print Affiliatiom
Kim Martone	Director of operations	OHCA
KAREN ROBERTS	Compliance Officer	OHCA
Carolyn Treiss	Chief of Staff	OHCA
Cristine Vogel	Commissioner	OHCA

OHS Comparison YR 1,2,3,4

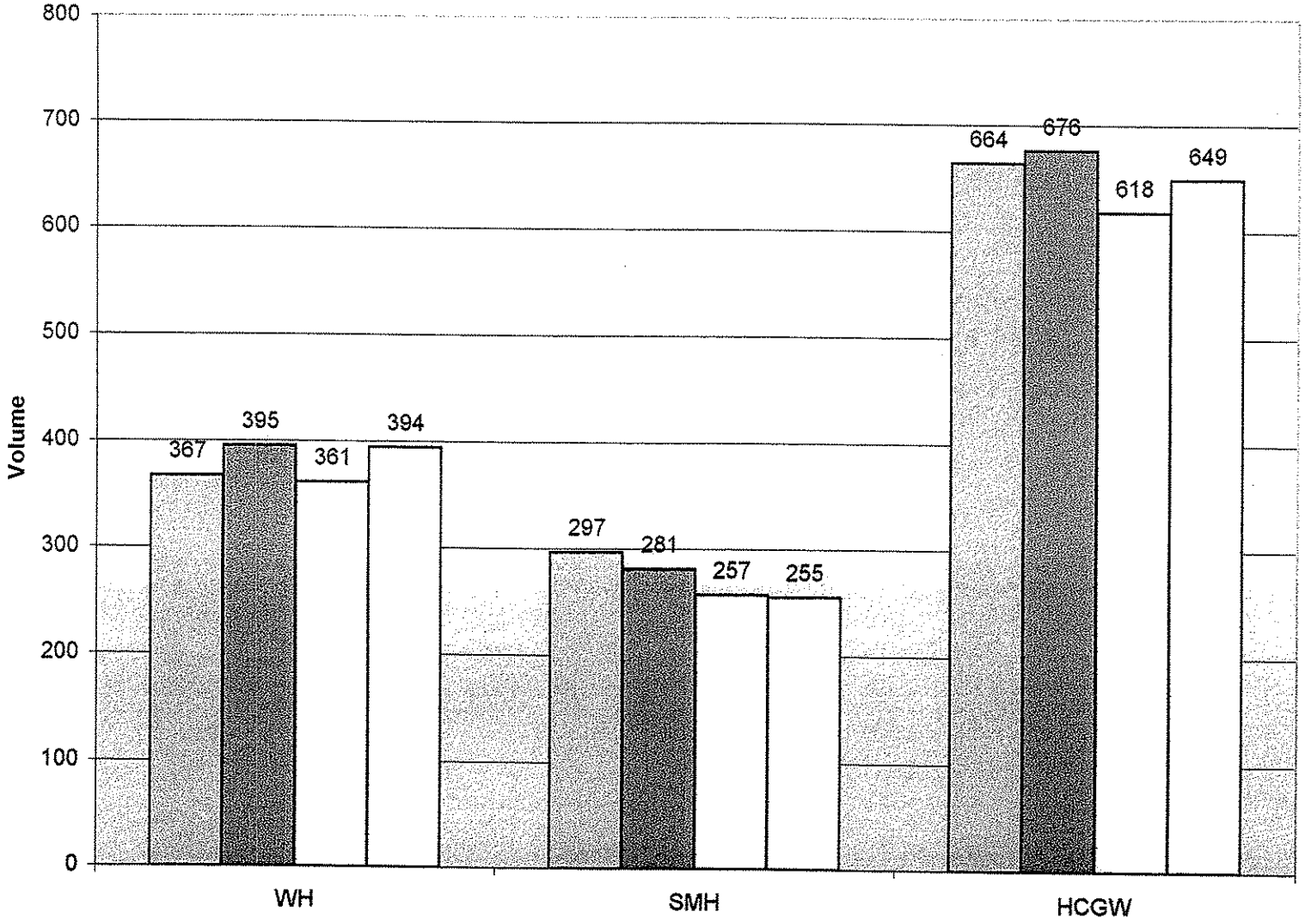


As a Program OHS volumes continue to increase with a 16% increase from YR1 to YR4.

SMH has demonstrated an increase of 36% from YR1 to YR4 and a 25% increase from YR3 to YR4.

WH demonstrated a decrease of 11% from YR3 to YR4 with volumes staying relatively flat from YR1 to YR4.

PCI Comparison YR 1,2,3,4



As a Program the volumes have increased 5% from YR3 to YR4 demonstrating a 2% decrease from YR1.

PCI volumes for SMH have remained virtually the same time from YR3 to YR4 and have demonstrated a 14% decrease from YR1 to YR4 despite a 7% increase in diagnostic caths from YR1 to YR4.

PCI volumes for WH have fluctuated each year with an increase from YR 1 to YR4 of 7%.

HEART CENTER of Greater Waterbury
Advanced Cardiac Care. Close to Home.

Summer 2009

THE BEAT GOES ON

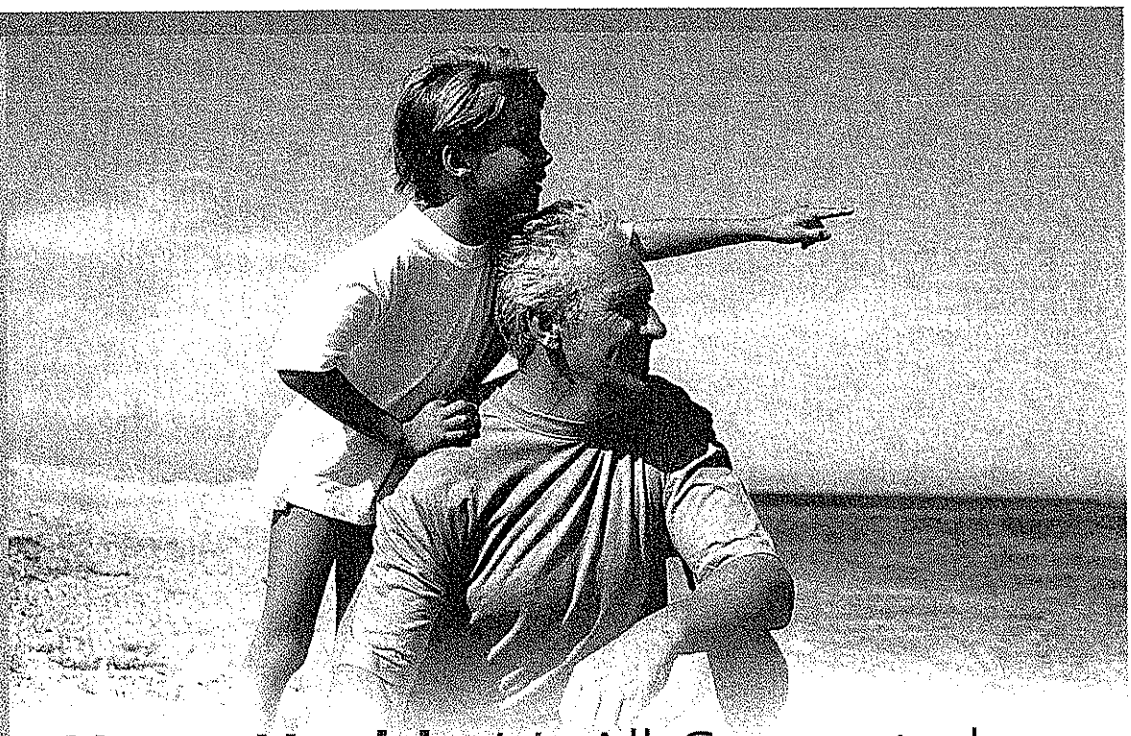
Message from the Executive Director



Loraine C. Shea
Executive Director,
Heart Center of
Greater Waterbury

With this issue the Heart Center of Greater Waterbury celebrates its fourth year of providing advanced cardiac care to the residents of this community. In addition to the lifesaving medical care, the Heart Center is your source for heart health information. In this issue we review several risk factors for heart disease and their relationship to one another. Maintaining an awareness of your personal risk factors and keeping them in check or reducing their effect can help you maintain and improve your overall well-being.

For more information on risk factors and heart health, log on to our Web site at **www.heartcentergw.org** or schedule a heart health presentation for your community group by calling us at **203-575-1992**. Having accurate information is the first step to improving or maintaining your heart health!



Heart Health: It's All Connected

Overall heart health is dependent on many factors. Knowing the risk factors that can lead to coronary artery disease (CAD), understanding how these risk factors all relate to each other, and keeping them under control are key steps in understanding how to keep your heart healthy.

The Link Between Diabetes, Obesity, and Heart Disease

Diabetes is a growing public health problem in the United States. More than 23 million Americans have diabetes. About 1.6 million new cases were diagnosed in 2007 alone.

Health experts link the epidemic to a disturbing trend: Americans are losing the battle of the bulge. Nearly two-thirds of American adults are overweight or obese. Carrying too much weight is one of the main risk factors for type 2 diabetes, the most common form of the disorder. In turn, diabetes is one of the leading risk factors for heart disease.

Pre-Diabetes and Diabetes

Pre-diabetes is defined as higher than normal blood sugar, but not high enough to be true diabetes. More than one in four adults in the United States has this condition. Within 10 years of this diagnosis, many people with pre-diabetes will develop type 2 diabetes.

(continued on page 3)

IN THIS ISSUE

2 Upcoming Events
2 Best Bets to Prevent Type 2 Diabetes
4 Primary Stroke Centers Close to Home



Best Bets to Prevent Type 2 Diabetes

Do you know your risk factors for type 2 diabetes? People with a family history of diabetes need to be particularly cautious. In addition to family history, other risk factors include:

- Age—about half of all cases occur in people ages 55 and older
- Being African-American, Hispanic-American, Asian, Pacific Islander, or American Indian
- Excess weight
- An inactive lifestyle
- A personal history of gestational diabetes—a form of the disease that affects some women during pregnancy

The Importance of Screening

Because diabetes often strikes without warning and the symptoms may be so mild that they go unnoticed, it is important to get screened for the disease on a regular basis.

Some early symptoms of type 2 diabetes may include:

- Excessive thirst and frequent urination
- Weight loss, fatigue, and drowsiness
- Frequent skin, gum, bladder, or vaginal infections
- Slow healing of cuts and bruises
- Blurred vision
- Numbness or tingling in the hands or feet
- Loss of coordination
- Itchy skin
- Nausea and vomiting

If detected, diabetes usually can be controlled. Some people can keep the disease in check by losing weight and exercising regularly—the same healthy measures that help prevent the disease. Others may need insulin and/or other medications.

Diabetes is the leading cause of heart disease, nerve disease, kidney disease, eye disease, and amputation. By maintaining good blood sugar control, many of these problems can be delayed or prevented.

The Heart Center offers group education for diabetes prevention. Call **203-575-5573** for information about our fall programs.

Upcoming Events

Heart Center of Greater Waterbury Support Group

July 13, 2009
7 p.m.
Harold Leever Regional Cancer Center
1075 Chase Parkway
Waterbury, CT
To register, call **203-575-5573.**

The following program will be offered at three different locations: "Hypertension Is a Major Risk Factor for Heart Attack and Stroke." Plan to attend and learn what you can do to control hypertension.

June 30, 2009
11 a.m.
The Federation, Jewish Community of Western CT
444 Main St. N.
Southbury, CT
To register, call **203-575-5573.**

July 14, 2009
11 a.m.
Cheshire Senior Center
240 Maple Ave.
Cheshire, CT
To register, call **203-575-5573.**

July 15, 2009
7 p.m.
The Harold Leever Regional Cancer Center
1075 Chase Parkway
Waterbury, CT
To register, call **203-575-5573.**

However, a healthy lifestyle can help the body become better at using sugar so it doesn't build up in the blood. Research shows that people with pre-diabetes can reduce their risk for full diabetes by more than half when they lose 5 to 7 percent of their body weight by exercising and eating right.

People with pre-diabetes rarely have symptoms, so it is a good idea to have your doctor check your blood sugar if you are age 45 or older. Younger people may want to ask their doctor about testing if they are overweight and have at least one other risk factor for diabetes. These include:

- Not exercising regularly
- Being African-American, Asian-American, or Latino
- Low HDL, or "good," cholesterol or high triglyceride levels

Because pre-diabetes is a precursor to diabetes, taking steps to diminish the chance of developing diabetes is vital.

A Problem for Young and Old Alike

Although the risk for type 2 diabetes increases with age, type 2 diabetes and obesity are growing fastest among young adults. In the last decade, type 2 diabetes rose by 70 percent in people ages 30 to 39. Obesity, too, jumped by 70 percent in people ages 18 to 29.

Even children and teens can develop type 2 diabetes. Experts say severe obesity in young people plays a major role in this development. Today, 15 percent of children and teens are overweight.

Other Ideas to Lower Your Risk

If you want to reduce your risk for developing diabetes—and complications such as heart disease, stroke, and blindness—try these strategies:

- **Shed extra pounds.** Losing just 5 to 7 percent of your weight may help ward off the disease. If you weigh 200 pounds, that's 10 to 15 pounds.
- **Go for a walk.** Walking just 30 minutes a day may help prevent diabetes. So can other regular exercise, such as dancing, swimming, or biking.
- **Watch how much you eat.** If you have trouble keeping your weight under control, try writing down what you eat and drink each day.

If you are concerned about getting diabetes, talk with your doctor about ways you can reduce your risk and live a healthier life.

The Link Between Diabetes and CAD

Approximately 30 percent of people with CAD also have diabetes. Over time, high blood sugar levels may work with other heart risk factors such as high blood pressure and high cholesterol to raise your risk of having a heart attack or stroke. There are several reasons why diabetes and heart disease go hand in hand:

- More than 70 percent of adults with diabetes also have high blood pressure or are on medication for it. High blood pressure is associated with stiff arteries, a major risk factor for CAD.
- Chances are, if you have diabetes, you also have abnormal cholesterol levels. Too little HDL ("good") cholesterol and too much LDL ("bad") cholesterol can lead to buildup on the inner walls of the arteries. Coronary artery disease occurs when the arteries become hardened or narrowed due to this buildup of plaque.

But you can prevent this—and help manage your CAD—by taking steps to control all these factors.

To learn about other major risk factors for heart disease, please see the Upcoming Events on page 2.



HEART CENTER of Greater Waterbury
Heart Center of Greater Waterbury
1075 Chase Parkway 2nd flr.
PO Box 2153
Waterbury, CT 06722

Non-Profit Org.
U.S. Postage
PAID
Heart Center of Greater Waterbury

Primary Stroke Centers Close to Home

Both Heart Center of Greater Waterbury campuses, Saint Mary's Hospital and Waterbury Hospital, have recently been designated as Primary Stroke Centers by the Connecticut Department of Health. Both hospitals have met the criteria set by the state for the provision of quality stroke care.



Stroke is one of the leading causes of death in the U.S., right behind heart disease. The greater Waterbury community is fortunate to have these quality health care organizations available to care for their total cardiovascular needs.

Lower Your Health Risks with **Exercise**

By now, many people are well-versed in the exercise advice prescribed by many experts: Get at least 30 minutes of moderate activity on most days of the week.

Following this advice can result in major health benefits. But does it go far enough?

You may be able to further reduce your risk for some chronic illnesses—such as those that run in your family—by expanding on this workout schedule.

Heart Disease

You can reduce your risk even further by working out longer or harder than 30 minutes of moderate activity a day. In one study, runners who averaged more than 40 miles a week had a 30 percent lower risk for heart disease than those who ran less than 10 miles a week.

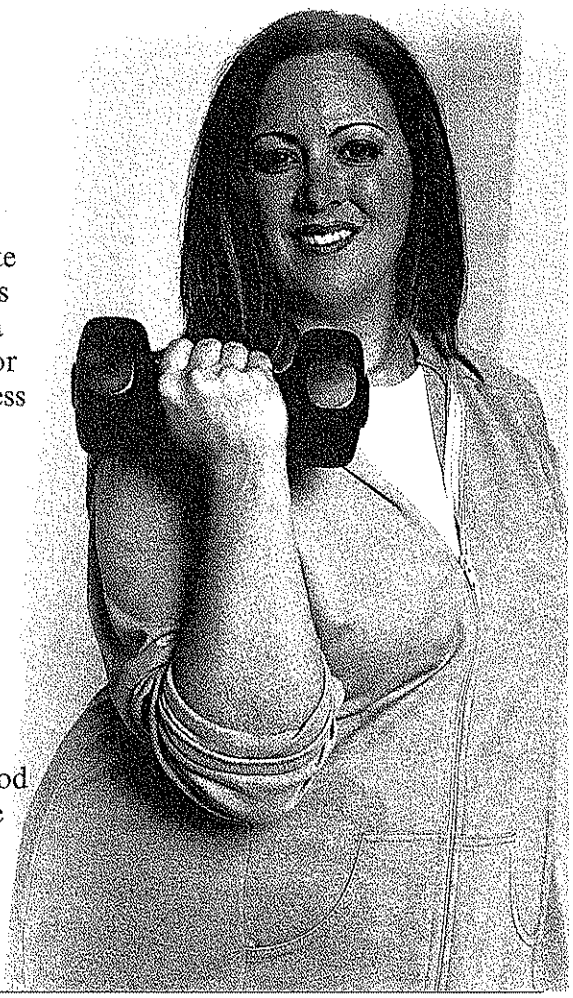
However, there is a limit to how much you can exercise for heart health. If you are at high risk for heart disease or have heart disease, check with your doctor before starting a vigorous program.

Type 2 Diabetes

Regular aerobic exercise may help prevent diabetes by controlling blood sugar levels. It also can help people control another risk factor: excess weight.

Another good exercise for weight control is strength training, which can increase your metabolism.

Would you like to schedule a heart health presentation for your community group? Give us a call at 203-575-1992.



THE BEAT GOES ON

The Beat Goes On is published by the Heart Center of Greater Waterbury. The newsletter provides general health information and is not intended to provide personal medical advice, which should be sought from a physician. © 2009 Printed in U.S.A.

Loraine Shea, Executive Director, Heart Center of Greater Waterbury

6032M



A FOUR-WEEK SERIES ON DIABETES PREVENTION

Understand metabolic syndrome and the factors associated with diabetes from Sandra Micalizzi, APRN, Certified Diabetes Educator and the Heart Center of Greater Waterbury's Clinical Nurse Specialist for Diabetes. Join us to learn how to stay healthy and enjoy some heart healthy snacks! These **FREE** seminars require pre-registration.

ATTEND ONE OR ALL OF THE FOLLOWING SESSIONS TO LEARN:

WHAT IS DIABETES? | THURSDAY, FEBRUARY 12TH | 1:00PM – 2:00PM

HEALTHY EATING & DIABETES | THURSDAY, FEBRUARY 19TH | 1:00PM – 2:00PM

CARBOHYDRATE COUNTING | THURSDAY, FEBRUARY 26TH | 1:00PM – 2:00PM

COMPLICATIONS OF DIABETES | THURSDAY, MARCH 5TH | 1:00PM – 2:00PM

PLEASE CALL 1-203-262-6868 BY FEBRUARY 10TH TO RESERVE YOUR SPACE.

THE WATERMARK
AT EAST HILL

611 East Hill Road | Southbury, CT 06488 | 1-203-262-6868 | www.watermarkcommunities.com

INDEPENDENT LIVING | ASSISTED LIVING | MEMORY CARE | SKILLED NURSING

HEART CENTER
of Greater Waterbury

RECEIVED
2009 AUG 17 A 11: 39
CONNECTICUT OFFICE OF HEALTH CARE ACCESS

Karen Roberts
Office of Health Care Access
410 Capitol Avenue MS# 13HCA
P.O. Box 340308
Hartford, CT 06134-0308

August 17, 2009

Re: **Docket Number: 08-31202 CON The Waterbury Hospital and Saint Mary's Hospital Corporation, d/b/a/ Heart Center of Greater Waterbury and University of Connecticut Health Center / John Dempsey Hospital**

Dear Karen:

Enclosed are the procedure and patient volume reports for Saint Mary's Hospital and Waterbury Hospital from July 18, 2008 through July 17, 2009.

The ACC Executive Summaries for both Saint Mary's Hospital and Waterbury Hospital are provided. The ACC Summaries represent data from Jan 1, 2008 through March 31, 2009.

The STS Regional Outcome Comparisons are also provided for both hospitals. The STS comparison summaries represent the period from January 2008 – December 2008.

If you have any questions, please feel free to contact me at (203)-575-5572 or via email at mlamour@hcogw.org

Sincerely,

Marjorie Lamour

Marjorie Lamour
Quality Data Analyst
Heart Center of Greater Waterbury
Enclosure

WATERBURY HOSPITAL Saint Mary's HOSPITAL UConn Health Center

Waterbury Hospital
PCI Case Volume
7/18/2008 - 7/17/2009

The following Codes were used to determine PCI Volume:
00.40 00.45 00.66 36.06 36.07
In case of an attempted but failed PCI, no PCI code is provided.

Dates	PCI Volume
7/18/2008 -7/31/2008	9
08-2008	30
09-2008	33
10-2008	39
11-2008	22
12-2008	35
01-2009	42
02-2009	39
03-2009	29
04-2009	39
05-2009	31
06-2009	30
07/1/2008 -7/17/2009	17
Year 4 Total	**395**

Waterbury Hospital
PCI Patient Volume
7/18/2008 - 6/30/2009

Dates	Patient Total
7/18/2008 -7/31/2008	8
08-2008	29
09-2008	31
10-2008	36
11-2008	22
12-2008	33
01-2009	39
02-2009	39
03-2009	27
04-2009	36
05-2009	30
06-2009	29
07/1/2008 -7/17/2009	17
Year 4 Total	**376**

Waterbury Hospital
OHS Case Volume
7/18/2008 -7/17/2009

The following Codes were used to determine Open Heart Surgery Volume:

35.10 35.11 35.12 35.13 35.14 35.20 35.21
35.22 35.23 35.24 35.25 35.26 35.27 35.28
35.33 35.61 35.81 35.95 36.10 36.11 36.12
36.13 36.14 36.15 36.16 36.17 36.19 37.33 39.52

Dates	OHS Count
7/18/2008 -7/31/2008	3
08-2008	9
09-2008	17
10-2008	6
11-2008	9
12-2008	13
01-2009	14
02-2009	16
03-2009	4
04-2009	10
05-2009	6
06-2009	7
07/1/2008 -7/17/2009	5
Year 4 Total	**119**

Waterbury Hospital
OHS Patient Volume
7/18/2008 -7/17/2009

Dates	Patient Total
7/18/2008 -7/31/2008	3
08-2008	9
09-2008	17
10-2008	6
11-2008	9
12-2008	13
01-2009	14
02-2009	16
03-2009	4
04-2009	10
05-2009	6
06-2009	7
07/1/2008 -7/17/2009	5
Year 4 Total	**119**

EXECUTIVE SUMMARY

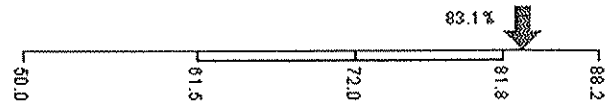
PCI and Diagnostic Catheterization Registry Metrics
Waterbury Hospital (841765) compared to Rolling Four Quarters (R4Q) for All Hospitals - 2008Y1

PCI Quality Metrics

1. Proportion of STEMI Pts with DBT <= 90"

My Hospital: 83.1% (Rank: 190 of 824, Rank Percentile: 78)

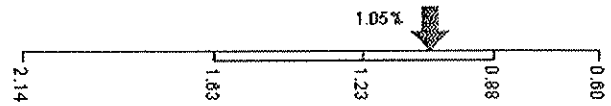
The proportion of primary PCI patients with DBT (door to balloon time) <= 90 minutes. The goal is to have a DBT of <= 90 minutes for all non-transferred patients pts having an ST elevated MI and having primary PCI. [Detail Line: 1771]



2. Risk Adjusted Mortality

My Hospital: 1.05% (Rank: 295 of 771, Rank Percentile: 62)

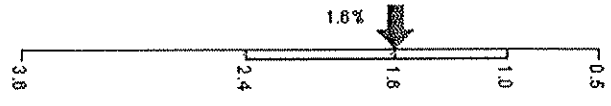
Your hospital's PCI mortality rate adjusted using the ACC-NCDR® risk adjustment model [Detail Line: 1736]



3. Incidence of Vascular Complications

My Hospital: 1.6% (Rank: 428 of 844, Rank Percentile: 52)

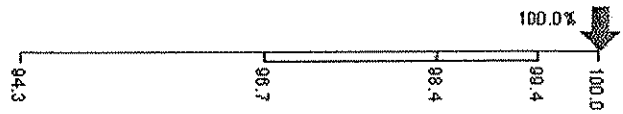
Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 2039]



4. Thienopyridine on Discharge (Patients with Stents)

My Hospital: 100.0% (Rank: 2 of 842, Rank Percentile: 95)

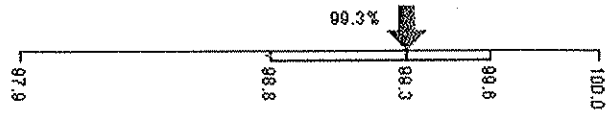
Percentage of eligible PCI patients who received any type of stent and had thienopyridine (such as clopidogrel or ticlopidine) prescribed at discharge. [Detail Line: 1587]



5. Angiographic Success (Lesions with Stents)

My Hospital: 99.3% (Rank: 421 of 843, Rank Percentile: 53)

Percentage of stented lesions with angiographic success (defined as post -stenosis <=20% for lesions with a stent implanted). [Detail Line: 1864]

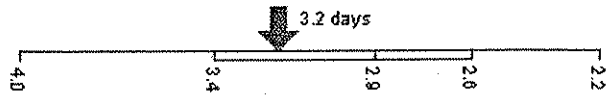


PCI Utilization Metrics

7. Length of Stay for All PCI Patients

My Hospital: 3.2 days

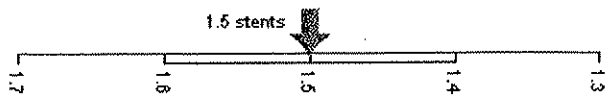
Mean total length of hospital stay (in days) for all patients having at least one PCI during admission. [Detail Line: 2094]



8. Mean Number of Stents per PCI Procedure

My Hospital: 1.5 stents

Mean number of stents deployed per PCI procedure with at least one stent. This includes all stents deployed: bare metal, drug eluting, coated, and covered. [Detail Line: 1979]

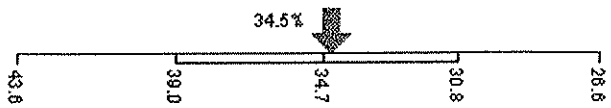


Diagnostic Cath Quality Metrics

9. Incidence of Non-Obstructive CAD

My Hospital: 34.5% (Rank: 333 of 674, Rank Percentile: 51)

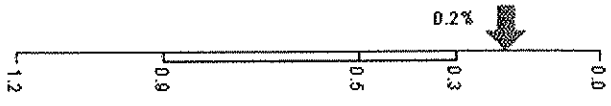
Patients having a left heart catheterization (including only patients with the indications of r/o CAD and/or arrhythmia) where all coronary branches have <50% stenosis. (Note: if a vessel is not assessed, its stenosis is assumed as 0). [Detail Line: 1337]



10. Incidence of Vascular Complications

My Hospital: 0.2% (Rank: 149 of 674, Rank Percentile: 84)

Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 1435]



© 2008, American College of Cardiology Foundation

EXECUTIVE SUMMARY

PCI and Diagnostic Catheterization Registry Metrics
Waterbury Hospital (841765) compared to Rolling Four Quarters (R4Q) for All Hospitals - 2008Y2

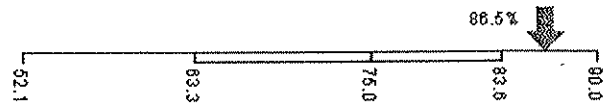
PCI Quality Metrics

Worse — Better

1. Proportion of STEMI Pts with DBT <= 90"

My Hospital: 86.5% (Rank: 143 of 857, Rank Percentile: 84)

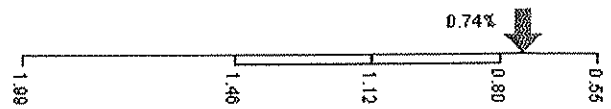
The proportion of primary PCI patients with DBT (door to balloon time) <= 90 minutes. The goal is to have a DBT of <= 90 minutes for all non-transferred patients pts having an ST elevated MI and having primary PCI. [Detail Line: 1771]



2. Risk Adjusted Mortality

My Hospital: 0.74% (Rank: 163 of 800, Rank Percentile: 80)

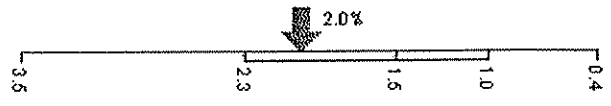
Your hospital's PCI mortality rate adjusted using the ACC-NCDR® risk adjustment model [Detail Line: 1736]



3. Incidence of Vascular Complications

My Hospital: 2.0% (Rank: 585 of 876, Rank Percentile: 35)

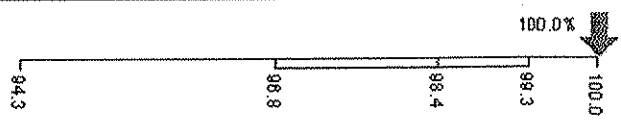
Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 2039]



4. Thienopyridine on Discharge (Patients with Stents)

My Hospital: 100.0% (Rank: 3 of 875, Rank Percentile: 94)

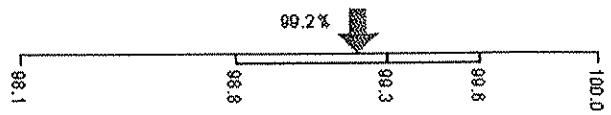
Percentage of eligible PCI patients who received any type of stent and had thienopyridine (such as clopidogrel or ticlopidine) prescribed at discharge. [Detail Line: 1587]



5. Angiographic Success (Lesions with Stents)

My Hospital: 99.2% (Rank: 478 of 875, Rank Percentile: 48)

Percentage of stented lesions with angiographic success (defined as post -stenosis <=20% for lesions with a stent implanted). [Detail Line: 1864]

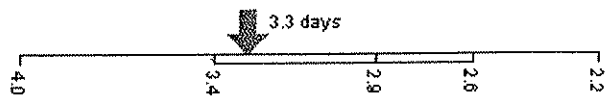


PCI Utilization Metrics

7. Length of Stay for All PCI Patients

My Hospital: 3.3 days

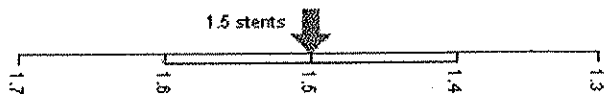
Mean total length of hospital stay (in days) for all patients having at least one PCI during admission. [Detail Line: 2094]



8. Mean Number of Stents per PCI Procedure

My Hospital: 1.5 stents

Mean number of stents deployed per PCI procedure with at least one stent. This includes all stents deployed: bare metal, drug eluting, coated, and covered. [Detail Line: 1979]



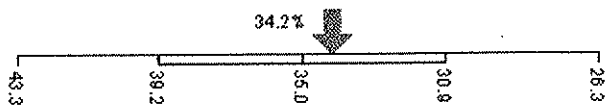
Diagnostic Cath Quality Metrics

Worse — Better

9. Incidence of Non-Obstructive CAD

My Hospital: 34.2% (Rank: 313 of 695, Rank Percentile: 55)

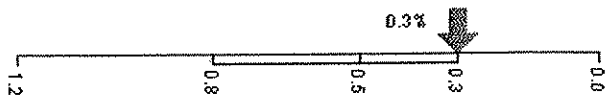
Patients having a left heart catheterization (including only patients with the indications of r/o CAD and/or arrhythmia) where all coronary branches have <50% stenosis. (Note: if a vessel is not assessed, its stenosis is assumed as 0). [Detail Line: 1337]



10. Incidence of Vascular Complications

My Hospital: 0.3% (Rank: 264 of 695, Rank Percentile: 68)

Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 1435]



© 2008, American College of Cardiology Foundation

EXECUTIVE SUMMARY

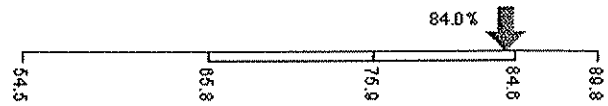
PCI and Diagnostic Catheterization Registry Metrics
Waterbury Hospital (841765) compared to Rolling Four Quarters (R4Q) for All Hospitals - 2008Y3

PCI Quality Metrics

1. Proportion of STEMI Pts with DBT <= 90"

My Hospital: 84.0% (Rank: 238 of 882, Rank Percentile: 74)

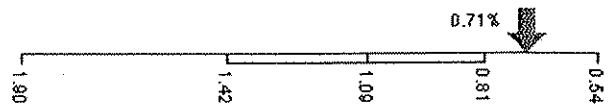
The proportion of primary PCI patients with DBT (door to balloon time) <= 90 minutes. The goal is to have a DBT of <= 90 minutes for all non-transferred patients pts having an ST elevated MI and having primary PCI. [Detail Line: 1771]



2. Risk Adjusted Mortality

My Hospital: 0.71% (Rank: 149 of 830, Rank Percentile: 82)

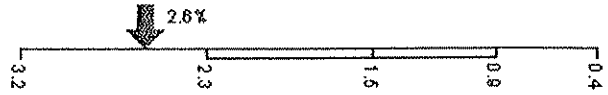
Your hospital's PCI mortality rate adjusted using the ACC-NCDR® risk adjustment model [Detail Line: 1736]



3. Incidence of Vascular Complications

My Hospital: 2.6% (Rank: 750 of 899, Rank Percentile: 17)

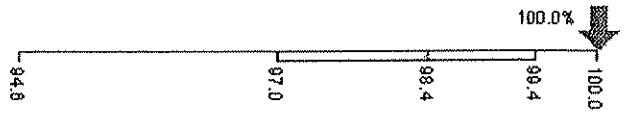
Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 2039]



4. Thienopyridine on Discharge (Patients with Stents)

My Hospital: 100.0% (Rank: 4 of 898, Rank Percentile: 95)

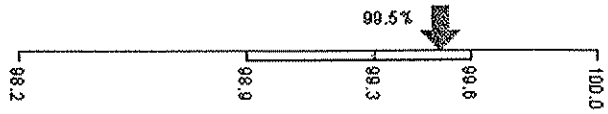
Percentage of eligible PCI patients who received any type of stent and had thienopyridine (such as clopidogrel or ticlopidine) prescribed at discharge. [Detail Line: 1587]



5. Angiographic Success (Lesions with Stents)

My Hospital: 99.5% (Rank: 335 of 898, Rank Percentile: 67)

Percentage of stented lesions with angiographic success (defined as post -stenosis <=20% for lesions with a stent implanted). [Detail Line: 1864]

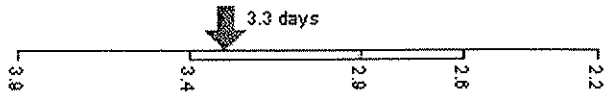


PCI Utilization Metrics

7. Length of Stay for All PCI Patients

My Hospital: 3.3 days

Mean total length of hospital stay (in days) for all patients having at least one PCI during admission. [Detail Line: 2094]



8. Mean Number of Stents per PCI Procedure

My Hospital: 1.6 stents

Mean number of stents deployed per PCI procedure with at least one stent. This includes all stents deployed: bare metal, drug eluting, coated, and covered. [Detail Line: 1979]

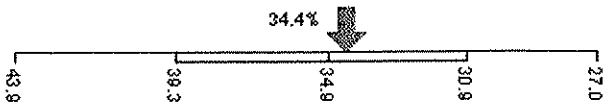


Diagnostic Cath Quality Metrics

9. Incidence of Non-Obstructive CAD

My Hospital: 34.4% (Rank: 343 of 720, Rank Percentile: 53)

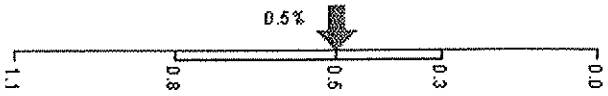
Patients having a left heart catheterization (including only patients with the indications of r/o CAD and/or arrhythmia) where all coronary branches have <50% stenosis. (Note: if a vessel is not assessed, its stenosis is assumed as 0). [Detail Line: 1337]



10. Incidence of Vascular Complications

My Hospital: 0.5% (Rank: 391 of 720, Rank Percentile: 50)

Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 1435]



© 2009, American College of Cardiology Foundation

EXECUTIVE SUMMARY

PCI and Diagnostic Catheterization Registry Metrics
Waterbury Hospital (841765) compared to Rolling Four Quarters (R4Q) for All Hospitals - 2008Y4

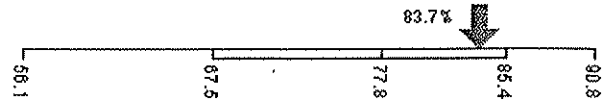
PCI Quality Metrics

Worse — Better

1. Proportion of STEMI Pts with DBT <= 90"

My Hospital: 83.7% (Rank: 276 of 906, Rank Percentile: 71)

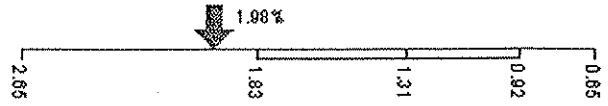
The proportion of primary PCI patients with DBT (door to balloon time) <= 90 minutes. The goal is to have a DBT of <= 90 minutes for all non-transferred patients pts having an ST elevated MI and having primary PCI. [Detail Line: 1771]



2. Risk Adjusted Mortality

My Hospital: 1.98% (Rank: 662 of 858, Rank Percentile: 20)

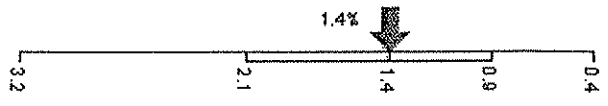
Your hospital's PCI mortality rate adjusted using the ACC-NCDR® risk adjustment model [Detail Line: 1736]



3. Incidence of Vascular Complications

My Hospital: 1.4% (Rank: 452 of 923, Rank Percentile: 53)

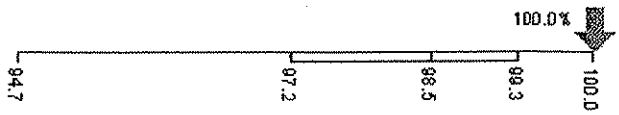
Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 2039]



4. Thienopyridine on Discharge (Patients with Stents)

My Hospital: 100.0% (Rank: 1 of 922, Rank Percentile: 100)

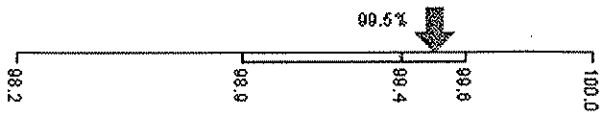
Percentage of eligible PCI patients who received any type of stent and had thienopyridine (such as clopidogrel or ticlopidine) prescribed at discharge. [Detail Line: 1587]



5. Angiographic Success (Lesions with Stents)

My Hospital: 99.5% (Rank: 355 of 922, Rank Percentile: 66)

Percentage of stented lesions with angiographic success (defined as post-stenosis <=20% for lesions with a stent implanted). [Detail Line: 1864]

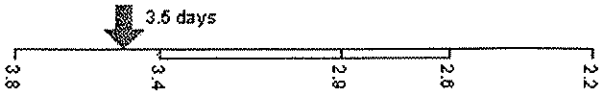


PCI Utilization Metrics

7. Length of Stay for All PCI Patients

My Hospital: 3.5 days

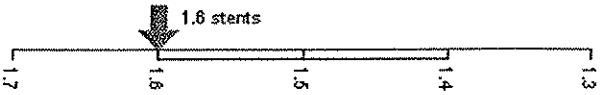
Mean total length of hospital stay (in days) for all patients having at least one PCI during admission. [Detail Line: 2094]



8. Mean Number of Stents per PCI Procedure

My Hospital: 1.6 stents

Mean number of stents deployed per PCI procedure with at least one stent. This includes all stents deployed: bare metal, drug eluting, coated, and covered. [Detail Line: 1979]



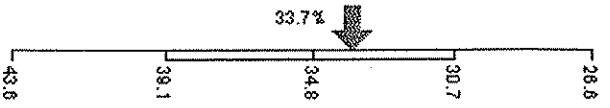
Diagnostic Cath Quality Metrics

Worse — Better

9. Incidence of Non-Obstructive CAD

My Hospital: 33.7% (Rank: 314 of 733, Rank Percentile: 57)

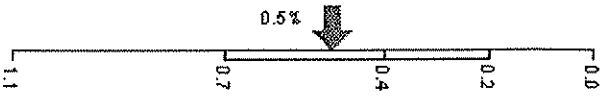
Patients having a left heart catheterization (including only patients with the indications of r/o CAD and/or arrhythmia) where all coronary branches have <50% stenosis. (Note: if a vessel is not assessed, its stenosis is assumed as 0). [Detail Line: 1337]



10. Incidence of Vascular Complications

My Hospital: 0.5% (Rank: 419 of 733, Rank Percentile: 47)

Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 1435]



© 2009, American College of Cardiology Foundation

EXECUTIVE SUMMARY

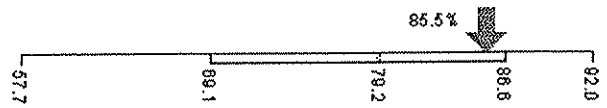
PCI and Diagnostic Catheterization Registry Metrics
Waterbury Hospital (841765) compared to Rolling Four Quarters (R4Q) for All Hospitals - 2009Y1

PCI Quality Metrics

1. Proportion of STEMI Pts with DBT <= 90"

My Hospital: 85.5% (Rank: 278 of 949, Rank Percentile: 72)

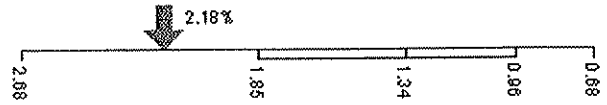
The proportion of primary PCI patients with DBT (door to balloon time) <= 90 minutes. The goal is to have a DBT of <= 90 minutes for all non-transferred patients pts having an ST elevated MI and having primary PCI. [Detail Line: 1771]



2. Risk Adjusted Mortality

My Hospital: 2.18% (Rank: 718 of 890, Rank Percentile: 17)

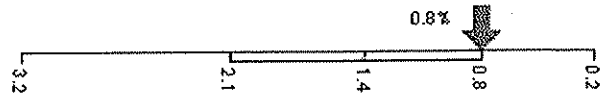
Your hospital's PCI mortality rate adjusted using the ACC-NCDR® risk adjustment model [Detail Line: 1736]



3. Incidence of Vascular Complications

My Hospital: 0.8% (Rank: 260 of 961, Rank Percentile: 76)

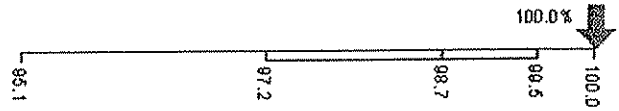
Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 2039]



4. Thienopyridine on Discharge (Patients with Stents)

My Hospital: 100.0% (Rank: 1 of 961, Rank Percentile: 100)

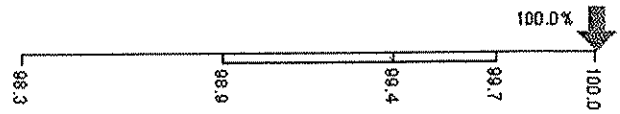
Percentage of eligible PCI patients who received any type of stent and had thienopyridine (such as clopidogrel or ticlopidine) prescribed at discharge. [Detail Line: 1587]



5. Angiographic Success (Lesions with Stents)

My Hospital: 100.0% (Rank: 1 of 961, Rank Percentile: 100)

Percentage of stented lesions with angiographic success (defined as post -stenosis <=20% for lesions with a stent implanted). [Detail Line: 1864]

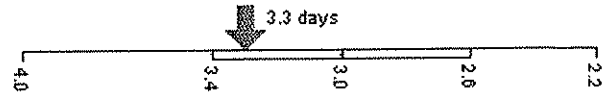


PCI Utilization Metrics

7. Length of Stay for All PCI Patients

My Hospital: 3.3 days

Mean total length of hospital stay (in days) for all patients having at least one PCI during admission. [Detail Line: 2094]



8. Mean Number of Stents per PCI Procedure

My Hospital: 1.7 stents

Mean number of stents deployed per PCI procedure with at least one stent. This includes all stents deployed: bare metal, drug eluting, coated, and covered. [Detail Line: 1979]

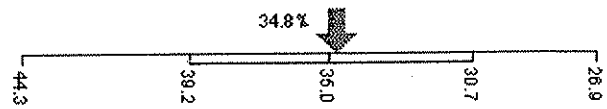


Diagnostic Cath Quality Metrics

9. Incidence of Non-Obstructive CAD

My Hospital: 34.8% (Rank: 368 of 769, Rank Percentile: 52)

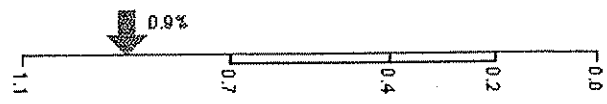
Patients having a left heart catheterization (including only patients with the indications of r/o CAD and/or arrhythmia) where all coronary branches have <50% stenosis. (Note: if a vessel is not assessed, its stenosis is assumed as 0). [Detail Line: 1337]



10. Incidence of Vascular Complications

My Hospital: 0.9% (Rank: 661 of 769, Rank Percentile: 15)

Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 1435]



© 2009, American College of Cardiology Foundation



Regional Outcomes Comparison

Participant 30397
STS Period Ending 12/31/2008

Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER



The region displayed for your site contains the following state(s):
Connecticut

Between 2006 and 2008, there were 10 participants in this region

Waterbury Hospital



Regional Outcomes Comparison

Participant 30397
STS Period Ending 12/31/2008

Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER

	Participant 2008	Region 2008
Isolated CAB		
Number of Cases	73	1,835
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	2.7%	1.9%
Risk-adjusted rate	3.2%	1.7%
Lower 95% confidence limit	0.1%	1.2%
Upper 95% confidence limit	6.3%	2.3%
Operative Mortality		
Observed Rate	5.5%	2.1%
Risk-adjusted rate	6.4%	1.9%
Lower 95% confidence limit	3.0%	1.4%
Upper 95% confidence limit	9.8%	2.5%
Complications Summary & Risk-Adjustment		
Major complications or operative mortality		
Observed Rate	24.7%	16.6%
Risk-adjusted rate	26.6%	16.6%
Lower 95% confidence limit	18.2%	15.0%
Upper 95% confidence limit	35.0%	18.2%
Any reoperation		
Observed Rate	1.4%	5.7%
Risk-adjusted rate	1.4%	5.5%
Lower 95% confidence limit	0.0%	4.6%
Upper 95% confidence limit	6.4%	6.5%
Deep sternal wound infection		
Observed Rate	**0.0%**	0.9%
Risk-adjusted rate	0.0%	0.9%
Lower 95% confidence limit	0.0%	0.6%
Upper 95% confidence limit	1.5%	1.2%
Permanent stroke		
Observed Rate	**6.8%**	1.0%
Risk-adjusted rate	7.1%	1.0%
Lower 95% confidence limit	4.6%	0.5%
Upper 95% confidence limit	9.7%	1.4%

	Participant 2008	Region 2008
Renal failure		
Observed Rate	1.4%	3.9%
Risk-adjusted rate	1.6%	3.8%
Lower 95% confidence limit	0.0%	3.0%
Upper 95% confidence limit	6.0%	4.7%
Prolonged ventilation		
Observed Rate	20.5%	11.1%
Risk-adjusted rate	22.7%	11.3%
Lower 95% confidence limit	15.6%	10.0%
Upper 95% confidence limit	29.9%	12.6%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	11.3	9.7
Median	10.0	8.0
Post-Procedure Length of Stay (days)		
Mean	7.8	7.3
Median	6.0	6.0
Length of Stay Risk-Adjustment		
Short stay: PLOS <6 days		
Observed Rate	32.9%	47.2%
Risk-adjusted rate	33.1%	47.4%
Lower 95% confidence limit	22.4%	45.3%
Upper 95% confidence limit	43.8%	49.5%
Long stay: PLOS >14 days		
Observed Rate	8.2%	5.9%
Risk-adjusted rate	9.1%	5.7%
Lower 95% confidence limit	3.7%	4.7%
Upper 95% confidence limit	14.4%	6.7%

Waterbury Hospital



Regional Outcomes Comparison

Participant 30397
STS Period Ending 12/31/2008

Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER

	Participant 2008	Region 2008
Aortic Valve Replacement		
Number of Cases	12	330
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	0.0%	1.2%
Risk-adjusted rate	0.0%	1.2%
Lower 95% confidence limit	0.0%	0.0%
Upper 95% confidence limit	12.2%	2.9%
Operative Mortality		
Observed Rate	0.0%	1.8%
Risk-adjusted rate	0.0%	1.8%
Lower 95% confidence limit	0.0%	0.0%
Upper 95% confidence limit	12.9%	3.7%
Complications Summary		
Major complications or operative mortality	16.7%	20.9%
Any reoperation	16.7%	11.8%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	0.0%	1.2%
Renal failure	8.3%	3.7%
Prolonged ventilation	16.7%	11.8%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	10.0	10.7
Median	6.0	7.0
Post-Procedure Length of Stay (days)		
Mean	8.5	8.3
Median	5.5	6.0
PLOS <6 days	50.0%	40.3%
PLOS >14 days	16.7%	9.4%

	Participant 2008	Region 2008
Aortic Valve Replacement + CAB		
Number of Cases	23	287
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	0.0%	5.9%
Risk-adjusted rate	0.0%	5.6%
Lower 95% confidence limit	0.0%	3.3%
Upper 95% confidence limit	10.8%	7.9%
Operative Mortality		
Observed Rate	0.0%	6.6%
Risk-adjusted rate	0.0%	6.3%
Lower 95% confidence limit	0.0%	3.8%
Upper 95% confidence limit	11.5%	8.7%
Complications Summary		
Major complications or operative mortality	21.7%	30.3%
Any reoperation	8.7%	11.1%
Deep sternal wound infection	0.0%	0.3%
Permanent stroke	0.0%	1.7%
Renal failure	8.7%	10.7%
Prolonged ventilation	13.0%	21.3%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	12.4	11.8
Median	11.0	8.0
Post-Procedure Length of Stay (days)		
Mean	9.5	9.7
Median	8.0	7.0
PLOS <6 days	21.7%	27.9%
PLOS >14 days	8.7%	12.9%

Waterbury Hospital



Regional Outcomes Comparison

Participant 30397
STS Period Ending 12/31/2008

Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER

	Participant 2008	Region 2008
Mitral Valve Replacement		
Number of Cases	3	61
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	0.0%	3.3%
Risk-adjusted rate	0.0%	2.8%
Lower 95% confidence limit	0.0%	0.0%
Upper 95% confidence limit	21.0%	7.8%
Operative Mortality		
Observed Rate	0.0%	3.3%
Risk-adjusted rate	0.0%	2.8%
Lower 95% confidence limit	0.0%	0.0%
Upper 95% confidence limit	21.8%	7.9%
Complications Summary		
Major complications or operative mortality	0.0%	32.8%
Any reoperation	0.0%	14.8%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	0.0%	1.6%
Renal failure	0.0%	10.5%
Prolonged ventilation	0.0%	23.0%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	13.3	15.3
Median	10.0	11.0
Post-Procedure Length of Stay (days)		
Mean	8.0	11.3
Median	9.0	8.0
PLOS <6 days	33.3%	21.3%
PLOS >14 days	0.0%	19.7%

	Participant 2008	Region 2008
Mitral Valve Replacement + CAB		
Number of Cases	5	48
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	0.0%	12.5%
Risk-adjusted rate	0.0%	10.7%
Lower 95% confidence limit	0.0%	3.8%
Upper 95% confidence limit	28.8%	17.7%
Operative Mortality		
Observed Rate	0.0%	12.5%
Risk-adjusted rate	0.0%	10.7%
Lower 95% confidence limit	0.0%	3.6%
Upper 95% confidence limit	29.9%	17.9%
Complications Summary		
Major complications or operative mortality	80.0%	60.4%
Any reoperation	0.0%	20.8%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	0.0%	10.4%
Renal failure	0.0%	20.5%
Prolonged ventilation	80.0%	54.2%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	16.4	18.7
Median	13.0	11.0
Post-Procedure Length of Stay (days)		
Mean	13.2	15.4
Median	11.0	10.0
PLOS <6 days	0.0%	16.7%
PLOS >14 days	20.0%	33.3%

Waterbury Hospital



Regional Outcomes Comparison

Participant 30397
STS Period Ending 12/31/2008

Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER

	Participant 2008	Region 2008
Mitral Valve Repair		
Number of Cases	4	117
Mortality Summary & Risk-Adjustment		
In-hospital Mortality	0.0%	0.0%
Operative Mortality	0.0%	0.0%
Complications Summary		
Major complications or operative mortality	0.0%	16.2%
Any reoperation	0.0%	9.4%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	0.0%	2.6%
Renal failure	0.0%	0.9%
Prolonged ventilation	0.0%	7.7%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	11.3	7.4
Median	5.5	6.0
Post-Procedure Length of Stay (days)		
Mean	7.3	6.2
Median	5.5	5.0
PLOS <6 days	50.0%	54.7%
PLOS >14 days	0.0%	1.7%

	Participant 2008	Region 2008
Mitral Valve Repair + CAB		
Number of Cases	1	60
Mortality Summary & Risk-Adjustment		
In-hospital Mortality	0.0%	6.7%
Operative Mortality	0.0%	6.7%
Complications Summary		
Major complications or operative mortality	100.0%	41.7%
Any reoperation	100.0%	25.0%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	0.0%	5.0%
Renal failure	0.0%	7.3%
Prolonged ventilation	100.0%	33.3%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	16.0	19.5
Median	16.0	11.0
Post-Procedure Length of Stay (days)		
Mean	6.0	15.4
Median	6.0	7.5
PLOS <6 days	0.0%	20.0%
PLOS >14 days	0.0%	26.7%

Waterbury Hospital

Waterbury Hospital

Saint Mary's Hospital
PCI Case Volume
7/18/2008 - 7/17/2009

The following Codes were used to determine PCI Volume:
00.40 00.45 00.66 36.06 36.07
In case of an attempted but failed PCI, no PCI code is provided.

Dates	PCI Volume
7/18/2008 -7/31/2008	9
08-2008	28
09-2008	15
10-2008	21
11-2008	18
12-2008	21
01-2009	22
02-2009	20
03-2009	21
04-2009	25
05-2009	31
06-2009	18
7/1/2008 - 7/17/2009	7
Year 4 Total	**256**

Saint Mary's Hospital
PCI Patient Volume
7/18/2008 - 7/17/2009

Dates	Patient Total
7/18/2008 -7/31/2008	9
08-2008	26
09-2008	15
10-2008	21
11-2008	17
12-2008	20
01-2009	22
02-2009	20
03-2009	19
04-2009	24
05-2009	29
06-2009	18
7/1/2008 - 7/17/2009	7
Year 4 Total	**247**

Saint Mary's Hospital
OHS Case Volume
7/18/2008 - 7/17/2009

The following Codes were used to determine Open Heart Surgery Volume:

35.10 35.11 35.12 35.13 35.14 35.20 35.21
35.22 35.23 35.24 35.25 35.26 35.27 35.28
35.33 35.61 35.81 35.95 36.10 36.11 36.12
36.13 36.14 36.15 36.16 36.17 36.19 37.33 39.52

Dates	OHS Count
7/18/2008 -7/31/2008	4
08-2008	7
09-2008	7
10-2008	10
11-2008	7
12-2008	9
01-2009	8
02-2009	8
03-2009	13
04-2009	17
05-2009	5
06-2009	8
07/1/2008 -7/17/2009	6
Year 4 Total	**109**

Saint Mary's Hospital
OHS Patient Volume
7/18/2008 - 7/17/2009

Dates	Patient Total
7/18/2008 -7/31/2008	4
08-2008	7
09-2008	7
10-2008	10
11-2008	7
12-2008	9
01-2009	8
02-2009	8
03-2009	13
04-2009	17
05-2009	5
06-2009	8
07/1/2008 -7/17/2009	6
Year 4 Total	**109**

EXECUTIVE SUMMARY

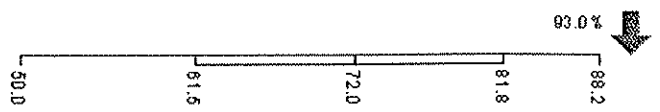
PCI and Diagnostic Catheterization Registry Metrics
Saint Mary's Hospital (881416) compared to Rolling Four Quarters (R4Q) for All Hospitals - 2008Y1

PCI Quality Metrics

1. Proportion of STEMI Pts with DBT <= 90"

My Hospital: 93.0% (Rank: 40 of 824, Rank Percentile: 96)

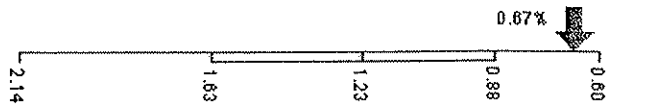
The proportion of primary PCI patients with DBT (door to balloon time) <= 90 minutes. The goal is to have a DBT of <= 90 minutes for all non-transferred patients pts having an ST elevated MI and having primary PCI. [Detail Line: 1771]



2. Risk Adjusted Mortality

My Hospital: 0.67% (Rank: 93 of 771, Rank Percentile: 88)

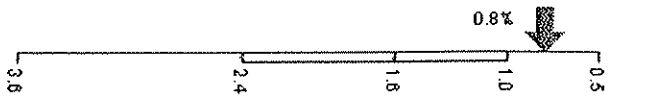
Your hospital's PCI mortality rate adjusted using the ACC-NCDR® risk adjustment model [Detail Line: 1736]



3. Incidence of Vascular Complications

My Hospital: 0.8% (Rank: 197 of 844, Rank Percentile: 80)

Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 2039]



4. Thienopyridine on Discharge (Patients with Stents)

My Hospital: 96.6% (Rank: 645 of 842, Rank Percentile: 23)

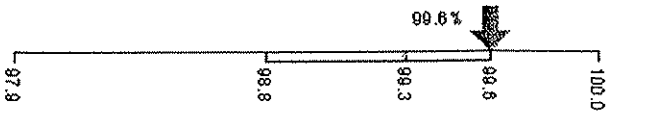
Percentage of eligible PCI patients who received any type of stent and had thienopyridine (such as clopidogrel or ticlopidine) prescribed at discharge. [Detail Line: 1587]



5. Angiographic Success (Lesions with Stents)

My Hospital: 99.6% (Rank: 232 of 843, Rank Percentile: 77)

Percentage of stented lesions with angiographic success (defined as post -stenosis <=20% for lesions with a stent implanted). [Detail Line: 1864]

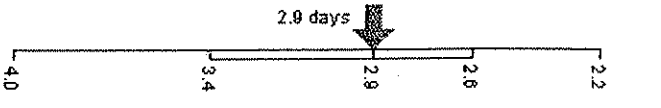


PCI Utilization Metrics

7. Length of Stay for All PCI Patients

My Hospital: 2.9 days

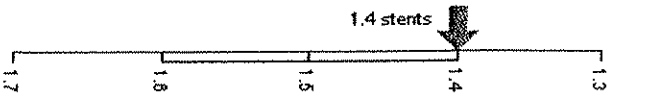
Mean total length of hospital stay (in days) for all patients having at least one PCI during admission. [Detail Line: 2094]



8. Mean Number of Stents per PCI Procedure

My Hospital: 1.4 stents

Mean number of stents deployed per PCI procedure with at least one stent. This includes all stents deployed: bare metal, drug eluting, coated, and covered. [Detail Line: 1979]

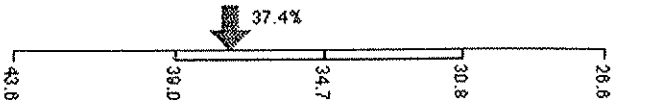


Diagnostic Cath Quality Metrics

9. Incidence of Non-Obstructive CAD

My Hospital: 37.4% (Rank: 446 of 674, Rank Percentile: 34)

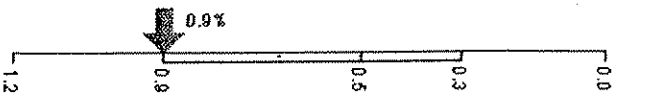
Patients having a left heart catheterization (including only patients with the indications of r/o CAD and/or arrhythmia) where all coronary branches have <50% stenosis. (Note: if a vessel is not assessed, its stenosis is assumed as 0). [Detail Line: 1337]



10. Incidence of Vascular Complications

My Hospital: 0.9% (Rank: 516 of 674, Rank Percentile: 25)

Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 1435]



© 2008, American College of Cardiology Foundation

EXECUTIVE SUMMARY

PCI and Diagnostic Catheterization Registry Metrics
Saint Mary's Hospital (881416) compared to Rolling Four Quarters (R4Q) for All Hospitals - 2008Y2

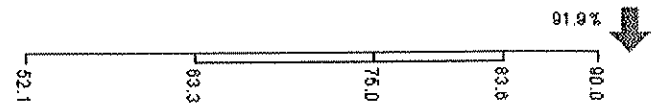
PCI Quality Metrics

Worse — Better

1. Proportion of STEMI Pts with DBT <= 90"

My Hospital: 91.9% (Rank: 62 of 857, Rank Percentile: 94)

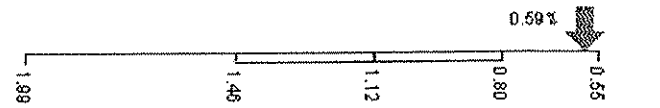
The proportion of primary PCI patients with DBT (door to balloon time) <= 90 minutes. The goal is to have a DBT of <= 90 minutes for all non-transferred patients pts having an ST elevated MI and having primary PCI. [Detail Line: 1771]



2. Risk Adjusted Mortality

My Hospital: 0.59% (Rank: 95 of 800, Rank Percentile: 88)

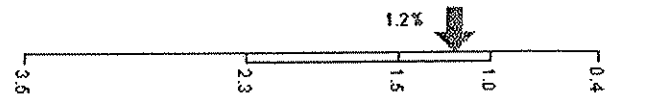
Your hospital's PCI mortality rate adjusted using the ACC-NCDR® risk adjustment model [Detail Line: 1736]



3. Incidence of Vascular Complications

My Hospital: 1.2% (Rank: 305 of 876, Rank Percentile: 68)

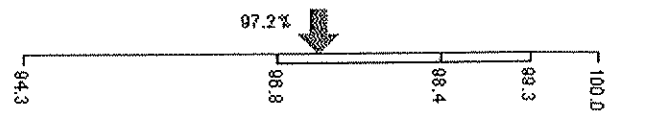
Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 2039]



4. Thienopyridine on Discharge (Patients with Stents)

My Hospital: 97.2% (Rank: 612 of 875, Rank Percentile: 30)

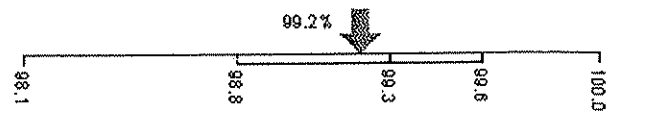
Percentage of eligible PCI patients who received any type of stent and had thienopyridine (such as clopidogrel or ticlopidine) prescribed at discharge. [Detail Line: 1587]



5. Angiographic Success (Lesions with Stents)

My Hospital: 99.2% (Rank: 480 of 875, Rank Percentile: 48)

Percentage of stented lesions with angiographic success (defined as post -stenosis <=20% for lesions with a stent implanted). [Detail Line: 1864]



PCI Utilization Metrics

7. Length of Stay for All PCI Patients

My Hospital: 6.0 days

Mean total length of hospital stay (in days) for all patients having at least one PCI during admission. [Detail Line: 2094]



8. Mean Number of Stents per PCI Procedure

My Hospital: 1.4 stents

Mean number of stents deployed per PCI procedure with at least one stent. This includes all stents deployed: bare metal, drug eluting, coated, and covered. [Detail Line: 1979]



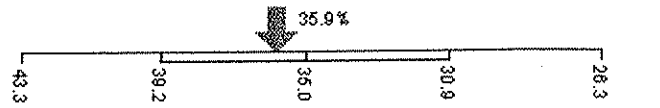
Diagnostic Cath Quality Metrics

Worse — Better

9. Incidence of Non-Obstructive CAD

My Hospital: 35.9% (Rank: 394 of 695, Rank Percentile: 43)

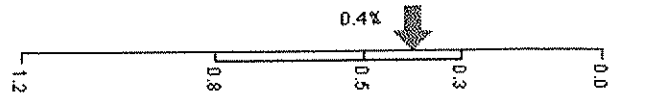
Patients having a left heart catheterization (including only patients with the indications of r/o CAD and/or arrhythmia) where all coronary branches have <50% stenosis. (Note: if a vessel is not assessed, its stenosis is assumed as 0). [Detail Line: 1337]



10. Incidence of Vascular Complications

My Hospital: 0.4% (Rank: 327 of 695, Rank Percentile: 58)

Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 1435]



© 2008, American College of Cardiology Foundation

EXECUTIVE SUMMARY

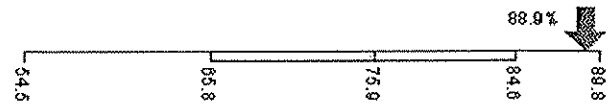
PCI and Diagnostic Catheterization Registry Metrics
Saint Mary's Hospital (881416) compared to Rolling Four Quarters (R4Q) for All Hospitals - 2008Y3

PCI Quality Metrics

1. Proportion of STEMI Pts with DBT <= 90"

My Hospital: 88.9% (Rank: 122 of 882, Rank Percentile: 87)

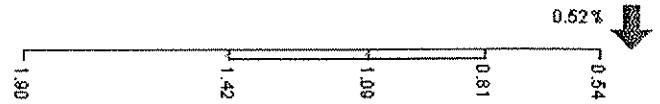
The proportion of primary PCI patients with DBT (door to balloon time) <= 90 minutes. The goal is to have a DBT of <= 90 minutes for all non-transferred patients pts having an ST elevated MI and having primary PCI. [Detail Line: 1771]



2. Risk Adjusted Mortality

My Hospital: 0.52% (Rank: 77 of 830, Rank Percentile: 91)

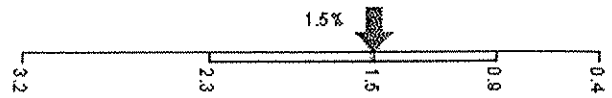
Your hospital's PCI mortality rate adjusted using the ACC-NCDR® risk adjustment model [Detail Line: 1736]



3. Incidence of Vascular Complications

My Hospital: 1.5% (Rank: 479 of 899, Rank Percentile: 49)

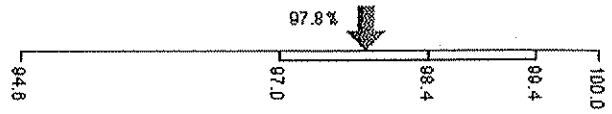
Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 2039]



4. Thienopyridine on Discharge (Patients with Stents)

My Hospital: 97.8% (Rank: 584 of 898, Rank Percentile: 35)

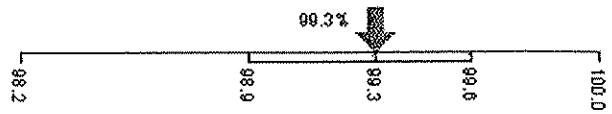
Percentage of eligible PCI patients who received any type of stent and had thienopyridine (such as clopidogrel or ticlopidine) prescribed at discharge. [Detail Line: 1587]



5. Angiographic Success (Lesions with Stents)

My Hospital: 99.3% (Rank: 504 of 898, Rank Percentile: 47)

Percentage of stented lesions with angiographic success (defined as post -stenosis <=20% for lesions with a stent implanted). [Detail Line: 1864]

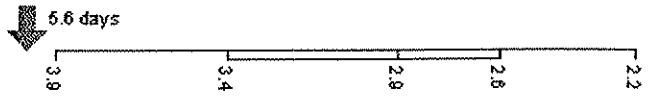


PCI Utilization Metrics

7. Length of Stay for All PCI Patients

My Hospital: 5.6 days

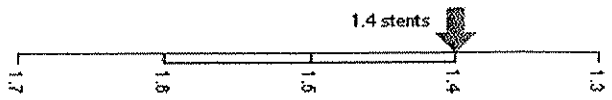
Mean total length of hospital stay (in days) for all patients having at least one PCI during admission. [Detail Line: 2094]



8. Mean Number of Stents per PCI Procedure

My Hospital: 1.4 stents

Mean number of stents deployed per PCI procedure with at least one stent. This includes all stents deployed: bare metal, drug eluting, coated, and covered. [Detail Line: 1979]

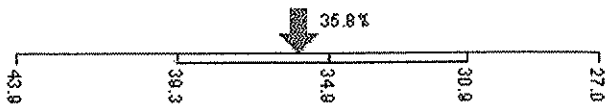


Diagnostic Cath Quality Metrics

9. Incidence of Non-Obstructive CAD

My Hospital: 35.8% (Rank: 394 of 720, Rank Percentile: 45)

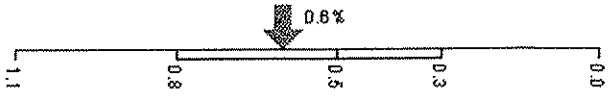
Patients having a left heart catheterization (including only patients with the indications of r/o CAD and/or arrhythmia) where all coronary branches have <50% stenosis. (Note: if a vessel is not assessed, its stenosis is assumed as 0). [Detail Line: 1337]



10. Incidence of Vascular Complications

My Hospital: 0.6% (Rank: 485 of 720, Rank Percentile: 36)

Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 1435]



© 2009, American College of Cardiology Foundation

EXECUTIVE SUMMARY

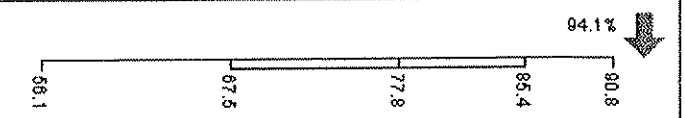
PCI and Diagnostic Catheterization Registry Metrics
Saint Mary's Hospital (881416) compared to Rolling Four Quarters (R4Q) for All Hospitals - 2008Y4

PCI Quality Metrics

1. Proportion of STEMI Pts with DBT <= 90"

My Hospital: 94.1% (Rank: 54 of 906, Rank Percentile: 95)

The proportion of primary PCI patients with DBT (door to balloon time) <= 90 minutes. The goal is to have a DBT of <= 90 minutes for all non-transferred patients pts having an ST elevated MI and having primary PCI. [Detail Line: 1771]



2. Risk Adjusted Mortality

My Hospital: 0.55% (Rank: 33 of 858, Rank Percentile: 93)

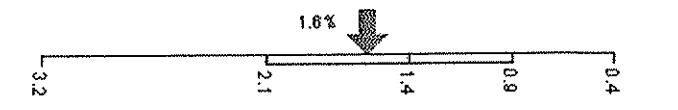
Your hospital's PCI mortality rate adjusted using the ACC-NCDR® risk adjustment model [Detail Line: 1736]



3. Incidence of Vascular Complications

My Hospital: 1.6% (Rank: 517 of 923, Rank Percentile: 46)

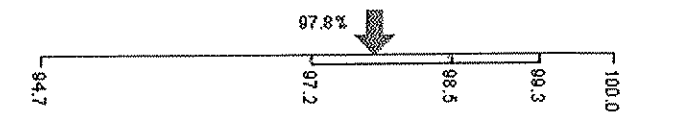
Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 2039]



4. Thienopyridine on Discharge (Patients with Stents)

My Hospital: 97.8% (Rank: 626 of 922, Rank Percentile: 34)

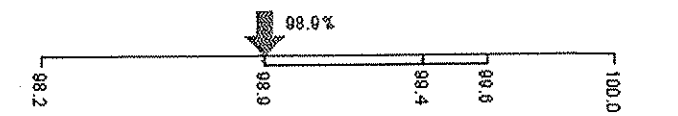
Percentage of eligible PCI patients who received any type of stent and had thienopyridine (such as clopidogrel or ticlopidine) prescribed at discharge. [Detail Line: 1587]



5. Angiographic Success (Lesions with Stents)

My Hospital: 98.9% (Rank: 683 of 922, Rank Percentile: 28)

Percentage of stented lesions with angiographic success (defined as post -stenosis <=20% for lesions with a stent implanted). [Detail Line: 1864]

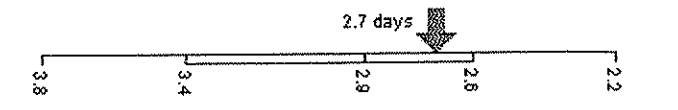


PCI Utilization Metrics

7. Length of Stay for All PCI Patients

My Hospital: 2.7 days

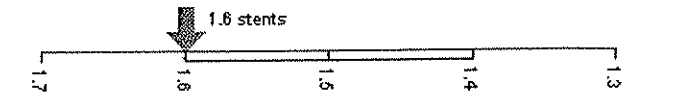
Mean total length of hospital stay (in days) for all patients having at least one PCI during admission. [Detail Line: 2094]



8. Mean Number of Stents per PCI Procedure

My Hospital: 1.6 stents

Mean number of stents deployed per PCI procedure with at least one stent. This includes all stents deployed: bare metal, drug eluting, coated, and covered. [Detail Line: 1979]

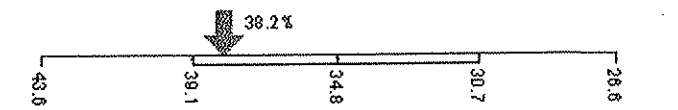


Diagnostic Cath Quality Metrics

9. Incidence of Non-Obstructive CAD

My Hospital: 38.2% (Rank: 507 of 733, Rank Percentile: 31)

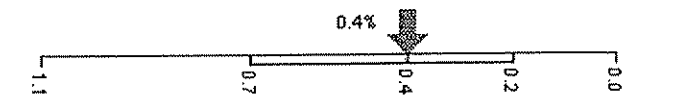
Patients having a left heart catheterization (including only patients with the indications of r/o CAD and/or arrhythmia) where all coronary branches have <50% stenosis. (Note: if a vessel is not assessed, its stenosis is assumed as 0). [Detail Line: 1337]



10. Incidence of Vascular Complications

My Hospital: 0.4% (Rank: 352 of 733, Rank Percentile: 56)

Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 1435]



© 2009, American College of Cardiology Foundation

EXECUTIVE SUMMARY

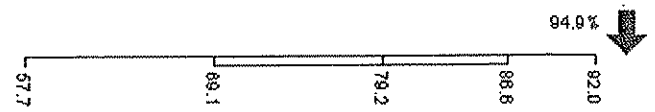
PCI and Diagnostic Catheterization Registry Metrics
Saint Mary's Hospital (881416) compared to Rolling Four Quarters (R4Q) for All Hospitals - 2009Y1

PCI Quality Metrics

1. Proportion of STEMI Pts with DBT <= 90"

My Hospital: 94.9% (Rank: 56 of 949, Rank Percentile: 96)

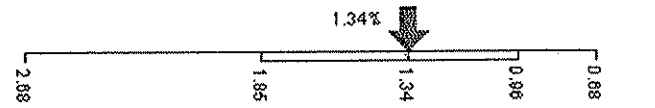
The proportion of primary PCI patients with DBT (door to balloon time) <= 90 minutes. The goal is to have a DBT of <= 90 minutes for all non-transferred patients pts having an ST elevated MI and having primary PCI. [Detail Line: 1771]



2. Risk Adjusted Mortality

My Hospital: 1.34% (Rank: 410 of 890, Rank Percentile: 50)

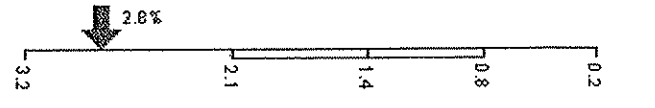
Your hospital's PCI mortality rate adjusted using the ACC-NCDR® risk adjustment model [Detail Line: 1736]



3. Incidence of Vascular Complications

My Hospital: 2.8% (Rank: 834 of 961, Rank Percentile: 14)

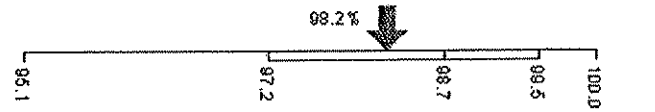
Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 2039]



4. Thienopyridine on Discharge (Patients with Stents)

My Hospital: 98.2% (Rank: 594 of 961, Rank Percentile: 40)

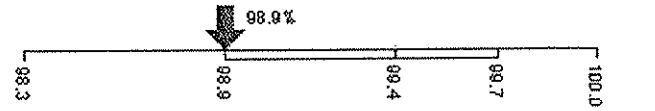
Percentage of eligible PCI patients who received any type of stent and had thienopyridine (such as clopidogrel or ticlopidine) prescribed at discharge. [Detail Line: 1587]



5. Angiographic Success (Lesions with Stents)

My Hospital: 98.9% (Rank: 721 of 961, Rank Percentile: 27)

Percentage of stented lesions with angiographic success (defined as post-stenosis <=20% for lesions with a stent implanted). [Detail Line: 1864]

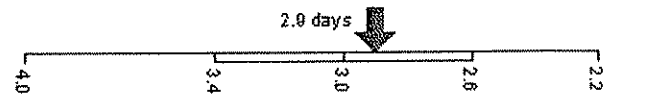


PCI Utilization Metrics

7. Length of Stay for All PCI Patients

My Hospital: 2.9 days

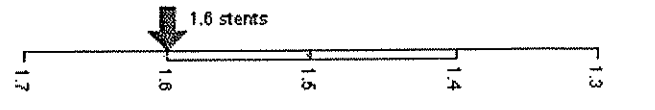
Mean total length of hospital stay (in days) for all patients having at least one PCI during admission. [Detail Line: 2094]



8. Mean Number of Stents per PCI Procedure

My Hospital: 1.6 stents

Mean number of stents deployed per PCI procedure with at least one stent. This includes all stents deployed: bare metal, drug eluting, coated, and covered. [Detail Line: 1979]

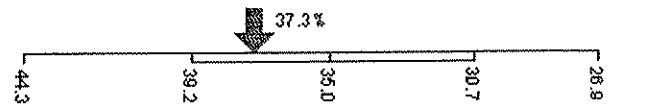


Diagnostic Cath Quality Metrics

9. Incidence of Non-Obstructive CAD

My Hospital: 37.3% (Rank: 490 of 769, Rank Percentile: 36)

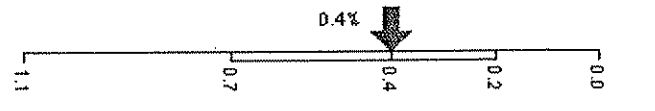
Patients having a left heart catheterization (including only patients with the indications of r/o CAD and/or arrhythmia) where all coronary branches have <50% stenosis. (Note: if a vessel is not assessed, its stenosis is assumed as 0). [Detail Line: 1337]



10. Incidence of Vascular Complications

My Hospital: 0.4% (Rank: 361 of 769, Rank Percentile: 58)

Includes procedures with access site bleeding (includes at least one vascular bleeding complication excluding GI, GU and Other bleeding) [Detail Line: 1435]



© 2009, American College of Cardiology Foundation

Regional Outcomes Comparison

Participant 30398
STS Period Ending 12/31/2008

Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER



The region displayed for your site contains the following state(s):
Connecticut

Between 2006 and 2008, there were 10 participants in this region

Saint Mary's Hospital



Regional Outcomes Comparison

Participant 30398
STS Period Ending 12/31/2008

Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER

	Participant 2008	Region 2008
Isolated CAB		
Number of Cases	57	1,835
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	0.0%	1.9%
Risk-adjusted rate	0.0%	1.7%
Lower 95% confidence limit	0.0%	1.2%
Upper 95% confidence limit	3.2%	2.3%
Operative Mortality		
Observed Rate	**0.0%**	2.1%
Risk-adjusted rate	0.0%	1.9%
Lower 95% confidence limit	0.0%	1.4%
Upper 95% confidence limit	3.4%	2.5%
Complications Summary & Risk-Adjustment		
Major complications or operative mortality		
Observed Rate	7.0%	16.6%
Risk-adjusted rate	7.0%	16.6%
Lower 95% confidence limit	0.0%	15.0%
Upper 95% confidence limit	16.2%	18.2%
Any reoperation		
Observed Rate	1.8%	5.7%
Risk-adjusted rate	1.7%	5.5%
Lower 95% confidence limit	0.0%	4.6%
Upper 95% confidence limit	7.1%	6.5%
Deep sternal wound infection		
Observed Rate	**0.0%**	0.9%
Risk-adjusted rate	0.0%	0.9%
Lower 95% confidence limit	0.0%	0.6%
Upper 95% confidence limit	1.7%	1.2%
Permanent stroke		
Observed Rate	**0.0%**	1.0%
Risk-adjusted rate	0.0%	1.0%
Lower 95% confidence limit	0.0%	0.5%
Upper 95% confidence limit	2.5%	1.4%

	Participant 2008	Region 2008
Renal failure		
Observed Rate	7.1%	3.9%
Risk-adjusted rate	7.1%	3.8%
Lower 95% confidence limit	2.4%	3.0%
Upper 95% confidence limit	11.8%	4.7%
Prolonged ventilation		
Observed Rate	1.8%	11.1%
Risk-adjusted rate	1.9%	11.3%
Lower 95% confidence limit	0.0%	10.0%
Upper 95% confidence limit	10.0%	12.6%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	10.7	9.7
Median	9.0	8.0
Post-Procedure Length of Stay (days)		
Mean	7.1	7.3
Median	6.0	6.0
Length of Stay Risk-Adjustment		
Short stay: PLOS <6 days		
Observed Rate	43.9%	47.2%
Risk-adjusted rate	46.8%	47.4%
Lower 95% confidence limit	34.2%	45.3%
Upper 95% confidence limit	59.5%	49.5%
Long stay: PLOS >14 days		
Observed Rate	3.5%	5.9%
Risk-adjusted rate	3.4%	5.7%
Lower 95% confidence limit	0.0%	4.7%
Upper 95% confidence limit	9.1%	6.7%

Saint Mary's Hospital



Regional Outcomes Comparison

Participant 30398
STS Period Ending 12/31/2008



Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER

	Participant 2008	Region 2008
Aortic Valve Replacement		
Number of Cases	9	330
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	0.0%	1.2%
Risk-adjusted rate	0.0%	1.2%
Lower 95% confidence limit	0.0%	0.0%
Upper 95% confidence limit	14.4%	2.9%
Operative Mortality		
Observed Rate	0.0%	1.8%
Risk-adjusted rate	0.0%	1.8%
Lower 95% confidence limit	0.0%	0.0%
Upper 95% confidence limit	15.3%	3.7%
Complications Summary		
Major complications or operative mortality	11.1%	20.9%
Any reoperation	0.0%	11.8%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	0.0%	1.2%
Renal failure	0.0%	3.7%
Prolonged ventilation	11.1%	11.8%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	7.8	10.7
Median	6.0	7.0
Post-Procedure Length of Stay (days)		
Mean	7.8	8.3
Median	6.0	6.0
PLOS <6 days	22.2%	40.3%
PLOS >14 days	11.1%	9.4%

	Participant 2008	Region 2008
Aortic Valve Replacement + CAB		
Number of Cases	8	287
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	12.5%	5.9%
Risk-adjusted rate	14.5%	5.6%
Lower 95% confidence limit	0.0%	3.3%
Upper 95% confidence limit	30.3%	7.9%
Operative Mortality		
Observed Rate	12.5%	6.6%
Risk-adjusted rate	14.5%	6.3%
Lower 95% confidence limit	0.0%	3.8%
Upper 95% confidence limit	31.2%	8.7%
Complications Summary		
Major complications or operative mortality	37.5%	30.3%
Any reoperation	0.0%	11.1%
Deep sternal wound infection	0.0%	0.3%
Permanent stroke	0.0%	1.7%
Renal failure	25.0%	10.7%
Prolonged ventilation	12.5%	21.3%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	10.3	11.8
Median	8.0	8.0
Post-Procedure Length of Stay (days)		
Mean	10.3	9.7
Median	8.0	7.0
PLOS <6 days	12.5%	27.9%
PLOS >14 days	25.0%	12.9%

Saint Mary's Hospital



Regional Outcomes Comparison

Participant 30398
STS Period Ending 12/31/2008

Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER

	Participant 2008	Region 2008
Mitral Valve Replacement		
Number of Cases	1	61
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	0.0%	3.3%
Risk-adjusted rate	0.0%	2.8%
Lower 95% confidence limit	0.0%	0.0%
Upper 95% confidence limit	43.7%	7.8%
Operative Mortality		
Observed Rate	0.0%	3.3%
Risk-adjusted rate	0.0%	2.8%
Lower 95% confidence limit	0.0%	0.0%
Upper 95% confidence limit	45.4%	7.9%
Complications Summary		
Major complications or operative mortality	0.0%	32.8%
Any reoperation	0.0%	14.8%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	0.0%	1.6%
Renal failure	0.0%	10.5%
Prolonged ventilation	0.0%	23.0%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	18.0	15.3
Median	18.0	11.0
Post-Procedure Length of Stay (days)		
Mean	11.0	11.3
Median	11.0	8.0
PLOS <6 days	0.0%	21.3%
PLOS >14 days	0.0%	19.7%

	Participant 2008	Region 2008
Mitral Valve Replacement + CAB		
Number of Cases	-	48
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	-	12.5%
Risk-adjusted rate	-	10.7%
Lower 95% confidence limit	-	3.8%
Upper 95% confidence limit	-	17.7%
Operative Mortality		
Observed Rate	-	12.5%
Risk-adjusted rate	-	10.7%
Lower 95% confidence limit	-	3.6%
Upper 95% confidence limit	-	17.9%
Complications Summary		
Major complications or operative mortality	-	60.4%
Any reoperation	-	20.8%
Deep sternal wound infection	-	0.0%
Permanent stroke	-	10.4%
Renal failure	-	20.5%
Prolonged ventilation	-	54.2%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	-	18.7
Median	-	11.0
Post-Procedure Length of Stay (days)		
Mean	-	15.4
Median	-	10.0
PLOS <6 days	-	16.7%
PLOS >14 days	-	33.3%

Saint Mary's Hospital



Regional Outcomes Comparison

Participant 30398
STS Period Ending 12/31/2008

Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER

	Participant 2008	Region 2008
Mitral Valve Repair		
Number of Cases	3	117
Mortality Summary & Risk-Adjustment		
In-hospital Mortality	0.0%	0.0%
Operative Mortality	0.0%	0.0%
Complications Summary		
Major complications or operative mortality	0.0%	16.2%
Any reoperation	0.0%	9.4%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	0.0%	2.6%
Renal failure	0.0%	0.9%
Prolonged ventilation	0.0%	7.7%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	6.7	7.4
Median	6.0	6.0
Post-Procedure Length of Stay (days)		
Mean	6.7	6.2
Median	6.0	5.0
PLOS <6 days	0.0%	54.7%
PLOS >14 days	0.0%	1.7%

	Participant 2008	Region 2008
Mitral Valve Repair + CAB		
Number of Cases	-	60
Mortality Summary & Risk-Adjustment		
In-hospital Mortality	-	6.7%
Operative Mortality	-	6.7%
Complications Summary		
Major complications or operative mortality	-	41.7%
Any reoperation	-	25.0%
Deep sternal wound infection	-	0.0%
Permanent stroke	-	5.0%
Renal failure	-	7.3%
Prolonged ventilation	-	33.3%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	-	19.5
Median	-	11.0
Post-Procedure Length of Stay (days)		
Mean	-	15.4
Median	-	7.5
PLOS <6 days	-	20.0%
PLOS >14 days	-	26.7%

Saint Mary's Hospital

Saint Mary's Hospital

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

July 15, 2008

The Honorable Vickie Nardello
State Representative, 89th District
House of Representatives
Legislative Office Building, Room 4040
Hartford, CT 06106-1591

Re: Certificate of Need Docket 08-31202-CON
Waterbury Hospital and Saint Mary's Hospital d/b/a Heart Center of Greater Waterbury
Advanced Cardiac Services Program

Dear Representative Nardello:

On July 8, 2008, the Office of Health Care Access ("OHCA") received your letter concerning the Certificate of Need ("CON") Docket 08-31202-CON for the proposal by Waterbury Hospital and Saint Mary's Hospital d/b/a Heart Center of Greater Waterbury for advanced cardiac services program.

OHCA appreciates your comments. Your letter has been made part of the formal record of the application. Please be advised once a decision has been rendered it will be posted and available on OHCA's website at http:// www.ct.gov/ohca. Meanwhile, OHCA's website maintains status reports that you may review at your convenience.

If you have any further concerns or questions, please contact me at OHCA at (860) 418-7001.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:SL:bko

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

July 15, 2008

The Honorable David Labriola
State Representative, 131st District
House Republican Office
State Capitol
Hartford, CT 06106

Re: Certificate of Need Docket 08-31202-CON
Waterbury Hospital and Saint Mary's Hospital d/b/a Heart Center of Greater Waterbury
Advanced Cardiac Services Program

Dear Representative Labriola:

On July 8, 2008, the Office of Health Care Access ("OHCA") received your letter concerning the Certificate of Need ("CON") Docket 08-31202-CON for the proposal by Waterbury Hospital and Saint Mary's Hospital d/b/a Heart Center of Greater Waterbury for advanced cardiac services program.

OHCA appreciates your comments. Your letter has been made part of the formal record of the application. Please be advised once a decision has been rendered it will be posted and available on OHCA's website at http:// www.ct.gov/ohca. Meanwhile, OHCA's website maintains status reports that you may review at your convenience.

If you have any further concerns or questions, please contact me at OHCA at (860) 418-7001.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:SL:bko

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

July 15, 2008

The Honorable Sean Williams
State Representative, 68th District
House Republican Office
State Capitol
Hartford, CT 06106

Re: Certificate of Need Docket 08-31202-CON
Waterbury Hospital and Saint Mary's Hospital d/b/a Heart Center of Greater Waterbury
Advanced Cardiac Services Program

Dear Representative Williams:

On July 8, 2008, the Office of Health Care Access ("OHCA") received your letter concerning the Certificate of Need ("CON") Docket 08-31202-CON for the proposal by Waterbury Hospital and Saint Mary's Hospital d/b/a Heart Center of Greater Waterbury for advanced cardiac services program.

OHCA appreciates your comments. Your letter has been made part of the formal record of the application. Please be advised once a decision has been rendered it will be posted and available on OHCA's website at http:// www.ct.gov/ohca. Meanwhile, OHCA's website maintains status reports that you may review at your convenience.

If you have any further concerns or questions, please contact me at OHCA at (860) 418-7001.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:SL:bko

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

July 15, 2008

The Honorable Leonard Green
State Representative, 105th District
House Republican Office
State Capitol
Hartford, CT 06106

Re: Certificate of Need Docket 08-31202-CON
Waterbury Hospital and Saint Mary's Hospital d/b/a Heart Center of Greater Waterbury
Advanced Cardiac Services Program

Dear Representative Green:

On July 8, 2008, the Office of Health Care Access ("OHCA") received your letter concerning the Certificate of Need ("CON") Docket 08-31202-CON for the proposal by Waterbury Hospital and Saint Mary's Hospital d/b/a Heart Center of Greater Waterbury for advanced cardiac services program.

OHCA appreciates your comments. Your letter has been made part of the formal record of the application. Please be advised once a decision has been rendered it will be posted and available on OHCA's website at http:// www.ct.gov/ohca. Meanwhile, OHCA's website maintains status reports that you may review at your convenience.

If you have any further concerns or questions, please contact me at OHCA at (860) 418-7001.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:SL:bko

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

July 15, 2008

The Honorable Anthony D'Amelio
State Representative, 71st District
House Republican Office
State Capitol
Hartford, CT 06106

Re: Certificate of Need Docket 08-31202-CON
Waterbury Hospital and Saint Mary's Hospital d/b/a Heart Center of Greater Waterbury
Advanced Cardiac Services Program

Dear Representative D'Amelio:

On July 8, 2008, the Office of Health Care Access ("OHCA") received your letter concerning the Certificate of Need ("CON") Docket 08-31202-CON for the proposal by Waterbury Hospital and Saint Mary's Hospital d/b/a Heart Center of Greater Waterbury for advanced cardiac services program.

OHCA appreciates your comments. Your letter has been made part of the formal record of the application. Please be advised once a decision has been rendered it will be posted and available on OHCA's website at http:// www.ct.gov/ohca. Meanwhile, OHCA's website maintains status reports that you may review at your convenience.

If you have any further concerns or questions, please contact me at OHCA at (860) 418-7001.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:SL:bko

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

July 15, 2008

The Honorable Selim G. Noujaim
State Representative, 74th District
House of Representatives
Legislative Office Building
Hartford, CT 06106-1591

Re: Certificate of Need Docket 08-31202-CON
Waterbury Hospital and Saint Mary's Hospital d/b/a Heart Center of Greater Waterbury
Advanced Cardiac Services Program

Dear Representative Noujaim:

On July 8, 2008, the Office of Health Care Access ("OHCA") received your letter concerning the Certificate of Need ("CON") Docket 08-31202-CON for the proposal by Waterbury Hospital and Saint Mary's Hospital d/b/a Heart Center of Greater Waterbury for advanced cardiac services program.

OHCA appreciates your comments. Your letter has been made part of the formal record of the application. Please be advised once a decision has been rendered it will be posted and available on OHCA's website at http:// www.ct.gov/ohca. Meanwhile, OHCA's website maintains status reports that you may review at your convenience.

If you have any further concerns or questions, please contact me at OHCA at (860) 418-7001.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:SL:bko

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

July 15, 2008

The Honorable Kevin M. DelGobbo
State Representative, 70th District
House of Representatives
Legislative Office Building
Hartford, CT 06106-1591

Re: Certificate of Need Docket 08-31202-CON
Waterbury Hospital and Saint Mary's Hospital d/b/a Heart Center of Greater Waterbury
Advanced Cardiac Services Program

Dear Representative DelGobbo:

On July 8, 2008, the Office of Health Care Access ("OHCA") received your letter concerning the Certificate of Need ("CON") Docket 08-31202-CON for the proposal by Waterbury Hospital and Saint Mary's Hospital d/b/a Heart Center of Greater Waterbury for advanced cardiac services program.

OHCA appreciates your comments. Your letter has been made part of the formal record of the application. Please be advised once a decision has been rendered it will be posted and available on OHCA's website at http:// www.ct.gov/ohca. Meanwhile, OHCA's website maintains status reports that you may review at your convenience.

If you have any further concerns or questions, please contact me at OHCA at (860) 418-7001.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:SL:bko

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

July 15, 2008

The Honorable Arthur O'Neill
State Representative, 69th District
House of Representatives
Legislative Office Building, Room 4200
Hartford, CT 06106-1591

Re: Certificate of Need Docket 08-31202-CON
Waterbury Hospital and Saint Mary's Hospital d/b/a Heart Center of Greater Waterbury
Advanced Cardiac Services Program

Dear Representative O'Neill:

On July 8, 2008, the Office of Health Care Access ("OHCA") received your letter concerning the Certificate of Need ("CON") Docket 08-31202-CON for the proposal by Waterbury Hospital and Saint Mary's Hospital d/b/a Heart Center of Greater Waterbury for advanced cardiac services program.

OHCA appreciates your comments. Your letter has been made part of the formal record of the application. Please be advised once a decision has been rendered it will be posted and available on OHCA's website at http:// www.ct.gov/ohca. Meanwhile, OHCA's website maintains status reports that you may review at your convenience.

If you have any further concerns or questions, please contact me at OHCA at (860) 418-7001.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:SL:bko

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

July 15, 2008

The Honorable Susan A. Cable
First Selectman
Town of Beacon Falls Connecticut
10 Maple Avenue
Beacon Falls, CT 06403-1198

Re: Certificate of Need Docket 08-31202-CON
Waterbury Hospital and Saint Mary's Hospital d/b/a Heart Center of Greater Waterbury
Advanced Cardiac Services Program

Dear First Selectman Cable:

On July 8, 2008, the Office of Health Care Access ("OHCA") received your letter concerning the Certificate of Need ("CON") Docket 08-31202-CON for the proposal by Waterbury Hospital and Saint Mary's Hospital d/b/a Heart Center of Greater Waterbury for advanced cardiac services program.

OHCA appreciates your comments. Your letter has been made part of the formal record of the application. Please be advised once a decision has been rendered it will be posted and available on OHCA's website at http:// www.ct.gov/ohca. Meanwhile, OHCA's website maintains status reports that you may review at your convenience.

If you have any further concerns or questions, please contact me at OHCA at (860) 418-7001.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:SL:bko

#31202

From: wgoliver@snet.net [mailto:wgoliver@snet.net]
Sent: Wednesday, July 16, 2008 11:05 AM
To: Vogel, Cristine
Subject: Waterbury Heart Center

Dear Ms. Vogel: I was one of hundreds of people who spoke at the meeting three years ago when the State first decided to open a heart center here in Waterbury. Now I read in this morning's paper that this issue has come up again. Please, please give Waterbury and the surrounding towns the access to heart care that they deserve. In my case, my husband had to be transported to Bridgeport to have a stent put in his heart. He is now 83 and will probably have to go through this procedure again soon. I am 75 and would have to travel back to Bridgeport if the procedure cannot be done here in Waterbury. As I travelled Route 8 the last time, I had to follow the ambulance by myself. My husband was put into surgery and I did not know what was happening for at least 4 hours as he had been put in a waiting line before the surgery. When I finally was able to leave the hospital, it was late at night and I got lost on my way home. I did not have a cell phone at the time so I couldn't call anyone. Believe me, I was very frightened.

In my case, my three sisters have had heart attacks and open heart surgery and it is probably only a matter of time before I could have one too. How would my husband get to Bridgeport? He only drives short distances and only in the daytime.

I beg you to give the okay for a permanent permit.

Thank you.

Respectfully,

Dolores G. Oliver
wgoliver@snet.net
203-757-9353
224 Windy Drive
Waterbury, CT 06705

(203) 758-1138
120 Camp Road
Middlebury, CT 06762
August 5, 2008

RECEIVED
2008 AUG -6 A 11:23
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Christine A. Vogel, Commissioner
Office of Health Care Access
410 Capitol Avenue
MS13HCA-PO Box 340308
Hartford, CT 06134-0308

Dear Commissioner Vogel:

This letter is in support of renewing the license of the Heart Center of Greater Waterbury.

In December of 2007 I underwent open-heart surgery (not by-pass surgery) at Waterbury Hospital. As my husband and I are both in our 60's, being close to home to have my surgery was of utmost importance to both of us. I cannot imagine having to undergo all the numerous required pre-operative testing at a distance from our home in nearby Middlebury.

After my surgery, my husband was able to visit me as many times as he wished each day to see in person the progress of my recovery. He could then report that progress to family members and friends. I am confident that my husband's close contact with me favorably assisted in my recovery.

The Waterbury Heart Center should be allowed to continue to serve the Greater Waterbury area.

Very truly yours,

Patricia E. Clark

Patricia E. Clark

ARCHDIOCESE OF HARTFORD
134 FARMINGTON AVENUE
HARTFORD, CONNECTICUT
06105-3784

OFFICE OF
THE ARCHBISHOP

RECEIVED
2008 AUG 18 A 11: 17
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 15, 2008

Christine A. Vogel
Commissioner
Office of Health Care Access
410 Capitol Avenue
MS #13HCA
Hartford, CT 06134-0308

Dear Commissioner Vogel:

I am writing to express my complete support for the Heart Center of Greater Waterbury.

As the Board Chairman for Saint Mary's Hospital, I have witnessed firsthand the planning, implementation, and ultimately the fruition of this superb program. We have made a significant investment in creating a state of the art cardiac center. Our facilities were specifically designed and built to provide the most innovative care available. We assembled teams of cardiac care specialists and provided them with additional training to ensure seamless integration between our campuses. We have demonstrated unprecedented collaboration between Saint Mary's Hospital, Waterbury Hospital, and the University of Connecticut Health Center.

The results of these efforts have been nothing short of spectacular. In the three years since the program was launched more than 2,500 people have been treated at either Saint Mary's or Waterbury Hospital. Countless lives have been saved right here in Waterbury.

Upon its approval in 2004, the Heart Center was given numerous management and performance criteria. The program has performed admirably, and has met all but one of the criteria. Surely the overall community impact of this life-saving program must be considered *in toto* before deciding its fate.

When one reviews all the good that has been accomplished, it is hard to believe that consideration might be given to closing the program. I urge you to take the necessary steps to ensure that advanced cardiac services will remain available through the Heart Center of Greater Waterbury. I would be most grateful for your understanding.

Sincerely,

+ Henry J. Mansell

Most Reverend Henry J. Mansell
Chairman, St. Mary's Hospital Board of Directors
Archbishop of Hartford

(860) 541-6491/FAX (860) 541-6293

TOWN OF MIDDLEBURY

Selectmen's Office

August 15, 2008

RECEIVED
2008 AUG 19 A 11:58
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Ms. Christine A. Vogel
Commissioner
Office of Health Care Access
410 Capitol Ave., MS #13HCA
Hartford, CT 06134

Re: Docket numbers 08-30167-MD-2 and 08-31202

Dear Commissioner Vogel:

I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital. I am writing this letter to you a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare.

As you probably know, the center has saved more than 2,400 hearts in the last three years. The center has consistently achieved clinical outcomes that meet or exceed national standards when treating critical care patients. Its services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

Without this crucial cardiac program, people's lives will surely be lost, and personally, I believe that every heart matters. Please register my strong support for the continuation of these services on a permanent basis.

Very truly yours,

Tom Gormley
First Selectman

cc: Mayor Michael Jarjura
Lisa Moody, Chief of Staff – Governor Rell's Office
Peter Dorpalen, COG

1212 Whittemore Road • P.O. Box 392 • Middlebury, Connecticut 06762
Phone: 203-758-2439 • Fax: 203-758-8629

TOWN OF WOODBURY
Selectmen's Office
281 Main Street South
P.O. Box 369
Woodbury, Connecticut 06798-0369

Woodbury
First land deed from the Indians
April 12th 1659

TELEPHONE: (203) 263-2141
FAX: (203) 263-4755
E-MAIL: wdbysel@woodburyct.org

August 18, 2008

RECEIVED
2008 AUG 19 A 11:57
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Ms, Cristine A. Vogel
Commissioner
Office of Health Care Access
410 Capitol Ave., MS #13HCA
Hartford, CT 06134

Re: Docket numbers 08-30167-MD-2 and 08-31202

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that ***every heart matters!***

Sincerely,

Paul D. Hinckley
First Selectman

Salus, Sandra

From: Salus, Sandra
Sent: Thursday, August 21, 2008 9:02 AM
To: 'VDick@Stmh.org'
Subject: The Heart Center of Greater Waterbury
Attachments: Mr. V. Dick.doc

Mr. Dick:

Attached is a response from Commissioner Cristine Vogel, Office of Health Care Access, to your letter of August 21, 2008.

Sandra A. Salus
Office of Health Care Access
410 Capitol Avenue, MS#13HCA
P.O. Box 340308
Hartford, CT 06134-0308
(860) 418-7005

RECEIVED
2008 AUG 21 A 9:32
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

RECEIVED
2008 AUG 21 A 9:32
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 21, 2008

Mr. Vinnie Dick
VDick@Stmh.org

Re: Docket Numbers 08-30167-MD2 and 08-31202-LOI
St. Mary's Hospital and The Waterbury Hospital, d/b/a The Heart Center of Greater Waterbury, and John Dempsey Hospital

Dear Mr. Dick:

The Office of Health Care Access ("OHCA") is in receipt of your letter dated August 5, 2008 regarding the above referenced matters which was forwarded to us by the Governor's office. OHCA understands your concerns and appreciates your comments. Your letter has been made part of each record referenced above.

If you are interested in additional information regarding the Heart Center of Greater Waterbury, please visit OHCA's website at http://www.ohca.state.ct.us/.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:ss

Salus, Sandra

From: Treiss, Carolyn
Sent: Wednesday, August 20, 2008 11:26 AM
To: Salus, Sandra
Subject: FW: For Your Information

A constituent letter for our response.

Carolyn M. Treiss, JD, MSW
Chief of Staff

Office of Health Care Access
State of Connecticut
410 Capitol Avenue
3rd Floor, MS # 13HCA
Hartford, CT 06134-0308
(860) 418-7024

-----Original Message-----
From: Litke, Jeff
Sent: Tuesday, August 19, 2008 8:07 AM
To: Vogel, Cristine
Cc: Treiss, Carolyn
Subject: For Your Information

Control No: 152203
Received: 08/15/2008
Due: 08/29/2008
Response: 08/19/2008

Issue: OHCA - Case (P)
Greater Waterbury Heart Center
Type: Electronic Mail
Status: Closed Correspondence

Origin:
Mr. Vinnie Dick
VDick@Stmh.org
email, CT 00000-0000

Remarks:

Referred By: Jeff Litke

Referred To: Commissioner Cristine Vogel (860) 418-7002
Action: For Your Information
Referred: 08/19/2008 Due: 09/02/2008

Notes:
08/19/08:

I am forwarding information to you that may be of interest. Please contact me if you have any questions.

Jeff Litke, Staff Assistant
State Capitol, Office of the Governor
210 Capitol Avenue, Room 408
Hartford, CT 06106
Phone: (860)524-7302/FAX: (860)524-7396

Jeff.Litke@ct.gov

08/19/08:

-----Original Message-----
From: Vinnie Dick [mailto:VDick@Stmh.org]
Sent: Friday, August 15, 2008 8:33 AM
To: Governor Rell
Subject: GREATER WATERBURY HEALTH CENTER

Just a note to let you know how I feel about the possible closing of the Greater Waterbury Heart Center. I am not sure where you live or how long it would take you to get to a hospital where you would be taken care of should you suffer a Heart Attack. If I should suffer a Heart Attack and the Greater Waterbury Heart Center is no longer in existence that would mean that I would have to be sent to Bridgport or New Haven - This could take a long amt of time. In the time it would take to get there I could die, whereas if the Heart Center was still available I would get Treatment much faster and would have a better chance of surviving.

What would you want to do…. Get treatment fast or wait to be transported to another Hospital…….Please

Thanks……..Vinnie Dick

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

08*19/08:

-----Original Message-----
From: Litke, Jeff
Sent: Tuesday, August 19, 2008 8:07 AM
To: 'VDick@Stmh.org'
Subject: RE: GREATER WATERBURY HEALTH CENTER

August 19, 2008

Mr. Vinnie Dick
VDick@Stmh.org

Dear Mr. Dick:

Thank you for your correspondence to Governor Rell regarding the Greater Waterbury Heart Center. The Governor truly appreciates the time you took to write to her office. Please

accept this response on her behalf.

Governor Rell believes that it is extremely important for citizens to voice their opinions to their elected officials. The Governor is committed to doing all that she can for the citizens of Connecticut. Governor Rell promises to keep your comments in mind as she makes decisions that are in the best interest of all Connecticut residents. I have forwarded your comments to Commissioner Cristine Vogel at the Office of Health Care Access for her information.

Thank you again for sharing your comments and concerns with Governor Rell. Please do not hesitate to contact our office in the future, should the need arise.

Sincerely,

Jeff Litke
Staff Assistant
Office of the Governor

THOMAS G. DUNN
MAYOR



RECEIVED
2008 AUG 21 A 11:56
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

OFFICE OF THE MAYOR
TOWN OF WOLCOTT

August 14, 2008

Ms. Cristine A. Vogel
Commissioner
Office of Health Care Access
410 Capitol Ave., MS #13HCA
Hartford, CT 06134

Re: Docket numbers 08-30167-MD-2 and 08-31202

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the Center has consistently achieved clinical outcomes that meet or exceed national standards. The Center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Thomas G. Dunn

Mayor, Town of Wolcott

10 KENEA AVENUE • WOLCOTT, CONNECTICUT 06716 • PHONE: (203) 879-8100 • FAX: (203) 879-1542
An Equal Opportunity Employer

Sisters of Saint Joseph
of Chambery

Provincial Office
27 Park Road
West Hartford, Connecticut, 06119

RECEIVED
2008 AUG 21 A 11: 38
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 15, 2008

Christine A. Vogel
Commissioner
Office of Health Care Access
410 Capitol Avenue
MS #13HCA
Hartford, CT 06134-0308

Dear Commissioner Vogel:

The Sisters of Saint Joseph of Chambéry founded Saint Mary's Hospital in 1909. For the past one hundred years, the people of Greater Waterbury have received only the highest medical services. On this, the eve of the hospital's centennial, we are dismayed to learn that the Heart Center of Greater Waterbury is in danger of being closed.

The Heart Center is one of the most vital and vibrant collaborative services available at Saint Mary's and Waterbury Hospitals. Since opening a mere three years ago, countless lives have been saved by both hospitals' dedicated teams of cardiac surgeons, cardiologists, and cardiac nurses. The emergency room staffs have played a critical role in making dramatic "saves," successfully caring for individuals so critically ill they most certainly would have perished had they been transported out of the Waterbury area.

There is no doubt that there is a great need for these services in Greater Waterbury. There is also no doubt that both Saint Mary's Hospital and Waterbury Hospital have performed admirably delivering these services to the community.

On behalf of the Sisters of Saint Joseph of Chambéry, the staff of Saint Mary's Hospital, and the entire Greater Waterbury Community, I urge you to fully approve the Heart Center of Greater Waterbury. This is truly a matter of life and death.

Sincerely,

Sister Dolores Lahr, CSJ

Sister Dolores Lahr, CSJ
Provincial

Telephone: 860-233-5126 Fax: 860-232-4649 Email: CSJUSA@sbcglobal.net
Website: www.sistersofsaintjoseph.org

RECEIVED
2008 AUG 22 A 11: 21
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

169 Scott Road
Waterbury, Ct. 06705-3204

August 19, 2008

Commissioner Vogel
Office of Health Care Access
State of Connecticut
410 Capitol Ave.
Hartford, Ct.

Dear Commisssioner Vogel,

I am writing this letter because I've never felt so strongly about a community issue before.

I am 59 years old. In 2006 I suffered a silent heart attack. Unbeknownst to me, I had a coronary artery with 100% blockage. I underwent a successful angioplasty and stent placement at the Heart Center of Greater Waterbury at Waterbury Hospital and participated in their cardiac rehab program. Today, I am feeling well due to the professional expertise and care I received during my brief stay at the hospital and the encouragement and positive atmosphere at the rehab center.

I cannot comprehend giving a community this advanced care facility to potentially save hundreds of lives in a given year and to ease the burden such illnesses can place on the patients' families, then taking it away, leaving us to take our chances in life-threatening situations.

Please consider the humanity of it first. Let us keep our Heart Center and all the outreach programs it has afforded Waterbury and the surrounding towns. Just maybe the reason the "numbers were down" was because the ancillary staff of the Heart Center did its job so well in providing cardiac education to the public??? Or...perhaps the mere proximity of the Heart Center made it possible to save lives with lesser strategies??? I feel credit must be given to the doctors and staff of the Heart Center for not jumping into open heart surgeries just to meet a quota.

The Heart Center has become an integral part of our city now. People here depend on it and its services. It's almost two-and-a -half years since my heart problem began, and I can't imagine not attending my monthly support group meeting. I know I (and my family) live more secure in the knowledge that should something happen again,I wouldn't have to be shuttled off to another city at a critical point in my medical care. This peace of mind is priceless, and you know they say

stress plays a huge part in heart health!!!

Very truly yours,

Mary Ellen Shea

Mary Ellen Shea

August 19, 2008

RECEIVED
2008 AUG 21 A 11:56
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Ms. Cristine A. Vogel
Commissioner
Office of Health Care Access
410 Capitol Avenue, MS #13HCA
Hartford, CT 06134

Re: Docket Numbers 08-30167-MD-2 and 08-31202

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that every heart matters!

Sincerely,

Barbara B. Morcey

Barbara B. Morcey

August 19, 2008

RECEIVED
2008 AUG 21 A 11:56
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Ms. Cristine A. Vogel
Commissioner
Office of Health Care Access
410 Capitol Avenue, MS #13HCA
Hartford, CT 06134

Re: Docket Numbers 08-30167-MD-2 and 08-31202

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

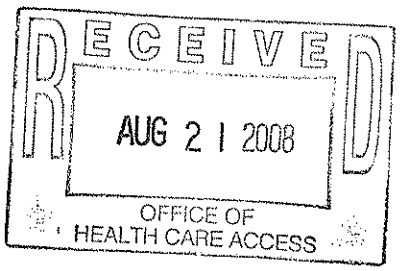
In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that every heart matters!

Sincerely,

Marilyn Lombardo

Marilyn B. Lombardo

August 19, 2008



Ms. Cristine A. Vogel
Commissioner
Office of Health Care Access
410 Capitol Avenue, MS #13HCA
Hartford, CT 06134

Re: Docket Numbers 08-30167-MD-2 and 08-31202

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that every heart matters!

Sincerely,

Curtis V. Titus

August 19, 2008

RECEIVED
2008 AUG 21 A 11:56
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Ms. Cristine A. Vogel
Commissioner
Office of Health Care Access
410 Capitol Avenue, MS #13HCA
Hartford, CT 06134

Re: Docket Numbers 08-30167-MD-2 and 08-31202

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that every heart matters!

Sincerely,

Janet B. Titus

Greer, Leslie

From: Vogel, Cristine
Sent: Thursday, August 21, 2008 12:55 PM
To: Greer, Leslie
Cc: Treiss, Carolyn
Subject: FW: Heart center of greater waterbury

Leslie: I believe I am to forward these letters/comments to you - Thanks

-----Original Message-----
From: Williams, Michael L - Waterbury, CT [mailto:Michael.L.Williams2@usps.gov]
Sent: Thursday, August 21, 2008 12:46 PM
To: Vogel, Cristine
Subject: Heart center of greater waterbury

After reading today's post regarding the petition about the "heart Center" I am at a loss. With all the waste and fraud the occurs in Connecticut what is the big push to keep this non-performing great expense center; and these words are not meant to be taken harshly.
Emergencies are handled by Hospitals and most are great when service occurs about the time of a heart attack. The hearth center is suppose to perform a certain number of hearth surgeries and it did not meet its goal and will not be able to meet its goals ever. It is not about the travel to Bridgeport or Danbury or Hartford; as again emergences are handled right away. Do not allow the State of Ct to be bogged down again with another non performing medical center that will request more tax dollar funds and be another sink hole of cash that every one thinks the State of Connecticut justifying its expense by stating it will hire more health care workers etc.

RICHARD BLUMENTHAL
ATTORNEY GENERAL

55 Elm Street
P.O. Box 120
Hartford, CT 06141-0120

(860) 808-5318

Office of The Attorney General
State of Connecticut

TELEFAX COMMUNICATION

RECEIVED
AUG 22 2008
OFFICE OF
HEALTH CARE ACCESS

Date: 8/22/08

To: Carolyn Treiss

Telefax #: 418-7052

Number of Pages: 3
(including this)

From: Richard F. Kehoe, Special Counsel

Telephone #: 860/808-5322

Telefax #: 860/808-5387

Information
Faxed by: Susan Kmiec, Administrative Assistant

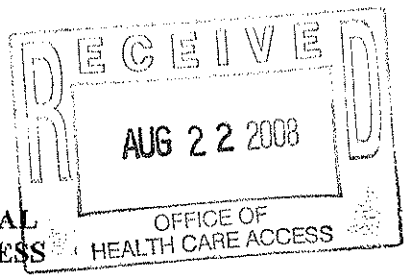
COMMENT(S):

NOTICE: This telecopy transmission and any accompanying documents may contain confidential or privileged information. They are intended only for use by the individual or entity named on this transmission sheet. If you are not the intended recipient, you are not authorized to disclose, copy, distribute or use in any manner the contents of this information. If you have received this transmission in error, please notify us by telephone immediately so that we can arrange retrieval of the faxed documents.

RICHARD BLUMENTHAL
ATTORNEY GENERAL

55 Elm Street
P.O. Box 120
Hartford, CT 06141-0120

Office of The Attorney General
State of Connecticut



TESTIMONY OF
ATTORNEY GENERAL RICHARD BLUMENTHAL
BEFORE THE OFFICE OF HEALTH CARE ACCESS
AUGUST 29, 2008

I appreciate the opportunity to strongly support the application for an extension of the operations deadline for the Heart Center of Greater Waterbury, a joint cardiac program operated by St. Mary's Hospital, Waterbury Hospital and the University of Connecticut Health Center.

I have long supported and worked to achieve this program for effective lifesaving cardiac care, and I pledge a continued fight for it. The time required to transport patients needing immediate hospital heart care can be literally the difference between life and death. Waterbury area residents deserve no less than the highly skilled and caring professionals and Heart Center programs provided by these hospitals. This heart care program should be made permanent under the extraordinary professional leadership team at both hospitals. If Waterbury residents become ill -- especially in a heart threatening emergency -- they should be treated in Waterbury.

In short, citizens of the Waterbury area need and deserve this vital cardiac care service, which literally saves lives. The Office of Health Care Access (OHCA) should grant the application for extension of time to carefully reach the right result.

The Heart Center of Greater Waterbury has already achieved its paramount goal -- providing residents of the 18 towns in the Greater Waterbury region with superb, world class cardiac care. Heart patients receive timely and seamless care in one facility from emergency room care to recovery. As OHCA acknowledged in its approval of the 2004 agreement, patients whose time of arrival to angioplasty exceeds two hours -- known as door to balloon time -- have a 40-60 percent increased risk of mortality.

This program's life saving benefits have been immeasurable and miraculous -- as testimony from patients as well as professionals irrefutably establishes.

The hospitals have committed over $7 million -- providing critical cardiac care to over 2400 patients, including the provision of more than 1800 angioplasty procedures and approximately 600 open heart surgeries. But the real benefits of this investment have only begun. Its results in lives saved and enhanced are rising -- not only in numbers of successful medical outcomes but quality of life.

The Heart Center's 2004 certificate of need agreement set several benchmarks, using the best available information at that time. The Heart Center has met every condition except the volume target for open heart surgeries.

- As required by the agreement, the Heart Center has established a relationship with an experienced partner in providing cardiac services -- the University of Connecticut Medical Center and John Dempsey Hospital. Cardiac surgeons and perfusionists who work at John Dempsey Hospital are provided under contract to the Heart Center. The Chief Cardiac

Surgeon at the Heart Center is the Chief of Cardiothoracic Surgery for John Dempsey Hospital. The University of Connecticut Medical Center and John Dempsey Hospital regularly perform oversight and hold case conferences with the Heart Center.

- As required under the agreement with OHCA, the Heart Center regularly submits data to the databases operated by the Society of Thoracic Surgeons Database and the American College of Cardiology. The Heart Center's outcomes meet or exceed the criteria and standards of these nationally recognized organizations.

- In each year since 2004, the Heart Center has exceeded the angioplasty target numbers -- in the past year by more than 50%.

Even if the Heart Center has not reached the overall volume targets for open heart surgery, the outcomes of its surgeries have met national standards. OHCA should consider that nationally and in Connecticut, the number of open heart surgeries has declined since 2004. The volume targets set in the 2004 agreement may have been reasonable at that time. Although there was already evidence that the number of open heart surgeries was starting to decline at some hospitals, neither OHCA nor the participating hospitals could have foreseen the dramatic 24% decline statewide in open heart surgeries since 2003. Moreover, for the past three years, the combined number of open heart surgeries at St. Mary's Hospital and Waterbury Hospital has grown steadily -- countering the statewide downward trend.

The Heart Center's request is for an extension of 6 months to provide it the opportunity to fully make the case for permanently establishing this critically important health care service. In light of the resources, funding and ongoing services already committed -- and forthcoming in the future -- OHCA should grant this extension of time. The harm of shutting down the program far outweighs any considerations to the contrary.

I urge OHCA to follow its usual prudent practice of hearing all the evidence, carefully and thoroughly assessing the issues, and making a decision that will best serve the health care needs of Waterbury's citizens.

Greer, Leslie

From: Vogel, Cristine
Sent: Monday, August 25, 2008 8:52 AM
To: Greer, Leslie
Cc: Treiss, Carolyn
Subject: FW: Heart Center

fyi

From: Norton, Nancy [mailto:NNorton@wtbyhosp.org]
Sent: Friday, August 22, 2008 8:08 AM
To: Vogel, Cristine
Subject: Heart Center

Cristine,
The people in this area would appreciate very much if you would allow the Heart Center to remain opened. You don't seem to understand how much it is really needed in this area. I personally have a heart problem and I do not want to be transported miles and miles to have my surgery done. What if we were having an ice storm or a snowstorm, after all we do live in New England. I want to be able to have my surgery done the local hospital. Through my experience I have seen a few people transported and have died via the transport. That is such a loss to family. Our Heart surgeons do keep their skills up because they do surgery Waterbury, St Mary's, New Haven, Bridgeport and Hartford. So that shouldn't be the issue. My heart specialist goes all over the stat, as does everyone of his Co workers at Cardiology Associates. Please not take the Heart Center away from the Waterbury area. We service a large area. I am a grandmother and I want to live long enough to see my grandchildren grow up and I do want to dance at their weddings.
Thank you,

Nancy Norton
Lead Scheduler & Registrar
Patient Access Department
Phone# 203-573-7661
Fax# 203-573-6788

CONFIDENTIALITY NOTICE: This email and any attachments contain confidential information that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party unless required to do so by law or regulation.

If you are not the intended recipient, you are hereby notified that any disclosure, copying, distribution or action taken in reliance on the contents of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately and delete these documents. Copyright (c) Waterbury Hospital

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

August 25, 2008

The Most Reverend Henry J. Mansell
Chairman, Saint Mary's Hospital Board of Directors
Archbishop of Hartford
134 Farmington Avenue
Hartford, CT 06105-3784

Re: Docket Number 08-30167-MD2 and Docket Number: 08-31202-LOI
Saint Mary's Hospital, Waterbury Hospital, and John Dempsey Hospital of the University of Connecticut Health Center
A Request to modify a Certificate of Need issued under Docket Number 03-30167-CON, the Primary and Elective Angioplasty and Open-Heart Surgery Programs at St. Mary's Hospital and at The Waterbury Hospital

Dear Archbishop Mansell:

On August 19, 2008, the Office of Health Care Access ("OHCA") received your letter concerning Docket 08-30167-MD2, the petition by Saint Mary's Hospital, Waterbury Hospital, and John Dempsey Hospital of the University of Connecticut Health Center to modify a Certificate of Need issued under Docket Number 03-30167-CON, the primary and elective angioplasty and open-heart surgery programs at Saint Mary's Hospital and at The Waterbury Hospital.

OHCA appreciates your comments. Your letter has been made part of the formal record of the application. Please be advised once a decision has been rendered it will be posted and available on OHCA's website at http:// www.ct.gov/ohca.

If you have any further concerns or questions, please contact me at OHCA at (860) 418-7001.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:KR:bko

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

August 25, 2008

The Honorable Thomas G. Dunn
Office of the Mayor
Town of Wolcott
10 Kenea Avenue
Wolcott, CT 06716

Re: Docket Number 08-30167-MD2 and Docket Number: 08-31202-LOI
Saint Mary's Hospital, Waterbury Hospital, and John Dempsey Hospital of the University of Connecticut Health Center
A Request to modify a Certificate of Need issued under Docket Number 03-30167-CON, the Primary and Elective Angioplasty and Open-Heart Surgery Programs at St. Mary's Hospital and at The Waterbury Hospital

Dear Mayor Dunn:

On August 21, 2008, the Office of Health Care Access ("OHCA") received your letter concerning Docket 08-30167-MD2, the petition by Saint Mary's Hospital, Waterbury Hospital, and John Dempsey Hospital of the University of Connecticut Health Center to modify a Certificate of Need issued under Docket Number 03-30167-CON, the primary and elective angioplasty and open-heart surgery programs at Saint Mary's Hospital and at The Waterbury Hospital.

OHCA appreciates your comments. Your letter has been made part of the formal record of the application. Please be advised once a decision has been rendered it will be posted and available on OHCA's website at http:// www.ct.gov/ohca.

If you have any further concerns or questions, please contact me at OHCA at (860) 418-7001.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:KR:bko

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

August 25, 2008

The Honorable Tom Gormley
First Selectman
Town of Middlebury
1212 Whittemore Rd., P. Box 392
Middlebury, CT 06762

Re: Docket Number 08-30167-MD2 and Docket Number: 08-31202-LOI
Saint Mary's Hospital, Waterbury Hospital, and John Dempsey Hospital of the University of Connecticut Health Center
A Request to modify a Certificate of Need issued under Docket Number 03-30167-CON, the Primary and Elective Angioplasty and Open-Heart Surgery Programs at St. Mary's Hospital and at The Waterbury Hospital

Dear Selectman Gormley:

On August 19, 2008, the Office of Health Care Access ("OHCA") received your letter concerning Docket 08-30167-MD2, the petition by Saint Mary's Hospital, Waterbury Hospital, and John Dempsey Hospital of the University of Connecticut Health Center to modify a Certificate of Need issued under Docket Number 03-30167-CON, the primary and elective angioplasty and open-heart surgery programs at Saint Mary's Hospital and at The Waterbury Hospital.

OHCA appreciates your comments. Your letter has been made part of the formal record of the application. Please be advised once a decision has been rendered it will be posted and available on OHCA's website at http:// www.ct.gov/ohca.

If you have any further concerns or questions, please contact me at OHCA at (860) 418-7001.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:KR:bko

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

August 25, 2008

The Honorable Paul D. Hinckley
First Selectman
Town of Woodbury
281 Main Street South
P.O. Box 369
Woodbury, CT 06798-0369

Re: Docket Number 08-30167-MD2 and Docket Number: 08-31202-LOI
Saint Mary's Hospital, Waterbury Hospital, and John Dempsey Hospital of the University of Connecticut Health Center
A Request to modify a Certificate of Need issued under Docket Number 03-30167-CON, the Primary and Elective Angioplasty and Open-Heart Surgery Programs at St. Mary's Hospital and at The Waterbury Hospital

Dear Selectman Hinckley:

On August 19, 2008, the Office of Health Care Access ("OHCA") received your letter concerning Docket 08-30167-MD2, the petition by Saint Mary's Hospital, Waterbury Hospital, and John Dempsey Hospital of the University of Connecticut Health Center to modify a Certificate of Need issued under Docket Number 03-30167-CON, the primary and elective angioplasty and open-heart surgery programs at Saint Mary's Hospital and at The Waterbury Hospital.

OHCA appreciates your comments. Your letter has been made part of the formal record of the application. Please be advised once a decision has been rendered it will be posted and available on OHCA's website at http:// www.ct.gov/ohca.

If you have any further concerns or questions, please contact me at OHCA at (860) 418-7001.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:KR:bko

259 Loper St
Southington, CT 06489
August 22, 2008

Dear Governor Rell,

I am an only child of an elderly couple in Waterbury. They have chosen to stay in Waterbury and because I have out of town, it is important they can access healthcare in the city.

Three years ago before the Heart Center of Greater Waterbury opened, my father needed to have open heart surgery. Due to diabetes, he had a ten week stay. My mother was not well enough to travel to New Haven to visit so did not see her husband for almost three months. As the only child I traveled daily-sometimes twice a day- because he had no visitors.

No one from Waterbury at their age was going to drive on 91.

My father's surgery was elective because my wife is a nurse and keeps an eye on them. Many do not have the luxury to have a family healthcare person.

My father in an emergency would not make it to New Haven;.The traffic in Waterbury is awful as you know. I have had friends who received care at the Heart Center of greater Waterbury and are pleased with their care.

They have had good outcomes. People can not be driving to the other side of the state. They have a wellness program and open heart surgeries are decreasing across the country but if another surgery is needed, these surgeons are well qualified and the surgery should be available in the 4th largest city in our state.

Please send your support in this matter

Joseph Micalizzi

RECEIVED
2008 AUG 25 A 11:46
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Docket
08-30167-MD
08-31202

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

August 25, 2008

Ms. Patricia Lanza
52 Academy Avenue
Waterbury, CT 06705

Re: Docket Numbers 08-30167-MD2 and 08-31202-LOI
St. Mary's Hospital and The Waterbury Hospital, d/b/a The Heart Center of Greater Waterbury, and John Dempsey Hospital

Dear Ms. Lanza:

The Office of Health Care Access ("OHCA") is in receipt of your letter dated August 21, 2008 regarding the above referenced matters which was forwarded to us by the Governor's office. OHCA understands your concerns and appreciates your comments. Your letter has been made part of each record referenced above.

If you are interested in additional information regarding the Heart Center of Greater Waterbury, please visit OHCA's website at http://www.ohca.state.ct.us/.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:ss

Salus, Sandra

From: Treiss, Carolyn
Sent: Friday, August 22, 2008 11:12 AM
To: Salus, Sandra
Subject: FW: Please Respond Directly to Constituent

Sandy,
Here is another letter that should also be responded to by mail.
This is one that the Commissioner should sign herself given the comments in the letter.
Carolyn

Carolyn M. Treiss, JD, MSW
Chief of Staff

Office of Health Care Access
State of Connecticut
410 Capitol Avenue
3rd Floor, MS # 13HCA
Hartford, CT 06134-0308
(860) 418-7024

-----Original Message-----
From: Litke, Jeff
Sent: Thursday, August 21, 2008 3:17 PM
To: Vogel, Cristine
Cc: Treiss, Carolyn
Subject: Please Respond Directly to Constituent

Control No: 152432
Received: 08/21/2008
Due: 09/04/2008
Response: 08/21/2008

Issue: OHCA - Case
Greater Waterbury Heart Center
Type: Electronic Mail
Status: Closed Correspondence

Origin:
Ms. Patricia Lanza
52 Academy Ave
memasboys4@sbcglobal.net
Waterbury, CT 06705

Remarks:

Referred By: Jeff Litke

Referred To: Commissioner Cristine Vogel (860) 418-7002
Action: Please Respond Directly to Constituent
Referred: 08/21/2008 Due: 09/04/2008

Notes:
08/21/08:

Please respond directly to the constituent, regarding the following letter, on behalf of Governor Rell. Also, please acknowledge that the Governor referred it to your agency.

It is not necessary to send a copy of response to the Governor's Office. The constituent has been instructed to contact the Commissioner's Office directly if they do not hear from the Agency within two (2) weeks.

If you have any questions, I can be reached at 524-7302. Thank you.

Jeff Litke
Staff Assistant
Office of the Governor

08/21/08:

-----Original Message-----
From: PATRICIA LANZA [mailto:memasboys4@sbcglobal.net]
Sent: Thursday, August 21, 2008 2:30 PM
To: Governor Rell
Subject: Waterbury

Dear Governor Rell,

I have been a citizen of Conn. and the city of Waterbury all my 67 years. I have worked , paid all my taxes, raised my children to be good responsible adults and have done everything the middle class of this state have been doing for generations. In all that time, and after never missing a chance to vote, this is my first letter to a legislator.

All that being said ,that your commissioner is trying to take our heart center away is outrageous. My 40 year old son.with a 3 year old would not be alive if not for that center. He could not have made it to New Haven or Bridgeport. After having chest pains he was in surgery and a stint was placed in his arteries in 30 minutes . Try to get to those other cities in that time. I could care less about the hospitals or Doctors of New Haven and Bridgeport loosing money or the politics involved in this decision I care only for mine. This year I was treated successfully at the Leever Cancer Center in Middlebury and hope that the people of that outlying town can now take advantage of what we have to offer with our Heart Center. Please step up and help us. Yes we have been daubed a second class town for the outrage things our politicians have done but we are good people that deserve the best just like everyone else. Thank you for allowing me to vent even though I know deep in my heart that you will never see this letter or anyone else in your office will pay one bit of attention to it.

Patricia Lanza
52 Academy Ave
Waterbury Ct. 06705
203-756-4821

08/21/08:

-----Original Message-----
From: Litke, Jeff
Sent: Thursday, August 21, 2008 3:17 PM
To: 'memasboys4@sbcglobal.net'
Subject: RE: Waterbury

August 21, 2008

Ms. Patricia Lanza

52 Academy Avenue
Waterbury, Connecticut 06705
memasboys4@sbcglobal.net

Dear Ms. Lanza:

Thank you for your correspondence to Governor Rell regarding the Greater Waterbury Heart Center. The Governor truly appreciates the time you took to write to her office. Please accept this response on her behalf.

Governor Rell believes that it is extremely important for citizens to voice their opinions and comments to their elected officials. As the matter you wrote about is overseen by the Office of Health Care Access, Governor Rell has asked that I forward your concerns to Commissioner Cristine Vogel's office to review and respond to your directly. If you do not receive a response from the Office of Health Care Access within two weeks please feel free to contact the Commissioner's office directly at (860) 418-7002. Due to the need to research and investigate certain matters it is possible that you will receive a response within four weeks. Should the need arise please feel free to contact the Governor's office at (860) 566-4840 or 1-800-406-1527.

Thank you again for sharing your comments and concerns with Governor Rell. Please do not hesitate to contact our office in the future, should the need arise.

Sincerely,

Jeff Litke
Staff Assistant
Office of Governor M. Jodi Rell

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

August 25, 2008

Ms. Phyllis M. Coviello
209 Windy Drive
Waterbury, CT 06705

Re: Docket Numbers 08-30167-MD2 and 08-31202-LOI
St. Mary's Hospital and The Waterbury Hospital, d/b/a The Heart Center of Greater Waterbury, and John Dempsey Hospital

Dear Ms. Coviello:

The Office of Health Care Access ("OHCA") is in receipt of your letter dated August 21, 2008 regarding the above referenced matters which was forwarded to us by the Governor's office. OHCA understands your concerns and appreciates your comments. Your letter has been made part of each record referenced above.

If you are interested in additional information regarding the Heart Center of Greater Waterbury, please visit OHCA's website at http://www.ohca.state.ct.us/.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:ss

Salus, Sandra

From: Treiss, Carolyn
Sent: Friday, August 22, 2008 10:57 AM
To: Salus, Sandra
Subject: FW: Please Respond Directly to Constituent

Sandy,
Please respond using the letter we crafted earlier this week. The writers address is below, so let's send it in the mail.
Carolyn

Carolyn M. Treiss, JD, MSW
Chief of Staff

Office of Health Care Access
State of Connecticut
410 Capitol Avenue
3rd Floor, MS # 13HCA
Hartford, CT 06134-0308
(860) 418-7024

-----Original Message-----
From: Litke, Jeff
Sent: Thursday, August 21, 2008 1:49 PM
To: Vogel, Cristine
Cc: Treiss, Carolyn
Subject: Please Respond Directly to Constituent

Control No: 152428
Received: 08/21/2008
Due: 09/04/2008
Response: 08/21/2008

Issue: OHCA - Case
Greater Waterbury Heart Center
Type: Electronic Mail
Status: Closed Correspondence

Origin:
Ms. Phylis Coviello
209 Windy Drive
Phaedra209@aol.com
Waterbury, CT 06705

Remarks:

Referred By: Jeff Litke

Referred To: Commissioner Cristine Vogel (860) 418-7002
Action: Please Respond Directly to Constituent
Referred: 08/21/2008 Due: 09/04/2008

Notes:
08/21/08:

Please respond directly to the constituent, regarding the following letter, on behalf of Governor Rell. Also, please acknowledge that the Governor referred it to your agency.

It is not necessary to send a copy of response to the Governor's Office. The constituent has been instructed to contact the Commissioner's Office directly if they do not hear from the Agency within two (2) weeks.

If you have any questions, I can be reached at 524-7302. Thank you.

Jeff Litke
Staff Assistant
Office of the Governor

08/21/08:

-----Original Message-----
From: Phaedra209@aol.com [mailto:Phaedra209@aol.com]
Sent: Thursday, August 21, 2008 12:52 PM
To: Governor Rell
Subject: Heart Center in Waterbury

Dear Governor Rell:

I am writing to you to seek your intervention in the decision to close the Heart Center in Waterbury. I am a person who personally had to use this center. I live in Waterbury and am handicapped. I state this because long distance travel is difficult for me. I would not be able to follow up on service rendered in another city.

I watched the Commissioner Ms. Voghel on the news one evening state that the "quota" of services was not met, and this would be the basis for the decision to be made. I hope not. "quota" what is the number of lives saved equal to the need for compassion and care of one person. I hope she and her family never have to endure the feeling of helplessness that a person feels when they give their body to health officials to save. I can tell you from experience it is not something I wish to worry about again. I know that you have had occasion for this feeling in both your husband and your own care. You live near to Danbury and did not have to travel far for your care. Please give us the same consideration to be close to our families in times of need. I urge you to tell Commissioner Voghel that people do not come in quotas and she should take all members of a family and the dynamics that each has into consideration especially when she speaks in the public forum we are not numbers but HUMANS with feelings and fears of our mortality.

Respectfully;

Phyllis M. Coviello
209 Windy Drive
Waterbury, Ct. 06705

08/21/08:

-----Original Message-----
From: Litke, Jeff
Sent: Thursday, August 21, 2008 1:49 PM
To: 'Phaedra209@aol.com'
Subject: RE: Heart Center in Waterbury

August 21, 2008

Ms. Phylis Coviello

209 Windy Drive
Waterbury, Connecticut 06705
Phaedra209@aol.com

Dear Ms. Coviello:

Thank you for your correspondence to Governor Rell regarding the Greater Waterbury Heart Center. The Governor truly appreciates the time you took to write to her office. Please accept this response on her behalf.

Governor Rell believes that it is extremely important for citizens to voice their opinions and comments to their elected officials. As the matter you wrote about is overseen by the Office of Health Care Access, Governor Rell has asked that I forward your concerns to Commissioner Cristine Vogel's office to review and respond to your directly. If you do not receive a response from the Office of Health Care Access within two weeks please feel free to contact the Commissioner's office directly at (860) 418-7002. Due to the need to research and investigate certain matters it is possible that you will receive a response within four weeks. Should the need arise please feel free to contact the Governor's office at (860) 566-4840 or 1-800-406-1527.

Thank you again for sharing your comments and concerns with Governor Rell. Please do not hesitate to contact our office in the future, should the need arise.

Sincerely,

Jeff Litke
Staff Assistant
Office of Governor M. Jodi Rell

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

August 25, 2008

Ms. Tammie L. Kennedy
108 Center Street
Thomaston, CT 06787

Re: Docket Numbers 08-30167-MD2 and 08-31202-LOI
St. Mary's Hospital and The Waterbury Hospital, d/b/a The Heart Center of Greater Waterbury, and John Dempsey Hospital

Dear Ms. Kennedy:

The Office of Health Care Access ("OHCA") is in receipt of your letter dated August 25, 2008 regarding the above referenced matters which was forwarded to us by the Governor's office. OHCA understands your concerns and appreciates your comments. Your letter has been made part of each record referenced above.

If you are interested in additional information regarding the Heart Center of Greater Waterbury, please visit OHCA's website at http://www.ohca.state.ct.us/.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:ss

Salus, Sandra

From: Treiss, Carolyn
Sent: Monday, August 25, 2008 12:29 PM
To: Salus, Sandra
Subject: FW: Please Respond Directly to Constituent

Here is a constituent letter sent to us from the Governor's office. Please respond according to our procedures.
C

Carolyn M. Treiss, JD, MSW
Chief of Staff

Office of Health Care Access
State of Connecticut
410 Capitol Avenue
3rd Floor, MS # 13HCA
Hartford, CT 06134-0308
(860) 418-7024

-----Original Message-----
From: Litke, Jeff
Sent: Monday, August 25, 2008 11:42 AM
To: Vogel, Cristine
Cc: Treiss, Carolyn
Subject: Please Respond Directly to Constituent

Control No: 152561
Received: 08/25/2008
Due: 09/08/2008
Response: 08/25/2008

Issue: OHCA - Case
Greater Waterbury Heart Center
Type: Electronic Mail
Status: Closed Correspondence

Origin:
Ms. Tammie Kennedy
108 Center Street
tkennedy@cawtby.com
Thomaston, CT 06787

Remarks:

Referred By: Jeff Litke

Referred To: Commissioner Cristine Vogel (860) 418-7002
Action: Please Respond Directly to Constituent
Referred: 08/25/2008 Due: 09/08/2008

Notes:
08/25/08:

Please respond directly to the constituent, regarding the following letter, on behalf of Governor Rell. Also, please acknowledge that the Governor referred it to your agency.

It is not necessary to send a copy of response to the Governor's Office. The constituent

has been instructed to contact the Commissioner's Office directly if they do not hear from the Agency within two (2) weeks.

If you have any questions, I can be reached at 524-7302. Thank you.

Jeff Litke
Staff Assistant
Office of the Governor

08/25/08:

-----Original Message-----
From: Kennedy Tammie [mailto:tkennedy@cawtby.com]
Sent: Monday, August 25, 2008 9:53 AM
To: Governor Rell
Subject: Heart Center of Greater Waterbury

Re: Docket 08-30167 & 08-31202

Governor Rell,

II am in great turmoil over this issue of the possible closure of the Heart Center of Greater Waterbury.

We have met in the past, my son was a returning Marine with 1/25 Charlie Co out of Plainville Ct. At his homecoming you were there along with the other politicians of the state to welcome them back. You held my niece and I have pictures of you doing so, to think her parents grandparents in need of a cardiac procedure may not survive and be there for her. To think my son arrived home safely after a year in this war zone, being shot at and his life threatened on a daily basis, but should he need a cardiac procedure in a hurry he may not survive.

As a tax payer, resident of the greater Waterbury area, patient, family member and nurse, I am extremely distressed over the direction this has gone. Closure of the Heart Center of Greater Waterbury will only lead to unnecessary deaths and risk of death to many citizens of this community. The travel time and traffic issues do not allow for meeting the standards of care for treatment times. Patients will wait unnecessarily as their capable doctors try to locate a hospital that can accommodate them. I am quite familiar with the process and have had the misfortune of being the Nurse on board ambulances responsible for the patient for transports of this nature in years past. My family members have been in the situation of having to be transported. I have had the misfortune of taking care of patients who were too unstable to transport and who may have been saved had this service been available to them. It is ridiculous that this state of the art, Quality service, is going to be taken away from the 400,000+ citizens of this area unless you do your part to stop it. Please consider how you would feel about your family or friends being in this area and needing these services!.

Please give serious consideration to this decision as the ramifications will be too great, please do the right thing and help to continue to save lives.

Thank You for your consideration.
Tammie L. Kennedy
108 Center St
Thomaston CT 06787

08/25/08:

-----Original Message-----
From: Litke, Jeff
Sent: Monday, August 25, 2008 11:42 AM
To: 'tkennedy@cawtby.com'

Subject: RE: Heart Center of Greater Waterbury

August 25, 2008

Ms. Tammie Kennedy
108 Center Street
Thomaston, Connecticut 06787
tkennedy@cawtby.com

Dear Ms. Kennedy:

Thank you for your correspondence to Governor Rell regarding the Greater Waterbury Heart Center. The Governor truly appreciates the time you took to write to her office. Please accept this response on her behalf.

Governor Rell believes that it is extremely important for citizens to voice their opinions and comments to their elected officials. As the matter you wrote about is overseen by the Office of Health Care Access, Governor Rell has asked that I forward your concerns to Commissioner Cristine Vogel's office to review and respond to your directly. If you do not receive a response from the Office of Health Care Access within two weeks please feel free to contact the Commissioner's office directly at (860) 418-7002. Due to the need to research and investigate certain matters it is possible that you will receive a response within four weeks. Should the need arise please feel free to contact the Governor's office at (860) 566-4840 or 1-800-406-1527.

Thank you again for sharing your comments and concerns with Governor Rell. Please do not hesitate to contact our office in the future, should the need arise.

Sincerely,

Jeff Litke
Staff Assistant
Office of Governor M. Jodi Rell

Greer, Leslie

From: Vogel, Cristine
Sent: Monday, August 25, 2008 4:42 PM
To: Greer, Leslie
Cc: Treiss, Carolyn
Subject: FW: Waterbury Heart Center

From: Joel Sherman [mailto:joel.sherman@gmail.com]
Sent: Monday, August 25, 2008 4:32 PM
To: Vogel, Cristine
Subject: Fwd: Waterbury Heart Center

---------- Forwarded message ----------
From: **www.politicsol.com** <editor@politicsol.com>
Date: Mon, Aug 25, 2008 at 4:23 PM
Subject: Waterbury Heart Center
To: "www.politicsol.com" <editor@politicsol.com>

Thank you for using www.politicsol.com Mail System

Message sent to the following recipients:
Governor Rell
Message text follows:

Joel Sherman
1211 W. Main St
Waterbury, CT 06708-3106

August 25, 2008

[recipient address was inserted here]

Dear [recipient name was inserted here],

Dear Gov. Rell,
As a practicing Waterbury cardiologist for 36 years, I am writing in support of the continuance of the Waterbury Heart Center. I have full knowledge of what cardiac patients had to do in Waterbury before the heart center. Delays for emergency treatment were substantial ranging from 2 to 12 hours. Many lives were lost which would be saved today. It is unbelievable to me that Waterbury could be abandoned to once again become

the only major urban center in Connecticut without modern emergency cardiac care. There is no medical justification for this. The center has easily surpassed the angioplasty guidelines. Surgery guidelines are not met, but they are outmoded. The frequency of cardiac surgery has dropped severely nationwide and I am told that other fully functioning and successful cardiac centers in Connecticut also no longer meet these guidelines. What's important is patient lives and health. There is no question that the Waterbury Cardiac Center is a major boon to Waterbury and needs to be continued. Bureaucratic guidelines should not be put before patients' welfare.

Sincerely,

Joel A Sherman MD
203 7561230

TOWN OF SOUTHBURY

OFFICE OF THE FIRST SELECTMAN

501 Main Street South

Southbury, Connecticut 06488-2295

(203) 262-0647

Fax: (203) 264-9762

RECEIVED
2008 AUG 26 A 11: 37
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 23, 2008

Ms. Christine A. Vogel, Commissioner
Office of Health Care Access
410 Capitol Avenue
P.O. Box 340308
Hartford, Conn. 06134

Dear Commissioner Vogel:

As the Town of Southbury's First Selectman, I am writing in support of the continuation for the Heart Center of Greater Waterbury on a permanent basis.

Southbury has the largest condominium complex in the state for those over the age of 65. The Town also has several assisted life care facilities providing care to a growing senior population. Currently, over twenty-six percent (26%) of Southbury's population is in the over 65 age cohort. U.S. Census Bureau projections indicate that by the year 2020, over forty percent (40%) of our population may be in this age cohort.

This segment of our population often need quick, accessible medical care, including advanced cardiac care. Interstate 84 provides easy access to hospitals in Waterbury, the destination of choice for many of our residents. Many of our seniors utilize public and private bus service to visit their physicians for chronic medical conditions. The town has been working to develop senior transportation collaboratives to reduce transportation as a barrier to quality health care. Additionally, many of our seniors have build strong patient relationships with doctors associated with Waterbury hospitals, are resistant to change and may find it very unsettling if they must go out of their "comfort zones".

During a cardiac emergency, time equals heart muscle. Even non-emergency angioplasty performed "out of existing transportation systems", can cause undue stress on the patient and other family members, who may not have easy access to alternate forms of transportation to other areas of the state.

Thank you for your consideration. If you have any questions or comments concerning this correspondence, please feel free to contact me.

Very truly yours,

Mark A.R. Cooper
First Selectman

C: SBOS
HVMA

COUNCIL OF GOVERNMENTS CENTRAL NAUGATUCK VALLEY
60 NORTH MAIN STREET. • 3RD FLOOR • WATERBURY, CT 06702-1403 (203) 757-0535
Web Site: www.cogcnv.org *E-Mail:* cogcnv@cogcnv.org

August 21, 2008

RECEIVED
2008 AUG 26 A 11:37
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Ms. Christine A. Vogel
Commissioner
Office of Health Care Access
410 Capitol Ave., MS #13HCA
Hartford, CT 06134

Dear Commissioner:

On behalf of the Council of Governments of the Central Naugatuck Valley (COGCNV), I am writing in support of the continuation of the Heart Center of Greater Waterbury on a permanent basis.

The Council of Governments represents the thirteen municipalities in the greater Waterbury region: Beacon Falls, Bethlehem, Cheshire, Middlebury, Naugatuck, Oxford, Prospect, Southbury, Thomaston, Waterbury, Watertown, Wolcott, and Woodbury. Our organization and its predecessor, the Central Naugatuck Valley Regional Planning Agency, have been in existence since 1960 to discuss and address municipal and regional issues of concern in transportation, land use, economic development, solid waste, water supply, open space, emergency response, and other issues related to the area's physical development.

Four years ago, when COG members learned that the two Waterbury hospitals were planning to submit a joint application to the Office of Health Care Access, COG voted unanimously to support the proposed cardiac care center, and many members testified in support of it. There was a similar response at this year's Heart Center rally in Waterbury.

As the municipal leadership representing Central Naugatuck Valley communities, we have some very strong reasons for supporting the heart center:

- The region is one of the state's major metropolitan regions.
- Waterbury is the fifth largest city in Connecticut.
- The hospitals are vital medical facilities for all thirteen municipalities of the region and beyond.
- The heart center greatly enhances the region's desirability as a place to live and to do business.
- And finally, travel times for treatment if cardiac care is not available in the region.

Given the critical importance of timely intervention with heart attacks and the region's population size, the Council members were taken aback by the distances that residents of the Greater Waterbury region were traveling for advanced cardiac treatment, prior to the establishment of the center.

If you drive on major roads in the Waterbury area with any frequency, you know that traffic delays can be severe during peak commuting hours and holiday periods. Traffic accidents and weather conditions only worsen the situation.

Transportation planning is an important function of COGCNV, and so we are very conscious of existing and projected traffic choke points: I-84 in eastern Waterbury and projected for the western half, the Route 8/I-84 interchange in Waterbury (the "mixmaster"), and bottlenecks on state highways between Waterbury and New Haven and along Route 8 in the lower Naugatuck Valley heading towards Bridgeport.

In its review of the Heart Center's request for an extension and for permanent status, we strongly encourage the Office of Health Care Access to examine the real-time travel scenarios for cardiac patients in the greater Waterbury area, if they had to be transported for cardiac care outside the region.

Sincerely,

Peter Dorpalen
Executive Director

PD/lr

cc: Governor's Chief of Staff Lisa Moody
✓COGCNV Mayors and First Selectmen
Heart Center of Greater Waterbury
State Senators and Representatives

T:\General\Legislation\Heart Center Support 2008-08-21.Vogel.ltr.wpd

To: Office of Health Care Access

15 Hillside Ave
Norwalk CT 06770
Aug 24, 2008

RECEIVED
2008 AUG 26 A 11:38
CONNECTICUT OFFICE OF HEALTH CARE ACCESS

Subject: HEART CENTER of Greater Waterbury

Before the opening of the HEART CENTER of Greater Waterbury anyone who lived in surrounding towns such as Naugatuck, Prospect, Beacon Falls, Thomaston or Watertown who needed urgent cardiology care had to endure at least a 30 minute ambulance ride to a hospital out of the area such as Bridgeport, Hartford or New Haven. This long tumultuous ride often aggravated the condition of the body and too frequently resulted in death.

The Heart Center has performed miracles on area people and saved lives that otherwise would have ended if people had to travel out of the area.

The Heart Center at Waterbury has saved people by performing

angioplasties instead of bypass surgery but has miraculously saved the lives of over 600 people by performing open heart surgery.

I was one of those 600+ people who had open heart surgery in May of 2006. I had 5 blockages, one of which was 100 per cent and the others 99 and 95 per cent. Would you say that's close to death?

Dr. Paul Preissler performed my open heart/bypass surgery followed by the best care you could ask for by the staff at the Waterbury Hospital Heart Center. They saved me. Please save the Heart Center.

Reference Docket Numbers
08-30167-MD & 08-31202

Respectfully
Virginia Donnelly

(203) 723-2685

Miss Virginia Donnelly
15 Hillside Ave
Naugatuck, CT 06770

Virginia Donnelly

RECEIVED
2008 AUG 26 P 12: 21
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

HEART CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that ***every heart matters!***

Sincerely,

Signature Susan Grimes

Please Print Name and Address

Susan Grimes
1330 Middlebury Rd.
Middlebury, CT 06762

Re: Docket numbers 08-30167—MD and 08-31202

RECEIVED
2008 AUG 26 P 12: 21
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

HEART
CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that ***every heart matters!***

Sincerely,

Signature Cristina Soler

Please Print Name and Address

Cristina Soler
89 Old Bound Line Rd.
Wolcott, CT 06716

Re: Docket numbers 08-30167—MD and 08-31202

RECEIVED
2008 AUG 26 P 12: 22
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

HEART
CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that ***every heart matters!***

Sincerely,

Signature Celeste M Bergstan

Please Print Name and Address

Celeste M Bergstan
76 Hadlum Neck Rd
E. Hampton, Ct 06424

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL · Saint Mary's HOSPITAL · UConn Health Center

RECEIVED
2008 AUG 26 P 12: 22
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

HEART CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that ***every heart matters!***

Sincerely,

Signature Donna White

Please Print Name and Address

Donna White
4 Cedar Lane
Berkhamsted, CT 06063

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center



RECEIVED
2008 AUG 26 P 12: 22
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Pat Patriss

Please Print Name and Address

Pat Patriss
110 Lydall Rd
Nqt. Ct. 06111

Re: Docket numbers 08-30167—MD and 08-31202

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

August 26, 2008

Ms. Giulietta Nave
243 Highland Drive
Waterbury, CT 06708

Re: Docket Numbers 08-30167-MD2 and 08-31202-LOI
St. Mary's Hospital and The Waterbury Hospital, d/b/a The Heart Center of Greater Waterbury, and John Dempsey Hospital

Dear Ms. Nave:

The Office of Health Care Access ("OHCA") is in receipt of your letter dated August 22, 2008 regarding the above referenced matters which was forwarded to us by the Governor's office. OHCA understands your concerns and appreciates your comments. Your letter has been made part of each record referenced above.

If you are interested in additional information regarding the Heart Center of Greater Waterbury, please visit OHCA's website at http://www.ohca.state.ct.us/.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:ss

Salus, Sandra

From: Treiss, Carolyn
Sent: Tuesday, August 26, 2008 12:20 PM
To: Salus, Sandra
Subject: FW: Please Respond Directly to Constituent

Attachments: OHCA-Nave.pdf



OHCA-Nave.pdf
(111 KB)

And one more...

Carolyn M. Treiss, JD, MSW
Chief of Staff

Office of Health Care Access
State of Connecticut
410 Capitol Avenue
3rd Floor, MS # 13HCA
Hartford, CT 06134-0308
(860) 418-7024

-----Original Message-----
From: Litke, Jeff
Sent: Tuesday, August 26, 2008 10:47 AM
To: Vogel, Cristine
Cc: Treiss, Carolyn
Subject: Please Respond Directly to Constituent

Control No: 152604
Received: 08/25/2008
Due: 09/09/2008
Response: 08/26/2008

Issue: OHCA - Case
Greater Waterbury Heart Center
Type: Constituent Mail
Status: Closed Correspondence

Origin:
Ms. Giulietta Nave
243 Highland Drive
Waterbury, CT 06708

Remarks:

Referred By: Jeff Litke

Referred To: Commissioner Cristine Vogel (860) 418-7002
Action: Please Respond Directly to Constituent
Referred: 08/26/2008 Due: 09/09/2008

Notes:
08/26/08:

Please respond directly to the constituent, regarding the following letter, on behalf of Governor Rell. Also, please acknowledge that the Governor referred it to your agency.

It is not necessary to send a copy of response to the Governor's Office. The constituent has been instructed to contact the Commissioner's Office directly if they do not hear from the Agency within two (2) weeks.

If you have any questions, I can be reached at 524-7302. Thank you.

Jeff Litke
Staff Assistant
Office of the Governor

08/26/08:

August 26, 2008

Ms. Giulietta Nave
243 Highland Drive
Waterbury, Connecticut 06708

Dear Ms. Nave:

Thank you for your correspondence to Governor Rell regarding the Greater Waterbury Heart Center. The Governor truly appreciates the time you took to write to her office. Please accept this response on her behalf.

Governor Rell believes that it is extremely important for citizens to voice their opinions and comments to their elected officials. As the matter you wrote about is overseen by the Office of Health Care Access, Governor Rell has asked that I forward your concerns to Commissioner Cristine Vogel's office to review and respond to your directly. If you do not receive a response from the Office of Health Care Access within two weeks please feel free to contact the Commissioner's office directly at (860) 418-7002. Due to the need to research and investigate certain matters it is possible that you will receive a response within four weeks. Should the need arise please feel free to contact the Governor's office at (860) 566-4840 or 1-800-406-1527.

Thank you again for sharing your comments and concerns with Governor Rell. Please do not hesitate to contact our office in the future, should the need arise.

Sincerely,

Jeff Litke
Staff Assistant
Office of Governor M. Jodi Rell

152604

August 22, 2008

Office of the Governor
State Capitol
210 Capitol Avenue
Hartford, CT 06106

Dear Governor Rell:

I am writing to you to encourage you to support the life saving efforts of the Heart Center of Greater Waterbury.

The state's Office of Health Care Access (OHCA) is looking to close our Heart Center based on the fact that the Hospital has failed to meet all three of the requirements originally imposed. The one requirement that was not met was the fact that we have not performed as many open heart surgeries as requested and therefore, **OHCA is concerned that the staff may not be as proficient as they should be to perform these studies.** Although I applaud OHCA's concern for making sure that the staff are qualified to perform these procedures, I'm disturbed to hear that they would consider closing the center down as an alternative which would result in the deaths of many patients as valuable time would be lost transporting patients to Hartford or Bridgeport Hospitals to obtain this life-saving procedure which should be made available to them right in their own backyard. The issue here is not about the quality of care and proficiency as the Hospital has demonstrated that they are qualified, have saved thousands of lives, and these same professionals also perform these same procedures in Hartford as well. If the procedures performed at Hartford were added to the procedures performed at Waterbury Hospital (WHHC), I would imagine that we've exceeded our quota and therefore, the staff are more than proficient in performing these procedures therefore, this should alleviate OHCA's concern for proficiency.

Perhaps a better question would be "How many Greater Waterbury residents have died in route to a heart center before the Heart Center of Greater Waterbury was instituted?"

Another thing to consider is that Hospitals should be applauded for being able to save lives using less invasive procedures such as angioplastaies, whenever possible, so that 1) the patient is spared added pain and longer recovery and 2) the Hospital and State save money; sounds like a WIN, WIN situation to me. The use of angioplasties has averted the necessity for performing many open heart surgeries; this should be considered a good thing. I'm told our Hospital has exceeded the number required for performing angioplasties.

Also, every life counts. If this hospital is capable of saving even one life (even though its already proven to have saved thousands), then isn't it worth it to keep the Center open? What if that life saved was yours or a loving family member's?

This Center is near and dear to my heart because several friends of mine and most importantly, my father have been privileged to have received exceptional care at this Center first hand. I was so grateful at the speed in which my father received care. He not only went in to see whether or not he had a blockage but when that blockage was discovered, they performed his life-saving procedure right then and there and he was resting comfortably in his room shortly thereafter. He often raves to me about how wonderful the staff and doctors treated him and how grateful he was that this Center is nearby otherwise who knows if he would have been fortunate to reach the next available heart center and whether or not his life would have been spared.

I implore you, please do your best to keep this Center open. I know, through your own personal experience with breast cancer, that you know how valuable these life saving treatment centers are to us. There's no doubt about it; when time is of the essence, having these Centers close to home saves lives.

Sincerely,

Giulietta Nave
GN

243 Highland Drive
Waterbury, CT 06708

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

August 26, 2008

Mr. Joseph Micalizzi
259 Loper Street
Southington, CT 06489

Re: Docket Numbers 08-30167-MD2 and 08-31202-LOI
St. Mary's Hospital and The Waterbury Hospital, d/b/a The Heart Center of Greater Waterbury, and John Dempsey Hospital

Dear Mr. Micalizzi:

The Office of Health Care Access ("OHCA") is in receipt of your letter dated August 22, 2008 regarding the above referenced matters which was forwarded to us by the Governor's office. OHCA understands your concerns and appreciates your comments. Your letter has been made part of each record referenced above.

If you are interested in additional information regarding the Heart Center of Greater Waterbury, please visit OHCA's website at http://www.ohca.state.ct.us/.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:ss

Salus, Sandra

From: Treiss, Carolyn
Sent: Tuesday, August 26, 2008 12:19 PM
To: Salus, Sandra
Subject: FW: Please Respond Directly to Constituent

Attachments: OHCA-Micalizzi.pdf



OHCA-Micalizzi.pdf
(52 KB)

And another...

Carolyn M. Treiss, JD, MSW
Chief of Staff

Office of Health Care Access
State of Connecticut
410 Capitol Avenue
3rd Floor, MS # 13HCA
Hartford, CT 06134-0308
(860) 418-7024

-----Original Message-----
From: Litke, Jeff
Sent: Tuesday, August 26, 2008 10:46 AM
To: Vogel, Cristine
Cc: Treiss, Carolyn
Subject: Please Respond Directly to Constituent

Control No: 152602
Received: 08/25/2008
Due: 09/09/2008
Response: 08/26/2008

Issue: OHCA - Case
Greater Waterbury Heart Center
Type: Constituent Mail
Status: Closed Correspondence

Origin:
Mr. Joseph Micalizzi
259 Loper Street
Southington, CT 06489

Remarks:

Referred By: Jeff Litke

Referred To: Commissioner Cristine Vogel (860) 418-7002
Action: Please Respond Directly to Constituent
Referred: 08/26/2008 Due: 09/09/2008

Notes:
08/26/08:

Please respond directly to the constituent, regarding the following letter, on behalf of Governor Rell. Also, please acknowledge that the Governor referred it to your agency.

It is not necessary to send a copy of response to the Governor's Office. The constituent has been instructed to contact the Commissioner's Office directly if they do not hear from the Agency within two (2) weeks.

If you have any questions, I can be reached at 524-7302. Thank you.

Jeff Litke
Staff Assistant
Office of the Governor

08/26/08:

August 26, 2008

Mr. Joseph Micalizzi
259 Loper Street
Southington, Connecticut 06489

Dear Mr. Micalizzi:

Thank you for your correspondence to Governor Rell regarding the Greater Waterbury Heart Center. The Governor truly appreciates the time you took to write to her office. Please accept this response on her behalf.

Governor Rell believes that it is extremely important for citizens to voice their opinions and comments to their elected officials. As the matter you wrote about is overseen by the Office of Health Care Access, Governor Rell has asked that I forward your concerns to Commissioner Cristine Vogel's office to review and respond to your directly. If you do not receive a response from the Office of Health Care Access within two weeks please feel free to contact the Commissioner's office directly at (860) 418-7002. Due to the need to research and investigate certain matters it is possible that you will receive a response within four weeks. Should the need arise please feel free to contact the Governor's office at (860) 566-4840 or 1-800-406-1527.

Thank you again for sharing your comments and concerns with Governor Rell. Please do not hesitate to contact our office in the future, should the need arise.

Sincerely,

Jeff Litke
Staff Assistant
Office of Governor M. Jodi Rell

152602

259 Loper St
Southington, CT 06489
August 22, 2008

Dear Governor Rell,

I am an only child of an elderly couple in Waterbury. They have chosen to stay in Waterbury and because I have out of town, it is important they can access healthcare in the city.

Three years ago before the Heart Center of Greater Waterbury opened, my father needed to have open heart surgery. Due to diabetes, he had a ten week stay. My mother was not well enough to travel to New Haven to visit so did not see her husband for almost three months. As the only child I traveled daily-sometimes twice a day- because he had no visitors.

No one from Waterbury at their age was going to drive on 91.

My father's surgery was elective because my wife is a nurse and keeps an eye on them. Many do not have the luxury to have a family healthcare person.

My father in an emergency would not make it to New Haven;.The traffic in Waterbury is awful as you know. I have had friends who received care at the Heart Center of greater Waterbury and are pleased with their care.

They have had good outcomes. People can not be driving to the other side of the state. They have a wellness program and open heart surgeries are decreasing across the country but if another surgery is needed, these surgeons are well qualified and the surgery should be available in the 4th largest city in our state.

Please send your support in this matter

Joseph Micalizzi

Docket 08-30167-MD
08-31202

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

August 26, 2008

Ms. Sally Murray
53 Craigie Avenue
Waterbury, CT 06705

Re: Docket Numbers 08-30167-MD2 and 08-31202-LOI
St. Mary's Hospital and The Waterbury Hospital, d/b/a The Heart Center of Greater Waterbury, and John Dempsey Hospital

Dear Ms. Murray:

The Office of Health Care Access ("OHCA") is in receipt of your letter dated August 21, 2008 regarding the above referenced matters which was forwarded to us by the Governor's office. OHCA understands your concerns and appreciates your comments. Your letter has been made part of each record referenced above.

If you are interested in additional information regarding the Heart Center of Greater Waterbury, please visit OHCA's website at http://www.ohca.state.ct.us/.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:ss

Salus, Sandra

From: Treiss, Carolyn
Sent: Tuesday, August 26, 2008 12:19 PM
To: Salus, Sandra
Subject: FW: Please Respond Directly to Constituent

Attachments: OHCA-Murray.pdf



OHCA-Murray.pdf
(56 KB)

For our response.

Carolyn M. Treiss, JD, MSW
Chief of Staff

Office of Health Care Access
State of Connecticut
410 Capitol Avenue
3rd Floor, MS # 13HCA
Hartford, CT 06134-0308
(860) 418-7024

-----Original Message-----
From: Litke, Jeff
Sent: Tuesday, August 26, 2008 10:38 AM
To: Vogel, Cristine
Cc: Treiss, Carolyn
Subject: Please Respond Directly to Constituent

Control No: 152571
Received: 08/25/2008
Due: 09/08/2008
Response: 08/25/2008

Issue: OHCA - Case
Greater Waterbury Heart Center
Type: Constituent Mail
Status: Closed Correspondence

Origin:
Ms. Sally Murray
53 Craigie Avenue
Waterbury, CT 06705

Remarks:

Referred By: Jeff Litke

Referred To: Commissioner Cristine Vogel (860) 418-7002
Action: Please Respond Directly to Constituent
Referred: 08/25/2008 Due: 09/08/2008

Notes:
08/25/08:

Please respond directly to the constituent, regarding the following letter, on behalf of Governor Rell. Also, please acknowledge that the Governor referred it to your agency.

It is not necessary to send a copy of response to the Governor's Office. The constituent has been instructed to contact the Commissioner's Office directly if they do not hear from the Agency within two (2) weeks.

If you have any questions, I can be reached at 524-7302. Thank you.

Jeff Litke
Staff Assistant
Office of the Governor

08/25/08:

August 25, 2008

Ms. Sally Murray
53 Craigie Avenue
Waterbury, Connecticut 06705

Dear Ms. Murray:

Thank you for your correspondence to Governor Rell regarding the Greater Waterbury Heart Center. The Governor truly appreciates the time you took to write to her office. Please accept this response on her behalf.

Governor Rell believes that it is extremely important for citizens to voice their opinions and comments to their elected officials. As the matter you wrote about is overseen by the Office of Health Care Access, Governor Rell has asked that I forward your concerns to Commissioner Cristine Vogel's office to review and respond to your directly. If you do not receive a response from the Office of Health Care Access within two weeks please feel free to contact the Commissioner's office directly at (860) 418-7002. Due to the need to research and investigate certain matters it is possible that you will receive a response within four weeks. Should the need arise please feel free to contact the Governor's office at (860) 566-4840 or 1-800-406-1527.

Thank you again for sharing your comments and concerns with Governor Rell. Please do not hesitate to contact our office in the future, should the need arise.

Sincerely,

Jeff Litke
Staff Assistant
Office of Governor M. Jodi Rell

152571

Dear Governor Rell, 8-21-2008

I am a resident of Waterbury, Connecticut and have lived here all my life. I am 72 years old and my husband is 72 years old.

About 5 years ago he had a heart attack in the late evening and was taken to St. Mary's hospital. He had an angiogram the following day and then Dr. Kelly told me that he had one artery in the heart that was completely blocked and another that had an aneurysm in it. I was also told he would need to go to Bridgeport Hospital for angioplast and possibly open heart surgery.

I cannot tell you how scary and stressful this time was for me and my family. The Campion Ambulance Paramedics and EMT were a great comfort to both of us. The ride was longer than 30 minutes due to traffic and some congestion in Bridgeport itself. Then you are in a hospital that you are not familiar with, and that alone is very stressful, and may I add that I am a Registered Nurse and know how important it is to be stress free at this time. Especially right before surgery.

Please, Please do everything you can to keep the Heart Center of Greater Waterbury open. Please do not let it be closed as it has saved many lives here in Waterbury and surrounding areas and has limited the amount of stress that a family has to go thru especially during a very stressful time itself.

Thank for you consideration
Sally Murray

Sally Murray

53 Craigie Avenue
Waterbury, CT. 06705-2903

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

August 26, 2008

Ms. Mary Ellen Shea
169 Scott Road
Waterbury, CT 06705

Re: Docket Numbers 08-30167-MD2 and 08-31202-LOI
St. Mary's Hospital and The Waterbury Hospital, d/b/a The Heart Center of Greater Waterbury, and John Dempsey Hospital

Dear Ms. Shea:

The Office of Health Care Access ("OHCA") is in receipt of your letter dated August 19, 2008 regarding the above referenced matters which was forwarded to us by the Governor's office. OHCA understands your concerns and appreciates your comments. Your letter has been made part of each record referenced above.

If you are interested in additional information regarding the Heart Center of Greater Waterbury, please visit OHCA's website at http://www.ohca.state.ct.us/.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:ss

Salus, Sandra

From: Treiss, Carolyn
Sent: Tuesday, August 26, 2008 12:19 PM
To: Salus, Sandra
Subject: FW: Please Respond Directly to Constituent

Attachments: OHCA-Shea.pdf



OHCA-Shea.pdf (91 KB)

Respond please.

Carolyn M. Treiss, JD, MSW
Chief of Staff

Office of Health Care Access
State of Connecticut
410 Capitol Avenue
3rd Floor, MS # 13HCA
Hartford, CT 06134-0308
(860) 418-7024

-----Original Message-----
From: Litke, Jeff
Sent: Tuesday, August 26, 2008 10:39 AM
To: Vogel, Cristine
Cc: Treiss, Carolyn
Subject: Please Respond Directly to Constituent

Control No: 152572
Received: 08/25/2008
Due: 09/08/2008
Response: 08/25/2008

Issue: OHCA - Case (P)
Greater Waterbury Heart Center
Type: Constituent Mail
Status: Closed Correspondence

Origin:
Ms. Mary Ellen Shea
169 Scott Road
Waterbury, CT 06705

Remarks:

Referred By: Jeff Litke

Referred To: Commissioner Cristine Vogel (860) 418-7002
Action: Please Respond Directly to Constituent
Referred: 08/26/2008 Due: 09/09/2008

Notes:
08/25/08:

Please respond directly to the constituent, regarding the following letter, on behalf of Governor Rell. Also, please acknowledge that the Governor referred it to your agency.

It is not necessary to send a copy of response to the Governor's Office. The constituent has been instructed to contact the Commissioner's Office directly if they do not hear from the Agency within two (2) weeks.

If you have any questions, I can be reached at 524-7302. Thank you.

Jeff Litke
Staff Assistant
Office of the Governor

08/25/08:

August 25, 2008

Ms. Mary Ellen Shea
169 Scott Road
Waterbury, Connecticut 06705

Dear Ms. Shea:

Thank you for your correspondence to Governor Rell regarding the Greater Waterbury Heart Center. The Governor truly appreciates the time you took to write to her office. Please accept this response on her behalf.

Governor Rell believes that it is extremely important for citizens to voice their opinions and comments to their elected officials. As the matter you wrote about is overseen by the Office of Health Care Access, Governor Rell has asked that I forward your concerns to Commissioner Cristine Vogel's office to review and respond to your directly. If you do not receive a response from the Office of Health Care Access within two weeks please feel free to contact the Commissioner's office directly at (860) 418-7002. Due to the need to research and investigate certain matters it is possible that you will receive a response within four weeks. Should the need arise please feel free to contact the Governor's office at (860) 566-4840 or 1-800-406-1527.

Thank you again for sharing your comments and concerns with Governor Rell. Please do not hesitate to contact our office in the future, should the need arise.

Sincerely,

Jeff Litke
Staff Assistant
Office of Governor M. Jodi Rell

15257 2

169 Scott Road
Waterbury, Ct. 06705-3204
August 19, 2008

Governor M. Jodi Rell
State Executive Offices
201 Capitol Ave.
Hartford,Ct.

Dear Governor Rell,

I have enclosed a copy of the letter I sent to Commissioner Vogel in suppert of the Heart Center of Greater Waterbury. In doing so, I hope to gain your support as well in our fight to keep the Heart Center up and running in our city. Please consider our distress over the possibility of losing this valuable facility and help us to SAVE THE HEART CENTER OF GREATER WATERBURY!!!!!

Very truly yours,

Mary Ellen Shea

Mary Ellen Shea

169 Scott Road
Waterbury, Ct. 06705-3204

August 19, 2008

Commissioner Vogel
Office of Health Care Access
State of Connecticut
410 Capitol Ave.
Hartford, Ct.

Dear Commisssioner Vogel,

I am writing this letter because I've never felt so strongly about a community issue before.

I am 59 years old. In 2006 I suffered a silent heart attack. Unbeknownst to me, I had a coronary artery with 100% blockage. I underwent a successful angioplasty and stent placement at the Heart Center of Greater Waterbury at Waterbury Hospital and participated in their cardiac rehab program. Today, I am feeling well due to the professional expertise and care I received during my brief stay at the hospital and the encouragement and positive atmosphere at the rehab center.

I cannot comprehend giving a community this advanced care facility to potentially save hundreds of lives in a given year and to ease the burden such illnesses can place on the patients' families, then taking it away, leaving us to take our chances in life-threatening situations.

Please consider the humanity of it first. Let us keep our Heart Center and all the outreach programs it has afforded Waterbury and the surrounding towns. Just maybe the reason the "numbers were down" was because the ancillary staff of the Heart Center did its job so well in providing cardiac education to the public??? Or...perhaps the mere proximity of the Heart Center made it possible to save lives with lesser strategies??? I feel credit must be given to the doctors and staff of the Heart Center for not jumping into open heart surgeries just to meet a quota.

The Heart Center has become an integral part of our city now. People here depend on it and its services. It's almost two-and-a -half years since my heart problem began, and I can't imagine not attending my monthly support group meeting. I know I (and my family) live more secure in the knowledge that should something happen again,I wouldn't have to be shuttled off to another city at a critical point in my medical care. This peace of mind is priceless, and you know they say

stress plays a huge part in heart health!!!

Very truly yours,

Mary Ellen Shea

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

August 26, 2008

Joel Sherman, M.D.
1211 West Main Street
Waterbury, CT 06708

Re: Docket Numbers 08-30167-MD2 and 08-31202-LOI
St. Mary's Hospital and The Waterbury Hospital, d/b/a The Heart Center of Greater Waterbury, and John Dempsey Hospital

Dear Dr. Sherman:

The Office of Health Care Access ("OHCA") is in receipt of your letter dated August 25, 2008 regarding the above referenced matters which was forwarded to us by the Governor's office. OHCA understands your concerns and appreciates your comments. Your letter has been made part of each record referenced above.

If you are interested in additional information regarding the Heart Center of Greater Waterbury, please visit OHCA's website at http://www.ohca.state.ct.us/.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:ss

Salus, Sandra

From: Treiss, Carolyn
Sent: Tuesday, August 26, 2008 10:08 AM
To: Salus, Sandra
Subject: FW: Please Respond Directly to Constituent

Sandy,
Another letter sent to Governor that requires our response. When you send over to Barbara or Leslie to be entered into the record, let them know that this one also came directly to us and thus should have already been entered.
Carolyn

Carolyn M. Treiss, JD, MSW
Chief of Staff

Office of Health Care Access
State of Connecticut
410 Capitol Avenue
3rd Floor, MS # 13HCA
Hartford, CT 06134-0308
(860) 418-7024

-----Original Message-----
From: Litke, Jeff
Sent: Tuesday, August 26, 2008 9:27 AM
To: Vogel, Cristine
Cc: Treiss, Carolyn
Subject: Please Respond Directly to Constituent

Control No: 152619
Received: 08/25/2008
Due: 09/08/2008
Response: 08/26/2008

Issue: OHCA - Case
Greater Waterbury Heart Center
Type: Electronic Mail
Status: Closed Correspondence

Origin:
Mr. Joel Sherman
1211 West Main Street
joel.sherman@gmail.com
Waterbury, CT 06708

Remarks:

Referred By: Jeff Litke

Referred To: Commissioner Cristine Vogel (860) 418-7002
Action: Please Respond Directly to Constituent
Referred: 08/26/2008 Due: 09/09/2008

Notes:
08/26/08:

Please respond directly to the constituent, regarding the following letter, on behalf of Governor Rell. Also, please acknowledge that the Governor referred it to your agency.

It is not necessary to send a copy of response to the Governor's Office. The constituent has been instructed to contact the Commissioner's Office directly if they do not hear from the Agency within two (2) weeks.

If you have any questions, I can be reached at 524-7302. Thank you.

Jeff Litke
Staff Assistant
Office of the Governor

08/26/08:

-----Original Message-----
From: Joel Sherman [mailto:joel.sherman@gmail.com]
Sent: Monday, August 25, 2008 4:23 PM
To: Governor Rell
Subject: Waterbury Heart Center

Joel Sherman
1211 W. Main St
Waterbury, CT 06708-3106

August 25, 2008

The Honorable M. Jodi Rell
Governor of Connecticut
210 Capitol Avenue
Hartford, CT 06106

Dear Governor Rell:

Dear Gov. Rell,
As a practicing Waterbury cardiologist for 36 years, I am writing in support of the continuance of the Waterbury Heart Center. I have full knowledge of what cardiac patients had to do in Waterbury before the heart center. Delays for emergency treatment were substantial ranging from 2 to 12 hours. Many lives were lost which would be saved today. It is unbelievable to me that Waterbury could be abandoned to once again become the only major urban center in Connecticut without modern emergency cardiac care. There is no medical justification for this. The center has easily surpassed the angioplasty guidelines. Surgery guidelines are not met, but they are outmoded. The frequency of cardiac surgery has dropped severely nationwide and I am told that other fully functioning and successful cardiac centers in Connecticut also no longer meet these guidelines. What's important is patient lives and health. There is no question that the Waterbury Cardiac Center is a major boon to Waterbury and needs to be continued. Bureaucratic guidelines should not be put before patients' welfare.

Sincerely,

Joel A Sherman MD
203 7561230

08/26/08:

-----Original Message-----
From: Litke, Jeff
Sent: Tuesday, August 26, 2008 9:26 AM

To: 'joel.sherman@gmail.com'
Subject: RE: Waterbury Heart Center

August 26, 2008

Mr. Joel Sherman
1211 West Main Street
Waterbury, Connecticut 06708
joel.sherman@gmail.com

Dear Mr. Sherman:

Thank you for your correspondence to Governor Rell regarding the Greater Waterbury Heart Center. The Governor truly appreciates the time you took to write to her office. Please accept this response on her behalf.

Governor Rell believes that it is extremely important for citizens to voice their opinions and comments to their elected officials. As the matter you wrote about is overseen by the Office of Health Care Access, Governor Rell has asked that I forward your concerns to Commissioner Cristine Vogel's office to review and respond to your directly. If you do not receive a response from the Office of Health Care Access within two weeks please feel free to contact the Commissioner's office directly at (860) 418-7002. Due to the need to research and investigate certain matters it is possible that you will receive a response within four weeks. Should the need arise please feel free to contact the Governor's office at (860) 566-4840 or 1-800-406-1527.

Thank you again for sharing your comments and concerns with Governor Rell. Please do not hesitate to contact our office in the future, should the need arise.

Sincerely,

Jeff Litke
Staff Assistant
Office of Governor M. Jodi Rell

RICHARD BLUMENTHAL
ATTORNEY GENERAL

55 Elm Street
P.O. Box 120
Hartford, CT 06141-0120

RECEIVED
2008 AUG 7 A 11:45
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Office of The Attorney General
State of Connecticut

TESTIMONY OF
ATTORNEY GENERAL RICHARD BLUMENTHAL
BEFORE THE OFFICE OF HEALTH CARE ACCESS
AUGUST 29, 2008

I appreciate the opportunity to strongly support the application for an extension of the operations deadline for the Heart Center of Greater Waterbury, a joint cardiac program operated by St. Mary's Hospital, Waterbury Hospital and the University of Connecticut Health Center.

I have long supported and worked to achieve this program for effective lifesaving cardiac care, and I pledge a continued fight for it. The time required to transport patients needing immediate hospital heart care can be literally the difference between life and death. Waterbury area residents deserve no less than the highly skilled and caring professionals and Heart Center programs provided by these hospitals. This heart care program should be made permanent under the extraordinary professional leadership team at both hospitals. If Waterbury residents become ill -- especially in a heart threatening emergency -- they should be treated in Waterbury.

In short, citizens of the Waterbury area need and deserve this vital cardiac care service, which literally saves lives. The Office of Health Care Access (OHCA) should grant the application for extension of time to carefully reach the right result.

The Heart Center of Greater Waterbury has already achieved its paramount goal -- providing residents of the 18 towns in the Greater Waterbury region with superb, world class cardiac care. Heart patients receive timely and seamless care in one facility from emergency room care to recovery. As OHCA acknowledged in its approval of the 2004 agreement, patients whose time of arrival to angioplasty exceeds two hours -- known as door to balloon time -- have a 40-60 percent increased risk of mortality.

This program's life saving benefits have been immeasurable and miraculous -- as testimony from patients as well as professionals irrefutably establishes.

The hospitals have committed over $7 million -- providing critical cardiac care to over 2400 patients, including the provision of more than 1800 angioplasty procedures and approximately 600 open heart surgeries. But the real benefits of this investment have only begun. Its results in lives saved and enhanced are rising -- not only in numbers of successful medical outcomes but quality of life.

The Heart Center's 2004 certificate of need agreement set several benchmarks, using the best available information at that time. The Heart Center has met every condition except the volume target for open heart surgeries.

- As required by the agreement, the Heart Center has established a relationship with an experienced partner in providing cardiac services -- the University of Connecticut Medical Center and John Dempsey Hospital. Cardiac surgeons and perfusionists who work at John Dempsey Hospital are provided under contract to the Heart Center. The Chief Cardiac

Surgeon at the Heart Center is the Chief of Cardiothoracic Surgery for John Dempsey Hospital. The University of Connecticut Medical Center and John Dempsey Hospital regularly perform oversight and hold case conferences with the Heart Center.

- As required under the agreement with OHCA, the Heart Center regularly submits data to the databases operated by the Society of Thoracic Surgeons Database and the American College of Cardiology. The Heart Center's outcomes meet or exceed the criteria and standards of these nationally recognized organizations.

- In each year since 2004, the Heart Center has exceeded the angioplasty target numbers -- in the past year by more than 50%.

Even if the Heart Center has not reached the overall volume targets for open heart surgery, the outcomes of its surgeries have met national standards. OHCA should consider that nationally and in Connecticut, the number of open heart surgeries has declined since 2004. The volume targets set in the 2004 agreement may have been reasonable at that time. Although there was already evidence that the number of open heart surgeries was starting to decline at some hospitals, neither OHCA nor the participating hospitals could have foreseen the dramatic 24% decline statewide in open heart surgeries since 2003. Moreover, for the past three years, the combined number of open heart surgeries at St. Mary's Hospital and Waterbury Hospital has grown steadily -- countering the statewide downward trend.

The Heart Center's request is for an extension of 6 months to provide it the opportunity to fully make the case for permanently establishing this critically important health care service. In light of the resources, funding and ongoing services already committed -- and forthcoming in the future -- OHCA should grant this extension of time. The harm of shutting down the program far outweighs any considerations to the contrary.

I urge OHCA to follow its usual prudent practice of hearing all the evidence, carefully and thoroughly assessing the issues, and making a decision that will best serve the health care needs of Waterbury's citizens.

COUNCIL OF GOVERNMENTS CENTRAL NAUGATUCK VALLEY
60 NORTH MAIN STREET. • 3RD FLOOR • WATERBURY, CT 06702-1403 (203) 757- 0535
Web Site: www.cogcnv.org *E-Mail:* cogcnv@cogcnv.org

RECEIVED
2008 AUG 27 A 11:47
CONNECTICUT OFFICE OF HEALTH CARE ACCESS

August 21, 2008

Ms. Christine A. Vogel
Commissioner
Office of Health Care Access
410 Capitol Ave., MS #13HCA
Hartford, CT 06134

Dear Commissioner:

On behalf of the Council of Governments of the Central Naugatuck Valley (COGCNV), I am writing in support of the continuation of the Heart Center of Greater Waterbury on a permanent basis.

The Council of Governments represents the thirteen municipalities in the greater Waterbury region: Beacon Falls, Bethlehem, Cheshire, Middlebury, Naugatuck, Oxford, Prospect, Southbury, Thomaston, Waterbury, Watertown, Wolcott, and Woodbury. Our organization and its predecessor, the Central Naugatuck Valley Regional Planning Agency, have been in existence since 1960 to discuss and address municipal and regional issues of concern in transportation, land use, economic development, solid waste, water supply, open space, emergency response, and other issues related to the area's physical development.

Four years ago, when COG members learned that the two Waterbury hospitals were planning to submit a joint application to the Office of Health Care Access, COG voted unanimously to support the proposed cardiac care center, and many members testified in support of it. There was a similar response at this year's Heart Center rally in Waterbury.

As the municipal leadership representing Central Naugatuck Valley communities, we have some very strong reasons for supporting the heart center:

- The region is one of the state's major metropolitan regions.
- Waterbury is the fifth largest city in Connecticut.
- The hospitals are vital medical facilities for all thirteen municipalities of the region and beyond.
- The heart center greatly enhances the region's desirability as a place to live and to do business.
- And finally, travel times for treatment if cardiac care is not available in the region.

Given the critical importance of timely intervention with heart attacks and the region's population size, the Council members were taken aback by the distances that residents of the Greater Waterbury region were traveling for advanced cardiac treatment, prior to the establishment of the center.

If you drive on major roads in the Waterbury area with any frequency, you know that traffic delays can be severe during peak commuting hours and holiday periods. Traffic accidents and weather conditions only worsen the situation.

Transportation planning is an important function of COGCNV, and so we are very conscious of existing and projected traffic choke points: I-84 in eastern Waterbury and projected for the western half, the Route 8/I-84 interchange in Waterbury (the "mixmaster"), and bottlenecks on state highways between Waterbury and New Haven and along Route 8 in the lower Naugatuck Valley heading towards Bridgeport.

In its review of the Heart Center's request for an extension and for permanent status, we strongly encourage the Office of Health Care Access to examine the real-time travel scenarios for cardiac patients in the greater Waterbury area, if they had to be transported for cardiac care outside the region.

Sincerely,

Peter Dorpalen
Executive Director

PD/lr

cc: Governor's Chief of Staff Lisa Moody
COGCNV Mayors and First Selectmen
Heart Center of Greater Waterbury
State Senators and Representatives

T:\General\Legislation\Heart Center Support 2008-08-21.Vogel.ltr.wpd

GREEK ORTHODOX ARCHDIOCESE OF AMERICA

Holy Trinity Greek Orthodox Church

†VERY REV. DR. STEPHEN P. NATSIS, PROTOPRESBYTER

937 CHASE PARKWAY WATERBURY, CONNECTICUT 06708
(203) 754-5189 (203) 754-5180 FAX (203) 759-5622 CELL PHONE (203) 228-1553
www.holytrinitywaterbury.org

RECEIVED
2008 AUG 27 A 11:46
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that every heart matters!

Sincerely,

+Very Rev. Dr. Stephen P. Natsis

+Very Rev. Dr. Stephen P. Natsis, Pastor

Re: Docket number 08-30167 – MD and 08-31202

ANTOINETTE FORINO
43 MAPLEHURST COURT
CHESHIRE, CT 06410

RECEIVED
2008 AUG 27 A 11:4
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 18, 2008

Dear Commissioner Vogel:

I am a second-generation heart patient at Waterbury St. Mary's Hospital. My dad who was first generation had had a scheduled triple by pass at Hospital of St. Raphael's New Haven in 1980. Thereafter throughout the years he had scheduled and emergency angioplasty at St Vincent's Hospital in Bridgeport. Dad's last procedure was not scheduled but an emergency by pass at St Raphael but since St Mary's or Waterbury Hospital did not have the Heart Center he was transported to St Raphael's after he was stabled enough at St. Mary's. That Friday he went to St. Raphael's he was the LAST scheduled patient of day. At first, we were notified he made it through the surgery. Shortly, thereafter we were informed "wrong patient need to come down immediately." We flew down route 69 during a heavy thunderstorm that evening only to be informed he passed away when they tried to start his heart. In my heart, I have always felt if the surgery were done in Waterbury, my dad would be alive today.

Presently I am facing my second bypass surgery within the next thirty days. The first surgery was a scheduled left main artery bypass at Yale in 2002. Since then I have had angioplasty with 3 stents July of 2006 and again April 2008 with two more stents all done right here at Heart Center of Greater Waterbury. Because of the level of care I received at Waterbury, I prefer Waterbury Hospital to Yale. I hope that I will not have to schedule my upcoming surgery other then Waterbury. This would only cause more stress then necessary on my relatives and me.

In closing I want to express that if my dad's surgery in 1995 was done in Waterbury, he might be alive today. If our heart center should be closed, I would be left feeling that patients from Waterbury area would be placed at a disadvantage. Our lives are no les valuable than those living in New Haven and Hartford. Thank you for your attention and support, hopefully OHCA will do the right thing by granting 'permanent status" to the Heart Center of Greater Waterbury.

Respectfully,

Antoinette Forino

Antoinette Forino

CC: Dr. Henry Borkowski

F
Jean Fitzgerald
31 Nottingham Ter Apt G8
Waterbury, CT 06704-1924

8/21/08

Heart Center: —

A few years ago I suffered a heart attack and was rushed to St. Mary's Hospital. I woke up with a six-way bypass.

Then, a couple of years later, my husband needed angioplasty, also here at St. Mary's.

We are both alive and kicking now thanks to the heart center. We realy needed it. Please don't take it away from Waterbury. We might need it again, and others might need it also!

Jean T. Fitzgerald

Robert Fitzgerald

RECEIVED
2008 AUG 27 A 11:43
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

26 Aug. 08

Commissioner Vogel

I'm writing to ask for your support for the Greater Waterbury Heart Center. My "significant other" had bypass surgery at Waterbury Hospital in 2006. The surgery was a sucess and the whole experience for her, her family and friends went smoothly a large part due to the locality of the Heart Center.

The surgery, recovery, and follow-up therapy was first class and its reassuring to know its not 45 min away in another part of the state.

Everybody loves a winner and The Heart Center of Greater Waterbury is a proven Winner. 300,000+ people in Greater Waterbury deserve the Heart Center and your support.

For Those who experience over.

Heart Attack symptons, time and travel could be the critical factor between life and death.

Sincerely

Charles T. Noonan

21 Hillside Ave

Naugatuck Ct. 06770

RECEIVED
2008 AUG 27 A 11:43
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

720-0004

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

August 27, 2008

Ms. Virginia Donnelly
15 Hillside Avenue
Naugatuck, CT 06770

Re: Docket Numbers 08-30167-MD2 and 08-31202-LOI
St. Mary's Hospital and The Waterbury Hospital, d/b/a The Heart Center of Greater Waterbury, and John Dempsey Hospital

Dear Ms. Donnelly:

The Office of Health Care Access ("OHCA") is in receipt of your letter dated August 24, 2008 regarding the above referenced matters which was forwarded to us by the Governor's office. OHCA understands your concerns and appreciates your comments. Your letter has been made part of each record referenced above.

If you are interested in additional information regarding the Heart Center of Greater Waterbury, please visit OHCA's website at http://www.ohca.state.ct.us/.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:ss

Salus, Sandra

From: Treiss, Carolyn
Sent: Wednesday, August 27, 2008 12:10 PM
To: Salus, Sandra
Subject: FW: Please Respond Directly to Constituent

Attachments: OHCA-DOnnelly.pdf



OHCA-DOnnelly.pdf
(218 KB)

Another from the Governor's office for our response.

Carolyn M. Treiss, JD, MSW
Chief of Staff

Office of Health Care Access
State of Connecticut
410 Capitol Avenue
3rd Floor, MS # 13HCA
Hartford, CT 06134-0308
(860) 418-7024

-----Original Message-----
From: Litke, Jeff
Sent: Wednesday, August 27, 2008 11:40 AM
To: Vogel, Cristine
Cc: Treiss, Carolyn
Subject: Please Respond Directly to Constituent

Control No: 152710
Received: 08/27/2008
Due: 09/10/2008
Response: 08/27/2008

Issue: OHCA - Case
the Greater Waterbury Health Center
Type: Constituent Mail
Status: Closed Correspondence

Origin:
Ms. Virginia Donnelly
15 Hillside Avenue
Naugatuck, CT 06770

Remarks:

Referred By: Jeff Litke

Referred To: Commissioner Cristine Vogel (860) 418-7002
Action: Please Respond Directly to Constituent
Referred: 08/27/2008 Due: 09/10/2008

Notes:
08/27/08:

Please respond directly to the constituent, regarding the following letter, on behalf of Governor Rell. Also, please acknowledge that the Governor referred it to your agency.

It is not necessary to send a copy of response to the Governor's Office. The constituent has been instructed to contact the Commissioner's Office directly if they do not hear from the Agency within two (2) weeks.

If you have any questions, I can be reached at 524-7302. Thank you.

Jeff Litke
Staff Assistant
Office of the Governor

08/27/08:

August 27, 2008

Ms. Virginia Donnelly
15 Hillside Avenue
Naugatuck, Connecticut 06770

Dear Ms. Donnelly:

Thank you for your correspondence to Governor Rell regarding the Greater Waterbury Health Center. The Governor truly appreciates the time you took to write to her office. Please accept this response on her behalf.

Governor Rell believes that it is extremely important for citizens to voice their opinions and comments to their elected officials. As the matter you wrote about is overseen by the Office of Health Care Access, Governor Rell has asked that I forward your concerns to Commissioner Cristine Vogel's office to review and respond to your directly. If you do not receive a response from the Office of Health Care Access within two weeks please feel free to contact the Commissioner's office directly at (860) 418-7002. Due to the need to research and investigate certain matters it is possible that you will receive a response within four weeks. Should the need arise please feel free to contact the Governor's office at (860) 566-4840 or 1-800-406-1527.

Thank you again for sharing your comments and concerns with Governor Rell. Please do not hesitate to contact our office in the future, should the need arise.

Sincerely,

Jeff Litke
Staff Assistant
Office of Governor M. Jodi Rell

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

August 28, 2008

Christopher J. Michos, M.D., FACEP
Chairman, Emergency Medicine
Waterbury Hospital
64 Robbins Street
Waterbury, CT 06708-2600

Re: Docket Numbers 08-30167-MD2 and 08-31202-LOI
St. Mary's Hospital and The Waterbury Hospital, d/b/a The Heart Center of Greater Waterbury, and John Dempsey Hospital

Dear Dr. Michos:

The Office of Health Care Access ("OHCA") is in receipt of your letter dated August 27, 2008 regarding the above referenced matters which was forwarded to us by the Governor's office. OHCA understands your concerns and appreciates your comments. Your letter has been made part of each record referenced above.

If you are interested in additional information regarding the Heart Center of Greater Waterbury, please visit OHCA's website at http://www.ohca.state.ct.us/.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:ss

Salus, Sandra

From: Treiss, Carolyn
Sent: Wednesday, August 27, 2008 3:20 PM
To: Salus, Sandra
Subject: FW: Please Respond Directly to Constituent

Another from governor.

Carolyn M. Treiss, JD, MSW
Chief of Staff

Office of Health Care Access
State of Connecticut
410 Capitol Avenue
3rd Floor, MS # 13HCA
Hartford, CT 06134-0308
(860) 418-7024

-----Original Message-----
From: Litke, Jeff
Sent: Wednesday, August 27, 2008 3:17 PM
To: Vogel, Cristine
Cc: Treiss, Carolyn
Subject: Please Respond Directly to Constituent

Control No: 152734
Received: 08/21/2008
Due: 09/10/2008
Response: 08/27/2008

Issue: OHCA - Case
Greater Waterbury Heart Center
Type: Electronic Mail
Status: Closed Correspondence

Origin:
Dr. Christopher Michos
cmichos@wtbyhosp.org
email, CT 00000-0000

Remarks:
08/27/08: FE will be responding and acknowledging receipt of correspondence.....JL

Referred By: Jeff Litke

Referred To: Commissioner Cristine Vogel (860) 418-7002
Action: Please Respond Directly to Constituent
Referred: 08/27/2008 Due: 09/10/2008

Notes:
08/27/08:

Please respond directly to the constituent, regarding the following letter, on behalf of Governor Rell. Also, please acknowledge that the Governor referred it to your agency.

It is not necessary to send a copy of response to the Governor's Office. The constituent has been instructed to contact the Commissioner's Office directly if they do not hear from the Agency within two (2) weeks.

If you have any questions, I can be reached at 524-7302. Thank you.

Jeff Litke
Staff Assistant
Office of the Governor

08/27/08:

-----Original Message-----
From: Michos, Christopher [mailto:cmichos@wtbyhosp.org]
Sent: Thursday, August 21, 2008 12:46 PM
To: Governor Rell
Subject: Greater Waterbury Heart Center

Dear Governor Rell,

I wish to share with you my presentation at yesterday's Greater Waterbury Heart Center rally. As the Chairman of Emergency Medicine at Waterbury Hospital, my words express my concern should the Heart Center be closed.

Thank you for your time.

Respectfully,

Christopher J. Michos, MD, FACEP

Chairman, Emergency Medicine

Waterbury Hospital

Waterbury, CT 06721

Heart Center Presentation, August 20, 2008

I'm sure many of you have seen what an Emergency Department is like whether from personal experience or after watching the many ER TV shows. We move fast because we have to. As we say, when a heart attack hits the door of the ER, the longer we wait to treat the patient, the more the heart is damaged. In some cases, it can cost a life. With our Heart Center of Greater Waterbury, when the radio call comes to the department from our outstanding paramedics who are well trained to assess chest pain patients or for those patients who actually walk into the Emergency Department, an experienced group of Emergency Department physicians, cardiologists, nurses and techs spring into action to provide life saving treatment. It's like a well trained Olympic athlete running an sprint, if you so much as blink, you might miss seeing the patient whisked to the catherization lab for life saving treatment. This becomes our race to save a life. I have no doubt that in the three years since the Heart Center opened, we have saved the lives of many, many patients who might not have made it if they had to spend hours being transported out of Waterbury to another hospital. Many of them might not have been able to wait another five minutes.

So I ask, why would anyone want to close the Heart Center? Is it about numbers? Well it should be about quality, not quantity. If the Center closes, what am I going to say to our critical heart patients when they arrive in the Emergency Department because we are the closest hospital? Instead of providing this highest level of care, instead of rushing that patient to the catherization room, I'm going to have to tell that patient we are going to find you another hospital and delay your care. And by doing so, we are going to place that person at great risk. To me, this is a public health crisis for the city of Waterbury and the surrounding communities. The Greater Waterbury Heart Center is all about providing life saving treatment. And from someone who knows first-hand about the value of time, closing the Heart Center and sending patients elsewhere would be a step backwards for the patients we serve and I am not willing to accept that risk. Neither should the citizens of

Waterbury. Right now, we do our job well and we are saving lives. All I want is the best care for my patients, the care they deserve.

Thank you.

CONFIDENTIALITY NOTICE: This email and any attachments contain confidential information that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party unless required to do so by law or regulation.

If you are not the intended recipient, you are hereby notified that any disclosure, copying, distribution or action taken in reliance on the contents of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately and delete these documents. Copyright (c) Waterbury Hospital

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

August 28, 2008

Ms. Sandra Micalizzi
Jmig3@cox.net

Re: Docket Numbers 08-30167-MD2 and 08-31202-LOI
St. Mary's Hospital and The Waterbury Hospital, d/b/a The Heart Center of Greater Waterbury, and John Dempsey Hospital

Dear Ms. Micalizzi:

The Office of Health Care Access ("OHCA") is in receipt of your letter dated August 27, 2008 regarding the above referenced matters which was forwarded to us by the Governor's office. OHCA understands your concerns and appreciates your comments. Your letter has been made part of each record referenced above.

If you are interested in additional information regarding the Heart Center of Greater Waterbury, please visit OHCA's website at http://www.ohca.state.ct.us/.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:ss

Salus, Sandra

From: Salus, Sandra
Sent: Thursday, August 28, 2008 12:02 PM
To: 'jmig3@cox.net'
Subject: The Heart Center of Greater Waterbury
Attachments: Sandra Micalizzi Aug 27 08.doc

Please see attached response.

Sandra A. Salus
Office of Health Care Access
410 Capitol Avenue, MS#13HCA
P.O. Box 340308
Hartford, CT 06134-0308
(860) 418-7005

Salus, Sandra

From: Treiss, Carolyn
Sent: Wednesday, August 27, 2008 3:15 PM
To: Salus, Sandra
Subject: FW: Please Respond Directly to Constituent

From governor for response.

Carolyn M. Treiss, JD, MSW
Chief of Staff

Office of Health Care Access
State of Connecticut
410 Capitol Avenue
3rd Floor, MS # 13HCA
Hartford, CT 06134-0308
(860) 418-7024

-----Original Message-----
From: Litke, Jeff
Sent: Wednesday, August 27, 2008 2:47 PM
To: Vogel, Cristine
Cc: Treiss, Carolyn
Subject: Please Respond Directly to Constituent

Control No: 152730
Received: 08/27/2008
Due: 09/10/2008
Response: 08/27/2008

Issue: OHCA - Case
the Greater Waterbury Heart Center
Type: Electronic Mail
Status: Closed Correspondence

Origin:
Ms. Sandra Micalizzi
jmig3@cox.net
email, CT 00000-0000

Remarks:

Referred By: Jeff Litke

Referred To: Commissioner Cristine Vogel (860) 418-7002
Action: Please Respond Directly to Constituent
Referred: 08/27/2008 Due: 09/10/2008

Notes:
08/27/08:

Please respond directly to the constituent, regarding the following letter, on behalf of Governor Rell. Also, please acknowledge that the Governor referred it to your agency.

It is not necessary to send a copy of response to the Governor's Office. The constituent has been instructed to contact the Commissioner's Office directly if they do not hear from the Agency within two (2) weeks.

If you have any questions, I can be reached at 524-7302. Thank you.

Jeff Litke
Staff Assistant
Office of the Governor

08/27/08:

-----Original Message-----
From: jmig3@cox.net [mailto:jmig3@cox.net]
Sent: Wednesday, August 27, 2008 2:41 PM
To: Governor Rell
Subject: heart center of Waterbury

As a long time nurse and citizen of greater Waterbury,I ask you for your support for this program.This area is urban.Lives will be lost trying to get to Bridgeport. Elderly do not have family or their MDs close when they go to New Haven. Waterbury is a large city and deserves and needs this program. The heart center has had great outcomes and has an outreach program to encourage good heart health living The people of greater Waterbury are in support of this program and as our leader you have worked hard to have healthcare accessible for the people. Please be there for the people of greater Waterbury. Their lives depend on it.
thank you Sandra Micalizzi

08/27/08:

-----Original Message-----
From: Litke, Jeff
Sent: Wednesday, August 27, 2008 2:47 PM
To: 'jmig3@cox.net'
Subject: RE: heart center of Waterbury

August 27, 2008

Ms. Sandra Micalizzi
jmig3@cox.net

Dear Ms. Micalizzi:

Thank you for your correspondence to Governor Rell regarding the Greater Waterbury Heart Center. The Governor truly appreciates the time you took to write to her office. Please accept this response on her behalf.

Governor Rell believes that it is extremely important for citizens to voice their opinions and comments to their elected officials. As the matter you wrote about is overseen by the Office of Health Care Access, Governor Rell has asked that I forward your concerns to Commissioner Cristine Vogel's office to review and respond to your directly. If you do not receive a response from the Office of Health Care Access within two weeks please feel free to contact the Commissioner's office directly at (860) 418-7002. Due to the need to research and investigate certain matters it is possible that you will receive a response within four weeks. Should the need arise please feel free to contact the Governor's office at (860) 566-4840 or 1-800-406-1527.

Thank you again for sharing your comments and concerns with Governor Rell. Please do not hesitate to contact our office in the future, should the need arise.

Sincerely,

Jeff Litke
Staff Assistant
Office of Governor M. Jodi Rell

STATE OF CONNECTICUT
OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

August 28, 2008

Ms. Giovanna Griffin
Giovanna.griffin@genesishcc.com

Re: Docket Numbers 08-30167-MD2 and 08-31202-LOI
St. Mary's Hospital and The Waterbury Hospital, d/b/a The Heart Center of Greater Waterbury, and John Dempsey Hospital

Dear Ms.Griffin:

The Office of Health Care Access ("OHCA") is in receipt of your letter dated August 27, 2008 regarding the above referenced matters which was forwarded to us by the Governor's office. OHCA understands your concerns and appreciates your comments. Your letter has been made part of each record referenced above.

If you are interested in additional information regarding the Heart Center of Greater Waterbury, please visit OHCA's website at http://www.ohca.state.ct.us/.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:ss

Salus, Sandra

From: Salus, Sandra
Sent: Thursday, August 28, 2008 11:59 AM
To: 'giovanna.griffin@genesishcc.com'
Subject: The Heart Center of Greater Waterbury
Attachments: Giovanna Griffin Aug 27 08.doc

Please see attached response.

Sandra A. Salus
Office of Health Care Access
410 Capitol Avenue, MS#13HCA
P.O. Box 340308
Hartford, CT 06134-0308
(860) 418-7005

Salus, Sandra

From: Treiss, Carolyn
Sent: Wednesday, August 27, 2008 3:15 PM
To: Salus, Sandra
Subject: FW: Please Respond Directly to Constituent

And another.

Carolyn M. Treiss, JD, MSW
Chief of Staff

Office of Health Care Access
State of Connecticut
410 Capitol Avenue
3rd Floor, MS # 13HCA
Hartford, CT 06134-0308
(860) 418-7024

-----Original Message-----
From: Litke, Jeff
Sent: Wednesday, August 27, 2008 2:59 PM
To: Vogel, Cristine
Cc: Treiss, Carolyn
Subject: Please Respond Directly to Constituent

Control No: 152732
Received: 08/27/2008
Due: 09/10/2008
Response: 08/27/2008

Issue: OHCA - Case (P)
the Greater Waterbury Heart Center
Type: Electronic Mail
Status: Closed Correspondence

Origin:
Mr./Mrs. Email Writer
giovanna.griffin@genesishcc.com
email, CT 00000-0000

Remarks:

Referred By: Jeff Litke

Referred To: Commissioner Cristine Vogel (860) 418-7002
Action: Please Respond Directly to Constituent
Referred: 08/27/2008 Due: 09/10/2008

Notes:
08/27/08:

Please respond directly to the constituent, regarding the following letter, on behalf of Governor Rell. Also, please acknowledge that the Governor referred it to your agency.

It is not necessary to send a copy of response to the Governor's Office. The constituent has been instructed to contact the Commissioner's Office directly if they do not hear from the Agency within two (2) weeks.

If you have any questions, I can be reached at 524-7302. Thank you.

Jeff Litke
Staff Assistant
Office of the Governor

08/27/08:

-----Original Message-----
From: giovanna.griffin@genesishcc.com [mailto:giovanna.griffin@genesishcc.com]
Sent: Wednesday, August 27, 2008 12:19 PM
Subject: Waterbury Heart Center

Good Afternoon, please accept this message from Glendale staff, current cardiac customers and past cardiac customers. Glendale Center designed a program to specifically met the needs of the Waterbury Heart Center. Along with our Cardiology Consultant, Dr Borkwoski, we specifically trained and customized a program to help rehab cardaic patients back home. We are a preferred provider in many ways due to our staff training and competence, specific equipment we provide (EKGs, Bladder Scans, AEDs, etc), patient and family training techniques, etc. Please reconsider and NOT CLOSE the Waterbury Heart Center. The services that they provide will also be a great lose to the business they are helping us develop to retain quality RNs, up to date equipment purchased/being purchased and the outcomes obviously that are resulting with the quality care given. Do not hesitate to contact me or our Cardiac Program Manager, Judy Sul, if you need more information. 203 723 1456

08/27/08:

-----Original Message-----
From: Litke, Jeff
Sent: Wednesday, August 27, 2008 2:55 PM
To: 'giovanna.griffin@genesishcc.com'
Subject: RE: Waterbury Heart Center

August 27, 2008

giovanna.griffin@genesishcc.com

Dear Sir or Madam:

Thank you for your correspondence to Governor Rell regarding the Greater Waterbury Heart Center. The Governor truly appreciates the time you took to write to her office. Please accept this response on her behalf.

Governor Rell believes that it is extremely important for citizens to voice their opinions and comments to their elected officials. As the matter you wrote about is overseen by the Office of Health Care Access, Governor Rell has asked that I forward your concerns to Commissioner Cristine Vogel's office to review and respond to your directly. If you do not receive a response from the Office of Health Care Access within two weeks please feel free to contact the Commissioner's office directly at (860) 418-7002. Due to the need to research and investigate certain matters it is possible that you will receive a response within four weeks. Should the need arise please feel free to contact the Governor's office at (860) 566-4840 or 1-800-406-1527.

Thank you again for sharing your comments and concerns with Governor Rell. Please do not hesitate to contact our office in the future, should the need arise.

Sincerely,

Jeff Litke
Staff Assistant
Office of Governor M. Jodi Rell

16210

15 Hillside Ave
Naugatuck, CT 06770
Aug. 24, 2005
(203) 723-2695

Please keep the Heart Center of Greater Waterbury - open!

The HEART CENTER of Greater Waterbury serves a population of 300,000 people. It serves not just Waterbury but also surrounding towns such as Naugatuck, Beacon Falls, Prospect, Thomaston and Watertown.

Before the Heart Center opened people with urgent needs had to travel out of this area to Bridgeport, Hartford or New Haven and had to endure an ambulance ride that took 30-60 minutes before arrival and care. Some people died before they got there. More will die if the Heart Center is closed!

The Heart Center has performed over 1,800 Angioplasties and over 600 open heart surgeries.

How does one arrive at a state-assigned target for surgery volume? The numbers are ridiculous!

The Heart Center is NOT into doing unnecessary surgeries! If they were driven to achieve the state assigned target of 950 they could have done half the 1800+ angioplasties as open heart surgeries instead of the 600 open heart surgeries.

But the Heart Center aims to save lives and avoid preventable deaths.

The Heart Center of Greater Waterbury saved my life by doing open heart surgery. I had 5 blockages and one of them was 100%. I would not have had such a great recovery without the skill and care of the Heart Center.

Keep the HEART CENTER open!

Respectfully,
Virginia Donnelly
Virginia Donnelly

Reference Docket Numbers
08-30167-MD & 08-31202

HEART CENTER
of Greater Waterbury

RECEIVED
2008 AUG 28 A 8:12
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Elba T. Armstrong

Please Print Name and Address

1 Horseshoe Dr
Danbury CT 06811

Re: Docket numbers 08-30167—MD and 08-31202

RECEIVED
2008 AUG 28 A 8:12
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

HEART
CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Lorraine E. Stukhis

Please Print Name and Address

Lorraine E. Stukhis
285 Buckingham St.
Oakville CT 06779

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

P.O. Box 2153, Waterbury, CT 06720

Aug. 27. 2008 4:47PM No. 0323 P. 2

RECEIVED
2008 AUG 28 A 8:12
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

HEART
CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!* they helped me!!!

Sincerely,

Signature Jacki Bruce

Please Print Name and Address

Jacki Bruce
129 Lewis St #18-A6
Naugatuck CT 06770

Re: Docket numbers 08-30167---MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

P.O. Box 2153, Waterbury, CT 06720

Aug. 27. 2008 4:47PM No. 0323 P. 3

RECEIVED
2008 AUG 28 A 8:12
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

HEART CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that ***every heart matters!***

Sincerely,

Signature Melissa Safouane

Please Print Name and Address

Melissa SAFouane
10 Plymouth Ave
WTBY Ct 06710

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

P.O. Box 2153, Waterbury, CT 06720

Aug. 27. 2008 4:47PM No. 0323 P. 4



RECEIVED
2008 AUG 28 A 8:12
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that ***every heart matters!***

Sincerely,

Signature Dona Hawley RN

Please Print Name and Address

Dona Hawley
251 Atwood Rd
Thomaston, CT 06787

Re: Docket numbers 08-30167—MD and 08-31202

RECEIVED
2008 AUG 28 A 8:12
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

HEART
CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that ***every heart matters!***

Sincerely,

Signature Judith Cordone

Please Print Name and Address

Judith Cordone
13 Fountainhead Rd
Terryville, CT 06786

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

P.O. Box 2153 Waterbury, CT 06720

Aug. 27. 2008 4:48PM No. 0323 P. 6

RECEIVED
2008 AUG 28 A 8:12
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

HEART CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature G. Colella

Please Print Name and Address

Gary Colella
27 Frederick St
Oakville, CT 06779

Re: Docket numbers 08-30167—MD and 08-31202



RECEIVED
2008 AUG 28 A 8:13
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Rebecca Colella

Please Print Name and Address

Rebecca Colella
37 Frederick St.
Oakville CT. 06779

Re: Docket numbers 08-30167—MD and 08-31202

HEART CENTER
of Greater Waterbury

RECEIVED
2008 AUG 28 A 8:03
CONNECTICUT OFFICE
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that ***every heart matters!***

Sincerely,

Signature Pat Jackman

Please Print Name and Address

Pat Jackman
126 Nichols Rd
Wolcott, CT. 06716

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

P.O. Box 2153, Waterbury, CT 06720

Aug. 27. 2008 4:48PM No. 0323 P. 9

RECEIVED
2008 AUG 28 A 8:13
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

HEART
CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that ***every heart matters!***

Sincerely,

Signature Michele Taylor

Please Print Name and Address

Michele Taylor
90 Thistle Down Lane
Naugatuck, CT, 06770

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

P.O. Box 2153, Waterbury, CT 06720

Aug. 27. 2008 4:48PM No. 0323 P. 10

HEART CENTER
of Greater Waterbury

RECEIVED
2008 AUG 28 A 8:13
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that ***every heart matters!***

Sincerely,

Signature Sylvia E. Gonzalez

Please Print Name and Address

Sylvia E. Gonzalez
94 Granby St
Wtby CT 06708

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

Aug. 27. 2008 4:48PM No. 0323 P. 11

HEART CENTER
of Greater Waterbury

RECEIVED
2008 AUG 28 A 8:13
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that ***every heart matters!***

Sincerely,

Signature Kathleen Greco

Please Print Name and Address

KATHLEEN GRECO
31 CRONIN DR
WATERBURY, CT 06708

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

Aug. 27. 2008 4:48PM No. 0323 P. 12

RECEIVED
2008 AUG 28 A 8:13
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

HEART CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Patricia Bouscada

Please Print Name and Address

Patricia Bouscada
253 Harwood Rd
Wtby CT 06706

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL · Saint Mary's HOSPITAL · UConn Health Center

P.O. Box 2153, Waterbury, CT 06720

Aug. 27. 2008 4:49PM No. 0323 P. 13

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

August 27, 2008

The Honorable Mark A. R. Cooper
First Selectman
Town of Southbury
501 Main Street South
Southbury, CT 06488-2295

Re: Docket Number 08-30167-MD2 and Docket Number: 08-31202-LOI
Saint Mary's Hospital, Waterbury Hospital, and John Dempsey Hospital of the University of Connecticut Health Center
A Request to modify a Certificate of Need issued under Docket Number 03-30167-CON, the Primary and Elective Angioplasty and Open-Heart Surgery Programs at St. Mary's Hospital and at The Waterbury Hospital

Dear Selectman Cooper:

On August 26 2008, the Office of Health Care Access ("OHCA") received your letter concerning Docket 08-30167-MD2, the petition by Saint Mary's Hospital, Waterbury Hospital, and John Dempsey Hospital of the University of Connecticut Health Center to modify a Certificate of Need issued under Docket Number 03-30167-CON, the primary and elective angioplasty and open-heart surgery programs at Saint Mary's Hospital and at The Waterbury Hospital.

OHCA appreciates your comments. Your letter has been made part of the formal record of the application. Please be advised once a decision has been rendered it will be posted and available on OHCA's website at http:// www.ct.gov/ohca.

If you have any further concerns or questions, please contact me at OHCA at (860) 418-7001.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:KR:bko

HEART CENTER of Greater Waterbury

RECEIVED
2008 AUG 27 P 2:45
CONNECTICUT OFFICE OF HEALTH CARE ACCESS

FAX

TO: Commissioner Cristina Vogel

FAX # 860-418-7053

TELE. # _____

DATE 8/27/08

PAGES 8 (Including cover)

RE: _____

FROM: HEART CENTER OF GREATER WATERBURY -

FAX # (203) 575-5575

TELE # (203) 575-5570

WATERBURY HOSPITAL
Saint Mary's HOSPITAL
UConn Health Center

P.O. Box 2153, Waterbury, CT 06722

HEART CENTER
of Greater Waterbury

RECEIVED
2008 AUG 27 P 2:45
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Cristine A. Vogel, Commissioner
Office of Health Care Access
410 Capitol Avenue
MS# 13HCA
P.O. Box 340308
Hartford, CT 06134-0308

August 27, 2008

RE: **Docket Number: 08-30167-CON-MD2**

The Waterbury Hospital and Saint Mary's Hospital Corporation, d/b/a/ Heart Center of Greater Waterbury and University of Connecticut Health Center/John Dempsey Hospital

Establish a primary and elective Angioplasty and Open Heart Surgery Program at Waterbury Hospital and St. Mary's Hospital

Request to Modify a previously authorized CON

Documents to be on the record

Dear Commissioner Vogel:

Enclosed you will find two letters of support of this matter signed by the Board of Directors of Saint Mary's Hospital and Waterbury Hospital. Please make these part of the above referenced record.

Thank you for your attention to this.

Sincerely,

Loraine C. Shea
Executive Director
Heart Center of Greater Waterbury

WATERBURY HOSPITAL Saint Mary's HOSPITAL UConn Health Center

Cc: Thomas Ring, Assistant Attorney General
Marna Borgstrom, President and CEO, Yale-New Haven Hospital (Intervenor in DN 03-30167-CON)
Robert Trefry, President and CEO, Bridgeport Hospital (Intervenor in DN 03-30167-CON)
Susan L. Davis, President and CEO, St. Vincent's Medical Center (Intervenor in DN 03-30167-CON)
Melinda A. Agsten, Esq. Wiggin and Dana LLP
John D. Newman, General Council, St. Vincent's Medical Center

WATERBURY HOSPITAL
HEALTH CENTER
caring makes a world of difference

RECEIVED
2008 AUG 27 P 2:45
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 18, 2008

Cristine A. Vogel
Commissioner
Office of Health Care Access
410 Capitol Avenue
MS #13HCA
Hartford, CT 06134-0308

Re: Support for the continuation of all services at the Heart Center of Greater Waterbury under Docket No. 08-30167-MD.

Dear Commissioner Vogel:

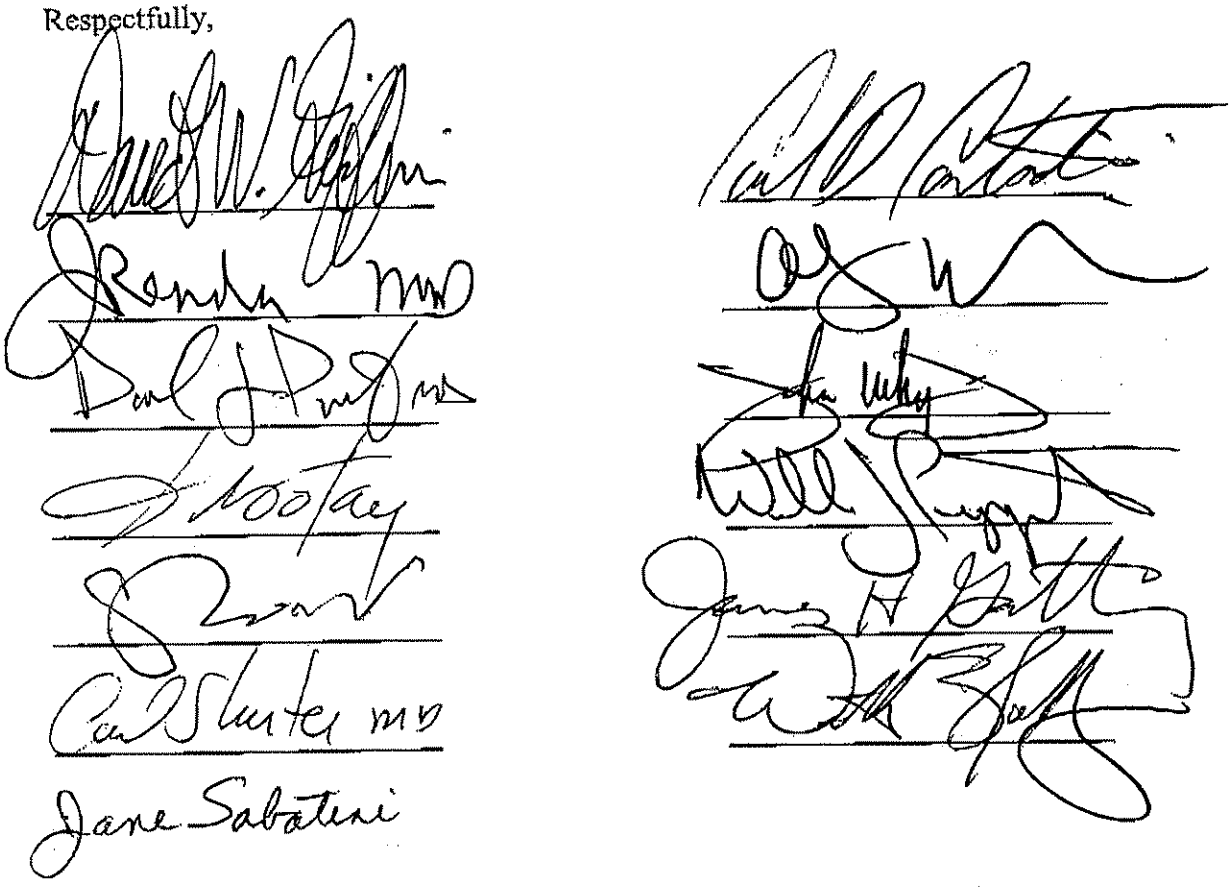
We write in support of the Heart Center of Greater Waterbury's request to extend its Certificate of Need. As Trustees of Waterbury Hospital, we are among the stewards of our community's health care and we take this role very seriously.

For many years, cardiac patients—our families, our employees, our children's teachers, our first responders, our clergymen—were forced to travel to other cities at the very time when they needed to be treated immediately. Finally, in 2005, the Heart Center opened and since then thousands of patients have been treated successfully at Waterbury Hospital and Saint Mary's Hospital. We have devoted the talents of our two community hospitals and the talents of the John Dempsey Hospital to develop and provide a high quality program: excellent surgeons, cardiologists and staff; state of the art equipment and facilities; and academic medical center supervision. The Greater Waterbury community now has the high quality cardiac care that is locally available in every other community of its size in the state.

Certainly you have seen the faces of our patients in the newspaper stories and personal accounts shared with the media. These patients' lives were saved – directly affected by the availability in their own community of the high quality health care they need and deserve. Patients and their families have expressed a very high level of satisfaction with the Heart Center; it is indeed comforting to be in familiar surroundings and see familiar faces when you or a family member faces a life threatening illness.

We have developed and nurtured a high quality program for a community of nearly 300,000 people of all backgrounds. Countless lives have been saved so far; let's not take a step backward by permitting preventable deaths. As health care leaders and stewards of Greater Waterbury, we urge you to approve the Heart Center of Greater Waterbury's request to extend its Certificate of Need.

Respectfully,



Jane Sabatini

Saint Mary's
HEALTH SYSTEM

August 18, 2008

Cristine A. Vogel
Commissioner
Office of Health Care Access
410 Capitol Avenue
MS #13HCA
Hartford, CT 06134-0308

Re: Support for the continuation of all services at the Heart Center of Greater Waterbury under Docket No. 08-30167-CON

Dear Commissioner Vogel:

The board of directors of Saint Mary's Hospital and Saint Mary's Health System strongly urge you to continue the availability of high quality advanced cardiac care to the greater Waterbury Community through the Heart Center of Greater Waterbury at both Saint Mary's and Waterbury Hospital.

Since its beginnings in 2003, our board has strongly supported the development and implementation of this life saving program and has dedicated its resources to making the Heart Center a success for our community. Together with our partner hospitals, we recruited excellent surgeons and other physicians and staff, designed facilities and developed clinical protocols that save lives. We are delighted that patient and family satisfaction has been high; our community physicians are happy that their patients can now be treated within the community.

As our population ages and their needs become more medically complex, this program will become even more important. In particular, the strong case volumes for angioplasty services not only reflect the high demand for these critical services, but recognize the advancement of the standard of care and national trends for less invasive procedural techniques to treat heart diseases. The shifts in the demographics for the Waterbury area predict a population that will be older than in other communities of like size. Continuing to provide high quality cardiac care at the Heart Center will prevent deaths that could be caused by delay in treatment or worse, no treatment at all.

This is an important program for the cardiac wellbeing of the greater Waterbury community. Please ensure that these services will continue to be available to our community.

Very truly yours,

Archbishop Henry J. Mansell

Burton Albert

S. Mark Albini, MD

J. Robert Anthony, MD

56 Franklin Street, Waterbury, Connecticut 06706 (203) 709-6000 www.stmh.org

AFFILIATED ORGANIZATIONS
Saint Mary's Hospital Saint Mary's Hospital Foundation Saint Mary's Partners Franklin Medical Group Scovill Medical Group
Diagnostic Imaging of Southbury Harold Leever Regional Cancer Center Heart Center of Greater Waterbury Naugatuck Valley MRI Naugatuck Valley Surgical Center

Reverend Thomas J. Barry

Henry Borkowski, MD

Gregory Buller, MD

Joseph Carlson

Garrett Casey

Robert Caufield

Reverend Monsignor James Coleman

Nancy Culos

Robert Finkenzeller

Stephen R. Griffin, Esq.

Michael Karnasiewicz, MD

Bernard Kershner

Sister Delores Lahr

Robert Lehman, MD

Michael Matzkin, DDS

Robert Mazalka

Joseph A. Mengacci, Esq.

William Morris

Michael O'Brien

Ellen Polokoff, MD

David Robinson

James C. Smith

Jerome Sugar, MD

Christine Sullivan, Esq.

James Uberti, MD

Edmund White

The Honorable Linda Wihbey, Esq.

PLEASE KEEP OUR HEART CENTER OF GREATER WATERBURY!!

The Residents and families of The Village at East Farms Assisted Living in Waterbury do not want the Heart Center to close.

Nan Parillo
Mary Perugini
Leroy Schellhaas
Helen Bonney
Joseph & Dr. Parillo
Bea Pelletier
Lorraine Nystrom
Claire E. Girard
Julia F. Celedo
Joseph Giannetti
Mabel Commerford
Harry L. Taylor
Fern Verrier
Myrtle Swanson
Jennie Stanzeski
Alva McHugh
Helen C. St. John
Erminia LaVorgna
Helen Janicki
Dear Hod

RECEIVED
2008 AUG 27 A 11:46
CONNECTICUT OFFICE OF HEALTH CARE ACCESS

PLEASE KEEP OUR HEART CENTER OF GREATER WATERBURY!!

The Residents and families of The Village at East Farms Assisted Living in Waterbury do not want the Heart Center to close.

Patricia Dail
Harriette Martin
Judy Rush
John Rush
Deandra Hidalgo
Mitzy Santa
Dan Moore
Edward Echevarria
Amelia Upton
Carmen Maraca
Ruth L. Amedeo
Jay & Lucille Gould
Joyce & Henry Stern
Bill Titley
Jacquelyn R. Del Negro
Mary Jewell Smith RN
Maureen Kirwan

AUGUST 20,2008

DEAR HEART COMMITTEE:

I AM VERY CONCERNED ABOUT LOSING OUR HEART CENTER HERE IN WATERBURY AND I AM NOT ALONE.

SO WHAT IT SEEMS TO COME DOWN TO IS PUSH OPEN HEART SURGERY ON ALL PATIENTS REGARDLESS OF THEIR NEEDS. WHY CAN'T WE HAVE ALTERNATIVES TO THIS HORRIBLE SURGERY IF WE ARE ABLE TO.

WHY SHOULD WE SETTLE FOR 2ND BEST (AND I AM NOT KNOCKING THE EXCELLENT CARE IN OTHER HOSPITALS) WE ALL DESERVE THE BEST AND BEING ABLE TO RECEIVE CARE CLOSE TO HOME IS BETTER. RECOVERING FOR THE PATIENT ALSO IS IMPORTANT TO FAMILY AND DISTANCE AND ALSO THE PROBLEMS THAT COULD ARRIVE DURING TRANSPORTATION.
IF THE CENTER AND ALL CENTERS SAY 1 LIFE THIS IS WHAT IT'S ALL ABOUT. I ALSO HEAR THAT OTHER CENTERS ARE BELOW THERE COUNTS.
THIS IS AMERICA DON'T TAKE OUR CARE FROM US.

ALSO WHAT IS BEST FOR THE PATIENT IS IMMEDIATE CARE ASAP NOT AS SOON AS YOU CAN BE TRANSPORTATED THE PATIENT IS #1.

SINCERELY,

N Anderson

NANCY J. ANDERSON

RECEIVED
2008 AUG 28 P 12:08
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

HEART
CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature_____

Please Print Name and Address

_____

_____

_____

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL

Saint Mary's HOSPITAL

UConn Health Center

P.O. Box 2153, Waterbury, CT 06722

Mr. Vogel

Why on earth would your want to put peoples lives in jeopardy by closing the Heart Center? My heart isn't that good, and I really would like to have someplace to go if I should need to have heart surgery. You will be making the biggest mistake of all by closing the heart center.

Please Keep it open.

Thank you

Sandra Garceau
38 Ann St 1E
Naugatuck, Ct. 06770

HEART
CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature_____

Please Print Name and Address

_____

_____

_____

RECEIVED
2008 AUG 28 P 12:07
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL

Saint Mary's HOSPITAL

UConn Health Center

Waterbury Support for Heart Center

Signature	Print Name + Address
	Christina Elmazi 1435 Guernseytown Rd. Watertown, CT 06795
Pauline Serrantre	37 BOOTH AVE OAKVILLE CT
Palma Graziano	99 Lowley Dr. Watertown, CT 06795
Josephine Cavaliere	110 Alberta St W'bry - Conn
Denise Rossi	30 Phillips Dr, Oakville, Ct.
Barbara Cresta	221 Hickory Hill Ln WTBY CT
Christine Jacovino	Christine Jacovino 391 Front Rd Wtby Ct
Arlene Bamone	15 Garibaldi ST. Oakville, CT 06779
Joe Raczkowski	JOE RACZKOWSKI 127 GREENMOUNT TER WATERBURY CT.
Nancy Grady	Nancy Grady 130 Farmdale Rd. Watertown, Ct 06795
Sophie Calo	Sophie Calo 7 Kimble Ave WTBY 06708
Mary Izzi	Mary Izzi 24 Oak Hill Ave Wtby
Dorothy DiMaria	Dorothy DiMaria 236 West Hill Rd. Wtby. 06787
Marlene Chasse	Marlene Chasse 359 Maybrook Rd WTBY CT 06708
Pamela Morey	362 Celia Drive Wolcott Pamela Morey
Alexandra	349 Windy Dr. WTBY CT 06705
Elizabeth Hales	108 Shove Drive Winsted, CT 06098 Elizabeth Hales
Marie Upatieff	Marie Upatieff 342 Celia Dr Wct Ct 06716
Barbara Hansen	7 Di Santo Dr Wolcott, CT 06716
Anthony Bruno	92 Fairwood - WTBy 06705

14 008
Hartford Business Supply, Inc.

Rev C. Salvatore 86 Post Ave. Westbrook Ct.

Beth Naylor 60 Houston St Wtby CT 06704

Loretta Murphy 13 LK Plymouth Blvd Plymouth CT 06782

Stephanie Ecksfalo 3 Coleman Dr. Wolcott CT 06716

Joseph J Fanger Jr. 1577 Woodtick Rd Wolcott CT 06716

Marianne Vasilakos 264 Lyman Rd Wolcott 06716

Charlotte Brady Charlotte Brady 23 Chapman Ave Waterbury CT 06710

[illegible] Paul P. Maisto 6 Frances Ann Ct Oakville 06779

Robert Hall RICH G. HEEBNER 40 CENTRAL AV WTBY 06708

Jean DeLeon 155 Bristol St. - Thomaston CT 06787

Robert DeLeon Jr 155 Bristol St - Thomaston, CT 06787

Joanne Mesthrene 500 Pleasant St Conn 06479

Louis Mesthrene 36 Westbrook Rd Plantsville Conn

Mark L. Post Sr. 35 Nutmeg Rd. - Middlebury, Ct. 06762

Carol Magnarella 1 Anthony Rd, Prospect, Ct 06712

SIMON MAGNARELLA 1 ANTHONY Rd. PROSPECT, CT 06712

Rose MANNELLO 1 ANTHONY Rd. Prospect CT 06712

Mario Maciano Mario Macciano 52 Winthrop Ave Naug

Linda Maciano Linda Macciano 52 Winthrop Ave Naugatuck, Ct 06770

Theresa Bessette Theresa Bessette 3 Hedgerow Drive W Tn.

Robert Bessette Robert A. Bessette

Rita Sciortino RITA SCIORTINO PLANTSVILLE CT

Hartford Business Supply, Inc.

Sign here	Print Name + Address
SIGN HERE	ANTHONY SCIORTINO - 1037 OLDTURNPIKE RD
Joan Bobko	JOAN BOBKO - 381 OAKVILLE AVE.
Jeanne Ferrari	JEANNE FERRARI 28 CHURCH DR WLCT
Mary V Yanniello	MARY V YANNIELLI 47 BUCKLAND ST Wolcott
Marguerite Fisman	Marguerite Fisman 33 Hampshire Dr., Wolcott CT
Robert Graham	ROBERT GRAHAM 16 Morris Rd PROSPECT CT
Josephine R. Graham	Josephine R Graham 16 Morris Rd Prospect Ct.
Louis Collins	Louis Collins 656 East Center St. Wallingford
Eugene L. Knorr	Eugene L. KNORR JR 26 Somerset St West Htfd, CT
Joyce Douglas	Joyce Douglas 531 South Farms Terr Southington, CT
Lorraine Fraser	LORRAINE FRASER 112-1 Bysm Rd Wtby CT
Theresa Dubansky	Theresa Dubansky 147 N Main St Terryville Ct,
Ruth Buckley	RUTH BUCKLEY 40 Southwick Ct Cheshire Ct
Nancy Miller	Nancy A. Miller 14 Sigwin Circle Wallingford, CT 06492
Rose Rubano	Rose Rubano 37 James Pl - Wolcott, CT.
Myra Ryan	36 Farview Ave Wolcott
Martin Ryan	36 Farview Ave. Wolcott
Katherine Alberto	10 Dewberry Rd. Wtby, Ct. 06705
Mary Lacey	222 Bradley Ave 3-4A Wtby CT 06705 MARY LACEY
Sharon L. Rissa	109 Middlebury Rd. Middlebury Ct 06762
Jeanette Chicera	961 Pearl Lake Rd. Wtby. CT 06706

14 008
Hartford Business Supply, Inc.

Sign Here	Print Name + Address
M. Hansen	Megan Hansen 2 Badger Rd Wolcott CT

Hartford Business Supply, Inc.

CUT ALONG DOTTED LINE

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that every heart matters!

Sincerely,

Signature

Please Print Name and Address

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL

Saint Mary's HOSPITAL

UConn Health Center

HEART
CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature_____

Please Print Name and Address

_____

_____

_____

Re: Docket numbers 08-30167—MD and 08-31202

RECEIVED
2008 AUG 28 P 12:08
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

WATERBURY HOSPITAL

Saint Mary's HOSPITAL

UConn Health Center

P.O. Box 2153, Waterbury, CT 06722

Frances Dunn
100 Atwood Ave.
Waterbury, CT 06705

Office of Health Care Access
Commissioner Cristine Vogel
410 Capitol Ave.
MS# 13HCA P.O. Box340308
Hartford CT 06134

RECEIVED
2008 AUG 29 A 11:2
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

To Whom It May Concern:

On October 5, 2005 my husband, George, suffered a heart attack. He was visiting a friend in Prospect at the time. He told his friend he was having chest pains. His friend called for an ambulance. When he arrived at St. Mary's Hospital a cardiologist met him with his team. They quickly checked him out and he was on his way to have three stints put in. All of this took only about an hour.

If he had to endure an ambulance ride to Bridgeport or New Haven he may not have pulled through as well as he did.

The Waterbury area needs to have a heart center to care for our residents.

Sincerely and concerned,

Frances Dunn

Frances Dunn

AFFILIATED FOOT & ANKLE SURGEONS

PETER A. BLUME, DPM, FACFAS
JONATHAN J. KEY, DPM, FACFAS
JAMES H. BLUME, DPM

Reconstructive Foot Surgery Diabetic Limb Salvage

August 27, 2008

RECEIVED
2008 AUG 29 A 11:27
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Honorable Cristine Vogel
Commisioner
Office of Health Care Access
410 Capitol Avenue, MS#13HCA
P.O. Box 340308
Hartford, CT 06134-0308

Re: Docket Number: 08-31130-CON

Dear Commissioner Vogel:

I am writing to support the Hamden Surgery Center's Certificate of Need (CON) Application for the Sale of Membership Interests by Saint Raphael Healthcare System Hamden Surgical Center, LLC to physicians. The Surgical Center is currently owned by the Saint Raphael Healthcare System and is a multispecialty ambulatory surgery center in operation since 2000.

My specialty is podiatry and I currently practice in New Haven, CT. The majority of my cases are ambulatory. Hamden is an excellent location for many of my patients. Performing cases at the surgery center will be beneficial to both my practice and patients. Many physicians who currently operate at the surgery center are interested in ownership in the center. Ownership will maintain and improve overall efficiency, foster growth and ongoing financial stability of the facility. All these factors are critical to ensure continued access to this high quality ambulatory surgery facility.

Physician ownership in ambulatory surgery centers is commonplace throughout Connecticut and the United States. The proposed ownership for the Hamden Surgery Center represents an ideal opportunity for a health care institution to partner with its physicians. I ask you to approve Saint Raphael Healthcare System's CON Application for the sale of membership interests in the Hamden Surgery Center to physicians.

Regards,

Jonathan J. Key, D.P.M., F.A.C.F.A.S.

508 Blake Street • New Haven, Connecticut 06515 • A Center of Excellence for Limb Preservation

Tel: (203) 397-0624 • Fax: (203) 397-0372
www.foot.4udr.com

8-22-08

To Whom It May Concern;

Five years ago I had an Aortic Valve Replacement. I had to be rushed to St. Raphaels for immediate surgery. I felt so alone, not knowing anyone. My family came to SEE me but it was an inconvenience for them to travel from Waterbury to New Haven. I felt so alone + terribly frightened. If I was able to have this surgery in Waterbury it would have aided my recovery + Dr. Duke would not have been so stressed + my family could visit daily. Please keep these units

RECEIVED
2008 SEP -2 A 11:25
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

opened.

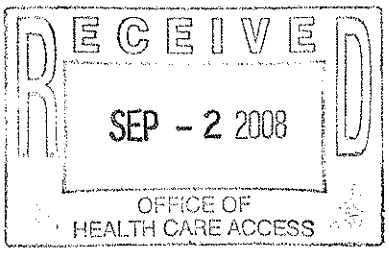
Thank you for your consideration

Debbie DeVito
115 Addison St.
Waterbury, Ct.
06708

Salus, Sandra

From: Treiss, Carolyn
Sent: Thursday, September 04, 2008 11:11 AM
To: Salus, Sandra
Subject: FW: Please Respond Directly to Constituent

Attachments: OHCA-Borduas.pdf





OHCA-Borduas.pdf
(85 KB)

I lied - here's another I discovered for both dockets.

Carolyn M. Treiss, JD, MSW
Chief of Staff

Office of Health Care Access
State of Connecticut
410 Capitol Avenue
3rd Floor, MS # 13HCA
Hartford, CT 06134-0308
(860) 418-7024

-----Original Message-----
From: Sandiaes, Linda
Sent: Tuesday, September 02, 2008 3:49 PM
To: Vogel, Cristine
Cc: Treiss, Carolyn
Subject: Please Respond Directly to Constituent

Control No: 152925
Received: 09/02/2008
Due: 09/16/2008
Response: 09/02/2008

Issue: OHCA - Case
The Heart Center of Greater Waterbury
Type: Constituent Mail
Status: Closed Correspondence

Origin:
Ms. Joanne Borduas
90 Carmel Hill Road S
Bethlehem, CT 06751

Remarks:
9/2/2008 letter re: support for keeping the heart center open. Sent to OHCA to review and respond.....LS

Referred By: Linda Sandiaes

Referred To: Commissioner Cristine Vogel (860) 418-7002
Action: Please Respond Directly to Constituent
Referred: 09/02/2008 Due: 09/16/2008

Notes:
Please respond directly to the constituent, regarding the following letter, on behalf of

Governor Rell. Also, please acknowledge that the Governor referred it to your agency.

It is not necessary to send a copy of response to the Governor's Office. The constituent has been instructed to contact the Commissioner's Office directly if they do not hear from the Agency within two (2) weeks.

If you have any questions, I can be reached at 524-7352. Thank you.

Linda Sandiaes
Staff Assistant
Office of the Governor

September 2, 2008

Ms. Joanne Borduas
90 Carmel Hill Road S
Bethlehem, CT 06751

Dear Ms. Borduas:

Thank you for your correspondence to Governor Rell regarding the Heart Center of Greater Waterbury. The Governor truly appreciates the time you took to write to her office. Please accept this response on her behalf.

Governor Rell believes that it is extremely important for citizens to voice their opinions and comments to their elected officials. As the matter you wrote about is overseen by the Office of Health Care Access, Governor Rell has asked that I forward your concerns to Commissioner Cristine Vogel's office to review and respond to you directly. If you do not receive a response from the Office of Health Care Access within two weeks please feel free to contact the Commissioner's office directly at (860) 418-7002. Please be aware that Commissioner Vogel did grant a six-month extension of the heart center's temporary operating permit.

Thank you again for sharing your comments and concerns with Governor Rell. Please do not hesitate to contact our office in the future, should the need arise.

Sincerely,

Linda Sandiaes
Staff Assistant
Office of Governor M. Jodi Rell

RECEIVED
SEP - 2 2008
OFFICE OF
HEALTH CARE ACCESS

Dear Governor Rell,

08-30167 MD
08-31202

Having been involved with the efforts to save the Heart Center of Great Waterbury in the last several weeks, I have been touched by the support that the city and its residents have shown. Having been born and raised in Waterbury, it has always been a community to rally together in times of crisis and need. The events that have surrounded the Heart Center recently proved that theory once again. The closing of the area's Heart Center would be a health care crisis. The residents of Waterbury and surrounding areas that we serve deserve better treatment than what they may be potentially faced with.

Although the target volumes for Open Heart Surgery were missed by 350, the fact that 600 Open heart Surgeries took place in the city should not go unnoticed and should not be looked at as insignificant. In fact, as Heart Centers across the state and nation, as evidenced by postings on the OHCA website, are faced with declining numbers of Open Heart Surgery Procedures, The Heart Center has actually grown. The quality of care The Heart Center has provided it's over 3,300 patients has met or exceeded national benchmarks. The Heart Center of Greater Waterbury, through each of the participating hospitals, employs experienced Cardiovascular Surgeons who have been performing Open Heart Surgery with unquestionable experience and knowledge at other facilities in the state for approx. 30 years between them. The Interventional Cardiologists come with expertise, knowledge and the many years of experience performing angioplasties. The teams of staff that provide cardiovascular care to the patients of the Heart Center are undeniably a team of experts with caring compassion and proven quality.

In a recent Television interview, Commissioner Vogel commented on OHCA not being able to give hospitals in this state everything they want. This is NOT about giving the hospitals in Waterbury what they want, but what the community NEEDS and wants. This is about saving lives and providing the standard of care that evidence has shown to be most beneficial in patients suffering from acute Heart Attacks. How ironic that while OHCA argues the numbers is about ensuring quality of care, that OHCA is also at the same time, willing to risk that quality and risk increasing mortality to provide a *substandard* of care for the patients in Greater Waterbury by forcing them out of the city for their Cardiac needs, especially in times of emergency. What is this really about? Is OHCA willing to risk political face at the expense of lives? Commissioner Vogel also mentioned that this has become too political...for whom?

Waterbury is proud to have the backing and support of Mayor Jarjura, Attorney General Richard Blumenthal, and all the State and local officials who have pledged their support. Let's not make this a numbers game. Instead let's pledge to save lives and do what's right for the community of Greater Waterbury.

Thank you..
A Concerned Citizen

Salus, Sandra

From: Treiss, Carolyn
Sent: Thursday, September 04, 2008 11:06 AM
To: Salus, Sandra
Subject: FW: For Your Information

Attachments: OHCA-Shaw.pdf

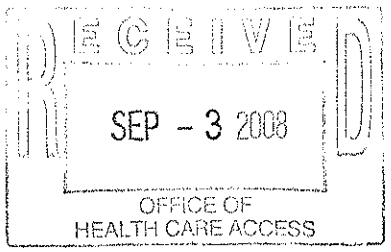


OHCA-Shaw.pdf
(433 KB)

Another for both dockets.

Carolyn M. Treiss, JD, MSW
Chief of Staff

Office of Health Care Access
State of Connecticut
410 Capitol Avenue
3rd Floor, MS # 13HCA
Hartford, CT 06134-0308
(860) 418-7024



-----Original Message-----
From: Sandiaes, Linda
Sent: Wednesday, September 03, 2008 8:31 AM
To: Vogel, Cristine; Treiss, Carolyn
Subject: For Your Information

Control No: 152933
Received: 08/29/2008
Due: 09/12/2008

Issue: OHCA - Case
The Heart Center of Greater Waterbury
Type: Constituent Mail
Status: Closed Correspondence

Origin:
Ms. Lorraine Shaw
Unknown
Unknown, XX 00000-0000
Home: (203) 754-2660
Remarks:
9/3/2008 letter re: support for keeping the heart center open. Sent to OHCA as an FYI. Logged and closed.....LS

Referred By: Linda Sandiaes

Referred To: Commissioner Cristine Vogel (860) 418-7002
Action: For Your Information
Referred: 09/03/2008 Due: 09/17/2008

Notes:
I am forwarding information to you that may be of interest. Please contact me if you have any questions.

Linda Sandiaes, Staff Assistant
State Capitol, Office of the Governor
210 Capitol Avenue, Room 408
Hartford, CT 06106
Phone: (860)524-7352/FAX: (860)524-7396
Linda.Sandiaes@ct.gov

RECEIVED
SEP - 3 2008
OFFICE OF
HEALTH CARE ACCESS

August 19, 2008

To Whom It may concern,

Because this letter is so important, not only to me, but to many others who may not be as fortunate as I am, I know you will forgive my very informal stationary. The message is too important to be overlooked by social graces.

On June 24th, 2003, having just returned from lunch on a rather warm day, I entered my office and noticed I was a bit dizzy and disoriented. In the moments that followed, I realized my condition was getting worse and called upon my colleagues for assistance. I was employed by a church, and one of our visiting parishioners happened to be a nurse. When I indicated I was beginning to feel numb, she immediately called for an ambulance.

I was transported to Waterbury Hospital. I was given nitroglycerin en route, but remained quite anxious about my condition.

As I was being wheeled into

the E.R room, I began to loose consciousness and the last words I heard were "she's going"! That 1½ hour ride seemed like hours to my family & was nothing compared to what would follow.

I regained consciousness and was told I had had a massive heart attack. I was also told that because the hospital was not authorized to perform any major heart procedures, it would be best to wait until morning, when I would be transported to Bridgeport Hospital to perform the angioplasty I needed. Bridgeport Hospital!!!

If I wasn't already nervous and scared enough, now I was being told I needed to leave the city for treatment. This made no sense to me since I was already in a hospital. I later understood why it all had to be this way, but it still didn't make sense to me, nor did it make my frightening experience any easier.

I had the angioplasty on

June 25th, and 3 stents were implanted. Since then, I have had 3 more stents implanted @ St. Mary's Hospital. It was expecting to be close to home for this subsequent procedure.

While I am certain that much time and effort goes into making important decisions regarding life, and the costs associated with the care of these lives, I hope you will consider the internal trauma that people experience when they are forced to leave the comfort of the surroundings they know and have come to expect the greatest care from, to being transported in such a fragile condition to a place many miles from their family.

On June 25, 2003 the ambulance ride to Bridgeport Hospital was more traumatic for me than learning of my condition. I was alone and terrified. It seems very cruel to have a policy that requires an individual no real choice in their own health

care. My family also traveled miles each day.

I urge you to approve permanent status of the heart center of greater Waterbury. You cannot put a quote on the lives that have been saved. Even if only one life was saved, the program was worth it.

Please ask yourself if the residents of New Haven and Bridgeport would ever condone their having to be transported to Waterbury for heart surgery. I think not, and rightfully so. The citizens of Waterbury deserve at least that much.

I apologize for the length of this letter, but I, for one, would be terribly disappointed, not to mention very concerned, if this approval is not given.

Thank you ever so much for your kind attention to my letter.

Sincerely yours,

Lorraine A. Shaw
(203) 754-2660

HEART
CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature_____

Please Print Name and Address

_____

_____

_____

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL

Saint Mary's HOSPITAL

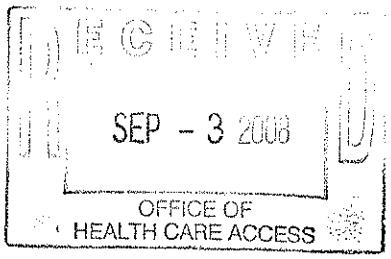
UConn Health Center

P.O. Box 2153, Waterbury, CT 06722

Salus, Sandra

From: Treiss, Carolyn
Sent: Thursday, September 04, 2008 11:05 AM
To: Salus, Sandra
Subject: FW: For Your Information

Attachments: OHCA-Gardner.pdf





OHCA-Gardner.pdf
(145 KB)

Sandy,
Please respond. Because this was written prior to the ruling it should go in both dockets. Any that come in with dates after August 29 only need to go into the LOI docket.
Carolyn

Carolyn M. Treiss, JD, MSW
Chief of Staff

Office of Health Care Access
State of Connecticut
410 Capitol Avenue
3rd Floor, MS # 13HCA
Hartford, CT 06134-0308
(860) 418-7024

-----Original Message-----
From: Sandiaes, Linda
Sent: Wednesday, September 03, 2008 8:35 AM
To: 'crisitne.vogel@po.state.ct.us'; Treiss, Carolyn
Subject: For Your Information

Control No: 152935
Received: 09/03/2008
Due: 09/17/2008

Issue: OHCA - Case
The Heart Center of Greater Waterbury
Type: Constituent Mail
Status: Closed Correspondence

Origin:
Mr. Robert A. Gardner
Unknown
Unknown, XX 00000-0000

Remarks:
9/3/2008 letter re: support for keeping the heart center open. Sent to OHCA as an FYI. Logged and closed.....LS

Referred By: Linda Sandiaes

Referred To: Commissioner Cristine Vogel (860) 418-7002
Action: For Your Information
Referred: 09/03/2008 Due: 09/17/2008

Notes:

August 17, 2008

Heart Center of Greater Waterbury:

I'm writing this letter for my husband and myself.

My husband had a slight heart attack and angio plasty, February of 2007 at St. Marys. He was also a patient at Waterbury Hospital 2005.

Time is of the essence when the heart is involved and the closeness of the center is very helpful. We were very thankful for the good care and peace of mind.

I also have heart problems and also like to see the program grated permanent status.

We cannot attend the support rally — but will be there in spirit. This is very important to this area.

Keep up the good work.

Best regards,

Robert A. Gardner Jr

Kay F. Gardner

Michael F. Gardner

HEART CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature_____

Please Print Name and Address

_____

_____

_____

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL

Saint Mary's HOSPITAL

UConn Health Center

P.O. Box 2153, Waterbury, CT 06722

I am forwarding information to you that may be of interest. Please contact me if you have any questions.

Linda Sandiaes, Staff Assistant
State Capitol, Office of the Governor
210 Capitol Avenue, Room 408
Hartford, CT 06106
Phone: (860)524-7352/FAX: (860)524-7396
Linda.Sandiaes@ct.gov

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

September 4, 2008

Mr. Frank San Angelo
88 Valley Drive
Naugatuck, CT 06770

Re: Docket Numbers 08-30167-MD2 and 08-31202-LOI
St. Mary's Hospital and The Waterbury Hospital, d/b/a The Heart Center of Greater Waterbury, and John Dempsey Hospital

Dear Mr. San Angelo:

The Office of Health Care Access ("OHCA") is in receipt of your letter dated August 21, 2008 regarding the above referenced matters which was forwarded to us by the Governor's office. OHCA understands your concerns and appreciates your comments. Your letter has been made part of each record referenced above.

If you are interested in additional information regarding the Heart Center of Greater Waterbury, please visit OHCA's website at http://www.ohca.state.ct.us/.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:ss

Salus, Sandra

From: Treiss, Carolyn
Sent: Thursday, September 04, 2008 11:07 AM
To: Salus, Sandra
Subject: FW: Please Respond Directly to Constituent

Attachments: OHCA-San Angelo.pdf

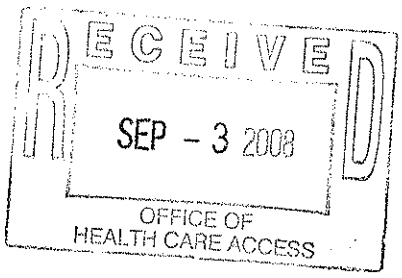


OHCA-San Angelo.pdf (36 KB)

Both dockets.(maybe the last one?)

Carolyn M. Treiss, JD, MSW
Chief of Staff

Office of Health Care Access
State of Connecticut
410 Capitol Avenue
3rd Floor, MS # 13HCA
Hartford, CT 06134-0308
(860) 418-7024



-----Original Message-----
From: Sandiaes, Linda
Sent: Wednesday, September 03, 2008 8:22 AM
To: Vogel, Cristine
Cc: Treiss, Carolyn
Subject: Please Respond Directly to Constituent

Control No: 152930
Received: 08/29/2008
Due: 09/17/2008
Response: 09/03/2008

Issue: OHCA - Case
The Heart Center of Greater Waterbury
Type: Constituent Mail
Status: Closed Correspondence

Origin:
Mr. Frank San Angelo
88 Valley Drive
Naugatuck, CT 06770

Remarks:
9/3/2008 letter re: support for keeping the heart center open. Sent to OHCA to review and respond.....LS

Referred By: Linda Sandiaes

Referred To: Commissioner Cristine Vogel (860) 418-7002
Action: Please Respond Directly to Constituent
Referred: 09/03/2008 Due: 09/17/2008

Notes:
Please respond directly to the constituent, regarding the following letter, on behalf of

Governor Rell. Also, please acknowledge that the Governor referred it to your agency.

It is not necessary to send a copy of response to the Governor's Office. The constituent has been instructed to contact the Commissioner's Office directly if they do not hear from the Agency within two (2) weeks.

If you have any questions, I can be reached at 524-7352. Thank you.

Linda Sandiaes
Staff Assistant
Office of the Governor

September 3, 2008

Mr. Frank San Angelo
88 Valley Drive
Naugatuck, CT 06770

Dear Mr. San Angelo:

Thank you for your correspondence to Governor Rell regarding the Heart Center of Greater Waterbury. The Governor truly appreciates the time you took to write to her office. Please accept this response on her behalf.

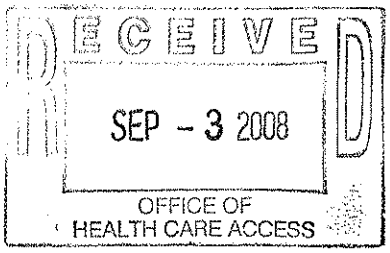
Governor Rell believes that it is extremely important for citizens to voice their opinions and comments to their elected officials. As the matter you wrote about is overseen by the Office of Health Care Access, Governor Rell has asked that I forward your concerns to Commissioner Cristine Vogel's office to review and respond to you directly. If you do not receive a response from the Office of Health Care Access within two weeks please feel free to contact the Commissioner's office directly at (860) 418-7002. Please be aware that Commissioner Vogel granted a six-month extension of the heart center's temporary operating permit.

Thank you again for sharing your comments and concerns with Governor Rell. Please do not hesitate to contact our office in the future, should the need arise.

Sincerely,

Linda Sandiaes
Staff Assistant
Office of Governor M. Jodi Rell

152930



August 21, 2008

To Whom it May Concern:

I just want to say how much the heart center is needed in the Waterbury area.

Approximately 5 years ago I was sent to St. Mary's hospital with a heart attack and then they had to rush me to St. Raphael's Hospital in New Haven to put a stent in. This was very frustrating and scary for me having to go to New Haven as an emergency patient. Then in 2005, I was admitted to St. Mary's Hospital and had to have a six-way bypass. This was much easier for me to stay and have the operation at St. Mary's and so much easier for my family not to have to drive to New Haven. I have nothing but praise for Dr. Preissler and all the staff in the heart center.

I support "with all my heart" keeping the heart center in Waterbury.

Frank San Angelo

Frank San Angelo
88 Valley Drive
Naugatuck, CT 06770

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

September 5, 2008

The Honorable Susan A. Cable
First Selectman
Town of Beacon Falls
10 Maple Ave.
Beacon Falls, CT 06403-1198

Re: Docket Number 08-30167-MD2 and Docket Number: 08-31202-LOI
Saint Mary's Hospital, Waterbury Hospital, and John Dempsey Hospital of the University of Connecticut Health Center
A Request to modify a Certificate of Need issued under Docket Number 03-30167-CON, the Primary and Elective Angioplasty and Open-Heart Surgery Programs at St. Mary's Hospital and at The Waterbury Hospital

Dear Selectman Cable:

On September 3, 2008, the Office of Health Care Access ("OHCA") received your letter concerning Docket 08-30167-MD2, the petition by Saint Mary's Hospital, Waterbury Hospital, and John Dempsey Hospital of the University of Connecticut Health Center to modify a Certificate of Need issued under Docket Number 03-30167-CON, the primary and elective angioplasty and open-heart surgery programs at Saint Mary's Hospital and at The Waterbury Hospital.

OHCA appreciates your comments. Your letter has been made part of the formal record of the application. Please be advised once a decision has been rendered it will be posted and available on OHCA's website at http:// www.ct.gov/ohca.

If you have any further concerns or questions, please contact me at OHCA at (860) 418-7001.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:KR:bko

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

September 5, 2008

The Honorable Susan A. Cable
First Selectman
Town of Beacon Falls
10 Maple Ave.
Beacon Falls, CT 06403-1198

Re: Docket Number 08-30167-MD2 and Docket Number: 08-31202-LOI
Saint Mary's Hospital, Waterbury Hospital, and John Dempsey Hospital of the University of Connecticut Health Center
A Request to modify a Certificate of Need issued under Docket Number 03-30167-CON, the Primary and Elective Angioplasty and Open-Heart Surgery Programs at St. Mary's Hospital and at The Waterbury Hospital

Dear Selectman Cable:

On September 3, 2008, the Office of Health Care Access ("OHCA") received your letter concerning Docket 08-30167-MD2, the petition by Saint Mary's Hospital, Waterbury Hospital, and John Dempsey Hospital of the University of Connecticut Health Center to modify a Certificate of Need issued under Docket Number 03-30167-CON, the primary and elective angioplasty and open-heart surgery programs at Saint Mary's Hospital and at The Waterbury Hospital.

OHCA appreciates your comments. Your letter has been made part of the formal record of the application. Please be advised once a decision has been rendered it will be posted and available on OHCA's website at http:// www.ct.gov/ohca.

If you have any further concerns or questions, please contact me at OHCA at (860) 418-7001.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:KR:bko

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

September 4, 2008

The Honorable Richard Blumenthal
Attorney General
Office of the Attorney General
State of Connecticut
55 Elm Street
Hartford, CT 06141-0120

Re: Docket Number 08-30167-MD2 and Docket Number: 08-31202-LOI
Saint Mary's Hospital, Waterbury Hospital, and John Dempsey Hospital of the University of Connecticut Health Center
A Request to modify a Certificate of Need issued under Docket Number 03-30167-CON, the Primary and Elective Angioplasty and Open-Heart Surgery Programs at St. Mary's Hospital and at The Waterbury Hospital

Dear Attorney General Blumenthal:

On August 27, 2008, the Office of Health Care Access ("OHCA") received your letter concerning Docket 08-30167-MD2, the petition by Saint Mary's Hospital, Waterbury Hospital, and John Dempsey Hospital of the University of Connecticut Health Center to modify a Certificate of Need issued under Docket Number 03-30167-CON, the primary and elective angioplasty and open-heart surgery programs at Saint Mary's Hospital and at The Waterbury Hospital.

OHCA appreciates your comments. Your letter has been made part of the formal record of the application. Please be advised once a decision has been rendered it will be posted and available on OHCA's website at http:// www.ct.gov/ohca.

If you have any further concerns or questions, please contact me at OHCA at (860) 418-7001.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:KR:bko

STATE OF CONNECTICUT

OFFICE OF HEALTH CARE ACCESS

M. JODI RELL
GOVERNOR

CRISTINE A. VOGEL
COMMISSIONER

September 12, 2008

The Honorable Jeffrey Hamel
First Selectman
Town of Bethlehem
36 Main Street South, P.O. Box 160
Bethlehem, CT 06751-0160

Re: Docket Number 08-31202-LOI
Saint Mary's Hospital, Waterbury Hospital, and John Dempsey Hospital of the University of Connecticut Health Center (d/b/a Heart Center of Greater Waterbury) Establish a Primary and Elective Angioplasty and Open Heart Surgery Program at Waterbury Hospital and Saint Mary's Hospital

Dear Selectman Hamel:

On September 11, 2008, the Office of Health Care Access ("OHCA") received your letter concerning Docket 08-31202, the petition by Saint Mary's Hospital, Waterbury Hospital, and John Dempsey Hospital of the University of Connecticut Health Center (d/b/a Heart Center of Greater Waterbury) to establish a primary and elective angioplasty and open heart surgery program at Waterbury Hospital and Saint Mary's Hospital

OHCA appreciates your comments. Your letter has been made part of the formal record of the application. Please be advised once a decision has been rendered it will be posted and available on OHCA's website at http:// www.ct.gov/ohca.

If you have any further concerns or questions, please contact me at OHCA at (860) 418-7001.

Sincerely,

Cristine A. Vogel
Commissioner

CAV:SL:bko

HEART
CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Virginia G. Napolitano

Please Print Name and Address

VIRGINIA NAPOLITANO
7 MAGNOLIA HILL ROAD
Bethlehem, CT 06751

RECEIVED
2008 SEP 12 A 11:07
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL

Saint Mary's HOSPITAL

UConn Health Center

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 12 A 10:21
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Andrew R Napolitano

Please Print Name and Address

Andrew R. Napolitano
7 Magnolia Hill Road
Bethlehem, CT 06751

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 15 A 9:22
CONNECTICUT OFFICE OF HEALTH CARE ACCESS

VIA HAND DELIVERY
Cristine A. Vogel, Commissioner
Office of Health Care Access
410 Capitol Avenue
MS# 13HCA
P.O. Box 340308
Hartford, CT 06134-0308

September 15, 2008

RE: **Certificate of Need Application**

The Waterbury Hospital and Saint Mary's Hospital Corporation, d/b/a/ Heart Center of Greater Waterbury and University of Connecticut Health Center/John Dempsey Hospital

Dear Commissioner Vogel:

On behalf of the applicants enclosed please find an original and an additional eight (8) copies of our Certificate of Need Application and supporting documents. Also included is a CD of the document. An electronic copy of the document will be sent via electronic mail. Should you require additional information or have any questions concerning this matter please contact:

Loraine C. Shea, Executive Director
Heart Center of Greater Waterbury
PO Box 2153
Waterbury, CT 06722
(P) 203-575-5571
(F) 203-575-5575

Sincerely,

Loraine C. Shea
Executive Director, HCGW

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:52
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature LuAnn Cogliser

Please Print Name and Address

L. Cogliser
40 Kent Ter
Watertown, CT 06795

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

P.O. Box 2153, Waterbury, CT 06722

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:52
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature _____

Please Print Name and Address

ANCA MOLNAR
22 MARIA HOTCHKISS RD.
PROSPECT, CT 06712

Re: Docket numbers 08-30167—MD and 08-31202

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:53
CONNECTICUT OFFICE OF HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Randolph Cogliser

Please Print Name and Address

C Randolph Cogliser
40 Kent Ter
Watertown, CT 06795-1842

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:53
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Jeanne Creem

Please Print Name and Address

Jeanne Creem
30 Prospect ST
Oakville, CT 06779

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL

Saint Mary's HOSPITAL

UConn Health Center

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:53
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Thomas McCreem

Please Print Name and Address

Thomas Creem
30 Prospect St
Oakville, CT 06779

Re: Docket numbers 08-30167—MD and 08-31202

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:53
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Jason Creem

Please Print Name and Address

Jason Creem

30 Prospect ST

Oakville, CT 06779

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL

Saint Mary's HOSPITAL

UConn Health Center

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:53
CONNECTICUT OFFICE OF HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Janet Bloemker

Please ~~Print~~ Name and Address

Jan Bloemker
85 Cannon Ridge Dr.
Watertown, CT 06795

Re: Docket numbers 08-30167—MD and 08-31202

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:53
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Rose Marie Mikasauskas

Please Print Name and Address

PO Box 929
Middlebury, CT 06762

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:53
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature

Please Print Name and Address

Barry R. McKeon
34 Crestwood Ave.
Watertown, CT 06795

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:53
CONNECTICUT OFFICE OF HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Leslie L. McKeon

Please Print Name and Address

Leslie L. McKeon
34 Crestwood Ave.
Watertown, CT 06795

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

RECEIVED
2008 SEP 24 P 12:53
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

HEART CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Alketa Tahirllari

Please Print Name and Address

Alketa Tahirllari
973 Bunker Hill Rd
Watertown CT 06795

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:53
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Louis Magnoli

Please Print Name and Address

Lou Magnoli
90 Worcester Rd.
Washington, CT 06793

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:53
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature

Please Print Name and Address

USA
Mr. Jim Krayeske
955 Bunker Hill Rd
Watertown, CT 06795-3231

Re: Docket numbers 08-30167—MD and 08-31202

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:53
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Mary Curtiss

Please Print Name and Address

MARY CURTISS
738 Linkfield Rd
WATERTOWN Conn 06795

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:53
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Anne A Hobson

Please Print Name and Address

ANNE A HOBSON
79 Judson Ave
Woodbury CT 06798

Re: Docket numbers 08-30167—MD and 08-31202

RECEIVED
2008 SEP 24 P 12:54
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

HEART CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature

Please Print Name and Address

MARIA MANCINI

415 THOMASTON RD

WATERTOWN CT 06795

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL

Saint Mary's HOSPITAL

UConn Health Center

P.O. Box 2153, Waterbury, CT 06722

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:54
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Lucille Burrell

Please Print Name and Address

Lucille M. Burrell
55 Edwards Ave.
Waterbury, CT 06795

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

HEART CENTER of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:54
CONNECTICUT OFFICE OF HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Josh Bartlett

Please Print Name and Address

Josh Bartlett
54 Hart St.
Watertown, CT 06795

Re: Docket numbers 08-30167—MD and 08-31202

HEART CENTER of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:54
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature

Please Print Name and Address Oscar L. Bartlett Jr.
54 Hart St.
Wallingford, CT
06795

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL

Saint Mary's HOSPITAL

UConn Health Center

P.O. Box 2153, Waterbury, CT 06722

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:54
CONNECTICUT OFFICE OF HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Brenda Bartlett

Please Print Name and Address Brenda Bartlett
54 Hart St.
Watertown, CT
06795

Re: Docket numbers 08-30167—MD and 08-31202

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:54
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Rick Bumeister

Please Print Name and Address

Rick Bumeister
605 Walnut St
Wtn Ct 06795

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL

Saint Mary's HOSPITAL

UConn Health Center

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:54
CONNECTICUT OFFICE OF HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Joe Ammirato

Please Print Name and Address

Joe Ammirato
79 Brass Mill Dam Rd
Torrington, CT

Re: Docket numbers 08-30167—MD and 08-31202

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:54
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Sandra Ammirato

Please Print Name and Address

Sandra Ammirato
79 Bass Mill Dam Rd
Torrington, CT 06790

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:54
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Linda Burmeister

Please Print Name and Address

Linda Burmeister
65 Walnut St.
Watertown Ct 06795

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL

Saint Mary's HOSPITAL

UConn Health Center

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:54
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature Linda DaSilva

Please Print Name and Address

Linda DaSilva
229 Honey Hill Rd
Wtn. Ct 06795

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

HEART CENTER
of Greater Waterbury

RECEIVED
2008 SEP 24 P 12:54
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature _____

Please Print Name and Address

Jenna Larkin

245 Cherry Ave #23

Watertown CT 06795

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL

Saint Mary's HOSPITAL

UConn Health Center

STANLEY J. FOSTER, MD., P.C.

PLASTIC RECONSTRUCTIVE SURGERY
HAND SURGERY
COSMETIC SURGERY

TEL: 203-757-0583
FAX: 203-757-0626
EMAIL: SFOSTERMD@AOL.COM

1389 WEST MAIN STREET
SUITE 306 • TOWER 1
WATERBURY, CT 06708



RECEIVED
2008 SEP 25 A 11:04
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

September 16, 2008

Office of Health Care Access
Commission Christine Vogel
410 Capitol Avenue
MS# 13HCA
PO Box 340308
Hartford, CT 06134

Dear Commissioner Vogel,

This letter concerns The Heart Center of Waterbury.

It is my feeling as a physician that The Heart Center is essential for the City of Waterbury.

As you know, the technician for the operating room, John Woznak, explained what he went through before his surgery.

The patient essentially came to the hospital with his complaints. His angiogram that morning showed severe five vessel disease. The patient was immediately booked for the operating room.

It was my pleasure to stand with John in the CCU as he waited for his surgery. His wife could not get back to the hospital before his surgery was scheduled.

This patient was in urgent need of cardiac surgery. With the stress involved, a trip to Bridgeport, Danbury or Hartford may have changed his life significantly for the worse.

Additionally, I was called to the emergency room to help out a friend who was a young female and had signs and symptoms of a stroke. I was able to get the patient immediately to CT scan to

try and diagnose her condition. During that stressful half hour, her husband developed significant chest pain. An EKG revealed cardiac ischemia. The patient underwent cardiac catheterization and was brought to the operating room in short order.

Again, a trip to Bridgeport, Danbury or Hartford may have made a difference in this patient's life.

I understand that the three cities mentioned above benefit economically from the patients of Waterbury. However, the city of Waterbury and its citizens are not well-served by traveling a half hour to get to these facilities.

That half hour also is a misnomer. By the time the patient comes to the emergency room, is worked up and then needs cardiac surgery, it is not just a half hour, it is many hours. Because of traffic and weather conditions, it may in fact take the patient many hours to get to one of these cities.

Putting economic factors aside, this Heart Center is vital for the city of Waterbury and its residents.

Please approve the CON for the cardiac center.

Honestly, it would make more sense to have all the cardiac surgery done at one hospital. The duplication of services in these economic times makes absolutely no sense whatsoever.

Sincerely,

Stanley J. Foster, M.D.

SJF/mc

79 Lakeside Blvd. East
Waterbury, Conn. 06708-2912

August 3, 2008

RECEIVED
2008 SEP 29 P 2:04
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

To Whom It May Concern:

I would like to take the opportunity to voice my concern relative to the circulating rumors that the Open Heart Program in Waterbury may be discontinued. If so, this is a serious breach of concern for the physical welfare of the citizens of the City of Waterbury.

In 2003, my sister, Elizabeth Mazzella, was admitted to St. Mary's Hospital with tachycardia. It was determined that she needed coronary by-pass surgery. She had to wait two days for a bed at St. Raphael's Hospital. Prior to Elizabeth's transfer to St. Raphael's, the communication between the two hospitals left a lot to be desired. To expedite this transfer, I had to personally call St. Raphael's to see if in fact they were expecting her. They said they were, but had no bed and would not have one until 6 P.M. Furthermore, the staff at St. Mary's acknowledged that the proper transfer papers were not complete.

She was finally transferred to St. Raphael's on a Friday at 7 P.M.

in a snow storm. She had been kept fasting all day expecting to have surgery on Friday. This did not happen. She had nothing to eat or drink until Saturday morning and kept waiting for surgery until Monday. Since she arrived at St. Raphaels on Friday evening and could not be fed for any number of unknown reasons.
She spent twelve days at St. Raphaels for a triple by-pass. One day after arriving home she had to be re-admitted to St. Mary's Hospital with sodium depletion
I traveled 40 miles daily to see her in dreadful winter conditions. Due to the weather conditions, most family members were reluctant to travel.
I realize it is the Commissions expectations that certain "numbers" should be met in order to allow an institution to maintain a cardiac program. Additionally I know the pressure being exerted on the Commission by other hospitals to eliminate the program in Waterbury. Revenue is revenue.
The physical well being of the citizens of Waterbury

should take precedence over all other outside interests and concerns. We should be allowed to maintain the Open Heart Program in Waterbury.

Thank you for listening.

Sincerely yours,

Lucia Mannello

HEART
CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that *every heart matters!*

Sincerely,

Signature_____

Please Print Name and Address

_____

_____

_____

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL

Saint Mary's HOSPITAL

UConn Health Center

P.O. Box 2153, Waterbury, CT 06722

Dr. Alvin M. Laster

112 Birchwood, Southbury, CT 06488

8/21/08

RECEIVED
2008 SEP 30 A 11:00
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Heart Center of Greater Waterbury
PO Box 2153
Waterbury,CT 06722

Four years ago, I suffered a heart attack and was sent to Waterbury Hospital for emergency treatment. An angioplasty was done and it was decided that I should have a stent inserted in the blocked vessel.

The probe had to be removed and I was sent to Bridgeport Hospital, a trip of 40 minutes, to repeat the process of reinserting the probe with the stent. The waste of time was critical. I know of one incident of a patient who died on route to Bridgeport. The delays may have caused other fatalities that I do not know about.

The insertion of the probe from groin to heart poses the possibility of puncturing a vessel. It is unconscionable to perform the procedure twice, doubling the risk.

When Waterbury Hospital appealed for a certificate of approval to perform heart surgery, I visited Governor Roland and was sent by him to the office that certifies such licenses. I and other concerned citizens gathered names for a petition to assure that the greater Waterbury area would have proper heart facility. To cancel that service and go back to the former dangers involved in transportation (weather and traffic delays) and double probing is a danger to the patient, as it was for me.

I appeal for the continuation of heart surgery service in the Waterbury area

Alvin M Laster

Alvin M. Laster

Telephone 203 264 8360 *email alhan4@aol.com*

Docket number
08-30167 + 08-31200

RECEIVED

2008 OCT 27 P 1:55

CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Lena D. Napolitano
369 East Mitchell Avenue
Cheshire, CT 06410-4128
Tel: (203) 271-3794

October 24, 2008

Heart Center of Greater Waterbury
P. O. Box 2153
Waterbury, CT 06722

RE: Heart Center of Greater Waterbury
"Permanent Status"
OHCA Docket No. 08-31202

Dear Heart Center:

First, let me express my sincere thanks to Commissioner Cristine Vogel of the Office of Health Care Access for the manner in which she handled the request and then the approval granting the Heart Center a continuation extension to January 19, 2009.

However, time passes quickly and now it is time to get serious again and request "permanent status" for the Heart Center to continue providing critical heart care services at both St. Mary's Hospital and Waterbury Hospital.

We have all heard many stories from the past when emergency and critical heart patients were transferred by ambulance to St. Raphael's Hospital in New Haven, and Bridgeport Hospital in Bridgeport -- some stories with sad and tragic endings and others with a more positive result. Nevertheless, families had to spend several hours each day traveling to the hospital, visiting their loved ones, and then traveling home. Many families had to rely on other family members, relatives, and or friends for transportation.

My three siblings, two sisters and a brother, all had to be transported by ambulance, two to St. Raphael's and one to Bridgeport Hospital – all had emergency critical open heart bypass surgery. My older sister died later from another heart attack.

In March of 2005, I was transported by ambulance from St. Mary's Hospital to Bridgeport Hospital where a two stent angioplasty (ramus and circumflex arteries) was performed. Within a few months the two stents failed and formed scar tissue blocking the Aorta. The result was the need for Open Heart Bypass Surgery. Since the Heart Center of Greater Waterbury opened in July of 2005, I was fortunate to have my surgery scheduled at St. Mary's Hospital in November of 2005. It was truly gratifying that it could be performed in the City and Hospital which I knew well and where I lived most of my life. The cardio-thoracic surgeon, doctors, nurses, and staff trained to perform these life-saving procedures took excellent care of me and I thank them for saving my life. I did not have to travel to New Haven or Bridgeport and it was satisfying to know that my family, relatives, and friends, did not have to travel distances to visit me.

Lena D.Napolitano
369 East Mitchell Avenue
Cheshire, CT 06410-4128
Tel: (203) 271-3794

RE: Heart Center of Greater Waterbury
"Permanent Status"
OHCA Docket No. 08-31202

The Heart Center of Greater Waterbury at both St. Mary's Hospital and Waterbury Hospital is an excellent program and should be continued in "PERMANENT STATUS" offering all the people of Waterbury and the surrounding towns the necessary advantage of this crucial cardiac program without having to be transported out of town by ambulance to other hospitals or having families travel to visit their loved ones. I pray that the decision be made by the Office of Health Care Access to continue the Heart Center of Greater Waterbury's successful and crucial cardiac program of saving lives.

The Heart Center of Greater Waterbury has proven its quality care and effective life-saving program and should be continued in "permanent status" now, and for many, many years to come! "EVERY HEART MATTERS" --- AND SO IT SHOULD BE!!!

Best Wishes, Good Luck, and God's Blessings to All!

Sincerely,

Lena D. Napolitano

Lena D. Napolitano
Heart Center Patient

cc: Office of Health Care Access, Commissioner Cristine Vogel
410 Capitol Avenue, MS# 13HCA, P.O.Box 340308, Hartford, CT 06134

cc: Office of the Governor, State Capitol, 210 Capitol Avenue, Hartford, CT 06106

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that every heart matters!

Sincerely, Does have a heart problem

Signature

Berta Palmer

Please this on Docket Grave Concern

Re: Docket numbers 08-30167—MD and 08-31202

Please Print Name and Address

BERTA L PALMER

105 wood St

WATERBURY, Ct,

HEART CENTER
of Greater Waterbury

RECEIVED
2008 OCT 28 P 1:45
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

VIA HAND DELIVERY
Cristine A. Vogel, Commissioner
Office of Health Care Access
410 Capitol Avenue
MS# 13HCA
P.O. Box 340308
Hartford, CT 06134-0308

October 28, 2008

RE: **Docket Number: 08-31202-CON**

The Waterbury Hospital and Saint Mary's Hospital Corporation, d/b/a/ Heart Center of Greater Waterbury and University of Connecticut Health Center/John Dempsey Hospital

Establish a primary and elective Angioplasty and Open Heart Surgery Program at Waterbury Hospital and St. Mary's Hospital

Letters of Support

Dear Commissioner Vogel:

On behalf of the Applicants enclosed you will find over 12,000 letters received by the Heart Center of Greater Waterbury since the August 29, 2008 public hearing. These letters were received on line, through the U.S. mail and from various community centers around the greater Waterbury area. These letters are in support of continuing the Heart Center of Greater Waterbury advanced cardiac program on a permanent basis.

Sincerely,

Loraine C. Shea
Executive Director,
Heart Center of Greater Waterbury

WATERBURY HOSPITAL Saint Mary's HOSPITAL UConn Health Center

Docket Number: 08-31202-CON

Waterbury Hospital and Saint Mary's Hospital (d/b/a Heart Center of Greater Waterbury) and John Dempsey Hospital

Additional Support letters may be viewed at the Office of Health Care Access.

RECEIVED
2008 AUG 18 P 1:16
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

HEART CENTER
of Greater Waterbury

August 2008

Dear Commissioner Vogel:

As a citizen of the Greater Waterbury community who cares deeply about access to quality healthcare, I strongly urge you to allow the Heart Center of Greater Waterbury to continue providing critical heart care services at both Waterbury Hospital and Saint Mary's Hospital.

In the last three years, the center has saved more than 2,400 hearts. In treating critical care patients, the center has consistently achieved clinical outcomes that meet or exceed national standards. The center's services, which include open heart surgery as well as elective and primary angioplasty, have provided the Waterbury community with an outstanding level of care that had previously been lacking.

Having these services located close to our homes, in a community with which we are most familiar and comfortable, has made it possible for the people of Greater Waterbury to receive quality, lifesaving care when they need it most.

In any and all future proceedings, however modified, with the Office of Health Care Access, please register my strong support for the continuation of these services on a permanent basis. Without this crucial cardiac program, people's lives will surely be lost, and I believe that ***every heart matters!***

Sincerely,

Signature Thomas Dolan

Please Print Name and Address

Thomas Dolan
159 Aetna St.
Naugatuck, CT 06770

My wife had open heart surgery (4 by-passes) on Nov 6, 08. Please keep this Heart Center in Waterbury.

Re: Docket numbers 08-30167—MD and 08-31202

WATERBURY HOSPITAL | Saint Mary's HOSPITAL | UConn Health Center

P.O. Box 2153, Waterbury, CT 06722

STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

Office of Health Care Access

February 5, 2010

Ms. Loraine C. Shea
Executive Director
Heart Center of Greater Waterbury
1075 Chase Parkway
Waterbury, CT 06708

RE: The scheduling of a bi-annual meeting pursuant to Docket Number 08-31202-CON
Heart Center of Greater Waterbury

Dear Ms. Shea:

Pursuant to Stipulation #7 of the Agreed Settlement under Docket Number 08-31202-CON, St. Mary's Hospital, The Waterbury Hospital and John Dempsey Hospital (the "Applicants") agreed to "*attend meetings with OHCA on a semi-annual basis for the purposes of discussion on quality monitoring, clinical team structure, and overall organization structure*". The first semi-annual meeting was held at OHCA on August 7, 2009 and on August 17, 2009, OHCA received the Applicants' year one utilization report as well as the ACC Executive Summaries for January 1, 2009 through March 31, 2009 and the STS Regional Comparisons for calendar year 2008.

On January 11, 2010, OHCA received your emailed request (see attached) for clarification as to whether a meeting will be scheduled and held for this semi-annual period. With this letter, I am notifying the Applicants that OHCA will not be scheduling a meeting regarding the CON authorized for this bi-annual period. Please contact OHCA in approximately six months regarding the scheduling of a meeting for the next bi-annual period. Please contact Karen Roberts, Principal Health Care Analyst at OHCA at 860-418-7041 if you have any questions regarding the above.

Sincerely,

Cristine A. Vogel
Deputy Commissioner

CAV:kr

Roberts, Karen

From: Loraine Shea (HCGW) [lshea@hcogw.org]
Sent: Monday, January 11, 2010 12:20 PM
To: Roberts, Karen
Subject: Bi- annual meeting with Commissioner Vogel
Follow Up Flag: Follow up
Flag Status: Red

Karen,

Hello and Happy New Year! I'm inquiring as to whether or not we will be meeting (I think in February) with the Commissioner as per our Agreed Settlement. Please let me know so that I can begin coordinating calendars on this side. Thanks.

Hope all is well.
Loraine Shea

Executive Director
Heart Center of Greater Waterbury
203-575-5571

We're Saving Hearts in Waterbury

lshea@hcogw.org

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	1217
RECIPIENT ADDRESS	912035755575
DESTINATION ID	
ST. TIME	02/05 16:51
TIME USE	00'26
PAGES SENT	3
RESULT	OK

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: Loraine Shea

FAX: 203-575-5575

AGENCY: Heart Center of Greater Waterbury

FROM: Karen Roberts

DATE: 2/5/2010 **TIME:**

NUMBER OF PAGES: 3
(including transmittal sheet

Comments:

Please see attached regarding CON Docket #08-31202-CON

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

RECEIVED

2010 AUG 11 P 12:00

CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Karen Roberts
Office of Health Care Access
410 Capitol Avenue MS# 13HCA
P.O. Box 340308
Hartford, CT 06134-0308

August 9, 2010

Re: **Docket Number: 08-31202 CON The Waterbury Hospital and Saint Mary's Hospital Corporation, d/b/a/ Heart Center of Greater Waterbury and University of Connecticut Health Center / John Dempsey Hospital**

Dear Karen:

Enclosed are the procedure and patient volume reports for Saint Mary's Hospital and Waterbury Hospital from July 18, 2009 through July 17, 2010.

The ACC Executive Summaries for both Saint Mary's Hospital and Waterbury Hospital are provided. The ACC Summaries represent data from July 1, 2009 through March 31, 2010. A new ACC database was instituted on July 1, 2009. Enclosed are the reports for three rolling quarters of data.

The STS Regional Outcome Comparisons are also provided for both hospitals. The STS comparison summaries represent the period from January through December 2009.

If you have any questions, please feel free to contact me at (203)-575-5572 or via email at mlamour@hcogw.org

Sincerely,

Marjorie Lamour

Marjorie Lamour
Quality Data Analyst
Heart Center of Greater Waterbury
Enclosure

Waterbury Hospital
PCI Case Volume
7/18/2009 -7/17/2010

The following Codes were used to determine PCI Volume:
00.40 00.45 00.66 36.06 36.07
In case of an attempted but failed PCI, no PCI code is provided.

Dates	PCI Volume
7/18/2009 -7/31/2009	16
08-2009	26
09-2009	29
10-2009	35
11-2009	28
12-2009	31
01-2010	37
02-2010	36
03-2010	42
04-2010	33
05-2010	32
06-2010	32
07/1/2010 -7/17/2010	8
Year 5 Total	**385**

Waterbury Hospital
PCI Patient Volume
7/18/2009 -7/17/2010

Dates	Patient Total
7/18/2009 -7/31/2009	14
08-2009	25
09-2009	26
10-2009	33
11-2009	25
12-2009	30
01-2010	35
02-2010	34
03-2010	39
04-2010	30
05-2010	30
06-2010	30
07/1/2010 -7/17/2010	8
Year 5 Total	**359**

Waterbury Hospital
OHS Case Volume
7/18/2009 -7/17/2010

The following Codes were used to determine Open Heart Surgery Volume:
35.10 35.11 35.12 35.13 35.14 35.20 35.21
35.22 35.23 35.24 35.25 35.26 35.27 35.28
35.33 35.61 35.81 35.95 36.10 36.11 36.12
36.13 36.14 36.15 36.16 36.17 36.19 37.33 39.52

Dates	OHS Count
7/18/2009 -7/31/2009	5
08-2009	10
09-2009	12
10-2009	10
11-2009	2
12-2009	8
01-2010	9
02-2010	5
03-2010	9
04-2010	13
05-2010	9
06-2010	10
07/1/2010 -7/17/2010	5
Year 5 Total	**107**

Waterbury Hospital
OHS Patient Volume
7/18/2009 -7/17/2010

Dates	Patient Total
7/18/2009 -7/31/2009	5
08-2009	10
09-2009	12
10-2009	10
11-2009	2
12-2009	8
01-2010	9
02-2010	5
03-2010	9
04-2010	13
05-2010	9
06-2010	10
07/1/2010 -7/17/2010	5
Year 5 Total	**107**

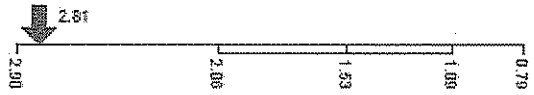
Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2010Q1

Section I: PCI Performance Measures

Endorsed by the National Quality Forum and appropriate for public reporting

PCI Performance Measures	Distribution of Data (10th percentile — Better → — 90th percentile)
1 **PCI in-hospital risk adjusted mortality (all patients)**	

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
2.81		1.46	0.79

Your hospital's PCI in-hospital risk adjusted mortality rate for all patients adjusted using the NCDR® risk adjustment model. [Detail Line:1979]

Note

In-hospital risk adjusted mortality for PCI is the only performance measure in the CathPCI Registry® that has been endorsed by the National Quality Forum. Such performance measures meeting the requirement for approval are intended not only for clinical quality improvement, but also may be considered for purposes of public reporting.

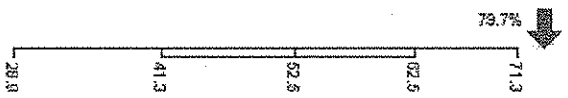
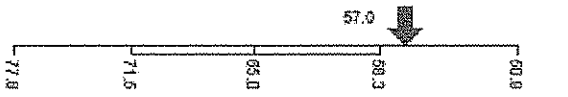
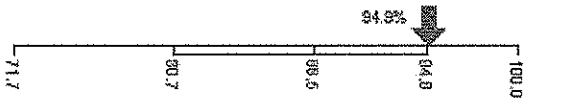
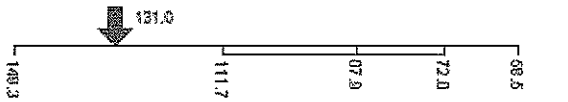
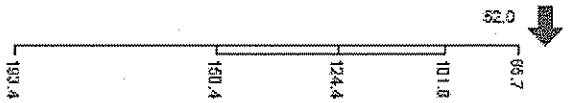
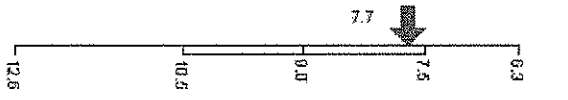
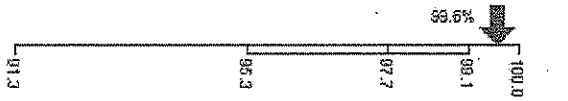
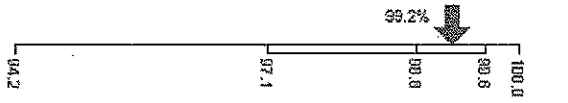
The "Registry Metrics" on the subsequent pages of this report are those measures that have been developed to support self assessment and quality improvement at the provider, hospital, and/or health care system level. While these metrics have not been formally developed by the American College of Cardiology/American Heart Association Task Force for Performance Measures Task Force, they may be identified as evolving measures worthy of consideration for further development into performance measures.

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2010Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

PCI Process Metrics		Distribution of Data
		10th percentile — Better → — 90th percentile
2	**Positive stress or imaging study prior to elective PCI** My Hospital: 79.7% | Vol Group R4Q: 52.0% | All Hosp: 52.3% | 90th Pctl: 71.3% Proportion of elective PCI procedures (excluding patients with ACS) with an antecedent stress or imaging study with a positive result (suggestive of ischemia) or with a fractional flow reserve assessed during the procedure. [Detail Line:1515]	
3	**Median time to immediate PCI for STEMI patients (in minutes)** My Hospital: 57.0 | Vol Group R4Q: 65.0 | All Hosp: 64.0 | 90th Pctl: 50.9 Your hospital's median time from hospital arrival to immediate PCI for STEMI patients in minutes. Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1504]	
4	**Proportion of STEMI patients receiving immediate PCI w/in 90"** My Hospital: 94.9% | Vol Group R4Q: 86.4% | All Hosp: 87.3% | 90th Pctl: 100.0% Proportion of STEMI patients with a time from your hospital arrival (or subsequent ECG if ST elevation first noted on subsequent ECG) to immediate PCI <=90". Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1505]	
5	**Median time from ED arrival at STEMI transferring facility to ED arrival at STEMI receiving facility among transferred patients.** My Hospital: 131.0 | Vol Group R4Q: 84.0 | All Hosp: 87.0 | 90th Pctl: 58.5 Your hospital's median time from arrival at transferring facility to ED arrival at STEMI receiving facility among transferred patients. [Detail Line:1507]	
6	**Median time from ED arrival at STEMI transferring facility to immediate PCI at STEMI receiving facility among transferred patients (in minutes)** My Hospital: 52.0 | Vol Group R4Q: 120.0 | All Hosp: 119.0 | 90th Pctl: 85.7 Your hospital's median time from arrival at referring facility to immediate PCI at STEMI receiving facility among transferred patients. Exclusions: Reasons for delay does not equal none. [Detail Line:1508]	
7	**Median fluoro time (in minutes)** My Hospital: 7.7 | Vol Group R4Q: 9.3 | All Hosp: 8.8 | 90th Pctl: 6.3 Inclusion criteria: PCI of one vessel/lesion. Exclusion criteria: Prior CABG, or "other" procedure during the same lab visit; PCI of >1 vessel/lesion. [Detail Line:1612]	
8	**Aspirin prescribed at discharge** My Hospital: 99.6% | Vol Group R4Q: 95.7% | All Hosp: 96.8% | 90th Pctl: 100.0% Proportion of patients (without a documented contraindication) with aspirin prescribed at discharge. [Detail Line:1941]	
9	**Thienopyridine prescribed at discharge (patients with stents)** My Hospital: 99.2% | Vol Group R4Q: 97.5% | All Hosp: 97.8% | 90th Pctl: 100.0% Proportion of patients (without a documented contraindication) with a stent implanted that had a thienopyridine prescribed at discharge. [Detail Line: 1950]	

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2010 11:59:59 PM
Publish Date: Jul 21, 2010

Executive Summary

CathPCI Registry®

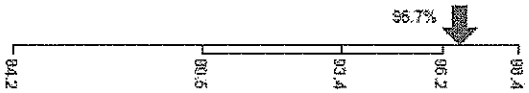
Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2010Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

10 **Lipid lowering agent prescribed at discharge (pts with dyslipidemia)**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
96.7%	92.0%	92.2%	98.4%

Proportion of patients (without a documented contraindication) prescribed a lipid lowering agent at discharge.
Inclusions: History of dyslipidemia [Detail Line:1948]

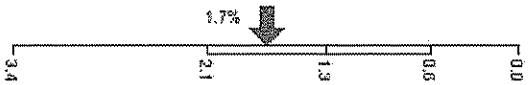


PCI Outcome Metrics — **Distribution of Data** (10th percentile … 90th percentile; Better →)

11 **Vascular access site injury requiring treatment or major bleeding***

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
1.7%	1.6%	1.4%	0.0%

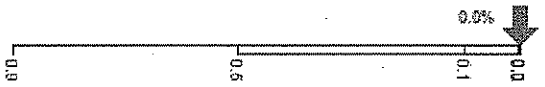
Your hospital's proportion of patients (excluding CABG or other surgery during same admission) with major access site related injury requiring treatment or major bleeding. [Detail Line:1818]



12 **Emergency CABG**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
0.0%	0.4%	0.3%	0.0%

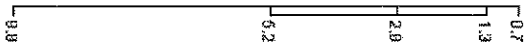
Your hospital's proportion of patients having emergency CABG (at your facility or transferred to another facility). [Detail Line:1923]



13 **Post procedure MI (among hospitals routinely collecting post-PCI biomarkers)****

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
	2.6%	3.4%	0.7%

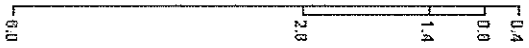
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with >= 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1781]



14 **Post procedure MI (among hospitals who do not routinely collect post-PCI biomarkers)****

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
	1.3%	1.4%	0.4%

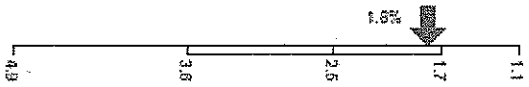
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with < 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1782]



15 **Acute kidney injury*****

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
1.8%	2.4%	2.7%	1.1%

Your hospital's proportion of patients who had a rise of serum creatinine of > 50% over the pre-procedure baseline (excluding patients on dialysis pre-procedure).
Inclusions: >= 90% of patients with a pre and post creatinine coded; LOS >=1 day. [Detail Line:1915]



16 **Post procedure stroke**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
0.3%	0.3%	0.2%	0.0%

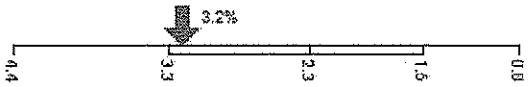
Your hospital's proportion of patients with stroke post procedure. [Detail Line:1788]



17 **Composite: Death, emergency CABG, stroke or repeat target vessel revascularization**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
3.2%	2.7%	2.3%	0.8%

Your hospital's proportion of patients with death, emergency CABG, stroke or repeat target vessel revascularization post procedure up to hospital discharge.
Exclusions: Staged PCI during same admission. [Detail Line:1779]



Executive Summary

CathPCI Registry®

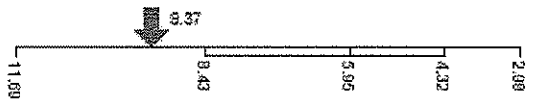
Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2010Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

18 **PCI in-hospital risk adjusted mortality (patients with STEMI)**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
9.37		5.60	2.98

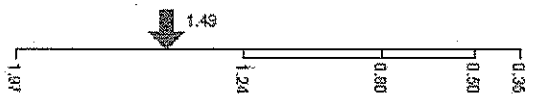
Your hospital's PCI in-hospital risk adjusted mortality rate for patients with STEMI adjusted using the NCDR® risk adjustment model. [Detail Line:1988]



19 **PCI in-hospital risk adjusted mortality (STEMI patients excluded)**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
1.49		0.69	0.35

Your hospital's PCI in-hospital risk adjusted mortality rate for patients with other diagnoses (not STEMI) using the NCDR® risk adjustment model. [Detail Line:1997]



Diagnostic Cath Process Metrics

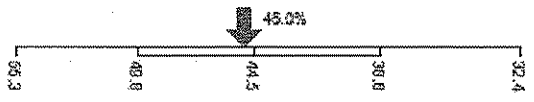
Distribution of Data

10th percentile — Better → — 90th percentile

20 **Incidence of non-obstructive CAD (elective patients only)**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
45.0%	45.3%	44.2%	32.4%

Patients with an elective diagnostic cath and coronary angiography with all native coronary territories <50%
Exclusions: Patients with prior CABG, cardiac transplant evaluation; pre-op evaluation for non-cardiac surgery and diagnostic cath treatment recommendation of "other cardiac therapy without CABG or PCI". [Detail Line:1254]



Diagnostic Cath Outcomes Metrics

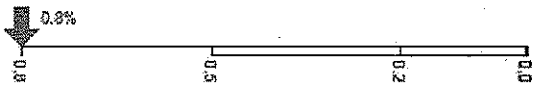
Distribution of Data

10th percentile — Better → — 90th percentile

21 **Vascular access site injury requiring treatment or major bleeding***

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
0.8%	0.3%	0.3%	0.0%

Your hospital's proportion of patients with major access site related injury requiring treatment or major bleeding. [Detail Line:1303]



Utilization Metrics

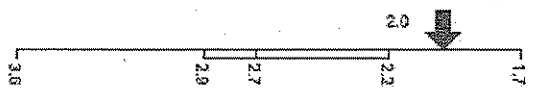
Distribution of Data

10th percentile — Better → — 90th percentile

22 **Median post-procedure length of stay (in days) for PCI patients with STEMI**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
2.0	3.0	3.0	1.7

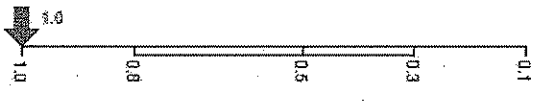
Your hospital's median post-procedure length of stay (in days) for PCI patients with STEMI. [Detail Line:2053]



23 **Median post-procedure length of stay (in days) for PCI patients with no STEMI**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
1.0	1.0	1.0	0.1

Your hospital's median post-procedure length of stay (in days) for PCI patients with no STEMI. [Detail Line:2092]



Data Quality Metrics

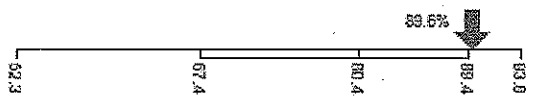
Distribution of Data

10th percentile — Better → — 90th percentile

24 **Creatinine assessed pre and post PCI procedure**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
89.6%	77.3%	75.3%	93.8%

Proportion of PCI patients with creatinine assessed pre and post procedure. Inclusions: LOS >=1 day. [Detail Line:1914]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2010 11:59:59 PM
Publish Date: Jul 21, 2010

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2010Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

Test Metrics		Distribution of Data
		10th percentile — 90th percentile; Better →
25	**Test Metric: Transfusion of whole blood or RBCs** My Hospital: 2.1% | Vol Group R4Q: 2.0% | All Hosp: 2.1% | 90th Pctl: 0.0% Proportion of patients who received a transfusion of whole blood or red blood cells after a PCI procedure. Exclusions: Patients having CABG or other major surgery during the same admission. [Detail Line:1820]	
26	**Test Data Quality Metric: Biomarkers assessed post-PCI for elective inpatients** My Hospital: 11.0% | Vol Group R4Q: 41.7% | All Hosp: 44.9% | 90th Pctl: 96.2% Proportion of elective procedures with biomarkers assessed post PCI. Inclusion criteria: LOS >= 1 day and hospital status is "not outpatient". [Detail Line:1912]	

Executive Summary Footnotes

*Vascular access site injury requiring treatment or major bleeding is defined as:

1.Bleeding at access site, hematoma at access site, or retroperitoneal bleed that occur within 72 hours of the procedure. To qualify, the event must be associated with a hemoglobin drop of >3 g/dL; transfusion of whole or packed red blood cells, or a procedural intervention/surgery at the bleeding site to reverse/stop or correct the bleeding. This excludes "GI", "GU" and "Other" bleeds.

2.Major access site related injury requiring treatment includes access site occlusion, peripheral embolization, dissection, pseudoaneurysm, AV fistula requiring treatment anytime from the procedure until discharge.

**Your rate of post procedure MI cannot be reported if you only collected cardiac biomarkers on <90% of your patients who were in the hospital >=1 day.

***Your rate of acute kidney injury cannot be reported if you only collected creatinine pre and post procedure on <90% of your patients who were in the hospital >=1 day.

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2010 11:59:59 PM
Publish Date: Jul 21, 2010

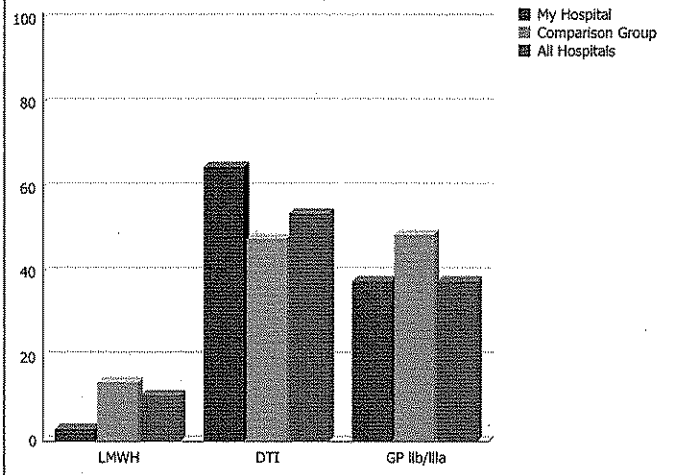
Executive Summary

CathPCI Registry®

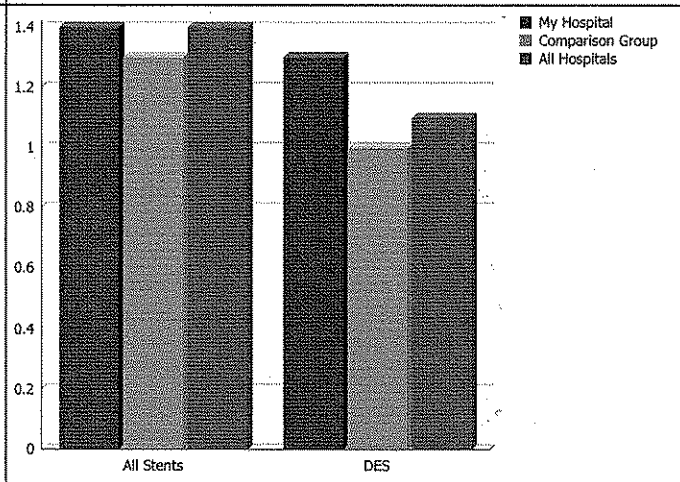
Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2010Q1

Section III: PCI Process Comparison Metrics

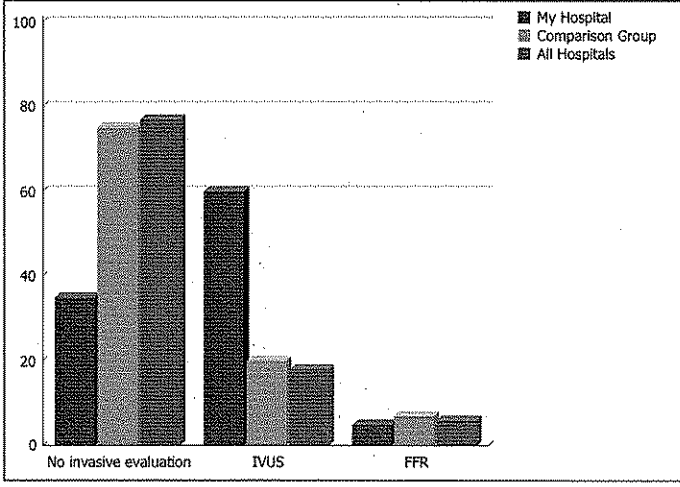
Anticoagulant Use: Low molecular weight heparin, direct thrombin inhibitors, GP IIb/IIIa inhibitor(pts with acute coronary syndrome).
[Detail Line:1579,1581,1586]



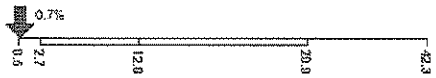
Stent Use: Average # of stents per PCI admission.
[Detail Line:1771,1772]



Intermediate stenosis lesions(40-70%): Further invasive evaluation performed (IVUS or FFR).
[Detail Line:1711,1712,1713]



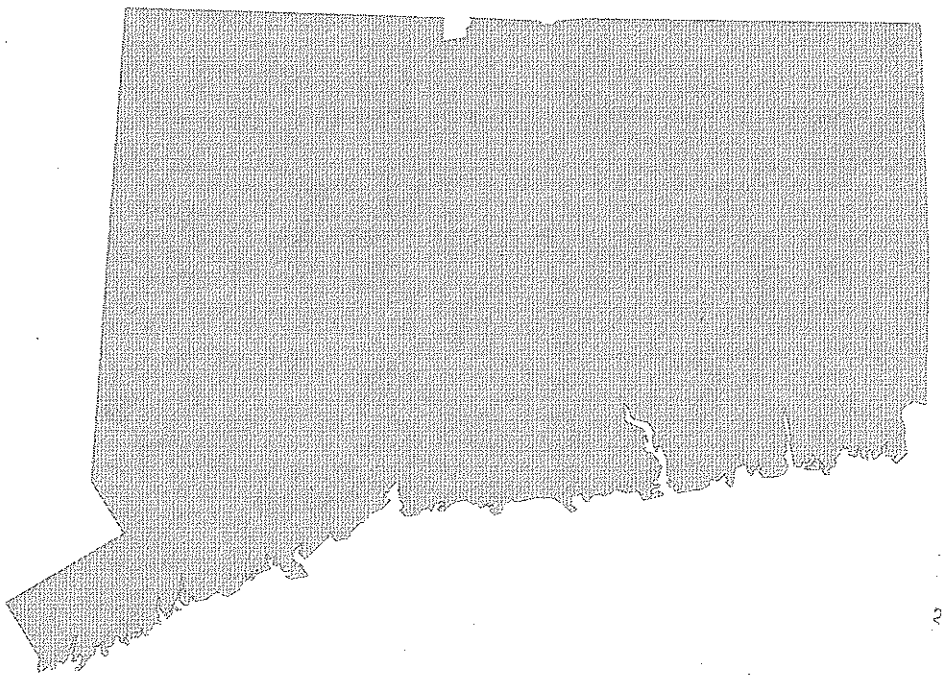
Outpatients: Proportion of PCI patient admissions whose hospital status was coded as "outpatient".
[Detail Line:1390]



Duke Clinical Research Institute

Regional Outcomes Comparison

Participant 30397
STS Period Ending 12/31/2009



The region displayed for your site contains the following state(s):
Connecticut

Between 2007 and 2009, there were 10 participants in this region

WATERBURY HOSPITAL



Regional Outcomes Comparison

Participant 30397
STS Period Ending 12/31/2009

Duke Clinical Research Institute

	Participant 2009	Region 2009
Isolated CAB		
Number of Cases	70	1,596
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	2.9%	1.8%
Risk-adjusted rate	2.4%	1.6%
Lower 95% confidence limit	0.4%	1.1%
Upper 95% confidence limit	7.5%	2.3%
Operative Mortality		
Observed Rate	2.9%	2.0%
Risk-adjusted rate	2.4%	1.9%
Lower 95% confidence limit	0.4%	1.3%
Upper 95% confidence limit	7.5%	2.6%
Complications Summary & Risk-Adjustment		
Major complications or operative mortality		
Observed Rate	18.6%	16.9%
Risk-adjusted rate	17.7%	17.0%
Lower 95% confidence limit	10.5%	15.3%
Upper 95% confidence limit	27.2%	18.8%
Any reoperation		
Observed Rate	7.1%	4.8%
Risk-adjusted rate	7.0%	4.7%
Lower 95% confidence limit	2.6%	3.8%
Upper 95% confidence limit	15.2%	5.9%
Deep sternal wound infection		
Observed Rate	**0.0%**	0.4%
Risk-adjusted rate	0.0%	0.4%
Lower 95% confidence limit	0.0%	0.2%
Upper 95% confidence limit	5.2%	0.9%
Permanent stroke		
Observed Rate	1.4%	1.2%
Risk-adjusted rate	1.2%	1.1%
Lower 95% confidence limit	0.1%	0.7%
Upper 95% confidence limit	6.5%	1.8%

	Participant 2009	Region 2009
Renal failure		
Observed Rate	2.9%	3.9%
Risk-adjusted rate	2.8%	4.1%
Lower 95% confidence limit	0.5%	3.2%
Upper 95% confidence limit	9.2%	5.2%
Prolonged ventilation		
Observed Rate	17.1%	11.8%
Risk-adjusted rate	16.8%	12.1%
Lower 95% confidence limit	9.6%	10.6%
Upper 95% confidence limit	26.3%	13.6%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	10.2	9.5
Median	9.0	7.0
Post-Procedure Length of Stay (days)		
Mean	6.6	7.2
Median	6.0	5.0
Length of Stay Risk-Adjustment		
Short stay: PLOS <6 days		
Observed Rate	40.0%	50.5%
Risk-adjusted rate	42.5%	50.4%
Lower 95% confidence limit	31.2%	48.1%
Upper 95% confidence limit	53.9%	52.6%
Long stay: PLOS >14 days		
Observed Rate	4.3%	6.0%
Risk-adjusted rate	4.0%	5.9%
Lower 95% confidence limit	1.1%	4.8%
Upper 95% confidence limit	10.7%	7.1%



Regional Outcomes Comparison

Participant 30397
STS Period Ending 12/31/2009

Duke Clinical Research Institute

	Participant 2009	Region 2009
Aortic Valve Replacement		
Number of Cases	7	349
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	0.0%	2.0%
Risk-adjusted rate	0.0%	1.8%
Lower 95% confidence limit	0.0%	0.8%
Upper 95% confidence limit	47.6%	3.4%
Operative Mortality		
Observed Rate	0.0%	2.3%
Risk-adjusted rate	0.0%	2.0%
Lower 95% confidence limit	0.0%	1.0%
Upper 95% confidence limit	47.6%	3.8%
Complications Summary		
Major complications or operative mortality	28.6%	16.3%
Any reoperation	0.0%	8.6%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	14.3%	0.6%
Renal failure	0.0%	5.0%
Prolonged ventilation	14.3%	10.3%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	8.7	9.4
Median	7.0	7.0
Post-Procedure Length of Stay (days)		
Mean	8.1	7.7
Median	7.0	6.0
PLOS <6 days	28.6%	41.5%
PLOS >14 days	0.0%	4.6%

	Participant 2009	Region 2009
Aortic Valve Replacement + CAB		
Number of Cases	7	302
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	0.0%	4.3%
Risk-adjusted rate	0.0%	3.9%
Lower 95% confidence limit	0.0%	2.2%
Upper 95% confidence limit	47.0%	6.4%
Operative Mortality		
Observed Rate	0.0%	4.3%
Risk-adjusted rate	0.0%	3.9%
Lower 95% confidence limit	0.0%	2.2%
Upper 95% confidence limit	47.0%	6.4%
Complications Summary		
Major complications or operative mortality	14.3%	28.1%
Any reoperation	0.0%	12.6%
Deep sternal wound infection	0.0%	0.7%
Permanent stroke	0.0%	1.3%
Renal failure	0.0%	7.1%
Prolonged ventilation	14.3%	21.2%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	7.9	11.5
Median	7.0	8.0
Post-Procedure Length of Stay (days)		
Mean	6.4	9.4
Median	6.0	7.0
PLOS <6 days	28.6%	25.8%
PLOS >14 days	0.0%	11.6%



Regional Outcomes Comparison

Participant 30397
STS Period Ending 12/31/2009

Duke Clinical Research Institute

	Participant 2009	Region 2009
Mitral Valve Replacement		
Number of Cases	3	52
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	33.3%	7.7%
Risk-adjusted rate	18.7%	7.9%
Lower 95% confidence limit	1.0%	2.6%
Upper 95% confidence limit	43.8%	17.6%
Operative Mortality		
Observed Rate	33.3%	7.7%
Risk-adjusted rate	18.7%	7.9%
Lower 95% confidence limit	1.0%	2.6%
Upper 95% confidence limit	43.8%	17.6%
Complications Summary		
Major complications or operative mortality	100.0%	30.8%
Any reoperation	33.3%	15.4%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	0.0%	1.9%
Renal failure	0.0%	6.0%
Prolonged ventilation	66.7%	21.2%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	16.0	15.2
Median	13.0	10.0
Post-Procedure Length of Stay (days)		
Mean	7.0	9.8
Median	9.0	8.0
PLOS <6 days	0.0%	25.0%
PLOS >14 days	0.0%	15.4%

	Participant 2009	Region 2009
Mitral Valve Replacement + CAB		
Number of Cases	1	44
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	0.0%	15.9%
Risk-adjusted rate	0.0%	10.4%
Lower 95% confidence limit	0.0%	4.8%
Upper 95% confidence limit	212.1%	18.3%
Operative Mortality		
Observed Rate	0.0%	15.9%
Risk-adjusted rate	0.0%	10.4%
Lower 95% confidence limit	0.0%	4.8%
Upper 95% confidence limit	212.1%	18.3%
Complications Summary		
Major complications or operative mortality	0.0%	65.9%
Any reoperation	0.0%	18.2%
Deep sternal wound infection	0.0%	2.3%
Permanent stroke	0.0%	4.5%
Renal failure	0.0%	17.5%
Prolonged ventilation	0.0%	56.8%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	17.0	22.8
Median	17.0	15.5
Post-Procedure Length of Stay (days)		
Mean	7.0	18.6
Median	7.0	10.5
PLOS <6 days	0.0%	4.5%
PLOS >14 days	0.0%	34.1%



Regional Outcomes Comparison

Participant 30397
STS Period Ending 12/31/2009

Duke Clinical Research Institute

	Participant 2009	Region 2009
Mitral Valve Repair		
Number of Cases	4	108
Mortality Summary & Risk-Adjustment		
In-hospital Mortality	0.0%	0.9%
Operative Mortality	0.0%	0.9%
Complications Summary		
Major complications or operative mortality	25.0%	10.2%
Any reoperation	0.0%	2.8%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	0.0%	0.9%
Renal failure	0.0%	0.9%
Prolonged ventilation	25.0%	9.3%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	7.5	6.7
Median	7.5	5.0
Post-Procedure Length of Stay (days)		
Mean	7.5	6.0
Median	7.5	5.0
PLOS <6 days	25.0%	64.8%
PLOS >14 days	0.0%	2.8%

	Participant 2009	Region 2009
Mitral Valve Repair + CAB		
Number of Cases	2	59
Mortality Summary & Risk-Adjustment		
In-hospital Mortality	0.0%	6.8%
Operative Mortality	0.0%	6.8%
Complications Summary		
Major complications or operative mortality	50.0%	54.2%
Any reoperation	50.0%	30.5%
Deep sternal wound infection	0.0%	1.7%
Permanent stroke	0.0%	3.4%
Renal failure	0.0%	12.7%
Prolonged ventilation	50.0%	44.1%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	18.0	20.9
Median	18.0	12.0
Post-Procedure Length of Stay (days)		
Mean	11.5	17.2
Median	11.5	9.0
PLOS <6 days	0.0%	16.9%
PLOS >14 days	0.0%	32.2%

Saint Mary's Hospital
PCI Case Volume
7/18/2009 - 7/17/2010

The following Codes were used to determine PCI Volume:
00.40 00.45 00.66 36.06 36.07
In case of an attempted but failed PCI, no PCI code is provided.

Dates	PCI Volume
7/18/2009 -7/31/2009	8
08-2009	29
09-2009	23
10-2009	18
11-2009	18
12-2009	24
01-2010	12
02-2010	28
03-2010	30
04-2010	38
05-2010	37
06-2010	25
07/1/2010 -7/17/2010	16
Year 5 Total	**306**

Saint Mary's Hospital
PCI Patient Volume
7/18/2009 - 7/17/2010

Dates	Patient Total
7/18/2009 -7/31/2009	8
08-2009	28
09-2009	22
10-2009	18
11-2009	18
12-2009	23
01-2010	10
02-2010	26
03-2010	30
04-2010	35
05-2010	35
06-2010	23
07/1/2010 -7/17/2010	16
Year 5 Total	**292**

Saint Mary's Hospital
OHS Case Volume
7/18/2009 - 7/17/2010

The following Codes were used to determine Open Heart Surgery Volume:

35.10 35.11 35.12 35.13 35.14 35.20 35.21
35.22 35.23 35.24 35.25 35.26 35.27 35.28
35.33 35.61 35.81 35.95 36.10 36.11 36.12
36.13 36.14 36.15 36.16 36.17 36.19 37.33 39.52

Dates	OHS Count
7/18/2009 -7/31/2009	10
08-2009	3
09-2009	11
10-2009	10
11-2009	10
12-2009	11
01-2010	5
02-2010	7
03-2010	11
04-2010	9
05-2010	7
06-2010	11
07/1/2010 -7/17/2010	4
Year 5 Total	**109**

Saint Mary's Hospital
OHS Patient Volume
7/18/2009 - 7/17/2010

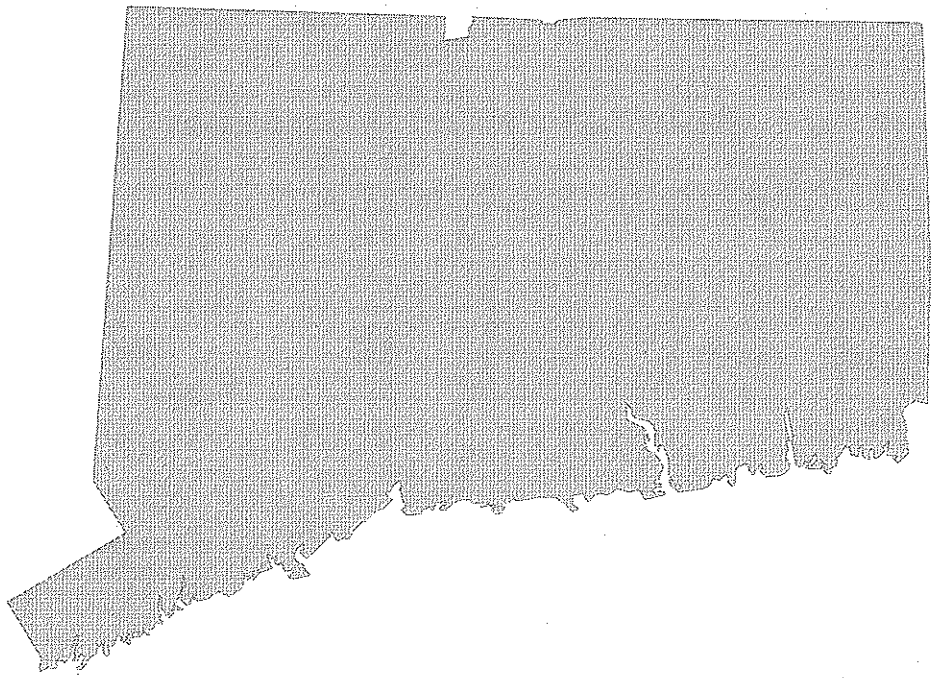
Dates	Patient Total
7/18/2009 -7/31/2009	10
08-2009	3
09-2009	11
10-2009	10
11-2009	10
12-2009	11
01-2010	5
02-2010	7
03-2010	11
04-2010	9
05-2010	7
06-2010	11
07/1/2010 -7/17/2010	4
Year 5 Total	**109**



Regional Outcomes Comparison

Participant 30398
STS Period Ending 12/31/2009

Duke Clinical Research Institute



The region displayed for your site contains the following state(s):
Connecticut

Between 2007 and 2009, there were 10 participants in this region

SAINT MARY'S HOSPITAL



Regional Outcomes Comparison

Participant 30398
STS Period Ending 12/31/2009

Duke Clinical Research Institute

	Participant 2009	Region 2009
Aortic Valve Replacement		
Number of Cases	11	349
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	0.0%	2.0%
Risk-adjusted rate	0.0%	1.8%
Lower 95% confidence limit	0.0%	0.8%
Upper 95% confidence limit	18.7%	3.4%
Operative Mortality		
Observed Rate	0.0%	2.3%
Risk-adjusted rate	0.0%	2.0%
Lower 95% confidence limit	0.0%	1.0%
Upper 95% confidence limit	18.7%	3.8%
Complications Summary		
Major complications or operative mortality	36.4%	16.3%
Any reoperation	0.0%	8.6%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	0.0%	0.6%
Renal failure	9.1%	5.0%
Prolonged ventilation	36.4%	10.3%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	8.4	9.4
Median	6.0	7.0
Post-Procedure Length of Stay (days)		
Mean	7.4	7.7
Median	6.0	6.0
PLOS <6 days	36.4%	41.5%
PLOS >14 days	0.0%	4.6%

	Participant 2009	Region 2009
Aortic Valve Replacement + CAB		
Number of Cases	10	302
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	0.0%	4.3%
Risk-adjusted rate	0.0%	3.9%
Lower 95% confidence limit	0.0%	2.2%
Upper 95% confidence limit	39.8%	6.4%
Operative Mortality		
Observed Rate	0.0%	4.3%
Risk-adjusted rate	0.0%	3.9%
Lower 95% confidence limit	0.0%	2.2%
Upper 95% confidence limit	39.8%	6.4%
Complications Summary		
Major complications or operative mortality	20.0%	28.1%
Any reoperation	20.0%	12.6%
Deep sternal wound infection	0.0%	0.7%
Permanent stroke	0.0%	1.3%
Renal failure	0.0%	7.1%
Prolonged ventilation	0.0%	21.2%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	7.3	11.5
Median	6.5	8.0
Post-Procedure Length of Stay (days)		
Mean	6.8	9.4
Median	6.5	7.0
PLOS <6 days	30.0%	25.8%
PLOS >14 days	0.0%	11.6%



Regional Outcomes Comparison

Participant 30398
STS Period Ending 12/31/2009

Duke Clinical Research Institute

	Participant 2009	Region 2009
Isolated CAB		
Number of Cases	70	1,596
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	1.4%	1.8%
Risk-adjusted rate	1.5%	1.6%
Lower 95% confidence limit	0.1%	1.1%
Upper 95% confidence limit	7.2%	2.3%
Operative Mortality		
Observed Rate	4.3%	2.0%
Risk-adjusted rate	4.4%	1.9%
Lower 95% confidence limit	1.1%	1.3%
Upper 95% confidence limit	11.3%	2.6%
Complications Summary & Risk-Adjustment		
Major complications or operative mortality		
Observed Rate	17.1%	16.9%
Risk-adjusted rate	18.6%	17.0%
Lower 95% confidence limit	10.6%	15.3%
Upper 95% confidence limit	29.2%	18.8%
Any reoperation		
Observed Rate	7.1%	4.8%
Risk-adjusted rate	7.4%	4.7%
Lower 95% confidence limit	2.8%	3.8%
Upper 95% confidence limit	16.0%	5.9%
Deep sternal wound infection		
Observed Rate	**0.0%**	0.4%
Risk-adjusted rate	0.0%	0.4%
Lower 95% confidence limit	0.0%	0.2%
Upper 95% confidence limit	5.8%	0.9%
Permanent stroke		
Observed Rate	1.4%	1.2%
Risk-adjusted rate	1.3%	1.1%
Lower 95% confidence limit	0.1%	0.7%
Upper 95% confidence limit	6.8%	1.8%

	Participant 2009	Region 2009
Renal failure		
Observed Rate	5.8%	3.9%
Risk-adjusted rate	7.0%	4.1%
Lower 95% confidence limit	2.3%	3.2%
Upper 95% confidence limit	16.2%	5.2%
Prolonged ventilation		
Observed Rate	4.3%	11.8%
Risk-adjusted rate	4.7%	12.1%
Lower 95% confidence limit	1.2%	10.6%
Upper 95% confidence limit	12.3%	13.6%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	9.5	9.5
Median	8.0	7.0
Post-Procedure Length of Stay (days)		
Mean	6.8	7.2
Median	6.0	5.0
Length of Stay Risk-Adjustment		
Short stay: PLOS <6 days		
Observed Rate	38.6%	50.5%
Risk-adjusted rate	38.3%	50.4%
Lower 95% confidence limit	27.8%	48.1%
Upper 95% confidence limit	49.0%	52.6%
Long stay: PLOS >14 days		
Observed Rate	2.9%	6.0%
Risk-adjusted rate	3.0%	5.9%
Lower 95% confidence limit	0.5%	4.8%
Upper 95% confidence limit	9.7%	7.1%



Regional Outcomes Comparison

Participant 30398
STS Period Ending 12/31/2009

Duke Clinical Research Institute

	Participant 2009	Region 2009
Mitral Valve Replacement		
Number of Cases	1	52
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	0.0%	7.7%
Risk-adjusted rate	0.0%	7.9%
Lower 95% confidence limit	0.0%	2.6%
Upper 95% confidence limit	201.5%	17.6%
Operative Mortality		
Observed Rate	0.0%	7.7%
Risk-adjusted rate	0.0%	7.9%
Lower 95% confidence limit	0.0%	2.6%
Upper 95% confidence limit	201.5%	17.6%
Complications Summary		
Major complications or operative mortality	100.0%	30.8%
Any reoperation	0.0%	15.4%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	0.0%	1.9%
Renal failure	0.0%	6.0%
Prolonged ventilation	100.0%	21.2%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	10.0	15.2
Median	10.0	10.0
Post-Procedure Length of Stay (days)		
Mean	10.0	9.8
Median	10.0	8.0
PLOS <6 days	0.0%	25.0%
PLOS >14 days	0.0%	15.4%

	Participant 2009	Region 2009
Mitral Valve Replacement + CAB		
Number of Cases	2	44
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	0.0%	15.9%
Risk-adjusted rate	0.0%	10.4%
Lower 95% confidence limit	0.0%	4.8%
Upper 95% confidence limit	28.2%	18.3%
Operative Mortality		
Observed Rate	0.0%	15.9%
Risk-adjusted rate	0.0%	10.4%
Lower 95% confidence limit	0.0%	4.8%
Upper 95% confidence limit	28.2%	18.3%
Complications Summary		
Major complications or operative mortality	50.0%	65.9%
Any reoperation	50.0%	18.2%
Deep sternal wound infection	0.0%	2.3%
Permanent stroke	0.0%	4.5%
Renal failure	0.0%	17.5%
Prolonged ventilation	0.0%	56.8%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	23.0	22.8
Median	23.0	15.5
Post-Procedure Length of Stay (days)		
Mean	10.0	18.6
Median	10.0	10.5
PLOS <6 days	0.0%	4.5%
PLOS >14 days	0.0%	34.1%



Regional Outcomes Comparison

Participant 30398
STS Period Ending 12/31/2009

Duke Clinical Research Institute

	Participant 2009	Region 2009
Mitral Valve Repair		
Number of Cases	4	108
Mortality Summary & Risk-Adjustment		
In-hospital Mortality	0.0%	0.9%
Operative Mortality	0.0%	0.9%
Complications Summary		
Major complications or operative mortality	0.0%	10.2%
Any reoperation	0.0%	2.8%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	0.0%	0.9%
Renal failure	0.0%	0.9%
Prolonged ventilation	0.0%	9.3%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	4.8	6.7
Median	4.5	5.0
Post-Procedure Length of Stay (days)		
Mean	4.8	6.0
Median	4.5	5.0
PLOS <6 days	75.0%	64.8%
PLOS >14 days	0.0%	2.8%

	Participant 2009	Region 2009
Mitral Valve Repair + CAB		
Number of Cases	1	59
Mortality Summary & Risk-Adjustment		
In-hospital Mortality	0.0%	6.8%
Operative Mortality	0.0%	6.8%
Complications Summary		
Major complications or operative mortality	100.0%	54.2%
Any reoperation	100.0%	30.5%
Deep sternal wound infection	0.0%	1.7%
Permanent stroke	0.0%	3.4%
Renal failure	0.0%	12.7%
Prolonged ventilation	100.0%	44.1%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	7.0	20.9
Median	7.0	12.0
Post-Procedure Length of Stay (days)		
Mean	7.0	17.2
Median	7.0	9.0
PLOS <6 days	0.0%	16.9%
PLOS >14 days	0.0%	32.2%

Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2010Q1

Section I: PCI Performance Measures

Endorsed by the National Quality Forum and appropriate for public reporting

PCI Performance Measures	Distribution of Data (10th percentile — Better → — 90th percentile)

1 **PCI in-hospital risk adjusted mortality (all patients)**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
0.65		1.46	0.79

Your hospital's PCI in-hospital risk adjusted mortality rate for all patients adjusted using the NCDR® risk adjustment model. [Detail Line:1979]



Note

In-hospital risk adjusted mortality for PCI is the only performance measure in the CathPCI Registry® that has been endorsed by the National Quality Forum. Such performance measures meeting the requirement for approval are intended not only for clinical quality improvement, but also may be considered for purposes of public reporting.

The "Registry Metrics" on the subsequent pages of this report are those measures that have been developed to support self assessment and quality improvement at the provider, hospital, and/or health care system level. While these metrics have not been formally developed by the American College of Cardiology/American Heart Association Task Force for Performance Measures Task Force, they may be identified as evolving measures worthy of consideration for further development into performance measures.

Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2010Q1

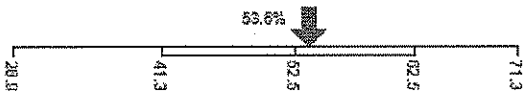
Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

PCI Process Metrics — **Distribution of Data** (10th percentile … 90th percentile; Better →)

2 **Positive stress or imaging study prior to elective PCI**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
53.6%	52.0%	52.3%	71.3%

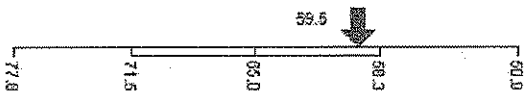
Proportion of elective PCI procedures (excluding patients with ACS) with an antecedent stress or imaging study with a positive result (suggestive of ischemia) or with a fractional flow reserve assessed during the procedure. [Detail Line:1515]



3 **Median time to immediate PCI for STEMI patients (in minutes)**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
59.5	65.0	64.0	50.9

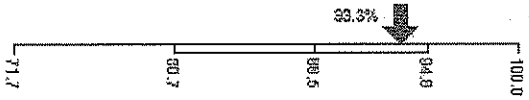
Your hospital's median time from hospital arrival to immediate PCI for STEMI patients in minutes. Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1504]



4 **Proportion of STEMI patients receiving immediate PCI w/in 90"**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
93.3%	86.4%	87.3%	100.0%

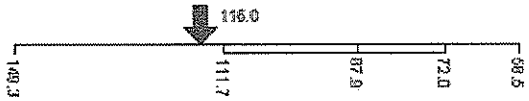
Proportion of STEMI patients with a time from your hospital arrival (or subsequent ECG if ST elevation first noted on subsequent ECG) to immediate PCI <=90". Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1505]



5 **Median time from ED arrival at STEMI transferring facility to ED arrival at STEMI receiving facility among transferred patients.**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
116.0	84.0	87.0	58.5

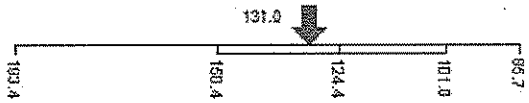
Your hospital's median time from arrival at transferring facility to ED arrival at STEMI receiving facility among transferred patients. [Detail Line:1507]



6 **Median time from ED arrival at STEMI transferring facility to immediate PCI at STEMI receiving facility among transferred patients (in minutes)**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
131.0	120.0	119.0	85.7

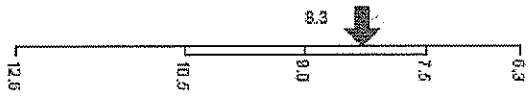
Your hospital's median time from arrival at referring facility to immediate PCI at STEMI receiving facility among transferred patients. Exclusions: Reasons for delay does not equal none. [Detail Line:1508]



7 **Median fluoro time (in minutes)**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
8.3	9.3	8.8	6.3

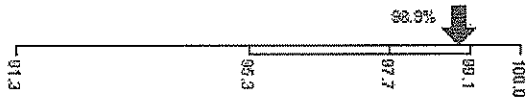
Inclusion criteria: PCI of one vessel/lesion. Exclusion criteria: Prior CABG, or "other" procedure during the same lab visit; PCI of >1 vessel/lesion. [Detail Line:1612]



8 **Aspirin prescribed at discharge**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
98.9%	95.7%	96.8%	100.0%

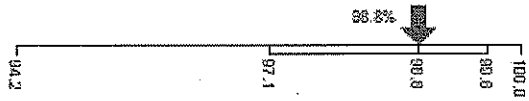
Proportion of patients (without a documented contraindication) with aspirin prescribed at discharge. [Detail Line:1941]



9 **Thienopyridine prescribed at discharge (patients with stents)**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
98.8%	97.5%	97.8%	100.0%

Proportion of patients (without a documented contraindication) with a stent implanted that had a thienopyridine prescribed at discharge. [Detail Line: 1950]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2010 11:59:59 PM
Publish Date: Jul 21, 2010

Executive Summary

CathPCI Registry®

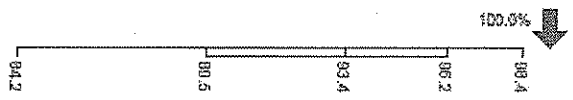
Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2010Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

10 **Lipid lowering agent prescribed at discharge (pts with dyslipidemia)**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
100.0%	92.0%	92.2%	98.4%

Proportion of patients (without a documented contraindication) prescribed a lipid lowering agent at discharge.
Inclusions: History of dyslipidemia [Detail Line:1948]



PCI Outcome Metrics

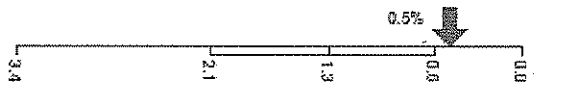
Distribution of Data

10th percentile — Better → — 90th percentile

11 **Vascular access site injury requiring treatment or major bleeding***

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
0.5%	1.6%	1.4%	0.0%

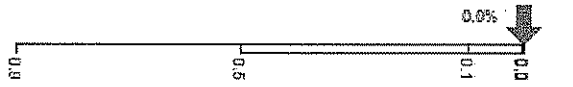
Your hospital's proportion of patients (excluding CABG or other surgery during same admission) with major access site related injury requiring treatment or major bleeding. [Detail Line:1818]



12 **Emergency CABG**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
0.0%	0.4%	0.3%	0.0%

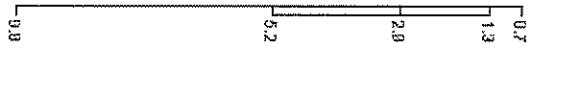
Your hospital's proportion of patients having emergency CABG (at your facility or transferred to another facility). [Detail Line:1923]



13 **Post procedure MI (among hospitals routinely collecting post-PCI biomarkers)****

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
	2.6%	3.4%	0.7%

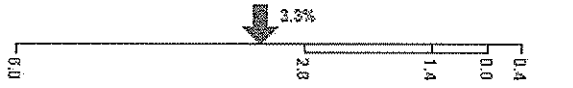
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with >= 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1781]



14 **Post procedure MI (among hospitals who do not routinely collect post-PCI biomarkers)****

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
3.3%	1.3%	1.4%	0.4%

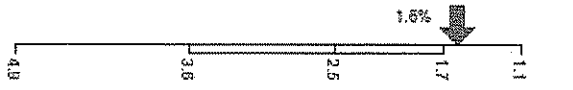
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with < 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1782]



15 **Acute kidney injury*****

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
1.6%	2.4%	2.7%	1.1%

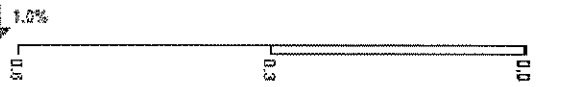
Your hospital's proportion of patients who had a rise of serum creatinine of > 50% over the pre-procedure baseline (excluding patients on dialysis pre-procedure).
Inclusions: >= 90% of patients with a pre and post creatinine coded; LOS >=1 day. [Detail Line:1915]



16 **Post procedure stroke**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
1.0%	0.3%	0.2%	0.0%

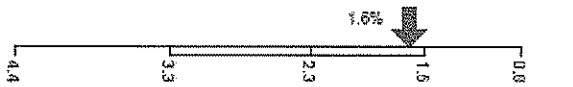
Your hospital's proportion of patients with stroke post procedure. [Detail Line:1788]



17 **Composite: Death, emergency CABG, stroke or repeat target vessel revascularization**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
1.6%	2.7%	2.3%	0.8%

Your hospital's proportion of patients with death, emergency CABG, stroke or repeat target vessel revascularization post procedure up to hospital discharge.
Exclusions: Staged PCI during same admission. [Detail Line:1779]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2010 11:59:59 PM
Publish Date: Jul 21, 2010

Executive Summary

CathPCI Registry®

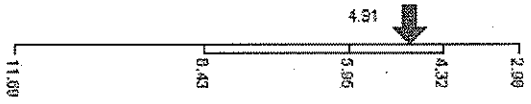
Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2010Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

18 **PCI in-hospital risk adjusted mortality (patients with STEMI)**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
4.91		5.60	2.98

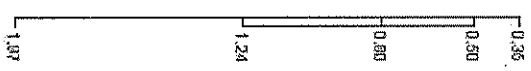
Your hospital's PCI in-hospital risk adjusted mortality rate for patients with STEMI adjusted using the NCDR® risk adjustment model. [Detail Line:1988]



19 **PCI in-hospital risk adjusted mortality (STEMI patients excluded)**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
		0.69	0.35

Your hospital's PCI in-hospital risk adjusted mortality rate for patients with other diagnoses (not STEMI) using the NCDR® risk adjustment model. [Detail Line:1997]



Diagnostic Cath Process Metrics

Distribution of Data

10th percentile — 90th percentile

Better →

20 **Incidence of non-obstructive CAD (elective patients only)**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
46.1%	45.3%	44.2%	32.4%

Patients with an elective diagnostic cath and coronary angiography with all native coronary territories <50%
Exclusions: Patients with prior CABG, cardiac transplant evaluation; pre-op evaluation for non-cardiac surgery and diagnostic cath treatment recommendation of "other cardiac therapy without CABG or PCI". [Detail Line:1254]



Diagnostic Cath Outcomes Metrics

Distribution of Data

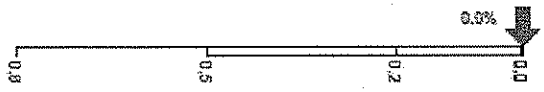
10th percentile — 90th percentile

Better →

21 **Vascular access site injury requiring treatment or major bleeding***

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
0.0%	0.3%	0.3%	0.0%

Your hospital's proportion of patients with major access site related injury requiring treatment or major bleeding. [Detail Line:1303]



Utilization Metrics

Distribution of Data

10th percentile — 90th percentile

Better →

22 **Median post-procedure length of stay (in days) for PCI patients with STEMI**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
3.0	3.0	3.0	1.7

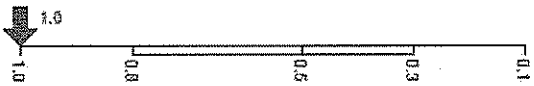
Your hospital's median post-procedure length of stay (in days) for PCI patients with STEMI. [Detail Line:2053]



23 **Median post-procedure length of stay (in days) for PCI patients with no STEMI**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
1.0	1.0	1.0	0.1

Your hospital's median post-procedure length of stay (in days) for PCI patients with no STEMI. [Detail Line:2092]



Data Quality Metrics

Distribution of Data

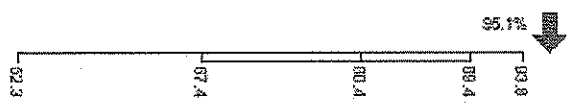
10th percentile — 90th percentile

Better →

24 **Creatinine assessed pre and post PCI procedure**

My Hospital	Vol Group R4Q	All Hosp	90th Pctl
95.1%	77.3%	75.3%	93.8%

Proportion of PCI patients with creatinine assessed pre and post procedure. Inclusions: LOS >=1 day. [Detail Line:1914]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

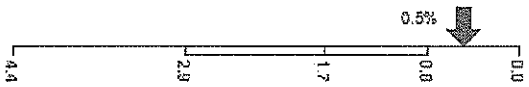
Aggregation Date: Jun 30, 2010 11:59:59 PM
Publish Date: Jul 21, 2010

Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2010Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

Test Metrics		Distribution of Data
		10th percentile — 90th percentile; Better →
25	**Test Metric: Transfusion of whole blood or RBCs** My Hospital: 0.5% | Vol Group R4Q: 2.0% | All Hosp: 2.1% | 90th Pctl: 0.0% Proportion of patients who received a transfusion of whole blood or red blood cells after a PCI procedure. Exclusions: Patients having CABG or other major surgery during the same admission. [Detail Line:1820]	
26	**Test Data Quality Metric: Biomarkers assessed post-PCI for elective inpatients** My Hospital: 10.0% | Vol Group R4Q: 41.7% | All Hosp: 44.9% | 90th Pctl: 96.2% Proportion of elective procedures with biomarkers assessed post PCI. Inclusion criteria: LOS >= 1 day and hospital status is "not outpatient". [Detail Line:1912]	

Executive Summary Footnotes

*Vascular access site injury requiring treatment or major bleeding is defined as:

1.Bleeding at access site, hematoma at access site, or retroperitoneal bleed that occur within 72 hours of the procedure. To qualify, the event must be associated with a hemoglobin drop of >3 g/dL; transfusion of whole or packed red blood cells, or a procedural intervention/surgery at the bleeding site to reverse/stop or correct the bleeding. This excludes "GI", "GU" and "Other" bleeds.

2.Major access site related injury requiring treatment includes access site occlusion, peripheral embolization, dissection, pseudoaneurysm, AV fistula requiring treatment anytime from the procedure until discharge.

**Your rate of post procedure MI cannot be reported if you only collected cardiac biomarkers on <90% of your patients who were in the hospital >=1 day.

***Your rate of acute kidney injury cannot be reported if you only collected creatinine pre and post procedure on <90% of your patients who were in the hospital >=1 day.

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2010 11:59:59 PM
Publish Date: Jul 21, 2010

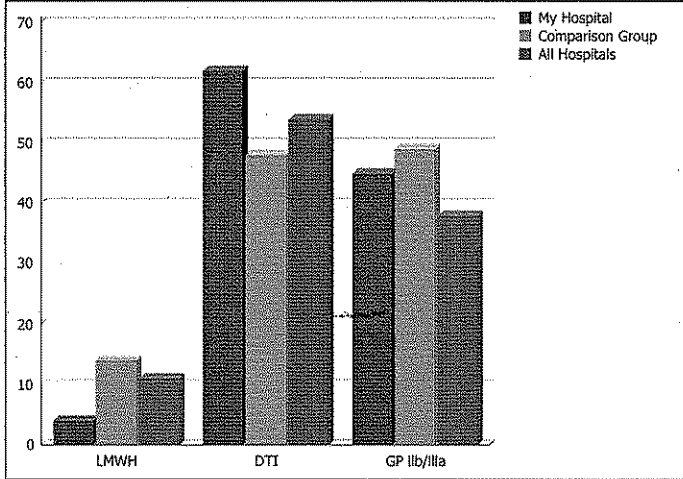
Executive Summary

CathPCI Registry®

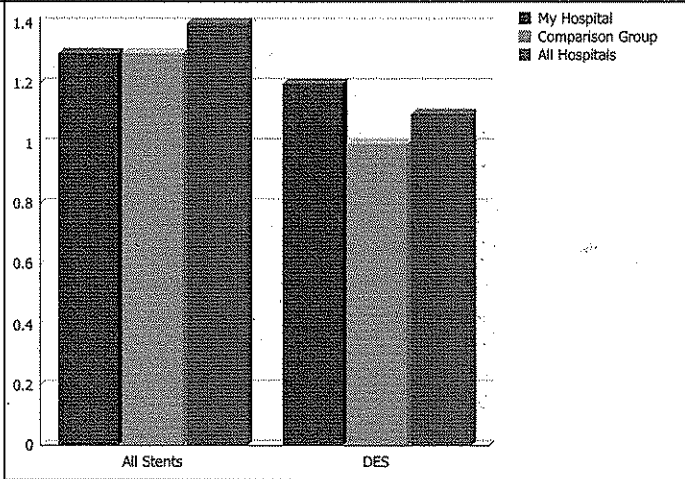
Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2010Q1

Section III: PCI Process Comparison Metrics

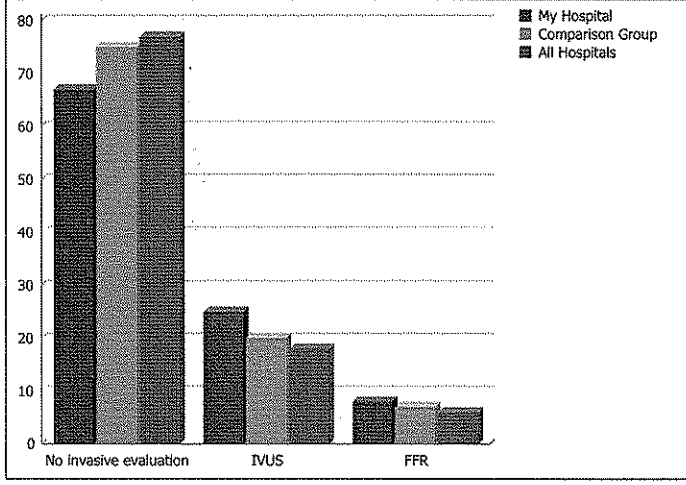
Anticoagulant Use: Low molecular weight heparin, direct thrombin inhibitors, GP IIb/IIIa inhibitor(pts with acute coronary syndrome).
[Detail Line:1579,1581,1586]



Stent Use: Average # of stents per PCI admission.
[Detail Line:1771,1772]



Intermediate stenosis lesions(40-70%): Further invasive evaluation performed (IVUS or FFR).
[Detail Line:1711,1712,1713]



Outpatients: Proportion of PCI patient admissions whose hospital status was coded as "outpatient".
[Detail Line:1390]



HEART CENTER
of Greater Waterbury

RECEIVED
2009 AUG 17 A 11:39
CONNECTICUT OFFICE OF
HEALTH CARE ACCESS

Karen Roberts
Office of Health Care Access
410 Capitol Avenue MS# 13HCA
P.O. Box 340308
Hartford, CT 06134-0308

August 17, 2009

Re: **Docket Number: 08-31202 CON The Waterbury Hospital and Saint Mary's Hospital Corporation, d/b/a/ Heart Center of Greater Waterbury and University of Connecticut Health Center / John Dempsey Hospital**

Dear Karen:

Enclosed are the procedure and patient volume reports for Saint Mary's Hospital and Waterbury Hospital from July 18, 2008 through July 17, 2009.

The ACC Executive Summaries for both Saint Mary's Hospital and Waterbury Hospital are provided. The ACC Summaries represent data from Jan 1, 2008 through March 31, 2009.

The STS Regional Outcome Comparisons are also provided for both hospitals. The STS comparison summaries represent the period from January 2008 – December 2008.

If you have any questions, please feel free to contact me at (203)-575-5572 or via email at mlamour@hcogw.org

Sincerely,

Marjorie Lamour

Marjorie Lamour
Quality Data Analyst
Heart Center of Greater Waterbury
Enclosure

Waterbury Hospital
PCI Case Volume
7/18/2008 - 7/17/2009

The following Codes were used to determine PCI Volume:
00.40 00.45 00.66 36.06 36.07
In case of an attempted but failed PCI, no PCI code is provided.

Dates	PCI Volume
7/18/2008 -7/31/2008	9
08-2008	30
09-2008	33
10-2008	39
11-2008	22
12-2008	35
01-2009	42
02-2009	39
03-2009	29
04-2009	39
05-2009	31
06-2009	30
07/1/2008 -7/17/2009	17
Year 4 Total	**395**

Waterbury Hospital
PCI Patient Volume
7/18/2008 - 6/30/2009

Dates	Patient Total
7/18/2008 -7/31/2008	8
08-2008	29
09-2008	31
10-2008	36
11-2008	22
12-2008	33
01-2009	39
02-2009	39
03-2009	27
04-2009	36
05-2009	30
06-2009	29
07/1/2008 -7/17/2009	17
Year 4 Total	**376**

Waterbury Hospital
OHS Case Volume
7/18/2008 -7/17/2009

The following Codes were used to determine Open Heart Surgery Volume:

35.10 35.11 35.12 35.13 35.14 35.20 35.21
35.22 35.23 35.24 35.25 35.26 35.27 35.28
35.33 35.61 35.81 35.95 36.10 36.11 36.12
36.13 36.14 36.15 36.16 36.17 36.19 37.33 39.52

Dates	OHS Count
7/18/2008 -7/31/2008	3
08-2008	9
09-2008	17
10-2008	6
11-2008	9
12-2008	13
01-2009	14
02-2009	16
03-2009	4
04-2009	10
05-2009	6
06-2009	7
07/1/2008 -7/17/2009	5
Year 4 Total	**119**

Waterbury Hospital
OHS Patient Volume
7/18/2008 -7/17/2009

Dates	Patient Total
7/18/2008 -7/31/2008	3
08-2008	9
09-2008	17
10-2008	6
11-2008	9
12-2008	13
01-2009	14
02-2009	16
03-2009	4
04-2009	10
05-2009	6
06-2009	7
07/1/2008 -7/17/2009	5
Year 4 Total	**119**

RECEIVED
2010 AUG 11 P 12:00
CONNECTICUT SITING COUNCIL
HEALTH CARE ACCESS

Karen Roberts
Office of Health Care Access
410 Capitol Avenue MS# 13HCA
P.O. Box 340308
Hartford, CT 06134-0308

August 9, 2010

Re: **Docket Number: 08-31202 CON The Waterbury Hospital and Saint Mary's Hospital Corporation, d/b/a/ Heart Center of Greater Waterbury and University of Connecticut Health Center / John Dempsey Hospital**

Dear Karen:

Enclosed are the procedure and patient volume reports for Saint Mary's Hospital and Waterbury Hospital from July 18, 2009 through July 17, 2010.

The ACC Executive Summaries for both Saint Mary's Hospital and Waterbury Hospital are provided. The ACC Summaries represent data from July 1, 2009 through March 31, 2010. A new ACC database was instituted on July 1, 2009. Enclosed are the reports for three rolling quarters of data.

The STS Regional Outcome Comparisons are also provided for both hospitals. The STS comparison summaries represent the period from January through December 2009.

If you have any questions, please feel free to contact me at (203)-575-5572 or via email at mlamour@hcogw.org

Sincerely,

Marjorie Lamour

Marjorie Lamour
Quality Data Analyst
Heart Center of Greater Waterbury
Enclosure

Waterbury Hospital
PCI Case Volume
7/18/2009 -7/17/2010

The following Codes were used to determine PCI Volume:
00.40 00.45 00.66 36.06 36.07
In case of an attempted but failed PCI, no PCI code is provided.

Dates	PCI Volume
7/18/2009 -7/31/2009	16
08-2009	26
09-2009	29
10-2009	35
11-2009	28
12-2009	31
01-2010	37
02-2010	36
03-2010	42
04-2010	33
05-2010	32
06-2010	32
07/1/2010 -7/17/2010	8
Year 5 Total	**385**

Waterbury Hospital
PCI Patient Volume
7/18/2009 -7/17/2010

Dates	Patient Total
7/18/2009 -7/31/2009	14
08-2009	25
09-2009	26
10-2009	33
11-2009	25
12-2009	30
01-2010	35
02-2010	34
03-2010	39
04-2010	30
05-2010	30
06-2010	30
07/1/2010 -7/17/2010	8
Year 5 Total	**359**

Waterbury Hospital
OHS Case Volume
7/18/2009 -7/17/2010

The following Codes were used to determine Open Heart Surgery Volume:
35.10 35.11 35.12 35.13 35.14 35.20 35.21
35.22 35.23 35.24 35.25 35.26 35.27 35.28
35.33 35.61 35.81 35.95 36.10 36.11 36.12
36.13 36.14 36.15 36.16 36.17 36.19 37.33 39.52

Dates	OHS Count
7/18/2009 -7/31/2009	5
08-2009	10
09-2009	12
10-2009	10
11-2009	2
12-2009	8
01-2010	9
02-2010	5
03-2010	9
04-2010	13
05-2010	9
06-2010	10
07/1/2010 -7/17/2010	5
Year 5 Total	**107**

Waterbury Hospital
OHS Patient Volume
7/18/2009 -7/17/2010

Dates	Patient Total
7/18/2009 -7/31/2009	5
08-2009	10
09-2009	12
10-2009	10
11-2009	2
12-2009	8
01-2010	9
02-2010	5
03-2010	9
04-2010	13
05-2010	9
06-2010	10
07/1/2010 -7/17/2010	5
Year 5 Total	**107**

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	2515
RECIPIENT ADDRESS	912035755575
DESTINATION ID	
ST. TIME	08/01 15:18
TIME USE	01'11
PAGES SENT	7
RESULT	OK

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: Marjorie Lamour

FAX: 203-575-5575

AGENCY: Heart Center of Greater Waterbury

FROM: Karen Roberts

DATE: 8/1/2011 **TIME:**

NUMBER OF PAGES: 7
(including transmittal sheet

Comments:
As we discussed, previous utilization reports only list Waterbury in error. Please correct and resubmit.

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS. Karen

STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

Office of Health Care Access

August 8, 2011

Kevin Kniery
Executive Director
Heart Center of Greater Waterbury
1075 Chase Parkway
Waterbury, CT 06708

RE: The scheduling of a semi-annual meeting pursuant to Docket Number 08-31202-CON
Heart Center of Greater Waterbury

Dear Mr. Kniery:

Pursuant to Stipulation #7 of the Agreed Settlement under Docket Number 08-31202-CON, St. Mary's Hospital, The Waterbury Hospital and John Dempsey Hospital (the "Applicants") agreed to "*attend meetings with OHCA on a semi-annual basis for the purposes of discussion on quality monitoring, clinical team structure, and overall organization structure.*"

On July 27, 2011, OHCA received your phone request for clarification as to whether a meeting will be scheduled and held for this semi-annual period. With this letter, I am notifying the Applicants (St. Mary's Hospital, The Waterbury Hospital and John Dempsey Hospital) that OHCA will not be scheduling a meeting regarding the CON authorization for this semi-annual period. Please contact Karen Roberts, Principal Health Care Analyst at 860-418-7041 or Paolo Fiducia, Associate Health Care Analyst at 860-418-7035, if you have any questions regarding the above.

Sincerely,

Kimberly A. Martone
Director of Operations

KAM:pf

HEART
CENTER
of Greater Waterbury

Karen Roberts
Office of Health Care Access
410 Capitol Avenue MS# 13HCA
P.O. Box 340308
Hartford, CT 06134-0308

August 17, 2011

Re: **Docket Number: 08-31202 CON The Waterbury Hospital and Saint Mary's Hospital Corporation, d/b/a/ Heart Center of Greater Waterbury and University of Connecticut Health Center / John Dempsey Hospital**

Dear Karen:

Enclosed are the procedure and patient volume reports for Saint Mary's Hospital and Waterbury Hospital from July 18, 2010 through July 17, 2011.

The ACC Executive Summaries from April 1, 2010 through March 31, 2011 for both Saint Mary's Hospital and Waterbury Hospital are provided.

The STS Executive Summaries are also provided for both hospitals and represent the period from January 1, 2011 through March 31, 2011

If you have any questions, please feel free to contact me at (203)-575-5560 or via email at kkniery@hcogw.org

Sincerely,

Kevin Kniery
Executive Director
Heart Center of Greater Waterbury
Enclosure

WATERBURY HOSPITAL Saint Mary's HOSPITAL UConn Health Center

Marjorie Lamour (HCGW)

From: Roberts, Karen [Karen.Roberts@ct.gov]
Sent: Wednesday, August 17, 2011 1:20 PM
To: Marjorie Lamour (HCGW)
Subject: annual filings to OHCA on heart center

Hi Marjorie:

Based on the phone message you'd left for me, I've rechecked the original file on Docket Number 08-31202-CON (Health Center of Greater Waterbury) and find that my fax to you on August 1, 2011 is in error. The St. Mary's information is found within the filings for both years filed and is not missing. I apologize for this oversight. Let me know if you have any further questions.

Sincerely,

Karen Roberts
Principal Health Care Analyst
Department of Public Health
Division of Office of Health Care Access
Phone: 860-418-7041
Email: karen.roberts@ct.gov

HEART CENTER of Greater Waterbury

RECEIVED
2009 AUG 17 A 11:39
CONNECTICUT OFFICE OF HEALTH CARE ACCESS

Karen Roberts
Office of Health Care Access
410 Capitol Avenue MS# 13HCA
P.O. Box 340308
Hartford, CT 06134-0308

August 17, 2009

Re: **Docket Number: 08-31202 CON The Waterbury Hospital and Saint Mary's Hospital Corporation, d/b/a/ Heart Center of Greater Waterbury and University of Connecticut Health Center / John Dempsey Hospital**

Dear Karen:

Enclosed are the procedure and patient volume reports for Saint Mary's Hospital and Waterbury Hospital from July 18, 2008 through July 17, 2009.

The ACC Executive Summaries for both Saint Mary's Hospital and Waterbury Hospital are provided. The ACC Summaries represent data from Jan 1, 2008 through March 31, 2009.

The STS Regional Outcome Comparisons are also provided for both hospitals. The STS comparison summaries represent the period from January 2008 – December 2008.

If you have any questions, please feel free to contact me at (203)-575-5572 or via email at mlamour@hcogw.org

Sincerely,

Marjorie Lamour

Marjorie Lamour
Quality Data Analyst
Heart Center of Greater Waterbury
Enclosure

WATERBURY HOSPITAL
Saint Mary's HOSPITAL
UConn Health Center

RECEIVED
2010 AUG 11 P 12:00
CONNECTICUT HEALTH CARE ACCESS

Karen Roberts
Office of Health Care Access
410 Capitol Avenue MS# 13HCA
P.O. Box 340308
Hartford, CT 06134-0308

August 9, 2010

Re: **Docket Number: 08-31202 CON The Waterbury Hospital and Saint Mary's Hospital Corporation, d/b/a/ Heart Center of Greater Waterbury and University of Connecticut Health Center / John Dempsey Hospital**

Dear Karen:

Enclosed are the procedure and patient volume reports for Saint Mary's Hospital and Waterbury Hospital from July 18, 2009 through July 17, 2010.

The ACC Executive Summaries for both Saint Mary's Hospital and Waterbury Hospital are provided. The ACC Summaries represent data from July 1, 2009 through March 31, 2010. A new ACC database was instituted on July 1, 2009. Enclosed are the reports for three rolling quarters of data.

The STS Regional Outcome Comparisons are also provided for both hospitals. The STS comparison summaries represent the period from January through December 2009.

If you have any questions, please feel free to contact me at (203)-575-5572 or via email at mlamour@hcogw.org

Sincerely,

Marjorie Lamour

Marjorie Lamour
Quality Data Analyst
Heart Center of Greater Waterbury
Enclosure

Received Time Aug. 1 2011 3:15PM No. 4009

08/01/2011 15:19 FAX

Waterbury Hospital
PCI Case Volume
7/18/2008 - 7/17/2009

The following Codes were used to determine PCI Volume:
00.40 00.45 00.66 36.06 36.07
In case of an attempted but failed PCI, no PCI code is provided.

Dates	PCI Volume
7/18/2008 -7/31/2008	9
08-2008	30
09-2008	33
10-2008	39
11-2008	22
12-2008	35
01-2009	42
02-2009	39
03-2009	29
04-2009	39
05-2009	31
06-2009	30
07/1/2008 -7/17/2009	17
Year 4 Total	**395**

Waterbury Hospital
PCI Patient Volume
7/18/2008 - 6/30/2009

Dates	Patient Total
7/18/2008 -7/31/2008	8
08-2008	29
09-2008	31
10-2008	36
11-2008	22
12-2008	33
01-2009	39
02-2009	39
03-2009	27
04-2009	36
05-2009	30
06-2009	29
07/1/2008 -7/17/2009	17
Year 4 Total	**376**

003/007

Received Time Aug. 1. 2011 3:15PM No. 4009

08/01/2011 15:19 FAX

Waterbury Hospital
OHS Case Volume
7/18/2008 -7/17/2009

The following Codes were used to determine Open Heart Surgery Volume:
35.10 35.11 35.12 35.13 35.14 35.20 35.21
35.22 35.23 35.24 35.25 35.26 35.27 35.28
35.33 35.61 35.81 35.95 36.10 36.11 36.12
36.13 36.14 36.15 36.16 36.17 36.19 37.33 39.52

Dates	OHS Count
7/18/2008 -7/31/2008	3
08-2008	9
09-2008	17
10-2008	6
11-2008	9
12-2008	13
01-2009	14
02-2009	16
03-2009	4
04-2009	10
05-2009	6
06-2009	7
07/1/2008 -7/17/2009	5
Year 4 Total	**119**

Waterbury Hospital
OHS Patient Volume
7/18/2008 -7/17/2009

Dates	Patient Total
7/18/2008 -7/31/2008	3
08-2008	9
09-2008	17
10-2008	6
11-2008	9
12-2008	13
01-2009	14
02-2009	16
03-2009	4
04-2009	10
05-2009	6
06-2009	7
07/1/2008 -7/17/2009	5
Year 4 Total	**119**

004/007

Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2011Q1

Section I: PCI Performance Measures

Endorsed by the National Quality Forum and appropriate for public reporting

PCI Performance Measures

Distribution of Hospital Performance

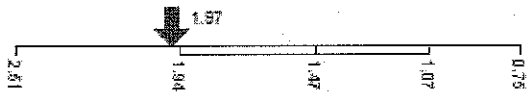
10th percentile — 90th percentile

Better →

1 **PCI in-hospital risk adjusted mortality (all patients)**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
1.97	1.47	0.75

Your hospital's PCI in-hospital risk adjusted mortality rate for all patients adjusted using the NCDR® risk adjustment model. [Detail Line:1997]



Note

In-hospital risk adjusted mortality for PCI is the only performance measure in the CathPCI Registry® that has been endorsed by the National Quality Forum. Such performance measures meeting the requirement for approval are intended not only for clinical quality improvement, but also may be considered for purposes of public reporting.

The "Registry Metrics" on the subsequent pages of this report are those measures that have been developed to support self assessment and quality improvement at the provider, hospital, and/or health care system level. While these metrics have not been formally developed by the American College of Cardiology/American Heart Association Task Force for Performance Measures Task Force, they may be identified as evolving measures worthy of consideration for further development into performance measures.

Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2011Q1

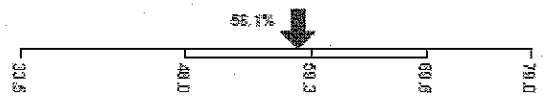
Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

PCI Process Metrics — **Distribution of Hospital Performance** (10th percentile … 90th percentile; Better →)

2 **Proportion of elective PCIs with prior positive stress or imaging study**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
58.1%	59.3%	79.0%

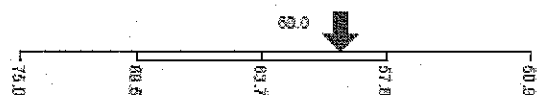
Proportion of elective PCI procedures (excluding patients with ACS) with an antecedent stress or imaging study with a positive result (suggestive of ischemia) or with a fractional flow reserve value of <=0.8 during the PCI procedure [Detail Line:1511]



3 **Median time to immediate PCI for STEMI patients (in minutes)**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
60.0	63.7	50.9

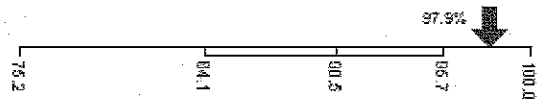
Your hospital's median time from hospital arrival to immediate PCI for STEMI patients in minutes. Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1500]



4 **Proportion of STEMI patients receiving immediate PCI w/in 90"**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
97.9%	90.5%	100.0%

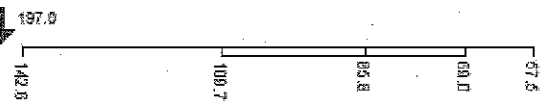
Proportion of STEMI patients with a time from your hospital arrival (or subsequent ECG if ST elevation first noted on subsequent ECG) to immediate PCI <=90". Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1501]



5 **Median time from ED arrival at STEMI transferring facility to ED arrival at STEMI receiving facility among transferred patients.**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
197.0	85.8	57.5

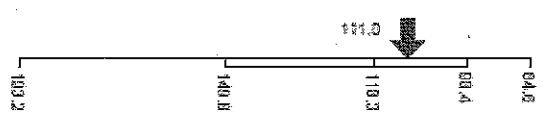
Your hospital's median time from arrival at transferring facility to ED arrival at STEMI receiving facility among transferred patients. [Detail Line:1503]



6 **Median time from ED arrival at STEMI transferring facility to immediate PCI at STEMI receiving facility among transferred patients (in minutes)**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
111.0	118.3	84.6

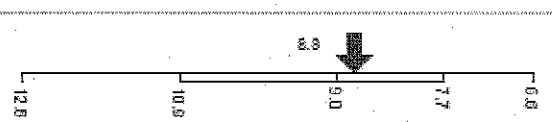
Your hospital's median time from arrival at referring facility to immediate PCI at STEMI receiving facility among transferred patients. Exclusions: Reasons for delay does not equal none. [Detail Line:1504]



7 **Median fluoro time (in minutes)**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
8.8	9.0	6.6

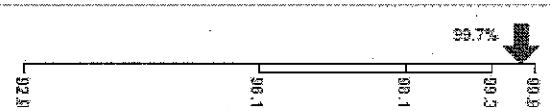
Inclusion criteria: PCI of one vessel/lesion. Exclusion criteria: Prior CABG, or "other" procedure during the same lab visit; PCI of >1 vessel/lesion. [Detail Line:1629]



8 **Proportion of patients with aspirin prescribed at discharge**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
99.7%	98.1%	99.9%

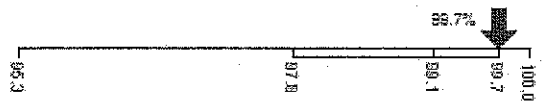
Proportion of patients (without a documented contraindication) with aspirin prescribed at discharge. [Detail Line:1959]



9 **Proportion of patients with thienopyridine prescribed at discharge**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
99.7%	99.1%	100.0%

Proportion of patients (without a documented contraindication) with a stent implanted that had a thienopyridine prescribed at discharge. [Detail Line: 1968]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2011 11:59:59 PM
Publish Date: Jul 25, 2011

Executive Summary

CathPCI Registry®

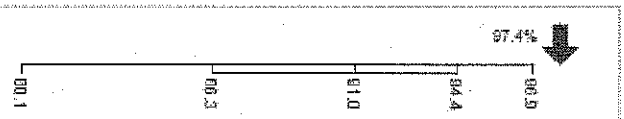
Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2011Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

10 **Statins prescribed at discharge**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
97.4%	91.0%	96.9%

Proportion of patients (without a documented contraindication) prescribed a statin at discharge. [Detail Line:1964]



PCI Outcome Metrics

Distribution of Hospital Performance

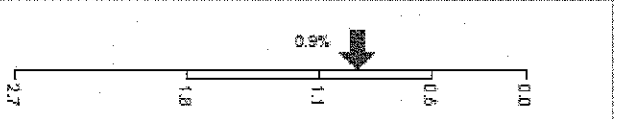
10th percentile — 90th percentile

Better →

11 **Proportion of PCI procedures with vascular access site injury requiring treatment or major bleeding***

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
0.9%	1.1%	0.0%

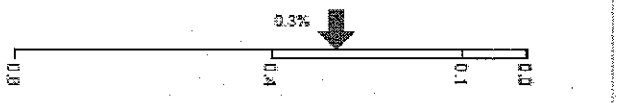
Your hospital's proportion of patients (excluding CABG or other surgery during same admission) with major access site related injury requiring treatment or major bleeding. [Detail Line:1836]



12 **Proportion of PCI patients with emergency CABG**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
0.3%	0.1%	0.0%

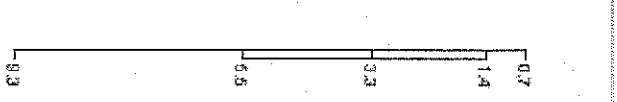
Your hospital's proportion of patients having emergency CABG (at your facility or transferred to another facility). [Detail Line:1941]



13 **Proportion of PCI procedures with a post procedure MI (among hospitals routinely collecting post-PCI biomarkers)****

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
	3.3%	0.7%

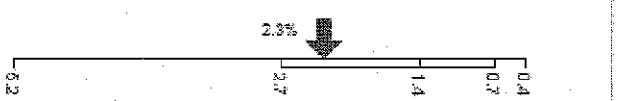
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with >= 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1799]



14 **Proportion of PCI procedures with post procedure MI (among hospitals who do not routinely collect post-PCI biomarkers)****

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
2.3%	1.4%	0.4%

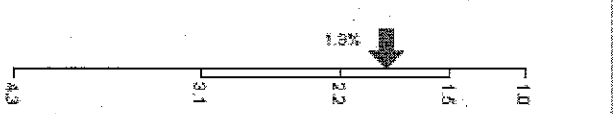
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with < 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1800]



15 **Proportion of PCI procedures with acute kidney injury*****

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
1.9%	2.2%	1.0%

Your hospital's proportion of patients who had a rise of serum creatinine of > 50% over the pre-procedure baseline (excluding patients on dialysis pre-procedure). Inclusions: >= 90% of patients with a pre and post creatinine coded; LOS >=1 day. [Detail Line:1933]



16 **Proportion of PCI procedures with post procedure stroke**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
0.0%	0.0%	0.0%

Your hospital's proportion of patients with stroke post procedure. [Detail Line:1807]



17 **Composite: Proportion of PCI patients with death, emergency CABG, stroke or repeat target vessel revascularization.**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
2.8%	2.3%	0.9%

Your hospital's proportion of patients with death, emergency CABG, stroke or repeat target vessel revascularization post procedure up to hospital discharge. Excludes patients with stroke and an elective, urgent or salvage CABG during same admission. [Detail Line:1797]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2011 11:59:59 PM
Publish Date: Jul 25, 2011

Executive Summary

CathPCI Registry®

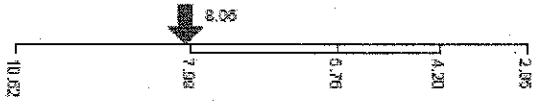
Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2011Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

18 **PCI in-hospital risk adjusted mortality (patients with STEMI)**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
8.06	5.76	2.85

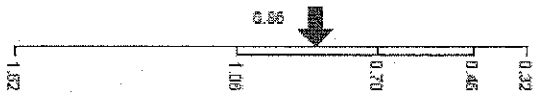
Your hospital's PCI in-hospital risk adjusted mortality rate for patients with STEMI adjusted using the NCDR® risk adjustment model. [Detail Line:2006]



19 **PCI in-hospital risk adjusted mortality (STEMI patients excluded)**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
0.86	0.70	0.32

Your hospital's PCI in-hospital risk adjusted mortality rate for patients with other diagnoses (not STEMI) using the NCDR® risk adjustment model. [Detail Line:2015]



Diagnostic Cath Process Metrics

Distribution of Hospital Performance

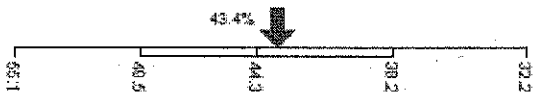
10th percentile 90th percentile

Better →

20 **Incidence of non-obstructive CAD (elective patients only)**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
43.4%	44.3%	32.2%

Patients with an elective diagnostic cath and coronary angiography with all native coronary territories <50% Exclusions: Patients with prior CABG, cardiac transplant evaluation; pre-op evaluation for non-cardiac surgery and diagnostic cath treatment recommendation of "other cardiac therapy without CABG or PCI". [Detail Line:1252]



Diagnostic Cath Outcomes Metrics

Distribution of Hospital Performance

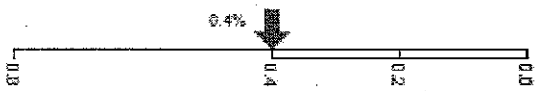
10th percentile 90th percentile

Better →

21 **Proportion of Diagnostic Catheterization procedures with vascular access site injury requiring treatment or major bleeding***

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
0.4%	0.2%	0.0%

Your hospital's proportion of patients with major access site related injury requiring treatment or major bleeding. [Detail Line:1301]



Utilization Metrics

Distribution of Hospital Performance

10th percentile 90th percentile

Better →

22 **Median post-procedure length of stay (in days) for PCI patients with STEMI**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
2.0	2.7	1.7

Your hospital's median post-procedure length of stay (in days) for PCI patients with STEMI. [Detail Line:2071]



Data Quality Metrics

Distribution of Hospital Performance

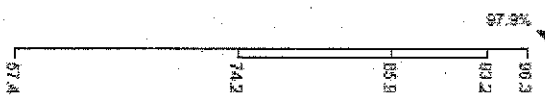
10th percentile 90th percentile

Better →

24 **Proportion of PCI procedures with creatinine assessed pre and post PCI**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
97.9%	85.9%	96.3%

Proportion of PCI patients with creatinine assessed pre and post procedure. Inclusions: LOS >=1 day. [Detail Line:1932]

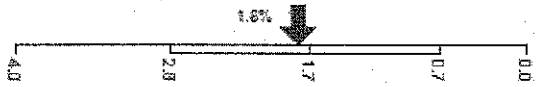
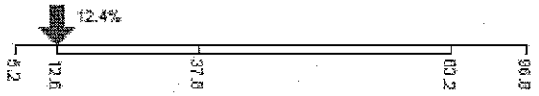


Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2011Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

Test Metrics	Distribution of Hospital Performance 10th percentile … 90th percentile Better →
25 **Test Metric: Proportion of PCI procedures with transfusion of whole blood or RBCs** My Hospital: 1.8% | All Hospitals 50th Pctl: 1.7% | All Hospitals 90th Pctl: 0.0% Proportion of patients who received a transfusion of whole blood or red blood cells after a PCI procedure. Exclusions: Patients having CABG or other major surgery during the same admission. [Detail Line:1838]	
26 **Test Data Quality Metric: Proportion of PCI procedures with biomarkers assessed post-PCI for elective inpatients** My Hospital: 12.4% | All Hospitals 50th Pctl: 37.8% | All Hospitals 90th Pctl: 96.8% Proportion of elective procedures with biomarkers assessed post PCI. Inclusion criteria: LOS >= 1 day and hospital status is "not outpatient". [Detail Line:1930]	

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2011 11:59:59 PM
Publish Date: Jul 25, 2011

Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2011Q1

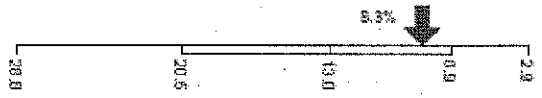
Section III: PCI Appropriate Use Criteria (AUC) Test Metrics – These data are based upon the 2009 Appropriateness Criteria for Coronary Revascularization (J Am Coll Cardiol 2009;53:530-53) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These test metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level. Test metrics are not appropriate for public/external reporting.

Test Metrics: PCI Appropriate Use Criteria (AUC)	Distribution of Hospital Performance (10th percentile – 90th percentile; Better →)

30 **Test Metric: Proportion of PCI procedures not classifiable for AUC reporting**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
8.3%	13.0%	2.9%

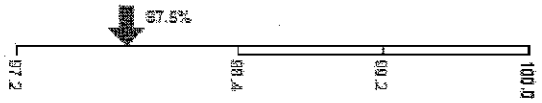
Proportion of PCI procedures that were not classifiable/evaluated for PCI AUC reporting due to incomplete or missing data. [Detail Line:1587]



31 **Patients WITH Acute Coronary Syndrome (Test Metric): Proportion of evaluated PCI procedures that were appropriate**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
97.8%	99.2%	100.0%

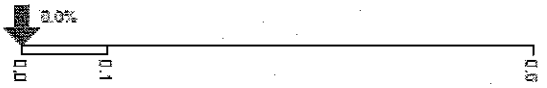
Proportion of PCI procedures that were evaluated as "Appropriate", among patients with ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1579]



32 **Patients WITH Acute Coronary Syndrome (Test Metric): Proportion of evaluated PCI procedures that were of uncertain appropriateness**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
0.0%	0.0%	0.6%

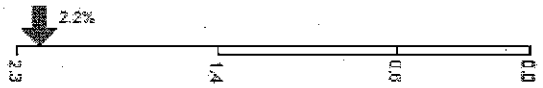
Proportion of PCI procedures that were evaluated as "Uncertain", among patients with ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1580]



33 **Patients WITH Acute Coronary Syndrome (Test Metric): Proportion of evaluated PCI procedures that were inappropriate**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
2.2%	0.6%	0.0%

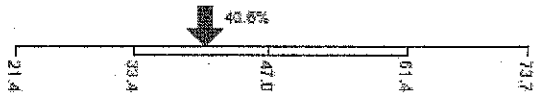
Proportion of PCI procedures that were evaluated as "Inappropriate", among patients with ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1581]



34 **Patients WITHOUT Acute Coronary Syndrome (Test Metric): Proportion of evaluated PCI procedures that were appropriate**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
40.6%	47.0%	73.7%

Proportion of PCI procedures that were evaluated as "Appropriate", among patients without ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1583]



35 **Patients WITHOUT Acute Coronary Syndrome (Test Metric): Proportion of evaluated PCI procedures that were of uncertain appropriateness**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
49.2%	39.7%	61.4%

Proportion of PCI procedures that were evaluated as "Uncertain", among patients without ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1584]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2011 11:59:59 PM
Publish Date: Jul 25, 2011

Executive Summary

CathPCI Registry®

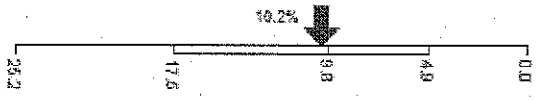
Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2011Q1

Section III: PCI Appropriate Use Criteria (AUC) Test Metrics – These data are based upon the 2009 Appropriateness Criteria for Coronary Revascularization (J Am Coll Cardiol 2009;53:530-53) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These test metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level. Test metrics are not appropriate for public/external reporting.

36 **Patients WITHOUT Acute Coronary Syndrome (Test Metric):**
Proportion of evaluated PCI procedures that were inappropriate

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
10.2%	9.8%	0.0%

Proportion of PCI procedures that were evaluated as "Inappropriate", among patients without ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1585]



Executive Summary Footnotes

*Vascular access site injury requiring treatment or major bleeding is defined as:

1.Bleeding at access site, hematoma at access site, or retroperitoneal bleed that occur within 72 hours of the procedure. To qualify, the event must be associated with a hemoglobin drop of >3 g/dL; transfusion of whole or packed red blood cells, or a procedural intervention/surgery at the bleeding site to reverse/stop or correct the bleeding. This excludes "GI", "GU" and "Other" bleeds.

2.Major access site related injury requiring treatment includes access site occlusion, peripheral embolization, dissection, pseudoaneurysm, AV fistula requiring treatment anytime from the procedure until discharge.

**Your rate of post procedure MI cannot be reported if you only collected cardiac biomarkers on <90% of your patients who were in the hospital >=1 day.

***Your rate of acute kidney injury cannot be reported if you only collected creatinine pre and post procedure on <90% of your patients who were in the hospital >=1 day.

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2011 11:59:59 PM
Publish Date: Jul 25, 2011

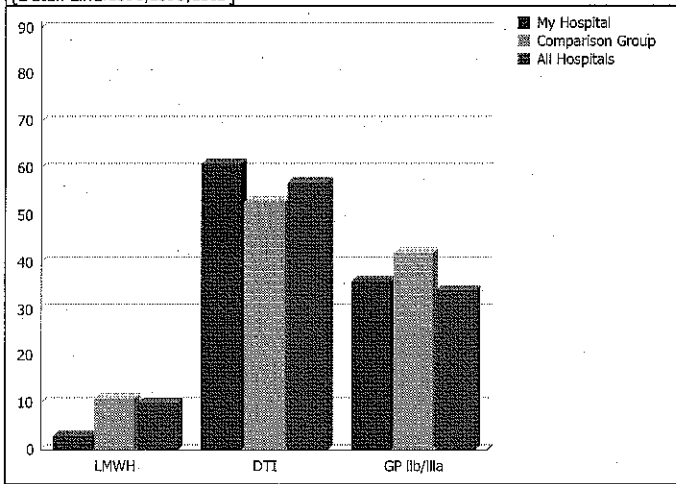
Executive Summary

CathPCI Registry®

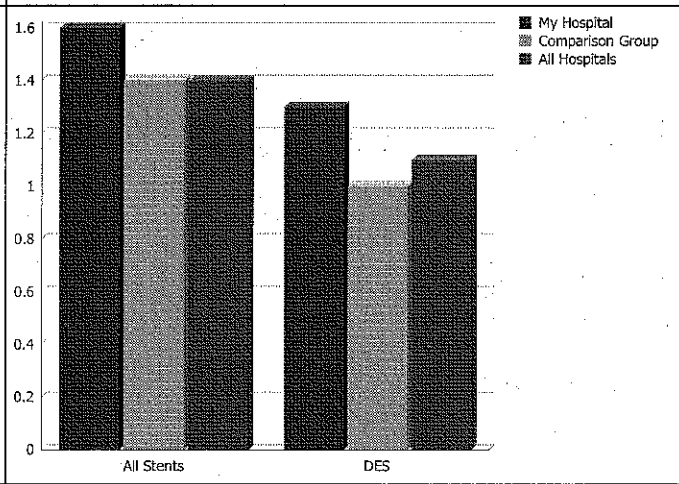
Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2011Q1

Section IV: PCI Process Comparison Metrics

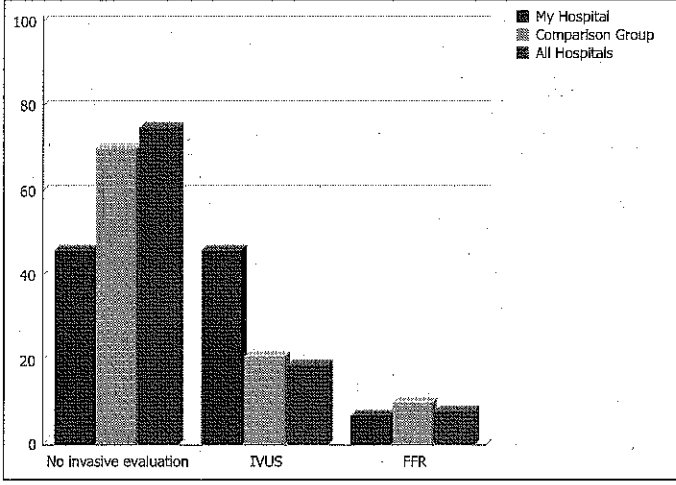
Anticoagulant Use: Low molecular weight heparin, direct thrombin inhibitors, GP IIb/IIIa inhibitor(pts with acute coronary syndrome).
[Detail Line:1596,1598,1603]



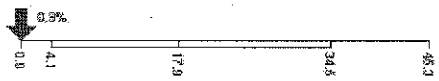
Stent Use: Average # of stents per PCI admission.
[Detail Line:1789,1790]



Intermediate stenosis lesions(40-70%): Further invasive evaluation performed (IVUS or FFR).
[Detail Line:1728,1729,1730]



Outpatients: Proportion of PCI patient admissions whose hospital status was coded as "outpatient".
[Detail Line:1388]



Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2011Q1

Section I: PCI Performance Measures

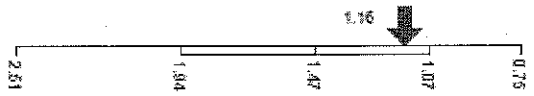
Endorsed by the National Quality Forum and appropriate for public reporting

PCI Performance Measures	Distribution of Hospital Performance (10th percentile — 90th percentile; Better →)

1 **PCI in-hospital risk adjusted mortality (all patients)**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
1.16	1.47	0.75

Your hospital's PCI in-hospital risk adjusted mortality rate for all patients adjusted using the NCDR® risk adjustment model. [Detail Line:1997]



Note

In-hospital risk adjusted mortality for PCI is the only performance measure in the CathPCI Registry® that has been endorsed by the National Quality Forum. Such performance measures meeting the requirement for approval are intended not only for clinical quality improvement, but also may be considered for purposes of public reporting.

The "Registry Metrics" on the subsequent pages of this report are those measures that have been developed to support self assessment and quality improvement at the provider, hospital, and/or health care system level. While these metrics have not been formally developed by the American College of Cardiology/American Heart Association Task Force for Performance Measures Task Force, they may be identified as evolving measures worthy of consideration for further development into performance measures.

©2010 American College of Cardiology Foundation

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2011Q1

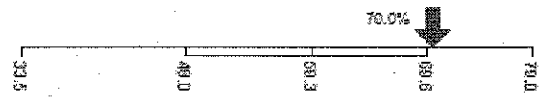
Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

PCI Process Metrics | **Distribution of Hospital Performance** (10th percentile … 90th percentile; Better →)

2 **Proportion of elective PCIs with prior positive stress or imaging study**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
70.0%	59.3%	79.0%

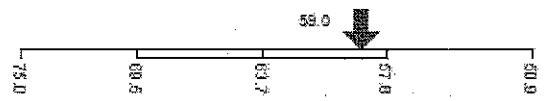
Proportion of elective PCI procedures (excluding patients with ACS) with an antecedent stress or imaging study with a positive result (suggestive of ischemia) or with a fractional flow reserve value of <=0.8 during the PCI procedure [Detail Line:1511]



3 **Median time to immediate PCI for STEMI patients (in minutes)**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
59.0	63.7	50.9

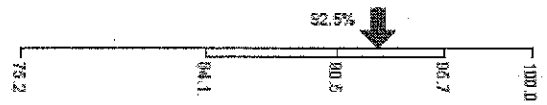
Your hospital's median time from hospital arrival to immediate PCI for STEMI patients in minutes. Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1500]



4 **Proportion of STEMI patients receiving immediate PCI w/in 90"**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
92.5%	90.5%	100.0%

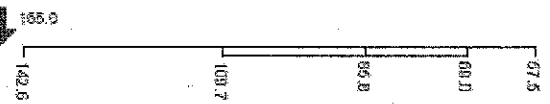
Proportion of STEMI patients with a time from your hospital arrival (or subsequent ECG if ST elevation first noted on subsequent ECG) to immediate PCI <=90". Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1501]



5 **Median time from ED arrival at STEMI transferring facility to ED arrival at STEMI receiving facility among transferred patients.**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
165.0	85.8	57.5

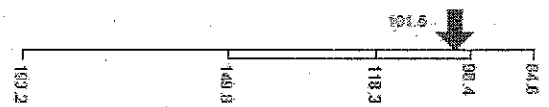
Your hospital's median time from arrival at transferring facility to ED arrival at STEMI receiving facility among transferred patients. [Detail Line:1503]



6 **Median time from ED arrival at STEMI transferring facility to immediate PCI at STEMI receiving facility among transferred patients (in minutes)**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
101.5	118.3	84.6

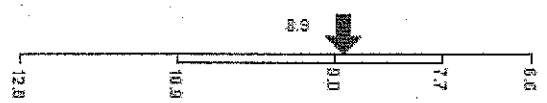
Your hospital's median time from arrival at referring facility to immediate PCI at STEMI receiving facility among transferred patients. Exclusions: Reasons for delay does not equal none. [Detail Line:1504]



7 **Median fluoro time (in minutes)**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
8.9	9.0	6.6

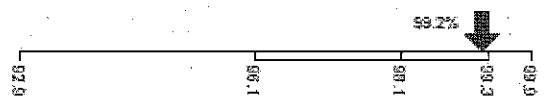
Inclusion criteria: PCI of one vessel/lesion. Exclusion criteria: Prior CABG, or "other" procedure during the same lab visit; PCI of >1 vessel/lesion. [Detail Line:1629]



8 **Proportion of patients with aspirin prescribed at discharge**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
99.2%	98.1%	99.9%

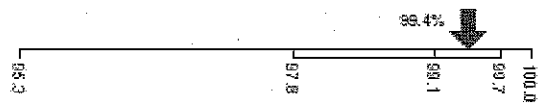
Proportion of patients (without a documented contraindication) with aspirin prescribed at discharge. [Detail Line:1959]



9 **Proportion of patients with thienopyridine prescribed at discharge**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
99.4%	99.1%	100.0%

Proportion of patients (without a documented contraindication) with a stent implanted that had a thienopyridine prescribed at discharge. [Detail Line: 1968]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2011 11:59:59 PM
Publish Date: Jul 22, 2011

Executive Summary

CathPCI Registry®

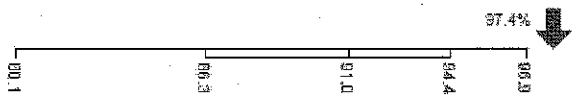
Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2011Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

10 **Statins prescribed at discharge**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
97.4%	91.0%	96.9%

Proportion of patients (without a documented contraindication) prescribed a statin at discharge. [Detail Line:1964]



PCI Outcome Metrics

Distribution of Hospital Performance

10th percentile — 90th percentile

Better →

11 **Proportion of PCI procedures with vascular access site injury requiring treatment or major bleeding***

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
0.8%	1.1%	0.0%

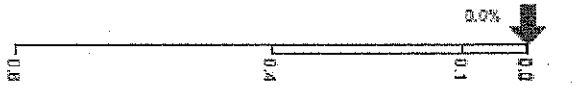
Your hospital's proportion of patients (excluding CABG or other surgery during same admission) with major access site related injury requiring treatment or major bleeding. [Detail Line:1836]



12 **Proportion of PCI patients with emergency CABG**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
0.0%	0.1%	0.0%

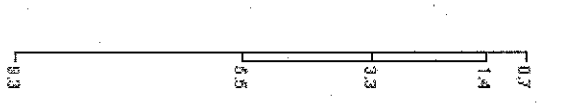
Your hospital's proportion of patients having emergency CABG (at your facility or transferred to another facility). [Detail Line:1941]



13 **Proportion of PCI procedures with a post procedure MI (among hospitals routinely collecting post-PCI biomarkers)****

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
	3.3%	0.7%

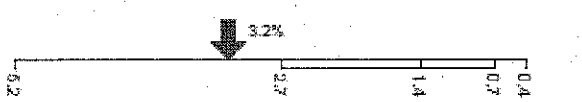
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with >= 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1799]



14 **Proportion of PCI procedures with post procedure MI (among hospitals who do not routinely collect post-PCI biomarkers)****

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
3.2%	1.4%	0.4%

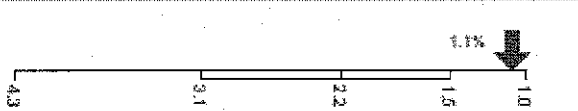
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with < 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1800]



15 **Proportion of PCI procedures with acute kidney injury*****

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
1.1%	2.2%	1.0%

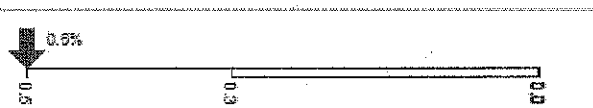
Your hospital's proportion of patients who had a rise of serum creatinine of > 50% over the pre-procedure baseline (excluding patients on dialysis pre-procedure). Inclusions: >= 90% of patients with a pre and post creatinine coded; LOS >=1 day. [Detail Line:1933]



16 **Proportion of PCI procedures with post procedure stroke**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
0.5%	0.0%	0.0%

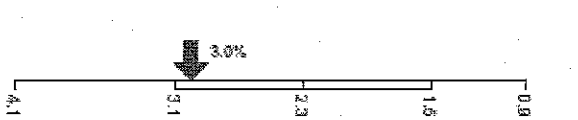
Your hospital's proportion of patients with stroke post procedure. [Detail Line:1807]



17 **Composite: Proportion of PCI patients with death, emergency CABG, stroke or repeat target vessel revascularization.**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
3.0%	2.3%	0.9%

Your hospital's proportion of patients with death, emergency CABG, stroke or repeat target vessel revascularization post procedure up to hospital discharge. Excludes patients with stroke and an elective, urgent or salvage CABG during same admission. [Detail Line:1797]



Executive Summary

CathPCI Registry®

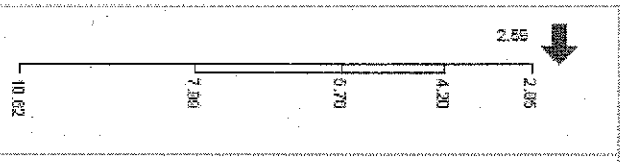
Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2011Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

18 **PCI in-hospital risk adjusted mortality (patients with STEMI)**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
2.59	5.76	2.85

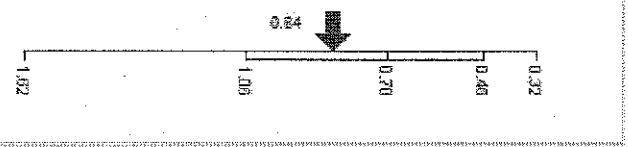
Your hospital's PCI in-hospital risk adjusted mortality rate for patients with STEMI adjusted using the NCDR® risk adjustment model. [Detail Line:2006]



19 **PCI in-hospital risk adjusted mortality (STEMI patients excluded)**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
0.84	0.70	0.32

Your hospital's PCI in-hospital risk adjusted mortality rate for patients with other diagnoses (not STEMI) using the NCDR® risk adjustment model. [Detail Line:2015]



Diagnostic Cath Process Metrics

Distribution of Hospital Performance

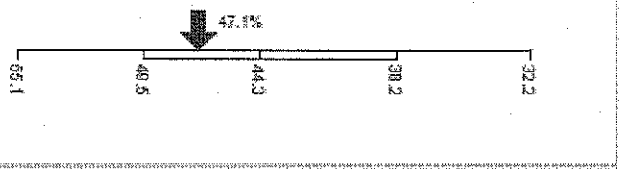
10th percentile — 90th percentile

Better →

20 **Incidence of non-obstructive CAD (elective patients only)**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
47.1%	44.3%	32.2%

Patients with an elective diagnostic cath and coronary angiography with all native coronary territories <50% Exclusions: Patients with prior CABG, cardiac transplant evaluation; pre-op evaluation for non-cardiac surgery and diagnostic cath treatment recommendation of "other cardiac therapy without CABG or PCI". [Detail Line:1252]



Diagnostic Cath Outcomes Metrics

Distribution of Hospital Performance

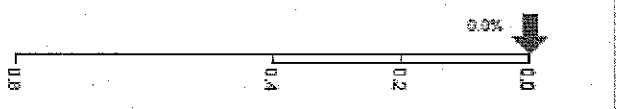
10th percentile — 90th percentile

Better →

21 **Proportion of Diagnostic Catheterization procedures with vascular access site injury requiring treatment or major bleeding***

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
0.0%	0.2%	0.0%

Your hospital's proportion of patients with major access site related injury requiring treatment or major bleeding. [Detail Line:1301]



Utilization Metrics

Distribution of Hospital Performance

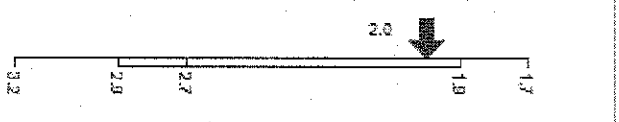
10th percentile — 90th percentile

Better →

22 **Median post-procedure length of stay (in days) for PCI patients with STEMI**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
2.0	2.7	1.7

Your hospital's median post-procedure length of stay (in days) for PCI patients with STEMI. [Detail Line:2071]



Data Quality Metrics

Distribution of Hospital Performance

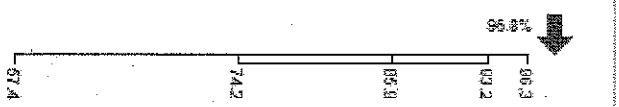
10th percentile — 90th percentile

Better →

24 **Proportion of PCI procedures with creatinine assessed pre and post PCI**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
96.8%	85.9%	96.3%

Proportion of PCI patients with creatinine assessed pre and post procedure. Inclusions: LOS >=1 day. [Detail Line:1932]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2011 11:59:59 PM
Publish Date: Jul 22, 2011

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2011Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

Test Metrics	Distribution of Hospital Performance 10th percentile — 90th percentile Better →
25 **Test Metric: Proportion of PCI procedures with transfusion of whole blood or RBCs** My Hospital: 3.8% | All Hospitals 50th Pctl: 1.7% | All Hospitals 90th Pctl: 0.0% Proportion of patients who received a transfusion of whole blood or red blood cells after a PCI procedure. Exclusions: Patients having CABG or other major surgery during the same admission. [Detail Line:1838]	
26 **Test Data Quality Metric: Proportion of PCI procedures with biomarkers assessed post-PCI for elective inpatients** My Hospital: 6.6% | All Hospitals 50th Pctl: 37.8% | All Hospitals 90th Pctl: 96.8% Proportion of elective procedures with biomarkers assessed post PCI. Inclusion criteria: LOS >= 1 day and hospital status is "not outpatient". [Detail Line:1930]	

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2011 11:59:59 PM
Publish Date: Jul 22, 2011

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2011Q1

Section III: PCI Appropriate Use Criteria (AUC) Test Metrics – These data are based upon the 2009 Appropriateness Criteria for Coronary Revascularization (J Am Coll Cardiol 2009;53:530-53) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These test metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level. Test metrics are not appropriate for public/external reporting.

Test Metrics: PCI Appropriate Use Criteria (AUC)	Distribution of Hospital Performance (10th percentile – 90th percentile; Better →)

30 **Test Metric: Proportion of PCI procedures not classifiable for AUC reporting**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
5.6%	13.0%	2.9%

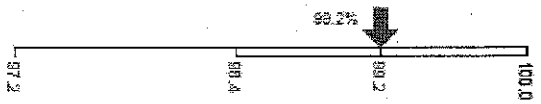
Proportion of PCI procedures that were not classifiable/evaluated for PCI AUC reporting due to incomplete or missing data. [Detail Line:1587]



31 **Patients WITH Acute Coronary Syndrome (Test Metric): Proportion of evaluated PCI procedures that were appropriate**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
99.2%	99.2%	100.0%

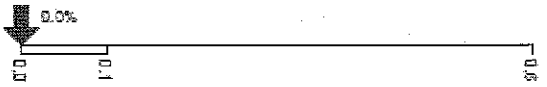
Proportion of PCI procedures that were evaluated as "Appropriate", among patients with ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1579]



32 **Patients WITH Acute Coronary Syndrome (Test Metric): Proportion of evaluated PCI procedures that were of uncertain appropriateness**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
0.0%	0.0%	0.6%

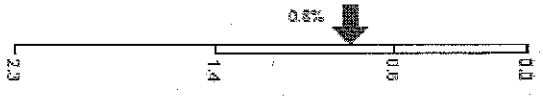
Proportion of PCI procedures that were evaluated as "Uncertain", among patients with ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1580]



33 **Patients WITH Acute Coronary Syndrome (Test Metric): Proportion of evaluated PCI procedures that were inappropriate**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
0.8%	0.6%	0.0%

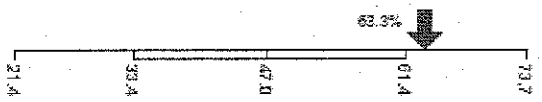
Proportion of PCI procedures that were evaluated as "Inappropriate", among patients with ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1581]



34 **Patients WITHOUT Acute Coronary Syndrome (Test Metric): Proportion of evaluated PCI procedures that were appropriate**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
63.3%	47.0%	73.7%

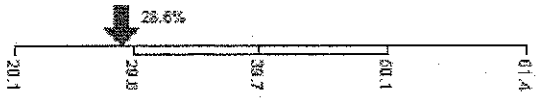
Proportion of PCI procedures that were evaluated as "Appropriate", among patients without ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1583]



35 **Patients WITHOUT Acute Coronary Syndrome (Test Metric): Proportion of evaluated PCI procedures that were of uncertain appropriateness**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
28.6%	39.7%	61.4%

Proportion of PCI procedures that were evaluated as "Uncertain", among patients without ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1584]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2011 11:59:59 PM
Publish Date: Jul 22, 2011

Executive Summary

CathPCI Registry®

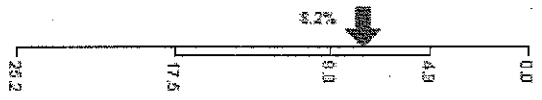
Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2011Q1

Section III: PCI Appropriate Use Criteria (AUC) Test Metrics – These data are based upon the 2009 Appropriateness Criteria for Coronary Revascularization (J Am Coll Cardiol 2009;53:530-53) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These test metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level. Test metrics are not appropriate for public/external reporting.

36 **Patients WITHOUT Acute Coronary Syndrome (Test Metric): Proportion of evaluated PCI procedures that were inappropriate**

My Hospital	All Hospitals 50th Pctl	All Hospitals 90th Pctl
8.2%	9.8%	0.0%

Proportion of PCI procedures that were evaluated as "Inappropriate", among patients without ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1585]



Executive Summary Footnotes

*Vascular access site injury requiring treatment or major bleeding is defined as:

1.Bleeding at access site, hematoma at access site, or retroperitoneal bleed that occur within 72 hours of the procedure. To qualify, the event must be associated with a hemoglobin drop of >3 g/dL; transfusion of whole or packed red blood cells, or a procedural intervention/surgery at the bleeding site to reverse/stop or correct the bleeding. This excludes "GI", "GU" and "Other" bleeds.

2.Major access site related injury requiring treatment includes access site occlusion, peripheral embolization, dissection, pseudoaneurysm, AV fistula requiring treatment anytime from the procedure until discharge.

**Your rate of post procedure MI cannot be reported if you only collected cardiac biomarkers on <90% of your patients who were in the hospital >=1 day.

***Your rate of acute kidney injury cannot be reported if you only collected creatinine pre and post procedure on <90% of your patients who were in the hospital >=1 day.

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2011 11:59:59 PM
Publish Date: Jul 22, 2011

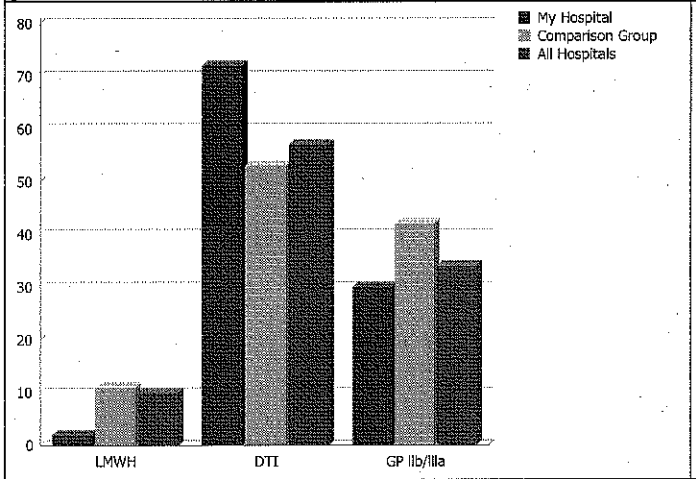
Executive Summary

CathPCI Registry®

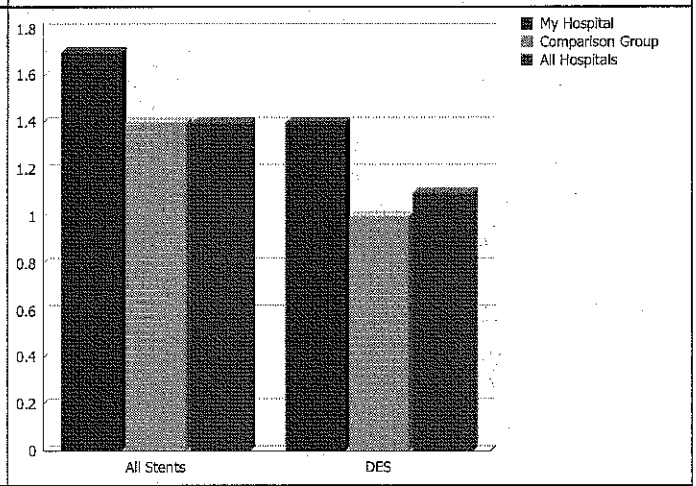
Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for All Hospitals ending 2011Q1

Section IV: PCI Process Comparison Metrics

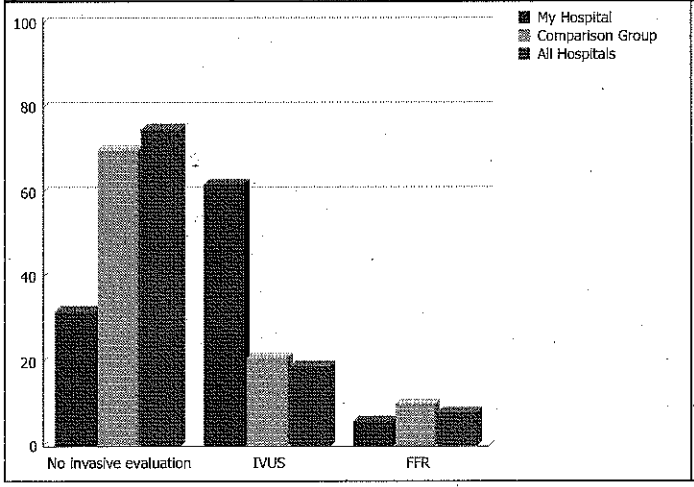
Anticoagulant Use: Low molecular weight heparin, direct thrombin inhibitors, GP IIb/IIIa inhibitor(pts with acute coronary syndrome).
[Detail Line:1596,1598,1603]



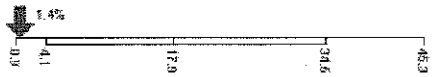
Stent Use: Average # of stents per PCI admission.
[Detail Line:1789,1790]



Intermediate stenosis lesions(40-70%): Further invasive evaluation performed (IVUS or FFR).
[Detail Line:1728,1729,1730]



Outpatients: Proportion of PCI patient admissions whose hospital status was coded as "outpatient".
[Detail Line:1388]

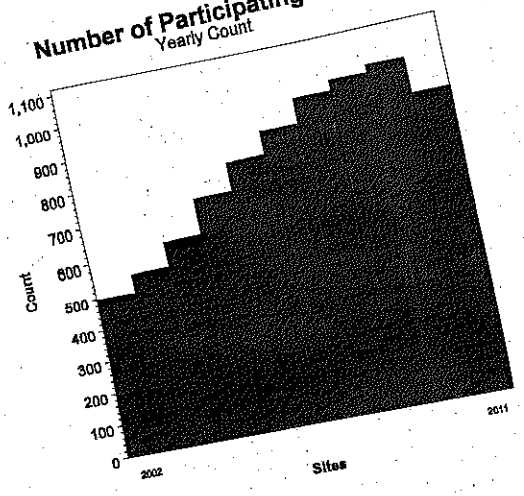


Duke Clinical Research Institute

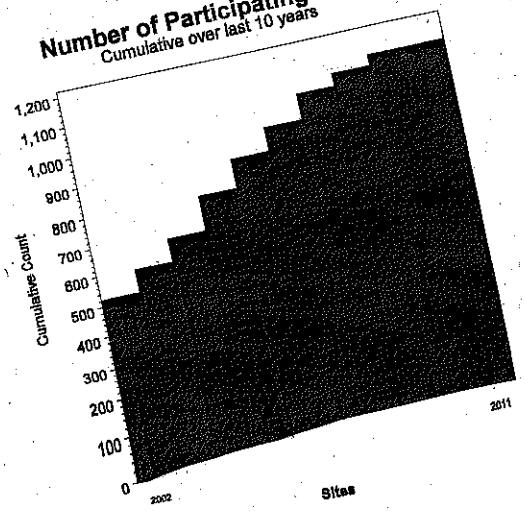
Executive Summary

Participant 30397
STS Period Ending 03/31/2011
2011 is a partial year: Jan 2011 - Mar 2011

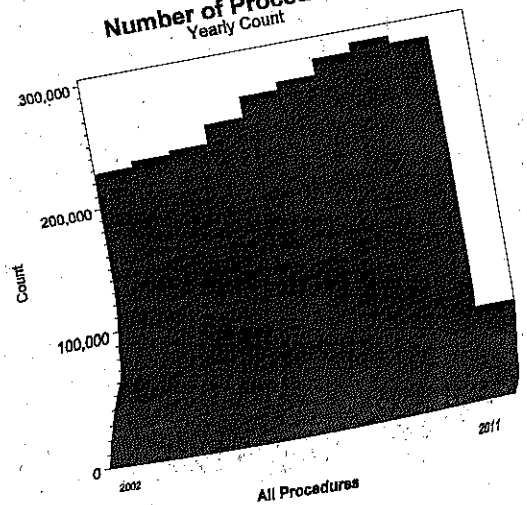
Number of Participating Sites
Yearly Count



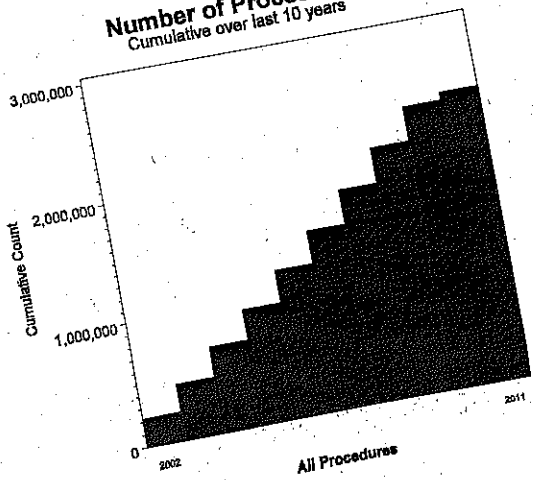
Number of Participating Sites
Cumulative over last 10 years



Number of Procedures
Yearly Count



Number of Procedures
Cumulative over last 10 years



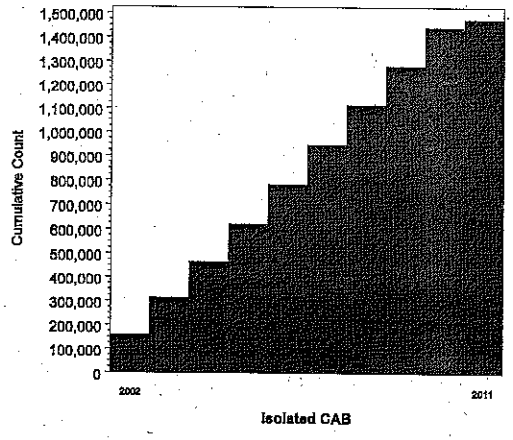
Executive Summary

Participant 30397
STS Period Ending 03/31/2011

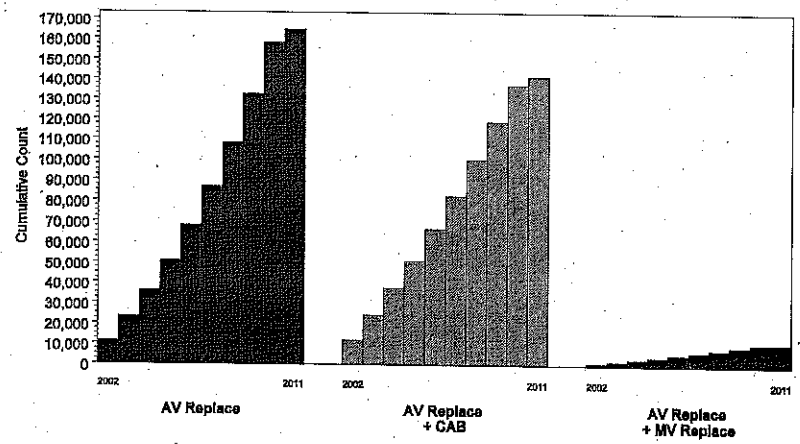
2011 is a partial year: Jan 2011 - Mar 2011

Duke Clinical Research Institute

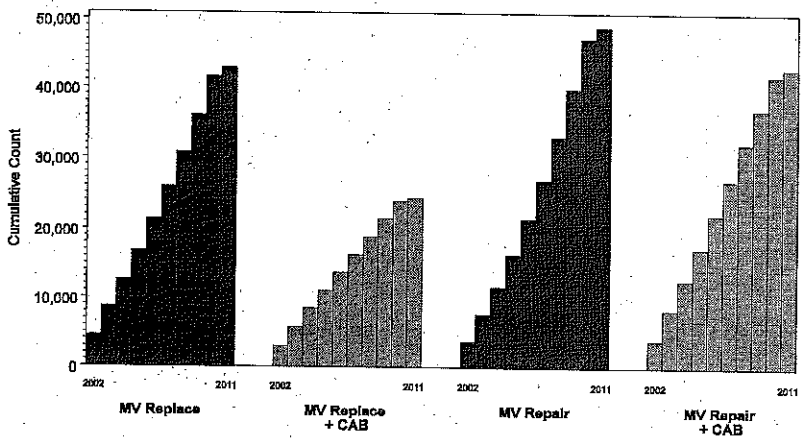
Number of Isolated CAB Procedures
Cumulative over last 10 years



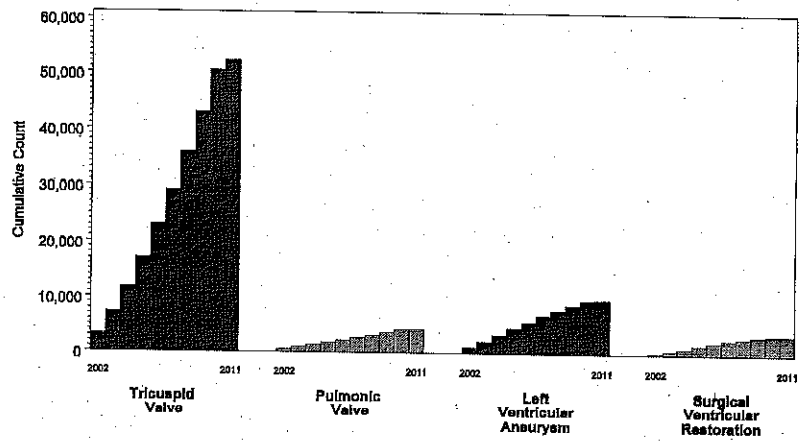
Number of Aortic Valve Procedures
Cumulative over last 10 years



Number of Mitral Valve Procedures
Cumulative over last 10 years



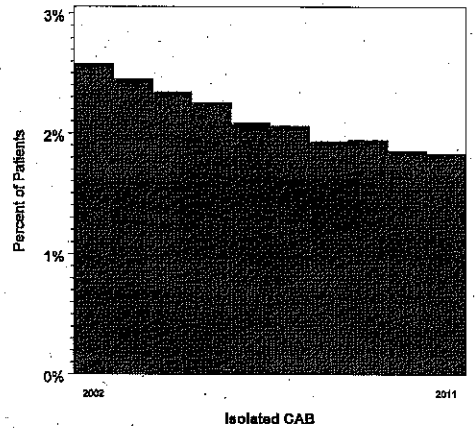
Number of Selected Other Cardiac Procedures
Cumulative over last 10 years



2011 is a partial year: Jan 2011 - Mar 2011

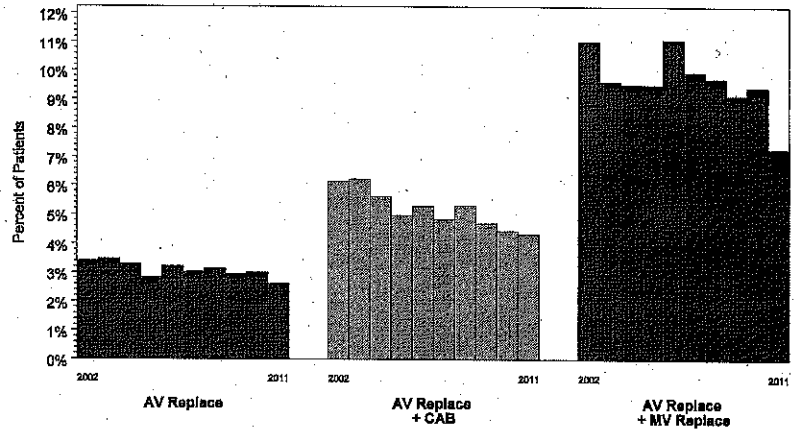
Unadjusted Isolated CAB Operative Mortality

Yearly over last 10 years



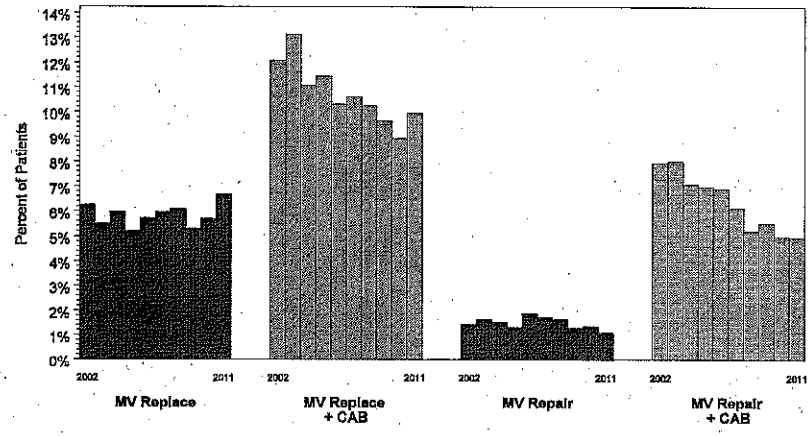
Unadjusted Aortic Valve Operative Mortality

Yearly over last 10 years



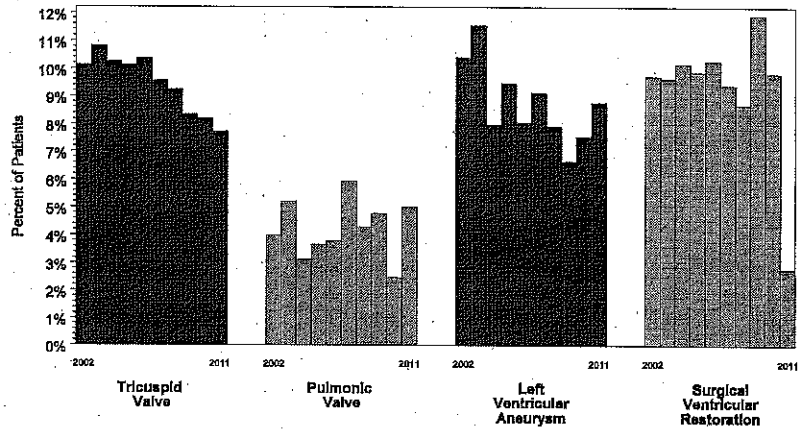
Unadjusted Mitral Valve Operative Mortality

Yearly over last 10 years



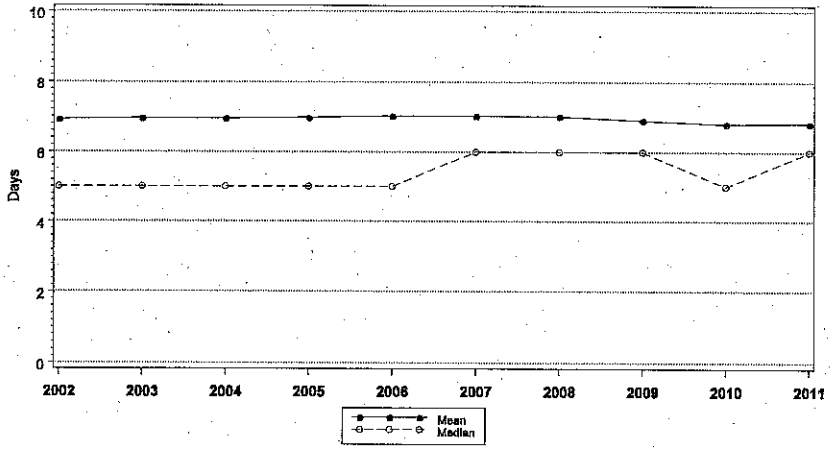
Unadjusted Other Cardiac Operative Mortality

Yearly over last 10 years

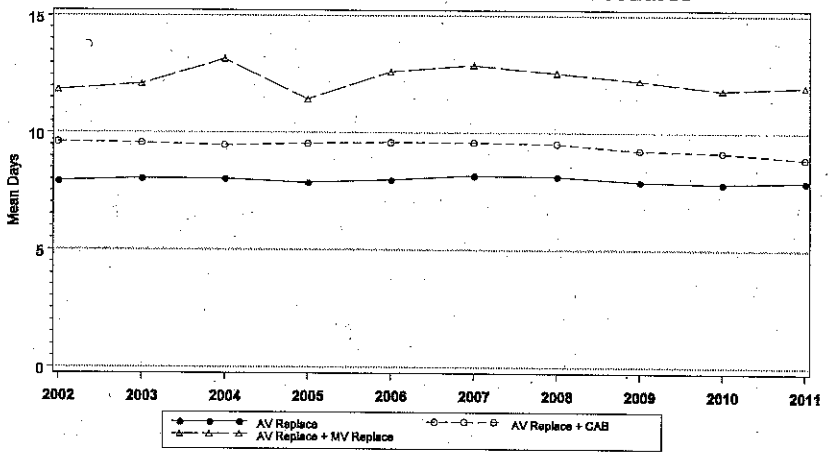


2011 is a partial year: Jan 2011 - Mar 2011

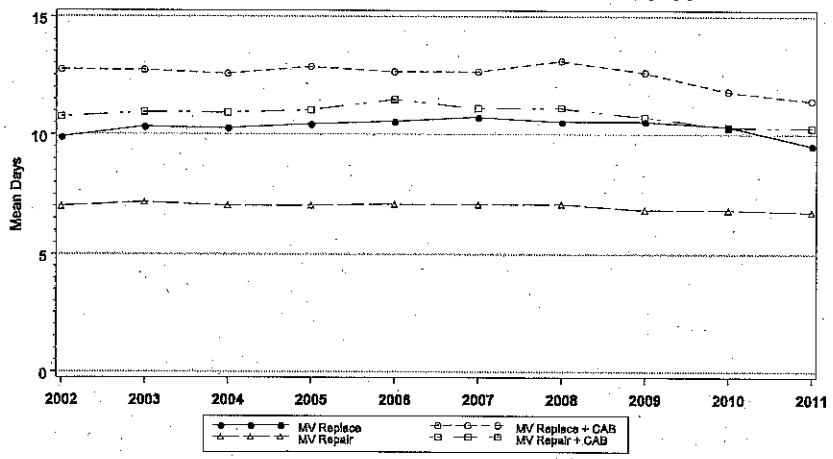
Post-Procedure LOS for Isolated CAB Procedures



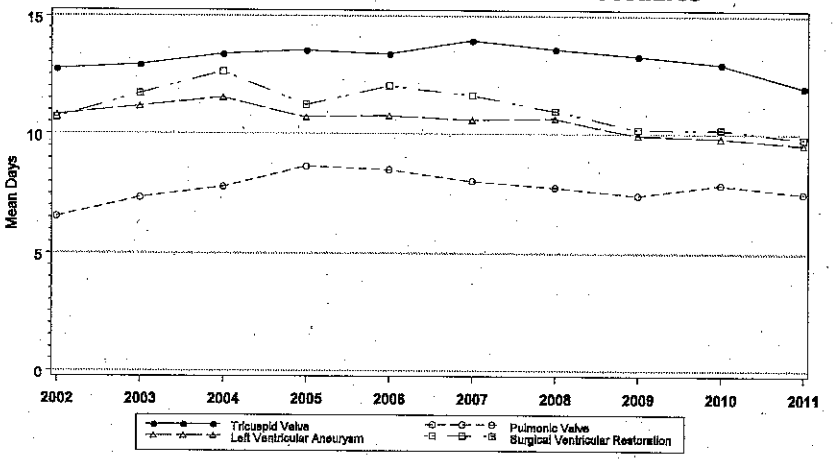
Post-Procedure LOS for Aortic Valve Procedures



Post-Procedure LOS for Mitral Valve Procedures



Post-Procedure LOS for Other Cardiac Procedures





Executive Summary

Participant 30397
STS Period Ending 03/31/2011

Duke Clinical Research Institut

2011 is a partial year: Jan 2011 - Mar 2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	201
Yearly Number of Sites in Analysis	499	549	616	716	802	872	946	980	1,006	88
Yearly Overall Procedure Count	227,783	232,044	235,369	250,819	267,877	273,864	287,239	294,524	288,383	65,77
Major Procedures										
Isolated CAB	157,324	155,292	151,883	155,012	161,746	164,340	168,044	167,160	159,763	35,25
Isolated Aortic Valve Replacement	11,342	12,070	12,678	14,945	16,955	18,730	21,378	24,473	25,515	6,46
Isolated Mitral Valve Replacement	4,535	4,176	3,900	4,289	4,498	4,522	4,845	5,329	5,448	1,28
Aortic Valve Replacement + CAB	12,018	12,437	12,949	13,763	15,540	15,879	17,539	18,809	18,227	4,50
Mitral Valve Replacement + CAB	3,021	2,815	2,754	2,496	2,648	2,582	2,576	2,586	2,427	51
Aortic + Mitral Valve Replacements	1,052	1,071	1,039	1,032	1,163	1,285	1,317	1,500	1,456	35
Mitral Valve Repair	3,794	3,951	3,977	4,671	5,092	5,424	6,155	6,820	7,293	1,69
Mitral Valve Repair + CAB	3,982	4,453	4,310	4,518	4,839	4,854	5,177	4,893	4,721	1,02
Not Classified Above	30,715	35,779	41,879	50,093	55,396	56,248	60,208	62,954	63,533	14,66
Incidence of Other Procedures										
Pulmonic Valve	501	461	448	409	447	454	490	524	529	10
Tricuspid Valve	3,256	4,086	4,466	5,271	5,966	6,090	6,699	7,151	7,414	1,71
Ventricular Assist Device	1,034	985	1,007	1,010	1,134	1,198	1,482	1,829	2,330	56
LVA - Left Ventricular Aneurysm Repair	1,076	1,134	1,190	1,224	1,189	1,139	1,034	916	821	14
VSD - Ventricular Septal Defect Repair	471	468	474	566	618	575	631	621	626	13
ASD - Atrial Septal Defect Repair	2,427	2,357	2,361	2,826	3,158	3,372	3,828	4,165	4,067	94
Batista	5	10	19	19	38	47	47	34	42	1
Surgical Ventricular Restoration	185	394	472	597	515	436	403	302	193	3
Congenital Defect Repair	755	1,003	1,200	1,396	1,697	2,073	1,810	1,570	1,527	33
Transmyocardial Laser Revascularization	1,771	2,205	2,317	2,921	3,208	2,497	2,387	2,033	1,960	42
Cardiac Trauma	184	147	208	238	293	291	329	297	283	5
Cardiac Transplant	656	675	778	858	978	1,031	1,101	1,200	1,324	25
Arrhythmia Correction Surgery	-	-	676	1,586	1,409	1,275	1,369	1,212	1,137	25
Atrial Fibrillation Correction Surgery	-	-	3,999	12,912	14,978	15,074	15,925	16,445	16,567	3,83
Aortic Aneurysm	5,254	5,831	6,867	8,437	9,561	10,138	11,576	12,956	13,589	3,29
Ascending Aorta	-	-	2,119	6,822	7,904	8,501	9,875	11,263	11,825	2,88
Aortic Arch	-	-	572	1,967	2,301	2,415	2,739	3,149	3,394	81
Descending Aorta	-	-	331	979	1,056	1,088	1,118	1,151	1,230	27
Thoracoabdominal Aorta	-	-	243	558	629	571	666	630	693	14
Carotid Endarterectomy	2,477	2,234	2,235	2,277	2,211	2,042	2,076	1,874	1,756	35
Other Vascular	1,382	1,386	1,479	1,296	1,365	1,199	1,456	1,554	1,448	29
Other Thoracic	1,804	1,645	1,643	1,635	1,631	1,605	1,793	1,632	1,609	35



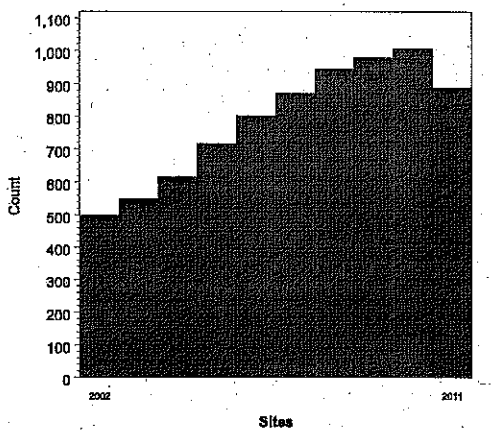
Executive Summary

Participant 30398
STS Period Ending 03/31/2011

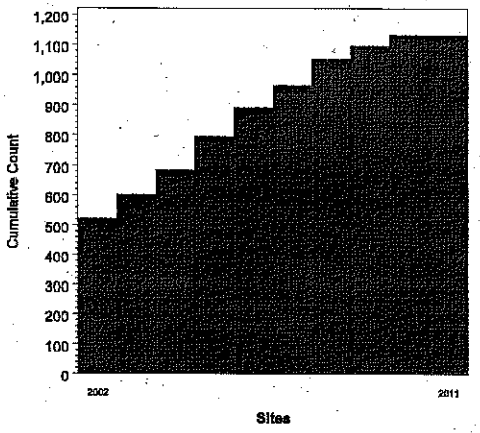
2011 is a partial year: Jan 2011 - Mar 2011

Duke Clinical Research Institute

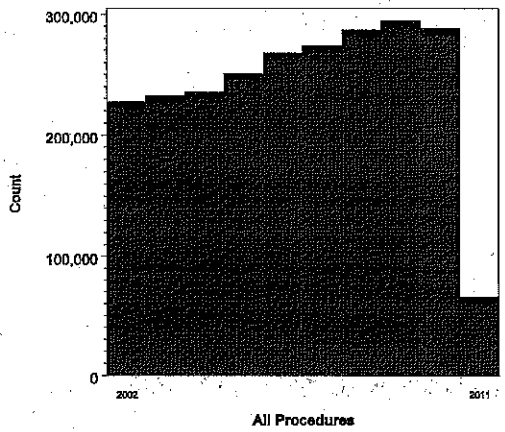
Number of Participating Sites
Yearly Count



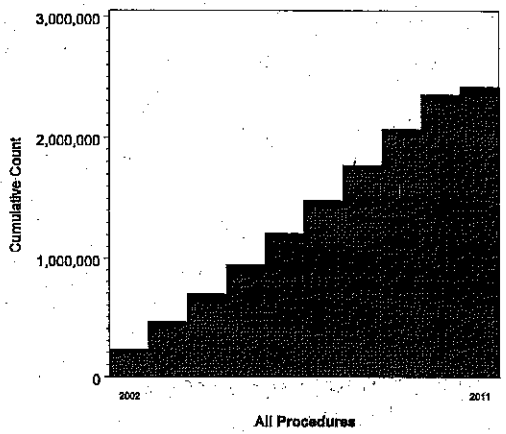
Number of Participating Sites
Cumulative over last 10 years



Number of Procedures
Yearly Count



Number of Procedures
Cumulative over last 10 years



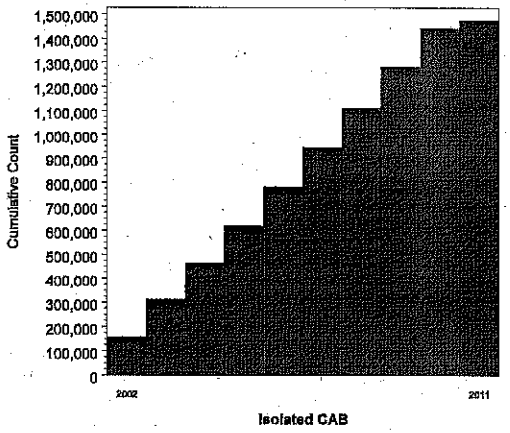
Executive Summary

Participant 30398
STS Period Ending 03/31/2011

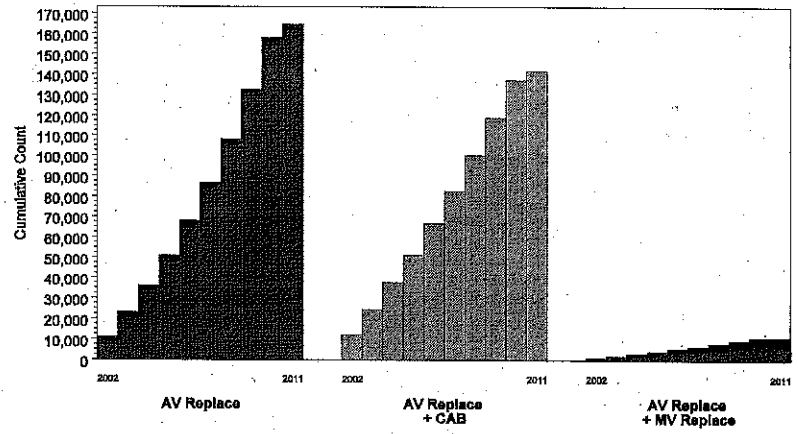
2011 is a partial year: Jan 2011 - Mar 2011

Duke Clinical Research Institute

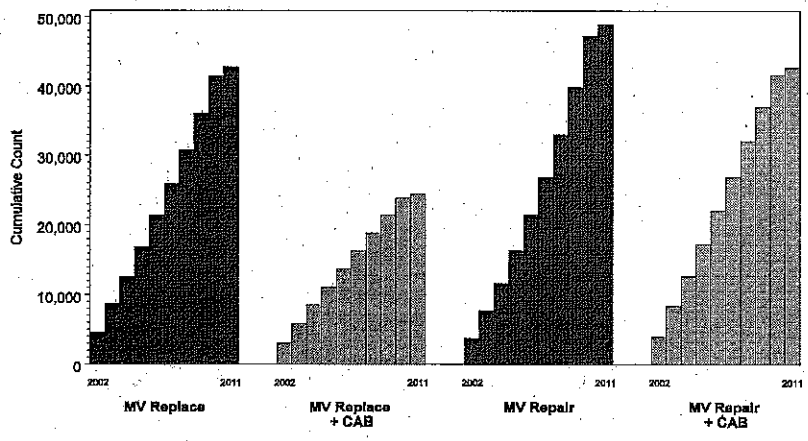
Number of Isolated CAB Procedures
Cumulative over last 10 years



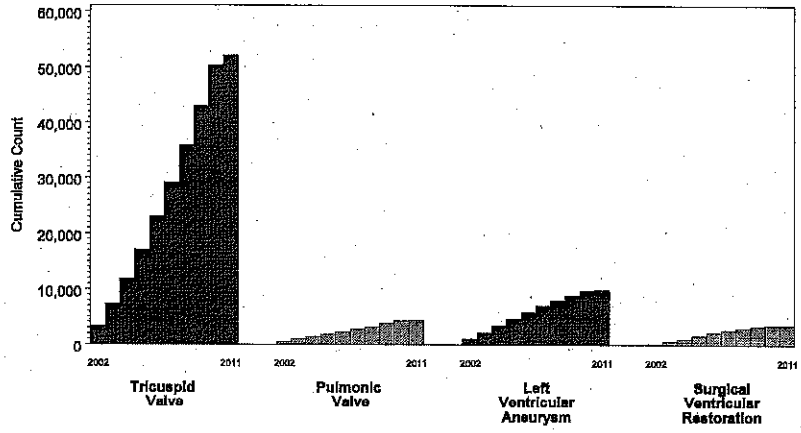
Number of Aortic Valve Procedures
Cumulative over last 10 years



Number of Mitral Valve Procedures
Cumulative over last 10 years



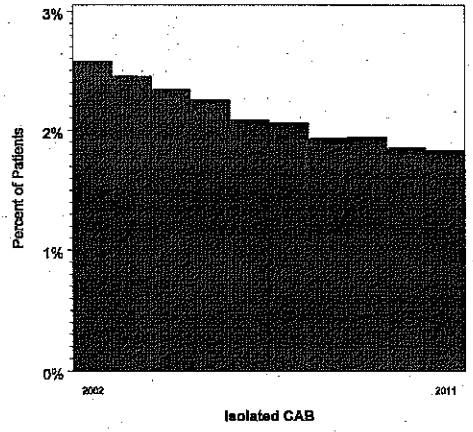
Number of Selected Other Cardiac Procedures
Cumulative over last 10 years



2011 is a partial year: Jan 2011 - Mar 2011

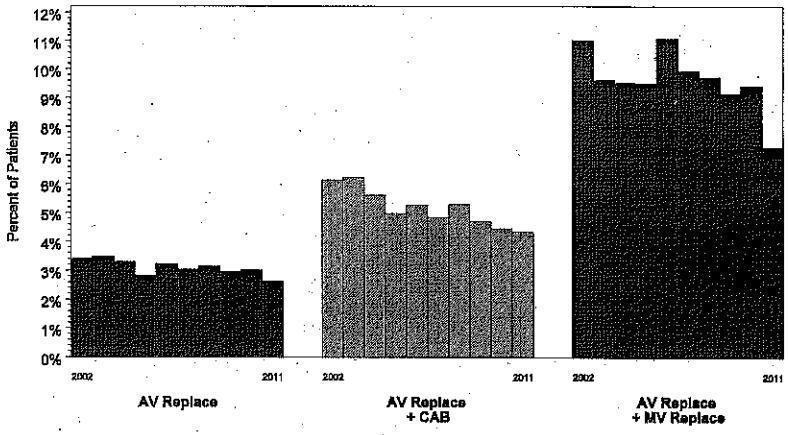
Unadjusted Isolated CAB Operative Mortality

Yearly over last 10 years



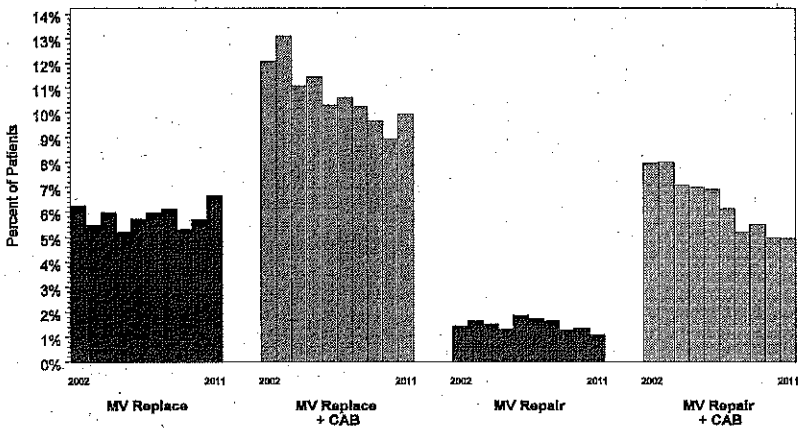
Unadjusted Aortic Valve Operative Mortality

Yearly over last 10 years



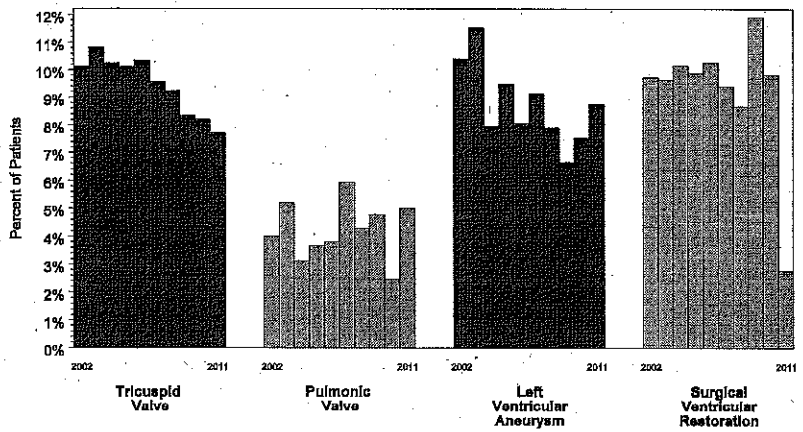
Unadjusted Mitral Valve Operative Mortality

Yearly over last 10 years



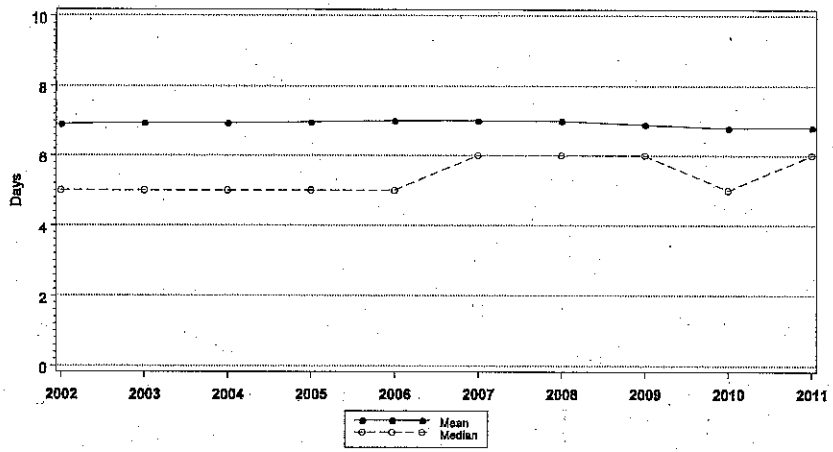
Unadjusted Other Cardiac Operative Mortality

Yearly over last 10 years

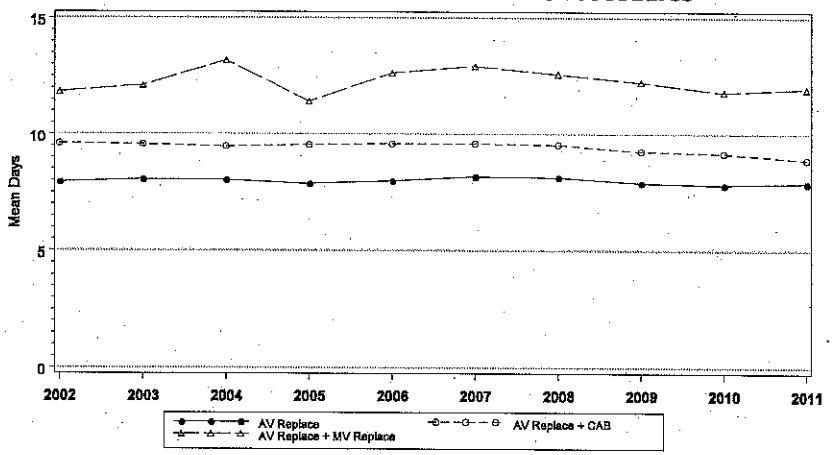


2011 is a partial year: Jan 2011 - Mar 2011

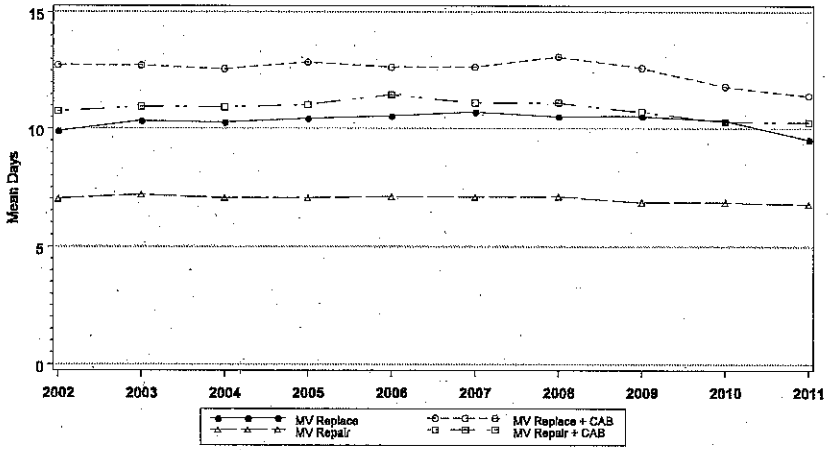
Post-Procedure LOS for Isolated CAB Procedures



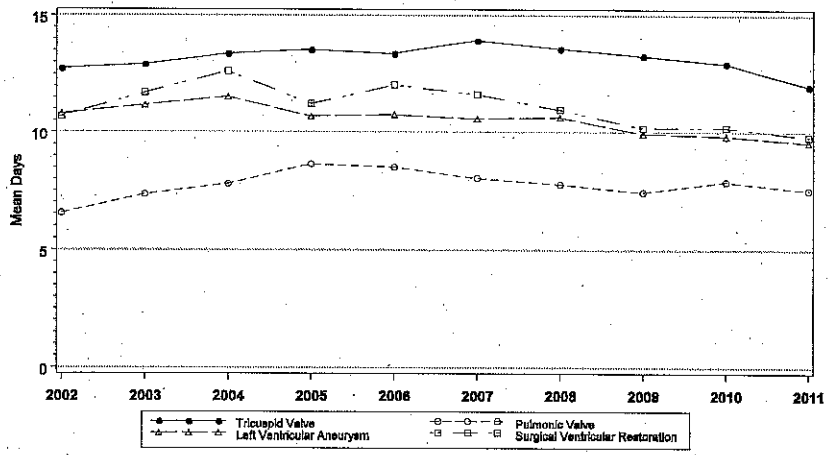
Post-Procedure LOS for Aortic Valve Procedures



Post-Procedure LOS for Mitral Valve Procedures



Post-Procedure LOS for Other Cardiac Procedures





Executive Summary

Participant 30398
STS Period Ending 03/31/2011

Duke Clinical Research Institute

2011 is a partial year: Jan 2011 - Mar 2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Yearly Number of Sites in Analysis	499	549	616	716	802	872	946	980	1,006	889
Yearly Overall Procedure Count	227,783	232,044	235,369	250,819	267,877	273,864	287,239	294,524	288,383	65,775
Major Procedures										
Isolated CAB	157,324	155,292	151,883	155,012	161,746	164,340	168,044	167,160	159,763	35,255
Isolated Aortic Valve Replacement	11,342	12,070	12,678	14,945	16,955	18,730	21,378	24,473	25,515	6,467
Isolated Mitral Valve Replacement	4,535	4,176	3,900	4,289	4,498	4,522	4,845	5,329	5,448	1,289
Aortic Valve Replacement + CAB	12,018	12,437	12,949	13,763	15,540	15,879	17,539	18,809	18,227	4,508
Mitral Valve Replacement + CAB	3,021	2,815	2,754	2,496	2,648	2,582	2,576	2,586	2,427	512
Aortic + Mitral Valve Replacements	1,052	1,071	1,039	1,032	1,163	1,285	1,317	1,500	1,456	356
Mitral Valve Repair	3,794	3,951	3,977	4,671	5,092	5,424	6,155	6,820	7,293	1,697
Mitral Valve Repair + CAB	3,982	4,453	4,310	4,518	4,839	4,854	5,177	4,893	4,721	1,029
Not Classified Above	30,715	35,779	41,879	50,093	55,396	56,248	60,208	62,954	63,533	14,662
Incidence of Other Procedures										
Pulmonic Valve	501	461	448	409	447	454	490	524	529	100
Tricuspid Valve	3,256	4,086	4,466	5,271	5,966	6,090	6,699	7,151	7,414	1,718
Ventricular Assist Device	1,034	985	1,007	1,010	1,134	1,198	1,482	1,829	2,330	562
LVA - Left Ventricular Aneurysm Repair	1,076	1,134	1,190	1,224	1,189	1,139	1,034	916	821	148
VSD - Ventricular Septal Defect Repair	471	468	474	566	618	575	631	621	626	136
ASD - Atrial Septal Defect Repair	2,427	2,357	2,361	2,826	3,158	3,372	3,828	4,165	4,067	942
Batista	5	10	19	19	38	47	47	34	42	11
Surgical Ventricular Restoration	185	394	472	597	515	436	403	302	193	36
Congenital Defect Repair	755	1,003	1,200	1,396	1,697	2,073	1,810	1,570	1,527	333
Transmyocardial Laser Revascularization	1,771	2,205	2,317	2,921	3,208	2,497	2,387	2,033	1,960	422
Cardiac Trauma	184	147	208	238	293	291	329	297	283	58
Cardiac Transplant	656	675	778	858	978	1,031	1,101	1,200	1,324	253
Arrhythmia Correction Surgery	-	-	676	1,586	1,409	1,275	1,369	1,212	1,137	256
Atrial Fibrillation Correction Surgery	-	-	3,999	12,912	14,978	15,074	15,925	16,445	16,567	3,833
Aortic Aneurysm	5,254	5,831	6,867	8,437	9,561	10,138	11,576	12,956	13,589	3,297
Ascending Aorta	-	-	2,119	6,822	7,904	8,501	9,875	11,263	11,825	2,880
Aortic Arch	-	-	572	1,967	2,301	2,415	2,739	3,149	3,394	813
Descending Aorta	-	-	331	979	1,056	1,088	1,118	1,151	1,230	276
Thoracoabdominal Aorta	-	-	243	558	629	571	666	630	693	143
Carotid Endarterectomy	2,477	2,234	2,235	2,277	2,211	2,042	2,076	1,874	1,756	358
Other Vascular	1,382	1,386	1,479	1,296	1,365	1,199	1,456	1,554	1,448	297
Other Thoracic	1,804	1,645	1,643	1,635	1,631	1,605	1,793	1,632	1,609	350

Saint Mary's Hospital
OHS Case Volume
7/18/2010 -7/17/2011

The following Codes were used to determine Open Heart Surgery Volume:

35.12 35.14 35.21 35.22
35.23 35.24 35.33 36.11
36.12 36.13 36.14 37.12
37.31 38.45

Dates	OHS Count
7/18/2010 -7/31/2010	7
08-2010	13
09-2010	11
10-2010	10
11-2010	5
12-2010	7
01-2011	12
02-2011	7
03-2011	12
04-2011	5
05-2011	9
06-2011	7
07/1/2011 -7/17/2011	3
Year 5 Total	**108**

Saint Mary's Hospital
OHS Patient Volume
7/18/2010 -7/17/2011

Dates	Patient To
7/18/2010 -7/31/2010	7
08-2010	13
09-2010	11
10-2010	10
11-2010	5
12-2010	7
01-2011	12
02-2011	7
03-2011	12
04-2011	5
05-2011	9
06-2011	7
07/1/2011 -7/17/2011	3
Year 5 Total	**108**

Waterbury Hospital
OHS Case Volume
7/18/2010 -7/17/2011

The following Codes were used to determine Open Heart Surgery Volume:

06.31 35.11 35.12 35.21
35.22 35.23 35.24 36.11
36.12 36.13 36.14 36.15
37.31 38.45

Dates	Open Heart Surgery Volume
7/18/2010 -7/31/2010	3
08-2010	8
09-2010	7
10-2010	5
11-2010	10
12-2010	15
01-2011	9
02-2011	8
03-2011	2
04-2011	7
05-2011	6
06-2011	9
07/1/2011 -7/17/2011	5
Total	**94**

Waterbury Hospital
OHS Patient Volume
7/18/2010 -7/17/2011

Dates	Patient Total
7/18/2010 -7/31/2010	3
08-2010	8
09-2010	7
10-2010	5
11-2010	10
12-2010	15
01-2011	9
02-2011	8
03-2011	2
04-2011	7
05-2011	6
06-2011	9
07/1/2011 -7/17/2011	5
Total	**94**

Saint Mary's Hospital
PCI Case Volume
7/18/2010 -7/17/2011

The following Codes were used to determine PCI Volume:
0.66
PCI codes were not provided for attempted but failed PCI cases.

Dates	PCI Volume
7/18/2010 -7/31/2010	15
08-2010	21
09-2010	26
10-2010	27
11-2010	26
12-2010	21
01-2011	24
02-2011	27
03-2011	34
04-2011	32
05-2011	27
06-2011	24
07/1/2011 -7/17/2011	18
Total	**322**

Saint Mary's Hospital
PCI Patient Volume
7/18/2010 -7/17/2011

Dates	Patient To
7/18/2010 -7/31/2010	15
08-2010	20
09-2010	24
10-2010	23
11-2010	24
12-2010	20
01-2011	23
02-2011	26
03-2011	34
04-2011	29
05-2011	27
06-2011	21
07/1/2011 -7/17/2011	17
Total	**303**

Waterbury Hospital
PCI Case Volume
7/18/2010 -7/17/2011

The following Code was used to determine PCI Volume:
0.66
PCI codes were not provided for attempted but failed PCI cases.

Dates	PCI Volume
7/18/2010 -7/31/2010	14
08-2010	31
09-2010	24
10-2010	45
11-2010	32
12-2010	29
01-2011	29
02-2011	34
03-2011	38
04-2011	37
05-2011	28
06-2011	40
07/1/2011 -7/17/2011	34
Total	**415**

Waterbury Hospital
PCI Patient Volume
7/18/2010 -7/17/2011

Dates	Patient Total
7/18/2010 -7/31/2010	13
08-2010	30
09-2010	23
10-2010	42
11-2010	32
12-2010	28
01-2011	29
02-2011	32
03-2011	36
04-2011	35
05-2011	24
06-2011	36
07/1/2011 -7/17/2011	34
Total	**394**

Roberts, Karen

From: Roberts, Karen
Sent: Wednesday, August 17, 2011 1:20 PM
To: 'mlamour@hcogw.org'
Subject: annual filings to OHCA on heart center

Hi Marjorie:

Based on the phone message you'd left for me, I've rechecked the original file on Docket Number 08-31202-CON (Health Center of Greater Waterbury) and find that my fax to you on August 1, 2011 is in error. The St. Mary's information is found within the filings for both years filed and is not missing. I apologize for this oversight. Let me know if you have any further questions.

Sincerely,

Karen Roberts
Principal Health Care Analyst
Department of Public Health
Division of Office of Health Care Access
Phone: 860-418-7041
Email: karen.roberts@ct.gov

STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

Office of Health Care Access

February 8, 2012 VIA FACSIMILE ONLY

Mr. Kevin Kniery
Executive Director
Heart Center of Greater Waterbury
1075 Chase Parkway
Waterbury, CT 06708

RE: The scheduling of a semi-annual meeting pursuant to Docket Number 08-31202-CON Heart Center of Greater Waterbury

Dear Mr. Kniery:

Pursuant to Stipulation #7 of the Agreed Settlement under Docket Number 08-31202-CON, St. Mary's Hospital, The Waterbury Hospital and John Dempsey Hospital (the "Applicants") agreed to "*attend meetings with OHCA on a semi-annual basis for the purposes of discussion on quality monitoring, clinical team structure, and overall organization structure.*"

With this letter, I am notifying you, on behalf of the Applicants (St. Mary's Hospital, The Waterbury Hospital and John Dempsey Hospital), that OHCA will not be scheduling a meeting regarding the CON authorization for this semi-annual period. Please contact Karen Roberts, Principal Health Care Analyst at 860-418-7041 or Paolo Fiducia, Associate Health Care Analyst at 860-418-7035, if you have any questions regarding the above.

Sincerely,

Kimberly R. Martone
Director of Operations

KAM:pf

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	2786
RECIPIENT ADDRESS	912035755575
DESTINATION ID	
ST. TIME	02/08 14:30
TIME USE	00'29
PAGES SENT	2
RESULT	OK

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: KEVIN KNIERY

FAX: 203 575 5575

AGENCY: HEART CENTER OF GREATER WATERBURY

FROM: PAOLO FIDUCIA

DATE: 2/8/12 **TIME:** 1:20 pm

NUMBER OF PAGES: 2
(including transmittal sheet

Comments:
08-31202-CON NO MEETING LETTER FOR THE SEMI-ANNUAL PERIOD

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

Office of Health Care Access

July 20, 2012 VIA FACSIMILE ONLY

Kevin Kniery
Executive Director
Heart Center of Greater Waterbury
1075 Chase Parkway
Waterbury, CT 06708

RE: The scheduling of a semi-annual meeting pursuant to Docket Number 08-31202-CON Heart Center of Greater Waterbury

Dear Mr. Kniery:

Pursuant to Stipulation #7 of the Agreed Settlement under Docket Number 08-31202-CON, St. Mary's Hospital, The Waterbury Hospital and John Dempsey Hospital (the "Applicants") agreed to "*attend meetings with OHCA on a semi-annual basis for the purposes of discussion on quality monitoring, clinical team structure, and overall organization structure.*"

On July 6, 2012, OHCA received your email request for clarification as to whether a meeting will be scheduled and held for this semi-annual period. With this letter, I am notifying the Applicants (St. Mary's Hospital, The Waterbury Hospital and John Dempsey Hospital) that OHCA will not be scheduling a meeting regarding the CON authorization for this semi-annual period. Please contact Karen Roberts, Principal Health Care Analyst at 860-418-7041 or Paolo Fiducia, Associate Health Care Analyst at 860-418-7035, if you have any questions regarding the above.

Sincerely,

Kimberly R. Martone
Director of Operations

KAM:pf

****
*** TX REPORT ***
****

TRANSMISSION OK

TX/RX NO	3001
RECIPIENT ADDRESS	912035755575
DESTINATION ID	
ST. TIME	07/20 09:55
TIME USE	00'21
PAGES SENT	2
RESULT	OK

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH
OFFICE OF HEALTH CARE ACCESS

FAX SHEET

TO: KEVIN KNIERY

FAX: 203 575 5575

AGENCY: HEART CENTER OF GREATER WATERBURY

FROM: PAOLO FIDUCIA

DATE: 7/20/12 TIME: 10 AM

NUMBER OF PAGES: 2
(including transmittal sheet

Comments: 08-31202-CON

NO MEETING LETTER FOR THE SEMI-ANNUAL PERIOD

PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.

Roberts, Karen

From: Roberts, Karen
Sent: Wednesday, September 05, 2012 11:58 AM
To: 'Kevin Kniery (HLRCC)'
Cc: Fiducia, Paolo
Subject: RE: HC Report

Tracking:

Recipient	Delivery
'Kevin Kniery (HLRCC)'	
Fiducia, Paolo	Delivered: 9/5/2012 11:58 AM

Hi Mr. Kniery

It is fine to file the material later in September and we will allow this extension of time. I've looked at the wording of the stipulation (#4) and it doesn't preclude an extension for filing this material in September. I'll have a copy of this email chain kept in the file under Docket Number 08-31202-CON to show that we've communicated on this matter. Also, please make sure that the filing includes that most recent ACC-NCDR and STS-DB reports (Stipulations #5 and #6).

Thank you for keeping OHCA informed regarding the status of this filing.

Karen Roberts
Principal Health Care Analyst
Department of Public Health
Division of Office of Health Care Access
Phone: 860-418-7041
Fax: 860-418-7053
Email: karen.roberts@ct.gov

-----Original Message-----
From: Kevin Kniery (HLRCC) [mailto:KKniery@leevercancercenter.org]
Sent: Tuesday, September 04, 2012 6:41 PM
To: Roberts, Karen
Subject: RE: HC Report

Ms. Roberts,
I am preparing the report and I am 95% done, can I get this to you by 9-14-12. I know we are suppose to report this by the end of August, but there have been some logistical challenges. Please let me know your thoughts or if you need to speak with me my cell is 203-910-2573.
Thanks Kevin

-----Original Message-----
From: Roberts, Karen [mailto:Karen.Roberts@ct.gov]
Sent: Thursday, August 23, 2012 7:32 AM
To: Kevin Kniery (HLRCC)
Cc: Fiducia, Paolo; Martone, Kim; Riggott, Kaila
Subject: RE: HC Report

Hi Mr. Kniery: I'm not in the office today but we'll take a look at the wording of the CON condition related to these annual filings and let you know early next week what the current status is.

Sincerely,

Karen Roberts
Principal Health Care Analyst
Department of Public Health
Office of Health Care Access
860-418-7041

From: Kevin Kniery (HLRCC) [KKniery@leevercancercenter.org]
Sent: Wednesday, August 22, 2012 6:10 PM
To: Roberts, Karen
Subject: FW: HC Report

Ms. Roberts,
I am forwarding this note to you, as I received an out of office notification from Ms. Martone whom I have been communicating with regarding the Heart Center. If you are able to help me with this I would appreciate it. Thanks Kevin

From: Kevin Kniery (HLRCC)
Sent: Wednesday, August 22, 2012 6:04 PM
To: Kimberly Martone (Kimberly.Martone@ct.gov)
Subject: HC Report

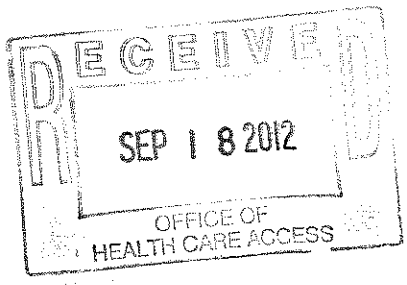
Ms. Martone,
At our recent board meeting for the heart center one of our board members stated that OCHA would not require the Heart Center of Greater Waterbury to submit the annual report of volumes, procedures and quality data. I wanted to verify this with your office. Please let me know. Thanks Kevin

Kevin Kniery
Executive Director
The Harold Leever Regional Cancer Center & The Heart Center of Greater Waterbury
1075 Chase Parkway
Waterbury Ct. 06708
Phone 203 575-5560
Fax 203 575-5550
www.leevercancercenter.org<http://www.leevercancercenter.org/>

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

HEART
CENTER
of Greater Waterbury



Karen Roberts
Office of Health Care Access
410 Capital Avenue MS# 13 HCA
PO Box 340308
Hrrtford CT, 06134-0308

September, 13, 2012

Re: Docket Number: 08-31202 CON The Waterbury Hospital and Saint Mary's Hospital Corporation, d/b/a Heart Center of Greater Waterbury and the University of Connecticut Health Center/ John Demsey Hospital

Dear Ms. Roberts,

Enclosed are the procedure and patient volume reports for Saint Mary's Hospital and Waterbury Hospital from July 18, 2011 through July 17, 2012.

The ACC Executive Summaries from April 1, 2011 to March 31, 2012 for both Saint Mary's Hospital and Waterbury Hospital are enclosed.

The STS Executive Summaries are also provided for both hospitals and represent the period from January 5, 2009 through December 30, 2011.

If you have any questions, please feel free to contact me at 203-575-5560 or email me at kkniery@leevercancercenter.org.

Sincerely,

Kevin Kniery
Executive Director
Heart Center of Greater Waterbury
Enclosure

Saint Mary's Hospital
PCI Case Volume
7/18/2011 -7/17/2012

The following Code was used to determine PCI Volume:
0.66
PCI codes were not provided for attempted but failed PCI cases.

Dates	PCI Volume
7/18/2011 -7/31/2011	14
08-2011	29
09-2011	31
10-2011	44
11-2011	38
12-2011	24
01-2012	19
02-2012	29
03-2012	35
04-2012	23
05-2012	34
06-2012	34
07/1/2012 -7/17/2012	16
Total	**370**

Saint Mary's Hospital
PCI Patient Volume
7/18/2011-7/17/2012

Dates	Patient Total
7/18/2011 -7/31/2011	13
08-2011	29
09-2011	29
10-2011	44
11-2011	37
12-2010	22
01-2012	19
02-2012	29
03-2012	35
04-2012	21
05-2012	34
06-2012	32
07/1/2011 -7/17/2011	14
Total	**358**

STMH Hospital
OHS Case Volume
7/18/2011 -7/17/2012

The following Codes were used to determine Open Heart Surgery Volume:

06.31 35.11 35.12 35.21
35.22 35.23 35.24 36.11
36.12 36.13 36.14 36.15
37.31 38.45

Dates	Open Heart Surgery Volume
7/18/2011 -7/31/2011	4
08-2011	6
09-2011	6
10-2011	8
11-2011	10
12-2011	8
01-2012	5
02-2012	8
03-2012	15
04-2012	9
05-2012	9
06-2012	8
07/1/2012 -7/17/2012	2
Total	**98**

STMH Hospital
OHS Patient Volume
7/18/2011 -7/17/2012

Dates	Patient Total
7/18/2011 -7/31/2011	4
08-2011	6
09-2011	6
10-2011	8
11-2011	10
12-2011	8
01-2012	5
02-2012	8
03-2012	15
04-2012	9
05-2012	9
06-2012	8
07/1/2012 -7/17/2012	2
Total	**98**

Waterbury Hospital
PCI Case Volume
7/18/2011 -7/17/2012

The following Code was used to determine PCI Volume:
0.66
PCI codes were not provided for attempted but failed PCI cases.

Dates	PCI Volume
7/18/2011 -7/31/2011	21
08-2011	32
09-2011	27
10-2011	30
11-2011	31
12-2011	26
01-2012	24
02-2012	22
03-2012	30
04-2012	34
05-2012	26
06-2012	37
07/1/2012 -7/17/2012	11
Total	**351**

Waterbury Hospital
PCI Patient Volume
7/18/2011 -7/17/2012

Dates	Patient Total
7/18/2011 -7/31/2011	20
08-2011	32
09-2011	27
10-2011	29
11-2011	30
12-2011	26
01-2012	22
02-2012	21
03-2012	29
04-2012	33
05-2012	24
06-2012	37
07/1/2012 -7/17/2012	11
Total	**341**

Waterbury Hospital
OHS Case Volume
7/18/2011 -7/17/2012

The following Codes were used to determine Open Heart Surgery Volume:

06.31 35.11 35.12 35.21
35.22 35.23 35.24 36.11
36.12 36.13 36.14 36.15
37.31 38.45

Dates	Open Heart Surgery Volume
7/18/2011 -7/31/2011	3
08-2011	7
09-2011	9
10-2011	8
11-2011	6
12-2011	7
01-2012	11
02-2012	6
03-2012	10
04-2012	7
05-2012	8
06-2012	7
07/1/2012 -7/17/2012	6
Total	**95**

Waterbury Hospital
OHS Patient Volume
7/18/2010 -7/17/2011

Dates	Patient Total
7/18/2011 -7/31/2011	3
08-2011	7
09-2011	9
10-2011	8
11-2011	6
12-2011	7
01-2012	11
02-2012	6
03-2012	10
04-2012	7
05-2012	8
06-2012	7
07/1/2012 -7/17/2012	6
Total	**95**

NCDR®
National Cardiovascular Data Registry
CathPCI Registry®
Version 4.4

Institutional Outcomes Report
2012Q1

Saint Mary's Hospital
881416

Aggregation Date: Jul 2, 2012 11:59:59 PM

Publish Date: Jul 29, 2012

If User desires to publish or otherwise distribute or use, in whole or in part, any aggregate data or reports provided by ACCF, or produced in connection with or derived from NCDR, with the exception of strictly internal use within User's organization, User must first obtain the prior express written consent of ACCF. To the extent User is permitted to publish aggregate data, such aggregate data and any related information published in connection with it must be reviewed and approved by ACCF prior to publication.

National Cardiovascular Data Registry
CathPCI Registry®
800-257-4737
www.ncdr.com •ncdr@acc.org
©2010 American College of Cardiology Foundation

Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2012Q1

Section I: PCI Performance Measures

Endorsed by the National Quality Forum and appropriate for public reporting

PCI Performance Measures

Distribution of Hospital Performance

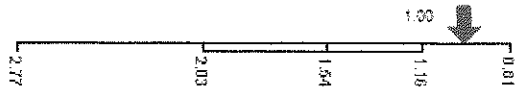
10th percentile — 90th percentile

Better →

1 **PCI in-hospital risk adjusted mortality (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
1.00	1.54	0.81

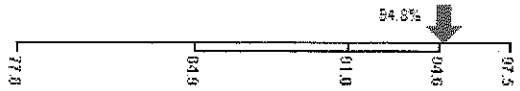
Your hospital's PCI in-hospital risk adjusted mortality rate for all patients adjusted using the NCDR® risk adjustment model. [Detail Line:2017]



38 **Composite: Discharge Medications in Eligible PCI Patients**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
94.8%	91.0%	97.5%

Patients with a PCI procedure who receive prescriptions for all medications (aspirin, P2Y12 inhibitor, and statin) for which they are eligible for at discharge. [Detail Line:1988]



Note

In-hospital risk adjusted mortality for PCI is the only performance measure in the CathPCI Registry® that has been endorsed by the National Quality Forum. Such performance measures meeting the requirement for approval are intended not only for clinical quality improvement, but also may be considered for purposes of public reporting.

The "Registry Metrics" on the subsequent pages of this report are those measures that have been developed to support self assessment and quality improvement at the provider, hospital, and/or health care system level. While these metrics have not been formally developed by the American College of Cardiology/American Heart Association Task Force for Performance Measures Task Force, they may be identified as evolving measures worthy of consideration for further development into performance measures.

Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2012Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

PCI Process Metrics

Distribution of Hospital Performance

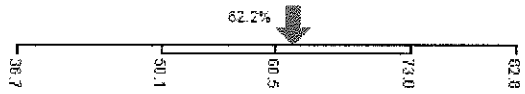
10th percentile — 90th percentile

Better →

2 **Proportion of elective PCIs with prior positive stress or imaging study**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
62.2%	60.5%	82.8%

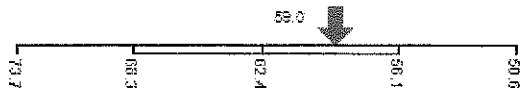
Proportion of elective PCI procedures (excluding patients with ACS) with an antecedent stress or imaging study with a positive result (suggestive of ischemia) or with a fractional flow reserve value of <=0.8 during the PCI procedure [Detail Line:1513]



3 **Median time to immediate PCI for STEMI patients (in minutes)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
59.0	62.4	50.6

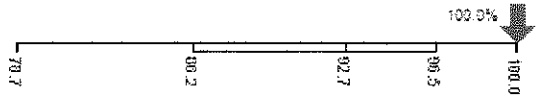
Your hospital's median time from hospital arrival to immediate PCI for STEMI patients in minutes. Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1502]



4 **Proportion of STEMI patients receiving immediate PCI w/in 90"**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
100.0%	92.7%	100.0%

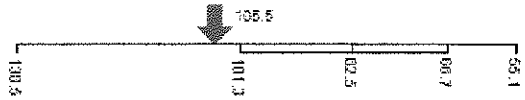
Proportion of STEMI patients with a time from your hospital arrival (or subsequent ECG if ST elevation first noted on subsequent ECG) to immediate PCI <=90". Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1503]



5 **Median time from ED arrival at STEMI transferring facility to ED arrival at STEMI receiving facility among transferred patients.**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
105.5	82.5	55.1

Your hospital's median time from arrival at transferring facility to ED arrival at STEMI receiving facility among transferred patients. [Detail Line:1505]



6 **Median time from ED arrival at STEMI transferring facility to immediate PCI at STEMI receiving facility among transferred patients (in minutes)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
154.5	113.2	82.6

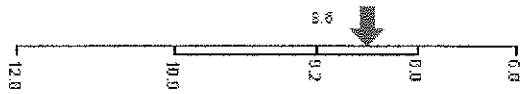
Your hospital's median time from arrival at referring facility to immediate PCI at STEMI receiving facility among transferred patients. Exclusions: Reasons for delay does not equal none. [Detail Line:1506]



7 **Median fluoro time (in minutes)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
8.6	9.2	6.8

Inclusion criteria: PCI of one vessel/lesion. Exclusion criteria: Prior CABG, or "other" procedure during the same lab visit; PCI of >1 vessel/lesion. [Detail Line:1633]



8 **Proportion of patients with aspirin prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
99.4%	98.5%	100.0%

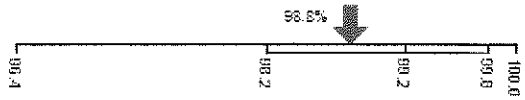
Proportion of patients (without a documented contraindication) with aspirin prescribed at discharge. [Detail Line:1978]



9 **Proportion of patients with a P2Y12 inhibitor prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
98.8%	99.2%	100.0%

Proportion of patients (without a documented contraindication) with a stent implanted that had a thienopyridine/P2Y12 inhibitor prescribed at discharge. [Detail Line:1987]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jul 2, 2012 11:59:59 PM
Publish Date: Jul 29, 2012

Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2012Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

10 **Statins prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
96.1%	93.1%	98.2%

Proportion of patients (without a documented contraindication) prescribed a statin at discharge. [Detail Line:1983]



PCI Outcome Metrics

Distribution of Hospital Performance

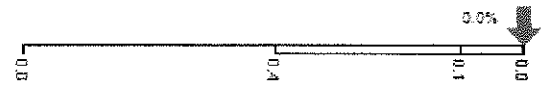
10th percentile — 90th percentile

Better →

12 **Proportion of PCI patients with emergency CABG**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.0%	0.1%	0.0%

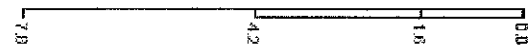
Your hospital's proportion of patients having emergency CABG (at your facility or transferred to another facility). [Detail Line:1960]



13 **Proportion of PCI procedures with a post procedure MI (among hospitals routinely collecting post-PCI biomarkers)****

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
	1.6%	0.0%

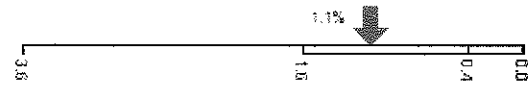
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with >= 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1803]



14 **Proportion of PCI procedures with post procedure MI (among hospitals who do not routinely collect post-PCI biomarkers)****

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
1.1%	0.4%	0.0%

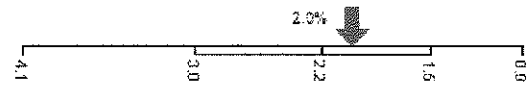
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with < 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1804]



15 **Proportion of PCI procedures with acute kidney injury*****

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
2.0%	2.2%	0.9%

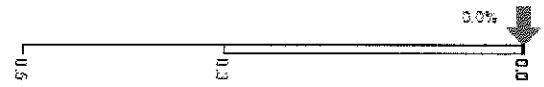
Your hospital's proportion of patients who had a rise of serum creatinine of > 50% over the pre-procedure baseline (excluding patients on dialysis pre-procedure). Inclusions: >= 90% of patients with a pre and post creatinine coded; LOS >=1 day. [Detail Line:1952]



16 **Proportion of PCI procedures with post procedure stroke**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.0%	0.0%	0.0%

Your hospital's proportion of patients with stroke post procedure. [Detail Line:1811]



17 **Composite: Proportion of PCI patients with death, emergency CABG, stroke or repeat target vessel revascularization.**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
1.7%	2.4%	1.0%

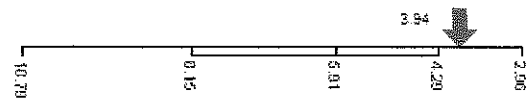
Your hospital's proportion of patients with death, emergency CABG, stroke or repeat target vessel revascularization post procedure up to hospital discharge. Excludes patients with stroke and an elective, urgent or salvage CABG during same admission. [Detail Line:1801]



18 **PCI in-hospital risk adjusted mortality (patients with STEMI)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
3.94	5.91	2.96

Your hospital's PCI in-hospital risk adjusted mortality rate for patients with STEMI adjusted using the NCDR® risk adjustment model. [Detail Line:2026]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jul 2, 2012 11:59:59 PM
Publish Date: Jul 29, 2012

Executive Summary

CathPCI Registry®

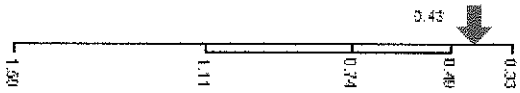
Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2012Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

19 **PCI in-hospital risk adjusted mortality (STEMI patients excluded)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.43	0.74	0.33

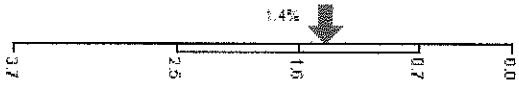
Your hospital's PCI in-hospital risk adjusted mortality rate for patients with other diagnoses (not STEMI) using the NCDR® risk adjustment model. [Detail Line:2035]



25 **Proportion of PCI procedures with transfusion of whole blood or RBCs**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
1.4%	1.6%	0.0%

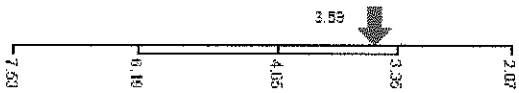
Proportion of patients who received a transfusion of whole blood or red blood cells after a PCI procedure. Inclusion: Patients with a pre-procedure hemoglobin >8 g/dL and patients with no CABG, and no other major surgery during the same admission. [Detail Line:1853]



37 **PCI in-hospital risk adjusted rate of bleeding events (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
3.59	4.65	2.07

Your hospital's risk adjusted rate of bleeding events for patients with PCI procedures using the NCDR® PCI bleeding risk adjustment model. [Detail Line:1823]



Diagnostic Cath Process Metrics

Distribution of Hospital Performance

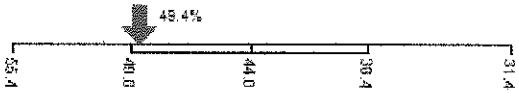
10th percentile — 90th percentile

Better →

20 **Incidence of non-obstructive CAD (elective patients only)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
49.4%	44.0%	31.4%

Patients with an elective diagnostic cath and coronary angiography with all native coronary territories <50% Exclusions: Patients with prior CABG, cardiac transplant evaluation; pre-op evaluation for non-cardiac surgery and diagnostic cath treatment recommendation of "other cardiac therapy without CABG or PCI". [Detail Line:1252]



Diagnostic Cath Outcomes Metrics

Distribution of Hospital Performance

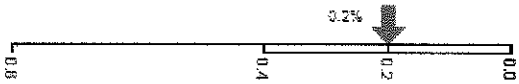
10th percentile — 90th percentile

Better →

21 **Proportion of Diagnostic Catheterization procedures with vascular access site injury requiring treatment or major bleeding***

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.2%	0.2%	0.0%

Your hospital's proportion of patients with major access site related injury requiring treatment or major bleeding. [Detail Line:1301]



Utilization Metrics

Distribution of Hospital Performance

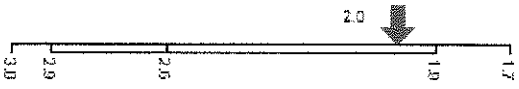
10th percentile — 90th percentile

Better →

22 **Median post-procedure length of stay (in days) for PCI patients with STEMI**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
2.0	2.6	1.7

Your hospital's median post-procedure length of stay (in days) for PCI patients with STEMI. [Detail Line:2091]



Data Quality Metrics

Distribution of Hospital Performance

10th percentile — 90th percentile

Better →

24 **Proportion of PCI procedures with creatinine assessed pre and post PCI**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
98.6%	87.4%	96.1%

Proportion of PCI patients with creatinine assessed pre and post procedure. Inclusions: LOS >=1 day. [Detail Line:1951]



Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2012Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

Test Metrics

Distribution of Hospital Performance

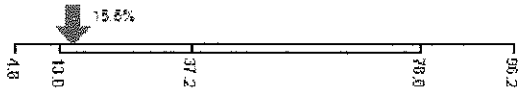
10th percentile 90th percentile

Better →

26 **Test Data Quality Metric: Proportion of PCI procedures with biomarkers assessed post-PCI for elective inpatients**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
15.6%	37.2%	96.2%

Proportion of elective procedures with biomarkers assessed post PCI.
Inclusion criteria: LOS >= 1 day and hospital status is "not outpatient".
[Detail Line:1949]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jul 2, 2012 11:59:59 PM
Publish Date: Jul 29, 2012

Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2012Q1

Section III: PCI Appropriate Use Criteria (AUC) Metrics – These data are based upon the 2009 Appropriateness Criteria for Coronary Revascularization (J Am Coll Cardiol 2009;53:530-53) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level. PCI AUC metrics are not appropriate for public/external reporting.

PCI Appropriate Use Criteria (AUC) Metrics

Distribution of Hospital Performance

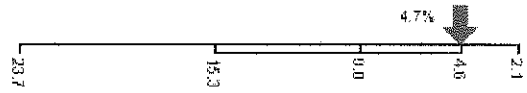
10th percentile — 90th percentile

Better →

30 **Proportion of PCI procedures not classifiable for AUC reporting**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
4.7%	9.0%	2.1%

Proportion of PCI procedures that were not classifiable/evaluated for PCI AUC reporting due to incomplete or missing data. [Detail Line:1589]



31 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were appropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
98.7%	99.5%	100.0%

Proportion of PCI procedures that were evaluated as "Appropriate", among patients with ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1581]



32 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were of uncertain appropriateness**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.0%	0.0%	0.5%

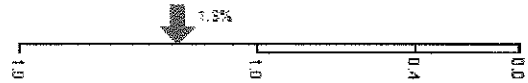
Proportion of PCI procedures that were evaluated as "Uncertain", among patients with ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1582]



33 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
1.3%	0.4%	0.0%

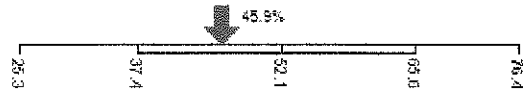
Proportion of PCI procedures that were evaluated as "Inappropriate", among patients with ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1583]



34 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were appropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
45.9%	52.1%	76.4%

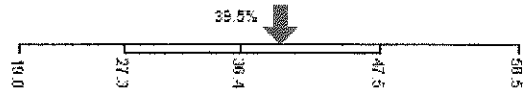
Proportion of PCI procedures that were evaluated as "Appropriate", among patients without ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1585]



35 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were of uncertain appropriateness**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
39.5%	36.4%	58.5%

Proportion of PCI procedures that were evaluated as "Uncertain", among patients without ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1586]



Executive Summary

CathPCI Registry®

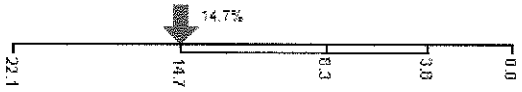
Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2012Q1

Section III: PCI Appropriate Use Criteria (AUC) Metrics – These data are based upon the 2009 Appropriateness Criteria for Coronary Revascularization (J Am Coll Cardiol 2009;53:530-53) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level. PCI AUC metrics are not appropriate for public/external reporting.

36 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
14.7%	8.3%	0.0%

Proportion of PCI procedures that were evaluated as "Inappropriate", among patients without ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1587]



Executive Summary Footnotes

*Vascular access site injury requiring treatment or major bleeding is defined as:

1.Bleeding at access site, hematoma at access site, or retroperitoneal bleed that occur within 72 hours of the procedure. To qualify, the event must be associated with a hemoglobin drop of >= 3 g/dL; transfusion of whole or packed red blood cells, or a procedural intervention/surgery at the bleeding site to reverse/stop or correct the bleeding. This excludes "GI", "GU" and "Other" bleeds.

2.Major access site related injury requiring treatment includes access site occlusion, peripheral embolization, dissection, pseudoaneurysm, AV fistula requiring treatment anytime from the procedure until discharge.

**Your rate of post procedure MI cannot be reported if you only collected cardiac biomarkers on <90% of your patients who were in the hospital >=1 day.

***Your rate of acute kidney injury cannot be reported if you only collected creatinine pre and post procedure on <90% of your patients who were in the hospital >=1 day.

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jul 2, 2012 11:59:59 PM
Publish Date: Jul 29, 2012

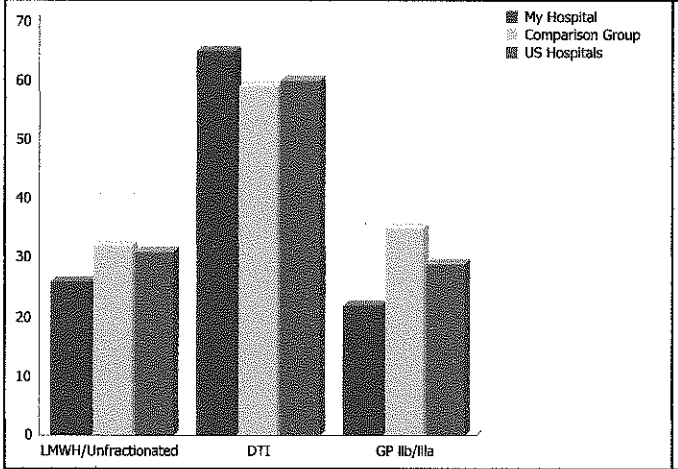
Executive Summary

CathPCI Registry®

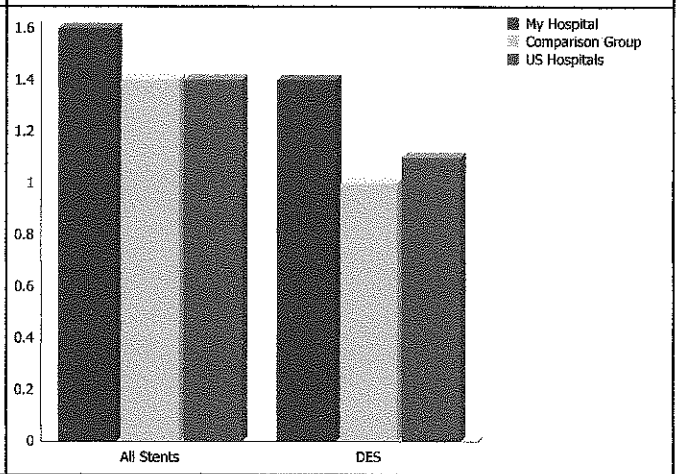
Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2012Q1

Section IV: PCI Process Comparison Metrics

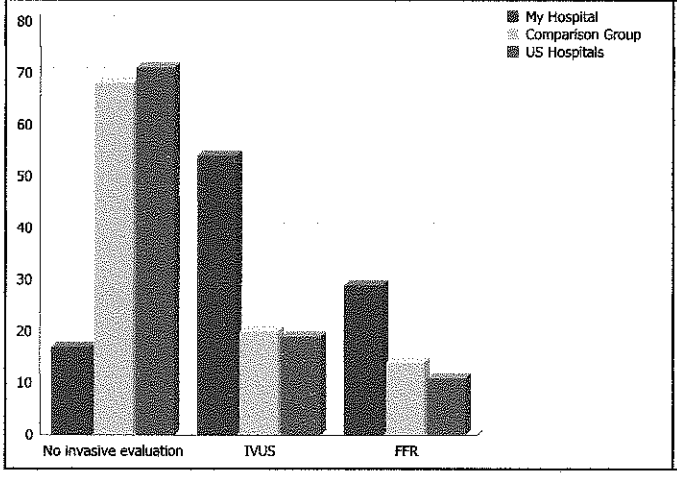
Anticoagulant Use: Any Low molecular weight/unfractionated heparin, direct thrombin inhibitors, GP IIb/IIIa inhibitor(pts with acute coronary syndrome).
[Detail Line:1600,1601,1606]



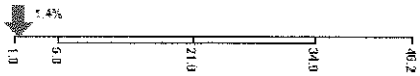
Stent Use: Average # of stents per PCI admission.
[Detail Line:1793,1794]



Intermediate stenosis lesions(40-70%): Further invasive evaluation performed (IVUS or FFR).
[Detail Line:1732,1733,1734]



Outpatients: Proportion of PCI patient admissions whose hospital status was coded as "outpatient".
[Detail Line:1390]



NCDR™
National Cardiovascular Data Registry
CathPCI Registry®
Version 4.4

Institutional Outcomes Report
2012Q1

Waterbury Hospital
841765

Aggregation Date: Jul 2, 2012 11:59:59 PM

Publish Date: Jul 29, 2012

If User desires to publish or otherwise distribute or use, in whole or in part, any aggregate data or reports provided by ACCF, or produced in connection with or derived from NCDR, with the exception of strictly internal use within User's organization, User must first obtain the prior express written consent of ACCF. To the extent User is permitted to publish aggregate data, such aggregate data and any related information published in connection with it must be reviewed and approved by ACCF prior to publication.

National Cardiovascular Data Registry
CathPCI Registry®
800-257-4737
www.ncdr.com •ncdr@acc.org
©2010 American College of Cardiology Foundation

Table of Contents

Inclusion Summary 3

Quarters included in this report 3

Comparison group included in this report 3

Release Notes 4

Frequently used terminology 5

Executive Summary 7

PCI Performance Measures 7

Data Quality Metrics 8

PCI Appropriate Use Criteria (AUC) Metrics 12

Detail Section Line Reference 15

Inclusion Summary

Quarters included in this report:

Timeframe	Benchmark Inclusion Status	Submission Type	Included in Executive Summary
2011Q2	✓	All Patients	Yes
2011Q3	✓	All Patients	Yes
2011Q4	✓	All Patients	Yes
2012Q1	✓	All Patients	Yes

Comparison group included in this report:

Volume Groups	Number of PCI Procedures per R4Q	Number of US Hospitals per Volume Group	Your Hospital's Volume Group	Your Annualized PCI Procedure Volume	Your Declared Procedure Volume
1	0-10	45			
2	11-200	313			
3	201-400	340	X	357	386
4	401-600	247			
5	601-1000	245			
6	1001-2000	141			
7	2001+	20			

Release Notes:

Executive Summary: Please refer to the Outcomes Report Companion Guide in the resources section of our website, https://www.ncdr.com/WebNCDR/RESOURCES/V4DOCUMENTS.ASPX#, for all measure and metric specifications.

1. 'Composite: Discharge Medications in Eligible PCI Patients' (metric 38, detail line 1988) is a new, National Quality Forum endorsed performance measure. This 'all or none' performance measure reports the percentage of patients with a PCI procedure with a prescription of discharge medications (statins, aspirin and P2Y12 inhibitors) for which they were eligible. Please refer to the Outcomes Report Companion Guide in the resources section of our website, https://www.ncdr.com/WebNCDR/RESOURCES/V4DOCUMENTS.ASPX#, for measure specifications.
2. Thienopyridines prescribed at discharge (metric 9, detail line 1987) – Ticagrelor now included in the medication umbrella for this metric. The medication category was modified from Thienopyridines to P2Y12 Inhibitors/Thienopyridines to include this new medication which is a broader medication category of P2Y12 Inhibitors.
3. Myocardial infarction (metric 13 and 14, detail lines 1803, 1804). A modification was made to the programming to display 'zero' instead of a null value in the numerator for detail lines 1803 and 1804. Because zeros were not previously displayed, including the zeros (and a rate of "no post procedure MI") affects the ranking and distribution of hospital performance. Please note the display of zeros will only be reflected when on one line (not both), which is based on your sites data submission and whether you routinely collect post-PCI biomarkers or not.
4. PCI in-hospital risk adjusted rate of bleeding events (metric 37, detail line 1823): Metric 11, Vascular access site injury requiring treatment or major bleeding has been replaced with a 'PCI Risk Adjusted Rate of Bleeding Events'. The retired metric is still displayed on detail line 1849. Please refer to the "CathPCI Registry Risk -adjusted Outcomes Interpretation and Specifications" in the resources section of our website, https://www.ncdr.com/WebNCDR/RESOURCES/V4DOCUMENTS.ASPX# , for model specifications.
5. Transfusions (metric 25). An additional exclusion criterion was added to this metric to align it with the specifications of the PCI bleeding model. Patients who have a pre-PCI hemeglobin level of <= 8 g/dL are excluded in the metric.
6. PCI Appropriate Use Criteria Metrics (30-36)– The 'test' status has been removed from the metrics in this section.

Executive Summary Section IV: PCI Process Comparisons:

1. Anticoagulant Use: Low molecular weight heparin, direct thrombin inhibitors, GP IIb/IIIa inhibitor(pts with acute coronary syndrome). Low molecular weight heparin (any) and Unfractionated heparin (any) are now combined in the first bar of the graph (the graph previously reported only low molecular weight heparins in this bar). Please note: a minor adjustment is being made to the denominator of this graph, which will be reflected in the 2012q1 report.

Detail lines:

1. New line, 1988: See above information describing Measure 38.
2. New line, 1600: Reports patients with PCI procedures that received either a low molecular weight heparin (any) and/or unfractionated heparin (any). Please note: a minor adjustment is being made to the denominator to this line, and the data will be displayed in the 2012Q1 report.
3. New lines 1818-1826: Risk adjusted bleeding. Please refer to the 'CathPCI Registry Risk -adjusted Outcomes Interpretation and Specifications' in the resources section of our website, https://www.ncdr.com/WebNCDR/RESOURCES/V4DOCUMENTS.ASPX# , for model specifications.
4. New or modified lines- 1608, 1612: Ticagrelor was added to the Pre-PCI medications and is included in line 1608, and reported separately in line 1612. Ticagrelor is considered a P2Y12 inhibitor so the medication category description of line 1608 (thienopyridine) was expanded to Thienopyridine/P2Y12.
5. New or modified lines- 1986-1987: Ticagrelor was added to the medications prescribed at discharge and is included in line 1986 and 1987. Ticagrelor is considered a P2Y12 inhibitor so the medication category description of line 1986 (thienopyridine) was expanded to Thienopyridine/P2Y12.
6. Modified lines 1852-1853: RBC/Whole Blood Transfusion has an additional exclusion criterion align it with the specifications of the PCI bleeding model. Patients who have a pre-PCI hemoglobin level of <= 8 g/dL are excluded.
7. Modified lines 1803, 1804 (myocardial infarction): A modification was made to the programming to display 'zero' instead of a null value in the numerator when you had NO post procedure MI for that quarter. The display of zeros will only be reflected one line (not both), which is based on your sites data submission and whether you routinely collect post-PCI biomarkers or not.
8. New lines 1302, 1303, 1850, 1851, 1894. 1895, 1942, 1943. Vascular access site injury or bleeding by access site (comparing outcomes by femoral or radial access) have been added to the report. The data in these new sections are still undergoing testing and will be displayed in the 2012q1 report.

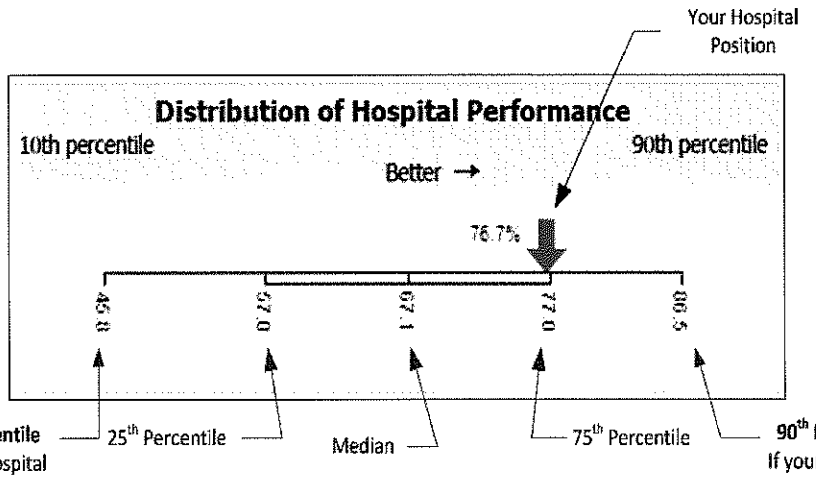
Frequently used terminology:

R4Q (Rolling Four Quarters)	The four (4) consecutive quarters included in this report. (Example: The 2011Q1 report includes 2010Q2, 2010Q3, 2010Q4 and 2011Q1. The "Q" in 'R4Q" indicates the last quarter of the rolling four quarters).
Benchmark Inclusion Status	Indicates whether a submission will be included in the R4Q aggregated data (benchmark) and comparison group statistics. "Green","Yellow" and "Red" stoplights denote the status. A "Green" status indicates the submission (one quarter/timeframe) is included in the benchmark and comparison group statistics. The data has successfully passed all data assessment and completeness checks. A "Yellow" status indicates the submission (one quarter/timeframe) is not included in the benchmark and comparison group statistics. Data is displayed in the quarterly column, but is not included in the "My Hospital R4Q" summary. The data has not passed the overall completeness assessment checks. A "Red" status indicates the submission (one quarter/timeframe) is not included in the benchmark or comparison group statistics. Data is not displayed in the quarterly column. A null or blank status indicates no submission has been received for that quarter/timeframe. Data is not displayed in the quarterly column.
Submission Type	Indicates the Submission Type based on the percentage of procedures performed in the submission file. A file with fewer than 50% of the procedures performed indicated as Diagnostic Catheterizations are designated as "PCI Only" submissions.
My Hospital R4Q	The values for a metric/measure (over R4Q) of data submitted by your facility with a Benchmark Inclusion Status of "Green".
US Hospital 50th Pctl	The median (or midpoint or 50th percentile) of US participant aggregated data for the metric or measure. Half of all participants will be above the median, and half will be below. This value will correspond to the midpoint of the box/whisker plot.
US Hospital 90th Pctl	The 90th percentile of US participant aggregated data for the metric or measure. 10% of all participants will be above the 90th percentile value, and 90% will be below. This value will correspond to the right-most endpoint of the box/whisker plot.
Annualized Volume	Annualized Volume is the total number of PCI procedures submitted over the R4Q period, adjusted for the number of quarters in which valid submissions were received during the R4Q period.
Volume Group Pts R4Q	The aggregated value for the metric/measure across all patients in the specified comparison group (over R4Q). Comparison Groups are based on annualized procedure volume. See the Comparison Group chart on the Inclusion Summary page of this report. To be included, data must have a Benchmark Inclusion Status of "Green".
US Registry Pts R4Q	The aggregated value for the measure/metric across US patients (over R4Q). To be included, data must have a Benchmark Inclusion Status of "Green". Only facilities in the United States and outlying territories are included.
Declared Procedure Volume	Indicates the estimated annual procedure volume as reported by the facility on the NCDR website Site Profile.
LFHS	This stands for Leapfrog Hospital Survey. This is to help identify the lines that are used for Leapfrog reporting for our participants. Please note that in the detail lines you will see "(LFHS)" to denote the lines that are to be used for Actual and Risk Adjusted Mortality Rate calculations.
Actual Mortality Rate (LFHS)	Enter your hospital's (actual) observed mortality rate (OMR) as a percentage. Using data from the My Hospital R4Q "Num" column in the current NCDR CathPCI Registry Institutional Outcomes Reports, OMR must be calculated by dividing the number for "Observed Mortality (among eligible) (LFHS)" by the number for "Eligible pts (LFHS)" to obtain the % rate for the most recent rolling four quarters where 12 consecutive months of data was submitted [i.e., Observed Mortality (among eligible) (LFHS)/Eligible pts (LFHS)].
Expected Mortality Rate (LFHS)	Enter your hospital's expected mortality rate (EMR) as a percentage. Using data from the Hospital R4Q "Num" column in the current NCDR CathPCI Registry Institutional Outcomes Reports, EMR must be calculated by dividing the number for "Expected Mortality (among eligible) (LFHS)" by the number for "Eligible pts (LFHS)" to obtain the % rate for the most recent rolling four quarters where 12 consecutive months of data was submitted [i.e., Expected Mortality (among eligible) (LFHS)/Eligible pts (LFHS)].

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Box and Whisker Plots

Interpreting Box and Whisker Plots



10th percentile
If your hospital scores below the 10th percentile, the arrow will be on the left of this number.

25th Percentile — Median — 75th Percentile

90th Percentile
If your hospital scores above the 90th percentile, the arrow will be on the right of this number.

10th Percentile
90% of the hospitals achieved "better" scores than the 10th percentile.

25th Percentile or 1st Quartile
75% of the hospitals achieved "better" scores than the 25th percentile.

50th Percentile or 2nd Quartile
Middle of the distribution: Half of the hospitals data is above and half are below the median.

75th Percentile or 3rd Quartile
25% of the hospitals achieved "better" scores than the 75th percentile.

90th Percentile
10% of the hospitals achieved "better" scores than the 90th percentile.

Your Hospital Position
Your 'Hospital Position' in relation to all other hospitals' data.

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

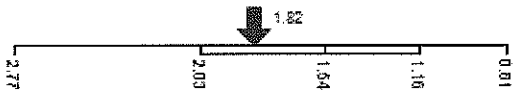
Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2012Q1

Section I: PCI Performance Measures

Endorsed by the National Quality Forum and appropriate for public reporting

PCI Performance Measures		Distribution of Hospital Performance (10th percentile — 90th percentile; Better →)
1	**PCI in-hospital risk adjusted mortality (all patients)** My Hospital: 1.82 | US Hospitals 50th Pctl: 1.54 | US Hospitals 90th Pctl: 0.81 Your hospital's PCI in-hospital risk adjusted mortality rate for all patients adjusted using the NCDR® risk adjustment model. [Detail Line:2017]	
38	**Composite: Discharge Medications in Eligible PCI Patients** My Hospital: 94.6% | US Hospitals 50th Pctl: 91.0% | US Hospitals 90th Pctl: 97.5% Patients with a PCI procedure who receive prescriptions for all medications (aspirin, P2Y12 inhibitor, and statin) for which they are eligible for at discharge. [Detail Line:1988]	

Note

In-hospital risk adjusted mortality for PCI is the only performance measure in the CathPCI Registry® that has been endorsed by the National Quality Forum. Such performance measures meeting the requirement for approval are intended not only for clinical quality improvement, but also may be considered for purposes of public reporting.

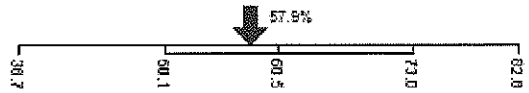
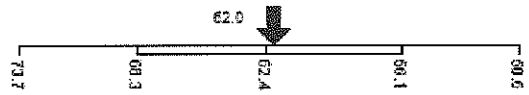
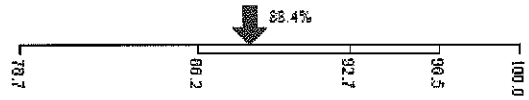
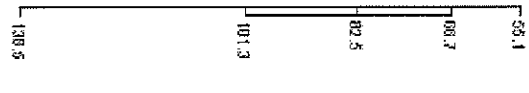
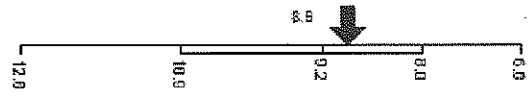
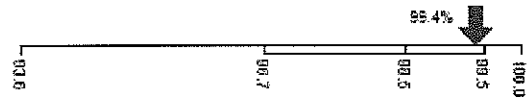
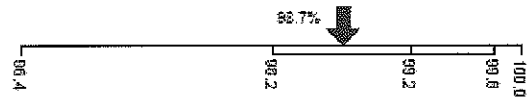
The "Registry Metrics" on the subsequent pages of this report are those measures that have been developed to support self assessment and quality improvement at the provider, hospital, and/or health care system level. While these metrics have not been formally developed by the American College of Cardiology/American Heart Association Task Force for Performance Measures Task Force, they may be identified as evolving measures worthy of consideration for further development into performance measures.

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2012Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

	PCI Process Metrics	Distribution of Hospital Performance (10th percentile – 90th percentile; Better →)
2	**Proportion of elective PCIs with prior positive stress or imaging study** My Hospital: 57.9% | US Hospitals 50th Pctl: 60.5% | US Hospitals 90th Pctl: 82.8% Proportion of elective PCI procedures (excluding patients with ACS) with an antecedent stress or imaging study with a positive result (suggestive of ischemia) or with a fractional flow reserve value of <=0.8 during the PCI procedure [Detail Line:1513]	
3	**Median time to immediate PCI for STEMI patients (in minutes)** My Hospital: 62.0 | US Hospitals 50th Pctl: 62.4 | US Hospitals 90th Pctl: 50.6 Your hospital's median time from hospital arrival to immediate PCI for STEMI patients in minutes. Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1502]	
4	**Proportion of STEMI patients receiving immediate PCI w/in 90"** My Hospital: 88.4% | US Hospitals 50th Pctl: 92.7% | US Hospitals 90th Pctl: 100.0% Proportion of STEMI patients with a time from your hospital arrival (or subsequent ECG if ST elevation first noted on subsequent ECG) to immediate PCI <=90". Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1503]	
5	**Median time from ED arrival at STEMI transferring facility to ED arrival at STEMI receiving facility among transferred patients.** My Hospital: [blank] | US Hospitals 50th Pctl: 82.5 | US Hospitals 90th Pctl: 55.1 Your hospital's median time from arrival at transferring facility to ED arrival at STEMI receiving facility among transferred patients. [Detail Line:1505]	
6	**Median time from ED arrival at STEMI transferring facility to immediate PCI at STEMI receiving facility among transferred patients (in minutes)** My Hospital: [blank] | US Hospitals 50th Pctl: 113.2 | US Hospitals 90th Pctl: 82.6 Your hospital's median time from arrival at referring facility to immediate PCI at STEMI receiving facility among transferred patients. Exclusions: Reasons for delay does not equal none. [Detail Line:1506]	
7	**Median fluoro time (in minutes)** My Hospital: 8.9 | US Hospitals 50th Pctl: 9.2 | US Hospitals 90th Pctl: 6.8 Inclusion criteria: PCI of one vessel/lesion. Exclusion criteria: Prior CABG, or "other" procedure during the same lab visit; PCI of >1 vessel/lesion. [Detail Line:1633]	
8	**Proportion of patients with aspirin prescribed at discharge** My Hospital: 99.4% | US Hospitals 50th Pctl: 98.5% | US Hospitals 90th Pctl: 100.0% Proportion of patients (without a documented contraindication) with aspirin prescribed at discharge. [Detail Line:1978]	
9	**Proportion of patients with a P2Y12 inhibitor prescribed at discharge** My Hospital: 98.7% | US Hospitals 50th Pctl: 99.2% | US Hospitals 90th Pctl: 100.0% Proportion of patients (without a documented contraindication) with a stent implanted that had a thienopyridine/P2Y12 inhibitor prescribed at discharge. [Detail Line:1987]	

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jul 2, 2012 11:59:59 PM
Publish Date: Jul 29, 2012

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2012Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

10 **Statins prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
96.3%	93.1%	98.2%

Proportion of patients (without a documented contraindication) prescribed a statin at discharge. [Detail Line:1983]



PCI Outcome Metrics

Distribution of Hospital Performance

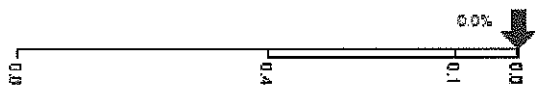
10th percentile — 90th percentile

Better →

12 **Proportion of PCI patients with emergency CABG**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.0%	0.1%	0.0%

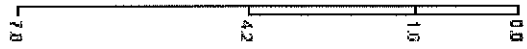
Your hospital's proportion of patients having emergency CABG (at your facility or transferred to another facility). [Detail Line:1960]



13 **Proportion of PCI procedures with a post procedure MI (among hospitals routinely collecting post-PCI biomarkers)****

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
	1.6%	0.0%

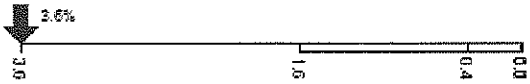
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with >= 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1803]



14 **Proportion of PCI procedures with post procedure MI (among hospitals who do not routinely collect post-PCI biomarkers)****

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
3.6%	0.4%	0.0%

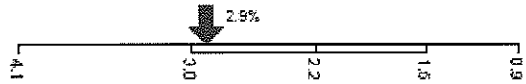
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with < 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1804]



15 **Proportion of PCI procedures with acute kidney injury*****

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
2.9%	2.2%	0.9%

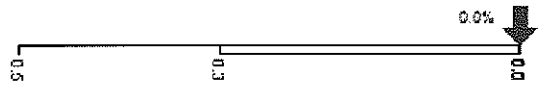
Your hospital's proportion of patients who had a rise of serum creatinine of > 50% over the pre-procedure baseline (excluding patients on dialysis pre-procedure). Inclusions: >= 90% of patients with a pre and post creatinine coded; LOS >=1 day. [Detail Line:1952]



16 **Proportion of PCI procedures with post procedure stroke**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.0%	0.0%	0.0%

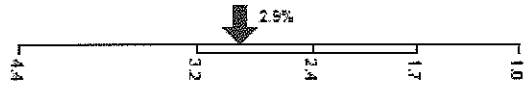
Your hospital's proportion of patients with stroke post procedure. [Detail Line:1811]



17 **Composite: Proportion of PCI patients with death, emergency CABG, stroke or repeat target vessel revascularization.**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
2.9%	2.4%	1.0%

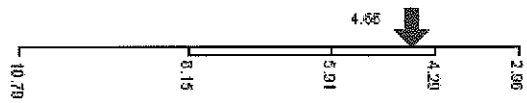
Your hospital's proportion of patients with death, emergency CABG, stroke or repeat target vessel revascularization post procedure up to hospital discharge. Excludes patients with stroke and an elective, urgent or salvage CABG during same admission. [Detail Line:1801]



18 **PCI in-hospital risk adjusted mortality (patients with STEMI)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
4.66	5.91	2.96

Your hospital's PCI in-hospital risk adjusted mortality rate for patients with STEMI adjusted using the NCDR® risk adjustment model. [Detail Line:2026]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jul 2, 2012 11:59:59 PM
Publish Date: Jul 29, 2012

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2012Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

19 **PCI in-hospital risk adjusted mortality (STEMI patients excluded)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
1.06	0.74	0.33

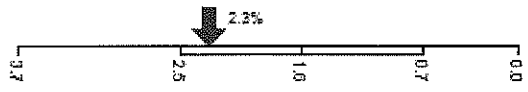
Your hospital's PCI in-hospital risk adjusted mortality rate for patients with other diagnoses (not STEMI) using the NCDR® risk adjustment model. [Detail Line:2035]



25 **Proportion of PCI procedures with transfusion of whole blood or RBCs**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
2.3%	1.6%	0.0%

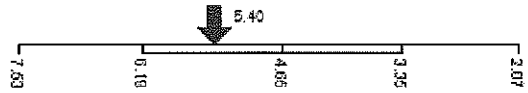
Proportion of patients who received a transfusion of whole blood or red blood cells after a PCI procedure. Inclusion: Patients with a pre-procedure hemoglobin >8 g/dL and patients with no CABG, and no other major surgery during the same admission. [Detail Line:1853]



37 **PCI in-hospital risk adjusted rate of bleeding events (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
5.40	4.65	2.07

Your hospital's risk adjusted rate of bleeding events for patients with PCI procedures using the NCDR® PCI bleeding risk adjustment model. [Detail Line:1823]



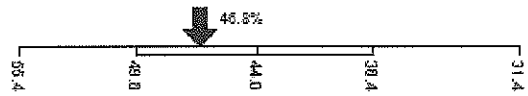
Diagnostic Cath Process Metrics



20 **Incidence of non-obstructive CAD (elective patients only)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
46.8%	44.0%	31.4%

Patients with an elective diagnostic cath and coronary angiography with all native coronary territories <50% Exclusions: Patients with prior CABG, cardiac transplant evaluation; pre-op evaluation for non-cardiac surgery and diagnostic cath treatment recommendation of "other cardiac therapy without CABG or PCI". [Detail Line:1252]



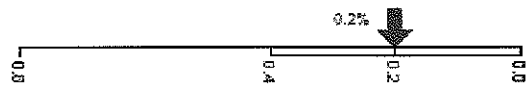
Diagnostic Cath Outcomes Metrics



21 **Proportion of Diagnostic Catheterization procedures with vascular access site injury requiring treatment or major bleeding***

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.2%	0.2%	0.0%

Your hospital's proportion of patients with major access site related injury requiring treatment or major bleeding. [Detail Line:1301]



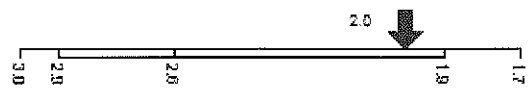
Utilization Metrics



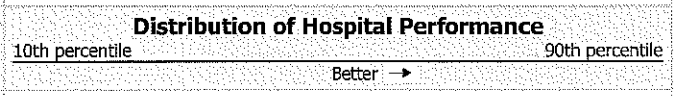
22 **Median post-procedure length of stay (in days) for PCI patients with STEMI**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
2.0	2.6	1.7

Your hospital's median post-procedure length of stay (in days) for PCI patients with STEMI. [Detail Line:2091]



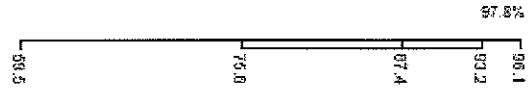
Data Quality Metrics



24 **Proportion of PCI procedures with creatinine assessed pre and post PCI**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
97.8%	87.4%	96.1%

Proportion of PCI patients with creatinine assessed pre and post procedure. Inclusions: LOS >=1 day. [Detail Line:1951]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jul 2, 2012 11:59:59 PM
Publish Date: Jul 29, 2012

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2012Q1

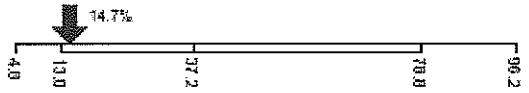
Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

Test Metrics	Distribution of Hospital Performance
10th percentile ... 90th percentile; Better →	

26 **Test Data Quality Metric: Proportion of PCI procedures with biomarkers assessed post-PCI for elective inpatients**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
14.7%	37.2%	96.2%

Proportion of elective procedures with biomarkers assessed post PCI.
Inclusion criteria: LOS >= 1 day and hospital status is "not outpatient".
[Detail Line:1949]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jul 2, 2012 11:59:59 PM
Publish Date: Jul 29, 2012

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2012Q1

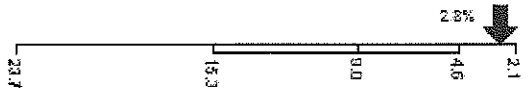
Section III: PCI Appropriate Use Criteria (AUC) Metrics – These data are based upon the 2009 Appropriateness Criteria for Coronary Revascularization (J Am Coll Cardiol 2009;53:530-53) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level. PCI AUC metrics are not appropriate for public/external reporting.

PCI Appropriate Use Criteria (AUC) Metrics	Distribution of Hospital Performance (10th percentile – 90th percentile; Better →)

30 **Proportion of PCI procedures not classifiable for AUC reporting**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
2.8%	9.0%	2.1%

Proportion of PCI procedures that were not classifiable/evaluated for PCI AUC reporting due to incomplete or missing data. [Detail Line:1589]



31 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were appropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
98.9%	99.5%	100.0%

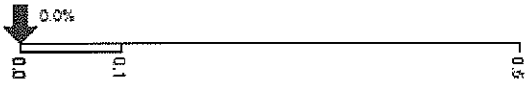
Proportion of PCI procedures that were evaluated as "Appropriate", among patients with ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1581]



32 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were of uncertain appropriateness**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.0%	0.0%	0.5%

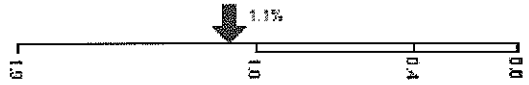
Proportion of PCI procedures that were evaluated as "Uncertain", among patients with ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1582]



33 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
1.1%	0.4%	0.0%

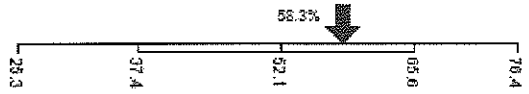
Proportion of PCI procedures that were evaluated as "Inappropriate", among patients with ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1583]



34 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were appropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
58.3%	52.1%	76.4%

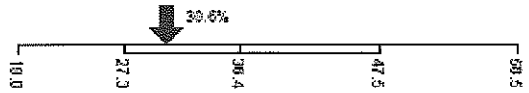
Proportion of PCI procedures that were evaluated as "Appropriate", among patients without ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1585]



35 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were of uncertain appropriateness**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
30.6%	36.4%	58.5%

Proportion of PCI procedures that were evaluated as "Uncertain", among patients without ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1586]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jul 2, 2012 11:59:59 PM
Publish Date: Jul 29, 2012

Executive Summary

CathPCI Registry®

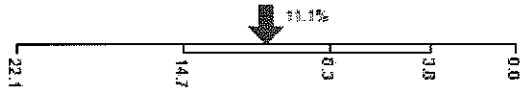
Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2012Q1

Section III: PCI Appropriate Use Criteria (AUC) Metrics – These data are based upon the 2009 Appropriateness Criteria for Coronary Revascularization (J Am Coll Cardiol 2009;53:530-53) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level. PCI AUC metrics are not appropriate for public/external reporting.

36 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
11.1%	8.3%	0.0%

Proportion of PCI procedures that were evaluated as "Inappropriate", among patients without ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1587]



Executive Summary Footnotes

*Vascular access site injury requiring treatment or major bleeding is defined as:

1.Bleeding at access site, hematoma at access site, or retroperitoneal bleed that occur within 72 hours of the procedure. To qualify, the event must be associated with a hemoglobin drop of >= 3 g/dL; transfusion of whole or packed red blood cells, or a procedural intervention/surgery at the bleeding site to reverse/stop or correct the bleeding. This excludes "GI", "GU" and "Other" bleeds.

2.Major access site related injury requiring treatment includes access site occlusion, peripheral embolization, dissection, pseudoaneurysm, AV fistula requiring treatment anytime from the procedure until discharge.

**Your rate of post procedure MI cannot be reported if you only collected cardiac biomarkers on <90% of your patients who were in the hospital >=1 day.

***Your rate of acute kidney injury cannot be reported if you only collected creatinine pre and post procedure on <90% of your patients who were in the hospital >=1 day.

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jul 2, 2012 11:59:59 PM
Publish Date: Jul 29, 2012

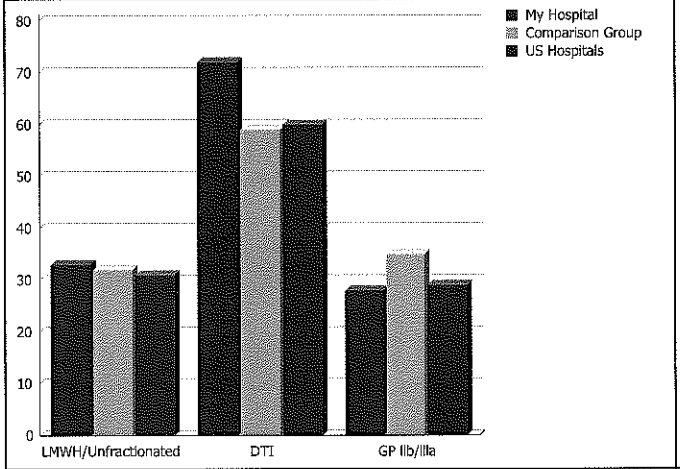
Executive Summary

CathPCI Registry®

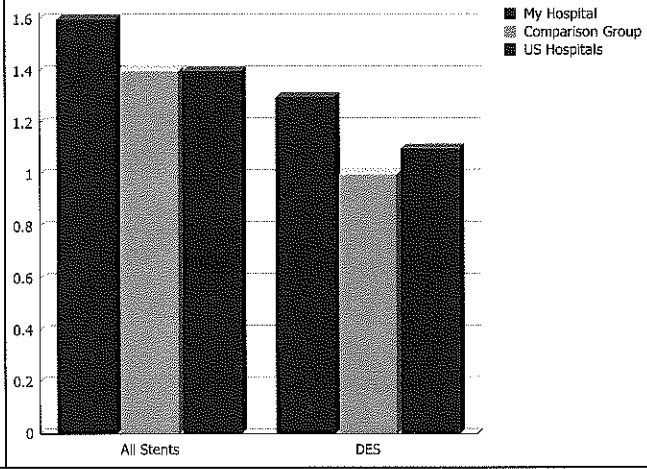
Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2012Q1

Section IV: PCI Process Comparison Metrics

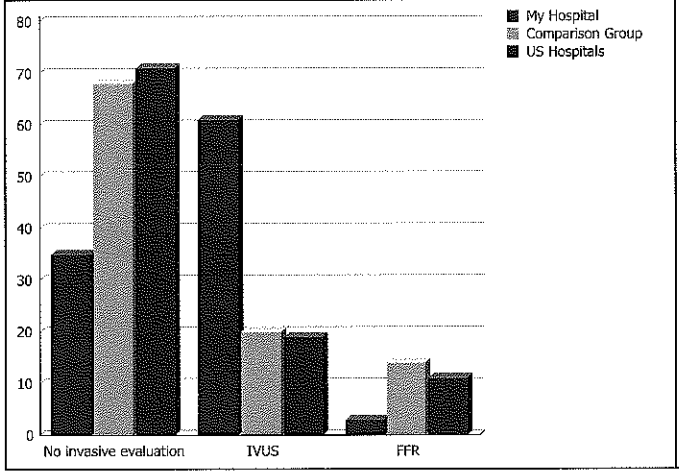
Anticoagulant Use: Any Low molecular weight/unfractionated heparin, direct thrombin inhibitors, GP IIb/IIIa inhibitor(pts with acute coronary syndrome).
[Detail Line:1600,1601,1606]



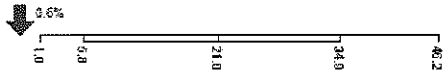
Stent Use: Average # of stents per PCI admission.
[Detail Line:1793,1794]



Intermediate stenosis lesions(40-70%): Further invasive evaluation performed (IVUS or FFR).
[Detail Line:1732,1733,1734]



Outpatients: Proportion of PCI patient admissions whose hospital status was coded as "outpatient".
[Detail Line:1390]

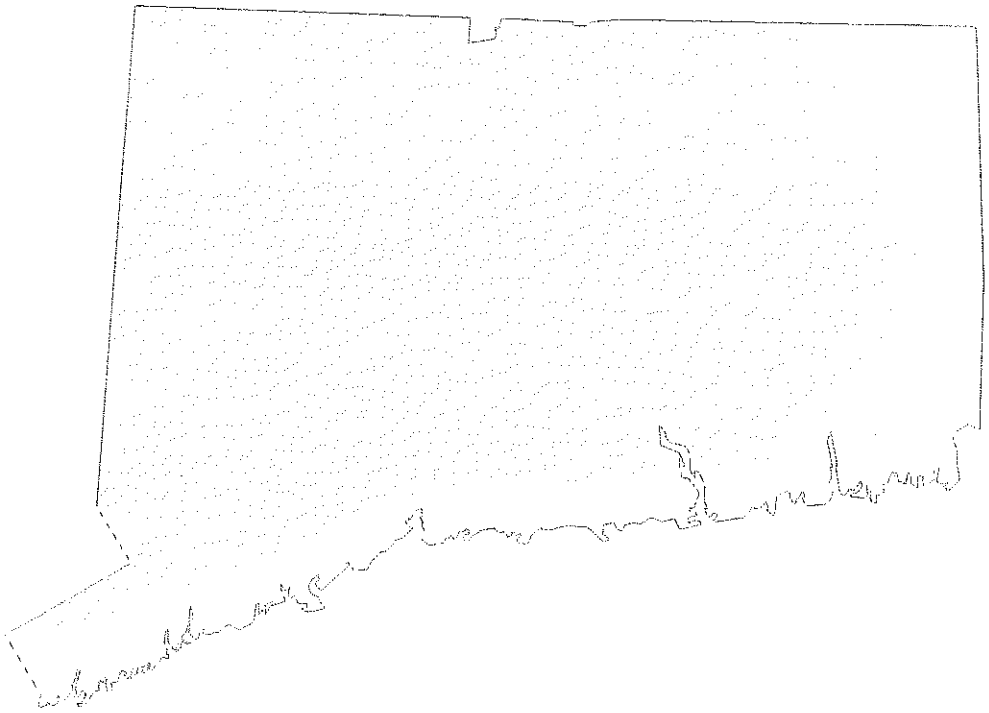




Regional Outcomes Comparison

Participant 30397
STS Period Ending 12/31/2011

Duke Clinical Research Institute



The region displayed for your site contains the following state(s):
Connecticut

Between 2009 and 2011, there were 11 participants in this region



Regional Outcomes Comparison

Participant 30397
STS Period Ending 12/31/2011

Duke Clinical Research Institute

	Participant 2011	Region 2011
Isolated CAB		
Number of Cases	46	1,500
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	2.2%	1.9%
Risk-adjusted rate	3.0%	1.9%
Lower 95% confidence limit	0.2%	1.3%
Upper 95% confidence limit	14.4%	2.7%
Operative Mortality		
Observed Rate	2.2%	2.1%
Risk-adjusted rate	3.0%	2.1%
Lower 95% confidence limit	0.2%	1.4%
Upper 95% confidence limit	14.4%	2.9%
Complications Summary & Risk-Adjustment		
Major complications or operative mortality		
Observed Rate	13.0%	15.5%
Risk-adjusted rate	15.9%	16.3%
Lower 95% confidence limit	6.7%	14.5%
Upper 95% confidence limit	30.4%	18.1%
Any reoperation		
Observed Rate	2.2%	4.7%
Risk-adjusted rate	2.5%	4.8%
Lower 95% confidence limit	0.1%	3.8%
Upper 95% confidence limit	12.6%	5.9%
Deep sternal wound infection		
Observed Rate	**0.0%**	0.1%
Risk-adjusted rate	0.0%	0.1%
Lower 95% confidence limit	0.0%	0.0%
Upper 95% confidence limit	9.0%	0.4%
Permanent stroke		
Observed Rate	2.2%	1.8%
Risk-adjusted rate	2.6%	1.8%
Lower 95% confidence limit	0.1%	1.2%
Upper 95% confidence limit	13.3%	2.6%

	Participant 2011	Region 2011
Renal failure		
Observed Rate	4.4%	3.1%
Risk-adjusted rate	5.6%	3.3%
Lower 95% confidence limit	1.0%	2.5%
Upper 95% confidence limit	17.4%	4.4%
Prolonged ventilation		
Observed Rate	10.9%	11.9%
Risk-adjusted rate	14.7%	12.6%
Lower 95% confidence limit	5.6%	11.1%
Upper 95% confidence limit	30.1%	14.3%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	9.5	9.5
Median	7.5	7.0
Post-Procedure Length of Stay (days)		
Mean	6.7	7.1
Median	6.0	5.0
Length of Stay Risk-Adjustment		
Short stay: PLOS <6 days		
Observed Rate	43.5%	52.1%
Risk-adjusted rate	40.3%	51.0%
Lower 95% confidence limit	27.7%	48.7%
Upper 95% confidence limit	52.6%	53.3%
Long stay: PLOS >14 days		
Observed Rate	2.2%	6.0%
Risk-adjusted rate	2.8%	6.3%
Lower 95% confidence limit	0.1%	5.1%
Upper 95% confidence limit	13.6%	7.6%



Regional Outcomes Comparison

Participant 30397
STS Period Ending 12/31/2011

Duke Clinical Research Institute

	Participant 2011	Region 2011
Aortic Valve Replacement		
Number of Cases	14	361
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	7.1%	1.9%
Risk-adjusted rate	9.1%	1.9%
Lower 95% confidence limit	0.5%	0.8%
Upper 95% confidence limit	37.6%	3.7%
Operative Mortality		
Observed Rate	7.1%	1.9%
Risk-adjusted rate	9.1%	1.9%
Lower 95% confidence limit	0.5%	0.8%
Upper 95% confidence limit	37.6%	3.7%
Complications Summary		
Major complications or operative mortality	35.7%	15.2%
Any reoperation	7.1%	6.1%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	7.1%	2.5%
Renal failure	7.1%	3.4%
Prolonged ventilation	21.4%	9.7%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	8.1	8.8
Median	7.5	7.0
Post-Procedure Length of Stay (days)		
Mean	5.9	7.5
Median	5.5	6.0
PLOS <6 days	50.0%	45.4%
PLOS >14 days	0.0%	5.8%

	Participant 2011	Region 2011
Aortic Valve Replacement + CAB		
Number of Cases	3	257
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	33.3%	2.7%
Risk-adjusted rate	45.5%	2.6%
Lower 95% confidence limit	2.4%	1.2%
Upper 95% confidence limit	106.9%	5.2%
Operative Mortality		
Observed Rate	33.3%	3.1%
Risk-adjusted rate	45.5%	3.0%
Lower 95% confidence limit	2.4%	1.4%
Upper 95% confidence limit	106.9%	5.7%
Complications Summary		
Major complications or operative mortality	33.3%	23.7%
Any reoperation	33.3%	7.4%
Deep sternal wound infection	0.0%	0.8%
Permanent stroke	0.0%	1.6%
Renal failure	0.0%	6.0%
Prolonged ventilation	0.0%	18.7%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	7.0	11.1
Median	7.0	9.0
Post-Procedure Length of Stay (days)		
Mean	5.0	8.9
Median	6.0	7.0
PLOS <6 days	0.0%	29.2%
PLOS >14 days	0.0%	8.9%



Regional Outcomes Comparison

Participant 30397
STS Period Ending 12/31/2011

Duke Clinical Research Institute

	Participant 2011	Region 2011
Mitral Valve Replacement		
Number of Cases	5	64
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	20.0%	6.3%
Risk-adjusted rate	17.6%	5.0%
Lower 95% confidence limit	0.9%	1.7%
Upper 95% confidence limit	53.1%	11.3%
Operative Mortality		
Observed Rate	20.0%	9.4%
Risk-adjusted rate	17.6%	7.5%
Lower 95% confidence limit	0.9%	3.3%
Upper 95% confidence limit	53.1%	14.4%
Complications Summary		
Major complications or operative mortality	80.0%	32.8%
Any reoperation	0.0%	6.3%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	0.0%	3.1%
Renal failure	25.0%	10.3%
Prolonged ventilation	60.0%	31.3%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	15.8	14.8
Median	10.0	10.0
Post-Procedure Length of Stay (days)		
Mean	13.6	10.9
Median	10.0	8.0
PLOS <6 days	0.0%	18.8%
PLOS >14 days	40.0%	20.3%

	Participant 2011	Region 2011
Mitral Valve Replacement + CAB		
Number of Cases	-	44
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	-	13.6%
Risk-adjusted rate	-	10.7%
Lower 95% confidence limit	-	4.5%
Upper 95% confidence limit	-	20.1%
Operative Mortality		
Observed Rate	-	13.6%
Risk-adjusted rate	-	10.7%
Lower 95% confidence limit	-	4.5%
Upper 95% confidence limit	-	20.1%
Complications Summary		
Major complications or operative mortality	-	43.2%
Any reoperation	-	20.5%
Deep sternal wound infection	-	0.0%
Permanent stroke	-	0.0%
Renal failure	-	15.9%
Prolonged ventilation	-	36.4%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	-	16.3
Median	-	13.0
Post-Procedure Length of Stay (days)		
Mean	-	12.7
Median	-	10.0
PLOS <6 days	-	6.8%
PLOS >14 days	-	15.9%

Regional Outcomes Comparison

Participant 30397
STS Period Ending 12/31/2011

Duke Clinical Research Institute

	Participant 2011	Region 2011
Mitral Valve Repair		
Number of Cases	2	121
Mortality Summary & Risk-Adjustment		
In-hospital Mortality	0.0%	0.0%
Operative Mortality	0.0%	0.8%
Complications Summary		
Major complications or operative mortality	50.0%	6.6%
Any reoperation	0.0%	3.3%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	0.0%	0.0%
Renal failure	0.0%	0.0%
Prolonged ventilation	50.0%	3.3%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	10.0	7.1
Median	10.0	5.0
Post-Procedure Length of Stay (days)		
Mean	5.0	5.8
Median	5.0	5.0
PLOS <6 days	100.0%	62.8%
PLOS >14 days	0.0%	1.7%

	Participant 2011	Region 2011
Mitral Valve Repair + CAB		
Number of Cases	-	55
Mortality Summary & Risk-Adjustment		
In-hospital Mortality	-	0.0%
Operative Mortality	-	0.0%
Complications Summary		
Major complications or operative mortality	-	29.1%
Any reoperation	-	9.1%
Deep sternal wound infection	-	1.8%
Permanent stroke	-	0.0%
Renal failure	-	3.7%
Prolonged ventilation	-	29.1%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	-	13.0
Median	-	10.0
Post-Procedure Length of Stay (days)		
Mean	-	10.2
Median	-	7.0
PLOS <6 days	-	27.3%
PLOS >14 days	-	12.7%



Other Procedures

Participant 30397
STS Period Ending 12/31/2011

Duke Clinical Research Institute

STS 2011	AV Replace + MV Replace	Pulmonic Valve	Tricuspid Valve	LVA	VSD	ASD	SVR
Number of Cases	1,546	452	7,812	765	652	3,806	201
Demographics							
Age (years)	64.3	41.9	64.8	63.5	58.3	58.8	63.0
>= 65 years old	54.3%	10.0%	58.3%	49.3%	37.4%	41.3%	47.8%
Gender, Female	51.9%	44.5%	58.0%	32.2%	41.6%	48.3%	28.9%
Operative Data							
Cross-clamp Time (min)							
Mean	148.4	119.6	119.9	98.8	116.2	96.3	98.9
Median	140.0	107.0	112.0	90.0	108.0	88.0	98.0
Perfusion Time (min)							
Mean	185.7	156.8	162.1	139.5	163.9	132.8	146.6
Median	175.0	132.0	150.0	126.0	152.0	121.0	139.5
Intraoperative Blood Products Used							
1 Red Blood Cell Unit	9.2%	8.6%	10.0%	9.0%	7.4%	7.3%	8.0%
2 Red Blood Cell Units	19.1%	7.7%	16.1%	12.5%	16.0%	10.2%	15.9%
3 Red Blood Cell Units	8.7%	5.3%	8.4%	6.4%	7.1%	4.7%	4.5%
4+ Red Blood CellUnits	22.4%	11.7%	17.5%	17.8%	21.6%	10.7%	24.9%



Other Procedures

Participant 30397
STS Period Ending 12/31/2011

Duke Clinical Research Institute

STS 2011	AV Replace + MV Replace	Pulmonic Valve	Tricuspid Valve	LVA	VSD	ASD	SVR
Outcomes - Mortality							
In-hospital Mortality	7.3%	4.6%	7.1%	7.7%	18.9%	3.5%	10.4%
Operative Mortality	8.2%	4.6%	7.9%	8.6%	19.6%	4.0%	10.9%
Outcomes - Complications							
Any Major Complications / Operative Mortality	37.8%	21.5%	39.8%	39.0%	48.3%	24.5%	40.8%
Any Reoperation	13.8%	6.0%	14.6%	11.1%	19.9%	8.6%	12.4%
Deep Sternal Wound Infection	0.3%	0.4%	0.4%	0.3%	0.3%	0.2%	0.5%
Permanent Stroke	2.1%	1.5%	2.3%	3.1%	1.8%	2.0%	2.0%
Renal Failure Complication	9.2%	4.6%	9.9%	8.2%	13.7%	5.3%	7.0%
Prolonged Ventilation	28.6%	16.2%	31.2%	31.1%	37.4%	18.5%	30.8%
Postoperative Blood Products Used							
1 Red Blood Cell Unit	13.8%	10.0%	13.3%	11.1%	10.4%	10.4%	10.9%
2 Red Blood Cell Units	15.5%	13.3%	15.4%	16.1%	13.0%	12.9%	11.4%
3 Red Blood Cell Units	9.1%	2.7%	7.5%	7.3%	8.6%	4.5%	10.0%
4+ Red Blood CellUnits	23.9%	10.8%	23.2%	17.8%	23.8%	13.0%	20.4%
Outcomes - Length of Stay							
Total Length of Stay (days)							
Mean	15.6	9.3	16.3	13.1	13.5	11.3	12.5
Median	11.0	6.0	11.0	10.0	9.0	7.0	10.0
Post-Procedure Length of Stay (days)							
Mean	12.4	7.9	12.7	10.1	10.8	9.2	9.6
Median	9.0	6.0	9.0	7.0	7.0	6.0	8.0



Other Procedures

Participant 30397
STS Period Ending 12/31/2011

Duke Clinical Research Institute

STS 2011	Aortic Aneurysm				Ventricular Assist Device
	Ascending Aorta	Aortic Arch	Descending Aorta	Thoracoabdominal Aorta	
Number of Cases	10,316	3,055	1,004	623	1,468
Demographics					
Age (years)	61.3	61.5	62.9	63.4	56.4
>= 65 years old	44.3%	45.5%	52.5%	54.6%	30.0%
Gender, Female	30.7%	34.1%	37.7%	39.2%	26.4%
Operative Data					
Cross-clamp Time (min)					
Mean	120.5	128.8	99.4	86.4	99.2
Median	112.0	120.0	86.0	71.0	81.0
Perfusion Time (min)					
Mean	172.6	196.4	171.5	146.8	123.7
Median	160.0	183.0	164.5	127.0	94.0
Intraoperative Blood Products Used					
1 Red Blood Cell Unit	7.5%	8.5%	6.2%	5.1%	7.6%
2 Red Blood Cell Units	11.9%	12.3%	10.6%	9.0%	12.8%
3 Red Blood Cell Units	5.3%	6.2%	5.8%	8.0%	7.3%
4+ Red Blood CellUnits	18.9%	28.7%	29.7%	43.8%	42.2%



Other Procedures

Participant 30397
STS Period Ending 12/31/2011

Duke Clinical Research Institute

STS 2011	Aortic Aneurysm				Ventricular Assist Device
	Ascending Aorta	Aortic Arch	Descending Aorta	Thoracoabdominal Aorta	
Outcomes - Mortality					
In-hospital Mortality	5.6%	8.1%	11.9%	14.1%	18.1%
Operative Mortality	6.0%	8.6%	12.3%	14.1%	19.5%
Outcomes - Complications					
Any Major Complications / Operative Mortality	30.3%	42.7%	45.8%	54.6%	74.6%
Any Reoperation	10.7%	15.7%	18.7%	21.7%	38.2%
Deep Sternal Wound Infection	0.3%	0.2%	0.4%	0.0%	0.7%
Permanent Stroke	3.5%	6.2%	6.1%	5.5%	4.6%
Renal Failure Complication	6.3%	9.0%	10.9%	17.5%	16.8%
Prolonged Ventilation	22.5%	34.0%	34.9%	43.5%	66.3%
Postoperative Blood Products Used					
1 Red Blood Cell Unit	11.3%	10.9%	7.8%	9.0%	6.6%
2 Red Blood Cell Units	12.7%	12.2%	10.8%	12.8%	10.1%
3 Red Blood Cell Units	6.1%	6.3%	5.0%	6.4%	6.7%
4+ Red Blood CellUnits	15.4%	20.5%	20.5%	27.6%	51.4%
Outcomes - Length of Stay					
Total Length of Stay (days)					
Mean	10.0	11.9	13.5	14.5	31.1
Median	7.0	8.0	10.0	11.0	25.0
Post-Procedure Length of Stay (days)					
Mean	8.9	10.8	11.8	12.9	22.9
Median	7.0	7.0	8.0	9.0	17.0



Appendix A: Participant-Specific Data Quality Summary

Participant 30397
STS Period Ending 12/31/2011

Duke Clinical Research Institute

INTRODUCTION
This data in this appendix is specific to your participating organization. We provide this data quality information to help you interpret and assess the weight and reliability of your results and to help you target data review and cleanup efforts for future harvests to the warehouse. Addressing and correcting data quality issues will result in increased value and meaningfulness of future participant-specific reports.

INCLUSION TIME PERIOD (First and Last Surgery Dates)
The first and last surgery dates found in the report for Participant 30397 for any record are:

First Surgery		Last Surgery
January 5, 2009	to	December 30, 2011

MISSING DATA
For all fields reported, the percentage of missing data is listed in the data summary table for each procedure. The graph at right displays the ten reported data fields that have a percentage missing of 0.1% or more for CAB risk model variables at your participating organization in the latest calendar year.

Data Quality: CAB Model Variables

[No records with missing data present for 2011]

MISSING DATA COLLECTION MONTHS
The table at right displays the months covered in this report for which no data from your organization is present at the warehouse. A review of this list can highlight incomplete data capture and/or data transfer problems.

Year	Months with no data
2009	[No missing months]
2010	[No missing months]
2011	[No missing months]

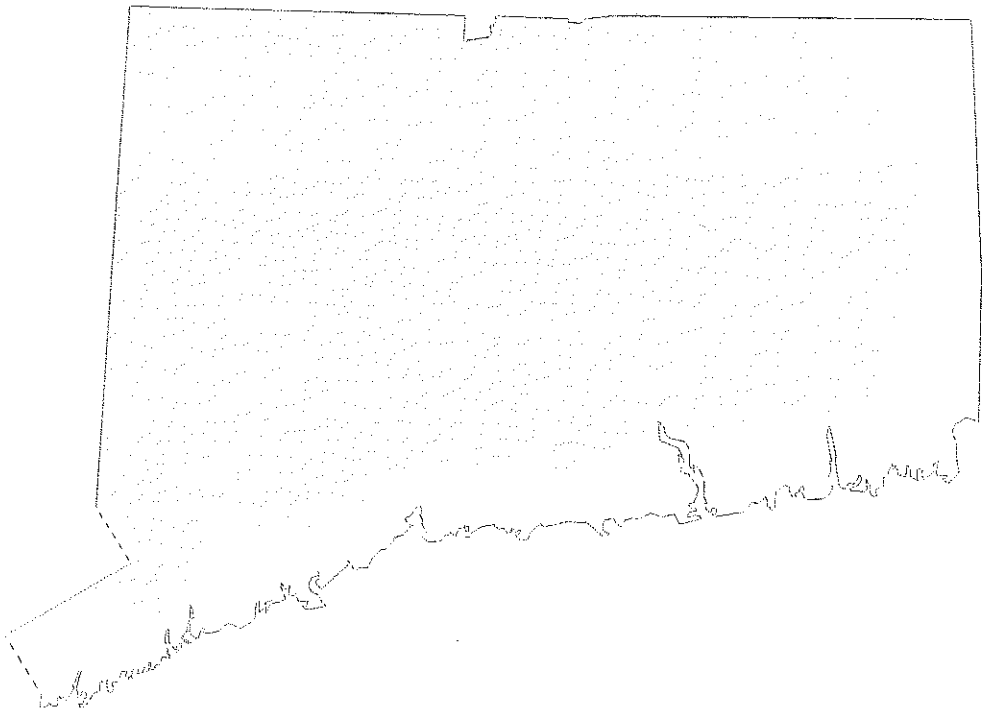
LIKE GROUP ASSIGNMENTS
Please refer to the Report Overview for further details about Like Group specifications.

CABG Group: Non-Residency Low Volume
Valve Group: Non-Residency Low Volume

Regional Outcomes Comparison

Participant 30398
STS Period Ending 12/31/2011

Duke Clinical Research Institute



The region displayed for your site contains the following state(s):
Connecticut

Between 2009 and 2011, there were 11 participants in this region



Regional Outcomes Comparison

Participant 30398
STS Period Ending 12/31/2011

Duke Clinical Research Institute

	Participant 2011	Region 2011
Isolated CAB		
Number of Cases	49	1,500
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	0.0%	1.9%
Risk-adjusted rate	0.0%	1.9%
Lower 95% confidence limit	0.0%	1.3%
Upper 95% confidence limit	6.2%	2.7%
Operative Mortality		
Observed Rate	**0.0%**	2.1%
Risk-adjusted rate	0.0%	2.1%
Lower 95% confidence limit	0.0%	1.4%
Upper 95% confidence limit	6.2%	2.9%
Complications Summary & Risk-Adjustment		
Major complications or operative mortality		
Observed Rate	18.4%	15.5%
Risk-adjusted rate	17.4%	16.3%
Lower 95% confidence limit	8.9%	14.5%
Upper 95% confidence limit	28.7%	18.1%
Any reoperation		
Observed Rate	2.0%	4.7%
Risk-adjusted rate	2.0%	4.8%
Lower 95% confidence limit	0.1%	3.8%
Upper 95% confidence limit	10.3%	5.9%
Deep sternal wound infection		
Observed Rate	**0.0%**	0.1%
Risk-adjusted rate	0.0%	0.1%
Lower 95% confidence limit	0.0%	0.0%
Upper 95% confidence limit	7.0%	0.4%
Permanent stroke		
Observed Rate	2.0%	1.8%
Risk-adjusted rate	2.2%	1.8%
Lower 95% confidence limit	0.1%	1.2%
Upper 95% confidence limit	11.1%	2.6%

	Participant 2011	Region 2011
Renal failure		
Observed Rate	8.3%	3.1%
Risk-adjusted rate	8.0%	3.3%
Lower 95% confidence limit	2.6%	2.5%
Upper 95% confidence limit	17.8%	4.4%
Prolonged ventilation		
Observed Rate	8.2%	11.9%
Risk-adjusted rate	7.5%	12.6%
Lower 95% confidence limit	2.5%	11.1%
Upper 95% confidence limit	16.6%	14.3%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	10.5	9.5
Median	9.0	7.0
Post-Procedure Length of Stay (days)		
Mean	7.1	7.1
Median	6.0	5.0
Length of Stay Risk-Adjustment		
Short stay: PLOS <6 days		
Observed Rate	49.0%	52.1%
Risk-adjusted rate	49.5%	51.0%
Lower 95% confidence limit	35.9%	48.7%
Upper 95% confidence limit	61.9%	53.3%
Long stay: PLOS >14 days		
Observed Rate	6.1%	6.0%
Risk-adjusted rate	6.0%	6.3%
Lower 95% confidence limit	1.6%	5.1%
Upper 95% confidence limit	15.4%	7.6%



Regional Outcomes Comparison

Participant 30398
STS Period Ending 12/31/2011

Duke Clinical Research Institute

	Participant 2011	Region 2011
Aortic Valve Replacement		
Number of Cases	6	361
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	0.0%	1.9%
Risk-adjusted rate	0.0%	1.9%
Lower 95% confidence limit	0.0%	0.8%
Upper 95% confidence limit	71.1%	3.7%
Operative Mortality		
Observed Rate	0.0%	1.9%
Risk-adjusted rate	0.0%	1.9%
Lower 95% confidence limit	0.0%	0.8%
Upper 95% confidence limit	71.1%	3.7%
Complications Summary		
Major complications or operative mortality	0.0%	15.2%
Any reoperation	0.0%	6.1%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	0.0%	2.5%
Renal failure	0.0%	3.4%
Prolonged ventilation	0.0%	9.7%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	6.2	8.8
Median	5.5	7.0
Post-Procedure Length of Stay (days)		
Mean	6.2	7.5
Median	5.5	6.0
PLOS <6 days	50.0%	45.4%
PLOS >14 days	0.0%	5.8%

	Participant 2011	Region 2011
Aortic Valve Replacement + CAB		
Number of Cases	11	257
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	9.1%	2.7%
Risk-adjusted rate	8.5%	2.6%
Lower 95% confidence limit	0.4%	1.2%
Upper 95% confidence limit	32.4%	5.2%
Operative Mortality		
Observed Rate	9.1%	3.1%
Risk-adjusted rate	8.5%	3.0%
Lower 95% confidence limit	0.4%	1.4%
Upper 95% confidence limit	32.4%	5.7%
Complications Summary		
Major complications or operative mortality	36.4%	23.7%
Any reoperation	9.1%	7.4%
Deep sternal wound infection	0.0%	0.8%
Permanent stroke	0.0%	1.6%
Renal failure	0.0%	6.0%
Prolonged ventilation	27.3%	18.7%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	8.7	11.1
Median	7.0	9.0
Post-Procedure Length of Stay (days)		
Mean	7.5	8.9
Median	7.0	7.0
PLOS <6 days	18.2%	29.2%
PLOS >14 days	0.0%	8.9%



Regional Outcomes Comparison

Participant 30398
STS Period Ending 12/31/2011

Duke Clinical Research Institute

	Participant 2011	Region 2011
Mitral Valve Replacement		
Number of Cases	4	64
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	0.0%	6.3%
Risk-adjusted rate	0.0%	5.0%
Lower 95% confidence limit	0.0%	1.7%
Upper 95% confidence limit	80.5%	11.3%
Operative Mortality		
Observed Rate	0.0%	9.4%
Risk-adjusted rate	0.0%	7.5%
Lower 95% confidence limit	0.0%	3.3%
Upper 95% confidence limit	80.5%	14.4%
Complications Summary		
Major complications or operative mortality	50.0%	32.8%
Any reoperation	0.0%	6.3%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	0.0%	3.1%
Renal failure	0.0%	10.3%
Prolonged ventilation	50.0%	31.3%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	8.3	14.8
Median	8.0	10.0
Post-Procedure Length of Stay (days)		
Mean	7.3	10.9
Median	7.5	8.0
PLOS <6 days	0.0%	18.8%
PLOS >14 days	0.0%	20.3%

	Participant 2011	Region 2011
Mitral Valve Replacement + CAB		
Number of Cases	2	44
Mortality Summary & Risk-Adjustment		
In-hospital Mortality		
Observed Rate	0.0%	13.6%
Risk-adjusted rate	0.0%	10.7%
Lower 95% confidence limit	0.0%	4.5%
Upper 95% confidence limit	62.9%	20.1%
Operative Mortality		
Observed Rate	0.0%	13.6%
Risk-adjusted rate	0.0%	10.7%
Lower 95% confidence limit	0.0%	4.5%
Upper 95% confidence limit	62.9%	20.1%
Complications Summary		
Major complications or operative mortality	50.0%	43.2%
Any reoperation	0.0%	20.5%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	0.0%	0.0%
Renal failure	0.0%	15.9%
Prolonged ventilation	50.0%	36.4%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	16.5	16.3
Median	16.5	13.0
Post-Procedure Length of Stay (days)		
Mean	7.0	12.7
Median	7.0	10.0
PLOS <6 days	50.0%	6.8%
PLOS >14 days	0.0%	15.9%



Regional Outcomes Comparison

Participant 30398
STS Period Ending 12/31/2011

Duke Clinical Research Institute

	Participant	Region
	2011	2011
Mitral Valve Repair		
Number of Cases	5	121
Mortality Summary & Risk-Adjustment		
In-hospital Mortality	0.0%	0.0%
Operative Mortality	0.0%	0.8%
Complications Summary		
Major complications or operative mortality	20.0%	6.6%
Any reoperation	0.0%	3.3%
Deep sternal wound infection	0.0%	0.0%
Permanent stroke	0.0%	0.0%
Renal failure	0.0%	0.0%
Prolonged ventilation	20.0%	3.3%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	6.6	7.1
Median	5.0	5.0
Post-Procedure Length of Stay (days)		
Mean	6.6	5.8
Median	5.0	5.0
PLOS <6 days	60.0%	62.8%
PLOS >14 days	0.0%	1.7%

	Participant	Region
	2011	2011
Mitral Valve Repair + CAB		
Number of Cases	1	55
Mortality Summary & Risk-Adjustment		
In-hospital Mortality	0.0%	0.0%
Operative Mortality	0.0%	0.0%
Complications Summary		
Major complications or operative mortality	100.0%	29.1%
Any reoperation	0.0%	9.1%
Deep sternal wound infection	0.0%	1.8%
Permanent stroke	0.0%	0.0%
Renal failure	100.0%	3.7%
Prolonged ventilation	100.0%	29.1%
Length of Stay Summary		
Total Length of Stay (days)		
Mean	47.0	13.0
Median	47.0	10.0
Post-Procedure Length of Stay (days)		
Mean	45.0	10.2
Median	45.0	7.0
PLOS <6 days	0.0%	27.3%
PLOS >14 days	100.0%	12.7%



Other Procedures

Participant 30398
STS Period Ending 12/31/2011

Duke Clinical Research Institute

STS 2011	AV Replace + MV Replace	Pulmonic Valve	Tricuspid Valve	LVA	VSD	ASD	SVR
Number of Cases	1,546	452	7,812	765	652	3,806	201
Demographics							
Age (years)	64.3	41.9	64.8	63.5	58.3	58.8	63.0
>= 65 years old	54.3%	10.0%	58.3%	49.3%	37.4%	41.3%	47.8%
Gender, Female	51.9%	44.5%	58.0%	32.2%	41.6%	48.3%	28.9%
Operative Data							
Cross-clamp Time (min)							
Mean	148.4	119.6	119.9	98.8	116.2	96.3	98.9
Median	140.0	107.0	112.0	90.0	108.0	88.0	98.0
Perfusion Time (min)							
Mean	185.7	156.8	162.1	139.5	163.9	132.8	146.6
Median	175.0	132.0	150.0	126.0	152.0	121.0	139.5
Intraoperative Blood Products Used							
1 Red Blood Cell Unit	9.2%	8.6%	10.0%	9.0%	7.4%	7.3%	8.0%
2 Red Blood Cell Units	19.1%	7.7%	16.1%	12.5%	16.0%	10.2%	15.9%
3 Red Blood Cell Units	8.7%	5.3%	8.4%	6.4%	7.1%	4.7%	4.5%
4+ Red Blood CellUnits	22.4%	11.7%	17.5%	17.8%	21.6%	10.7%	24.9%



Other Procedures

Participant 30398
STS Period Ending 12/31/2011

Duke Clinical Research Institute

STS 2011	AV Replace + MV Replace	Pulmonic Valve	Tricuspid Valve	LVA	VSD	ASD	SVR
Outcomes - Mortality							
In-hospital Mortality	7.3%	4.6%	7.1%	7.7%	18.9%	3.5%	10.4%
Operative Mortality	8.2%	4.6%	7.9%	8.6%	19.6%	4.0%	10.9%
Outcomes - Complications							
Any Major Complications / Operative Mortality	37.8%	21.5%	39.8%	39.0%	48.3%	24.5%	40.8%
Any Reoperation	13.8%	6.0%	14.6%	11.1%	19.9%	8.6%	12.4%
Deep Sternal Wound Infection	0.3%	0.4%	0.4%	0.3%	0.3%	0.2%	0.5%
Permanent Stroke	2.1%	1.5%	2.3%	3.1%	1.8%	2.0%	2.0%
Renal Failure Complication	9.2%	4.6%	9.9%	8.2%	13.7%	5.3%	7.0%
Prolonged Ventilation	28.6%	16.2%	31.2%	31.1%	37.4%	18.5%	30.8%
Postoperative Blood Products Used							
1 Red Blood Cell Unit	13.8%	10.0%	13.3%	11.1%	10.4%	10.4%	10.9%
2 Red Blood Cell Units	15.5%	13.3%	15.4%	16.1%	13.0%	12.9%	11.4%
3 Red Blood Cell Units	9.1%	2.7%	7.5%	7.3%	8.6%	4.5%	10.0%
4+ Red Blood CellUnits	23.9%	10.8%	23.2%	17.8%	23.8%	13.0%	20.4%
Outcomes - Length of Stay							
Total Length of Stay (days)							
Mean	15.6	9.3	16.3	13.1	13.5	11.3	12.5
Median	11.0	6.0	11.0	10.0	9.0	7.0	10.0
Post-Procedure Length of Stay (days)							
Mean	12.4	7.9	12.7	10.1	10.8	9.2	9.6
Median	9.0	6.0	9.0	7.0	7.0	6.0	8.0



Other Procedures

Participant 30398
STS Period Ending 12/31/2011

Duke Clinical Research Institute

STS 2011	Aortic Aneurysm				Ventricular Assist Device
	Ascending Aorta	Aortic Arch	Descending Aorta	Thoracoabdominal Aorta	
Number of Cases	10,316	3,055	1,004	623	1,468
Demographics					
Age (years)	61.3	61.5	62.9	63.4	56.4
>= 65 years old	44.3%	45.5%	52.5%	54.6%	30.0%
Gender, Female	30.7%	34.1%	37.7%	39.2%	26.4%
Operative Data					
Cross-clamp Time (min)					
Mean	120.5	128.8	99.4	86.4	99.2
Median	112.0	120.0	86.0	71.0	81.0
Perfusion Time (min)					
Mean	172.6	196.4	171.5	146.8	123.7
Median	160.0	183.0	164.5	127.0	94.0
Intraoperative Blood Products Used					
1 Red Blood Cell Unit	7.5%	8.5%	6.2%	5.1%	7.6%
2 Red Blood Cell Units	11.9%	12.3%	10.6%	9.0%	12.8%
3 Red Blood Cell Units	5.3%	6.2%	5.8%	8.0%	7.3%
4+ Red Blood CellUnits	18.9%	28.7%	29.7%	43.8%	42.2%



Other Procedures

Participant 30398
STS Period Ending 12/31/2011

Duke Clinical Research Institute

STS 2011	Aortic Aneurysm: Ascending Aorta	Aortic Aneurysm: Aortic Arch	Aortic Aneurysm: Descending Aorta	Aortic Aneurysm: Thoracoabdominal Aorta	Ventricular Assist Device
Outcomes - Mortality					
In-hospital Mortality	5.6%	8.1%	11.9%	14.1%	18.1%
Operative Mortality	6.0%	8.6%	12.3%	14.1%	19.5%
Outcomes - Complications					
Any Major Complications / Operative Mortality	30.3%	42.7%	45.8%	54.6%	74.6%
Any Reoperation	10.7%	15.7%	18.7%	21.7%	38.2%
Deep Sternal Wound Infection	0.3%	0.2%	0.4%	0.0%	0.7%
Permanent Stroke	3.5%	6.2%	6.1%	5.5%	4.6%
Renal Failure Complication	6.3%	9.0%	10.9%	17.5%	16.8%
Prolonged Ventilation	22.5%	34.0%	34.9%	43.5%	66.3%
Postoperative Blood Products Used					
1 Red Blood Cell Unit	11.3%	10.9%	7.8%	9.0%	6.6%
2 Red Blood Cell Units	12.7%	12.2%	10.8%	12.8%	10.1%
3 Red Blood Cell Units	6.1%	6.3%	5.0%	6.4%	6.7%
4+ Red Blood CellUnits	15.4%	20.5%	20.5%	27.6%	51.4%
Outcomes - Length of Stay					
Total Length of Stay (days)					
Mean	10.0	11.9	13.5	14.5	31.1
Median	7.0	8.0	10.0	11.0	25.0
Post-Procedure Length of Stay (days)					
Mean	8.9	10.8	11.8	12.9	22.9
Median	7.0	7.0	8.0	9.0	17.0



Appendix A: Participant-Specific Data Quality Summary

Participant 30398
STS Period Ending 12/31/2011

Duke Clinical Research Institute

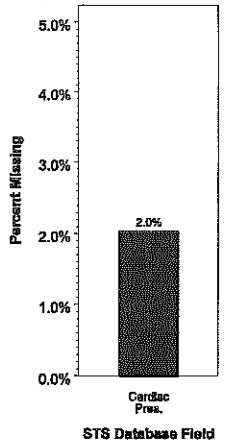
INTRODUCTION
This data in this appendix is specific to your participating organization. We provide this data quality information to help you interpret and assess the weight and reliability of your results and to help you target data review and cleanup efforts for future harvests to the warehouse. Addressing and correcting data quality issues will result in increased value and meaningfulness of future participant-specific reports.

INCLUSION TIME PERIOD (First and Last Surgery Dates)
The first and last surgery dates found in the report for Participant 30398 for any record are:

First Surgery		Last Surgery
January 7, 2009	to	December 14, 2011

MISSING DATA
For all fields reported, the percentage of missing data is listed in the data summary table for each procedure. The graph at right displays the ten reported data fields that have a percentage missing of 0.1% or more for CAB risk model variables at your participating organization in the latest calendar year.

Data Quality: CAB Model Variables



MISSING DATA COLLECTION MONTHS
The table at right displays the months covered in this report for which no data from your organization is present at the warehouse. A review of this list can highlight incomplete data capture and/or data transfer problems.

Year	Months with no data
2009	[No missing months]
2010	[No missing months]
2011	[No missing months]

LIKE GROUP ASSIGNMENTS
Please refer to the Report Overview for further details about Like Group specifications.

CABG Group: Non-Residency Low Volume
Valve Group: Non-Residency Low Volume



Appendix A: Participant-Specific Data Quality Summary

Participant 30398
STS Period Ending 12/31/2011

Duke Clinical Research Institute

OUTLIER DATA

The STS Database Committee has developed thresholds for model-related data fields in order to highlight extreme participant-level values, known as outliers. The table below shows these thresholds along with your organization's value. Outliers are bolded.

Reported variable	Low Threshold	High Threshold	Your Value
Patient age, mean	55.0	75.0	64.6
Morbid obesity (BMI 40.0+)	0.0%	10.0%	6.1%
Diabetes mellitus	15.0%	60.0%	49.0%
Hypertension	40.0%	95.0%	91.8%
Arrhythmia, afib/aflutter	0.0%	95.0%	50.0%
Chronic lung disease	4.0%	75.0%	28.6%
Cardiac presentation, unstable angina	5.0%	80.0%	28.6%
Congestive heart failure	0.0%	50.0%	16.3%
NYHA class IV	0.0%	70.0%	**0.0%**
Peripheral arterial disease	3.0%	40.0%	**0.0%**
Cerebrovascular disease	1.0%	35.0%	12.2%
Cerebrovascular accident	0.0%	20.0%	4.1%
Creatinine, mean	0.5	2.0	1.2
Renal failure, dialysis-dependent	0.0%	7.5%	2.0%
Immunosuppressive treatment	0.0%	10.0%	6.1%
First reoperation	0.0%	20.0%	6.1%
Second+ reoperation	0.0%	5.0%	**0.0%**
PCI <= 6 hours prior to surgery	0.0%	5.0%	**0.0%**
Emergent	0.0%	20.0%	**0.0%**
Emergent/Salvage	0.0%	4.0%	**0.0%**
MI	20.0%	75.0%	46.9%
Cardiogenic shock	0.0%	7.5%	**0.0%**
Resuscitation	0.0%	5.0%	**0.0%**
Triple vessel disease	40.0%	95.0%	93.9%
Left main disease (>50% stenosis)	5.0%	50.0%	40.8%
EF, mean	40.0	60.0	48.5
Preop IABP	0.0%	30.0%	12.2%
Outcome: Operative mortality	0.0%	15.0%	**0.0%**
Outcome: Combined mortality/morbidity	0.0%	40.0%	18.4%
Outcome: Any reoperation	0.0%	15.0%	2.0%
Outcome: Deep sternal wound infection	0.0%	5.0%	**0.0%**
Outcome: Permanent stroke	0.0%	6.0%	2.0%
Outcome: Prolonged ventilation	0.0%	30.0%	8.2%
Outcome: Renal failure	0.0%	15.0%	8.3%

HEART
CENTER
of Greater Waterbury

Karen Roberts
Office of Health Care Access
410 Capital Avenue MS# 13 HCA
PO Box 340308
Hrrtford CT, 06134-0308

RECEIVED
SEP - 6 2013
OFFICE OF
HEALTH CARE ACCESS

August 8, 2013,

Re: Docket Number: 08-31202 CON The Waterbury Hospital and Saint Mary's Hospital Corporation, d/b/a Heart Center of Greater Waterbury and the University of Connecticut Health Center/ John Demsey Hospital

Dear Ms. Roberts,

Enclosed are the procedure and patient volume reports for Saint Mary's Hospital and Waterbury Hospital from July 18, 2012 through July 17, 2013.

The ACC Executive Summaries from July 14, 2013 QTR 1 report for both Saint Mary's Hospital and Waterbury Hospital are enclosed.

The STS Executive Summaries are also provided for both hospitals the latest report published, which is for period ending 12/31/12..

If you have any questions, please feel free to contact me at 203-575-5560 or email me at kkniery@leevercancercenter.org.

Sincerely,

Kevin Kniery
Executive Director
Heart Center of Greater Waterbury
Enclosure

Waterbury Hospital
OHS Case Volume
7/18/2012 -7/17/2013

The following Codes were used to determine Open Heart Surgery Volume:

06.31 35.11 35.12 35.21
35.22 35.23 35.24 36.11
36.12 36.13 36.14 36.15
37.31 38.45

Dates	Open Heart Surgery Volume
7/18/2012 -7/31/2012	2
08-2012	13
09-2012	8
10-2012	8
11-2012	10
12-2012	8
01-2013	6
02-2013	16
03-2013	8
04-2013	10
05-2013	6
06-2013	12
07/1/2013 -7/17/2013	5
Total	**112**

Waterbury Hospital
OHS Patient Volume
7/18/2012 -7/17/2013

Dates	Patient Total
7/18/2012 -7/31/2012	3
08-2012	13
09-2012	8
10-2012	8
11-2012	10
12-2012	8
01-2013	6
02-2013	16
03-2013	8
04-2013	10
05-2013	6
06-2013	12
07/1/2013 -7/17/2013	4
Total	**112**

Waterbury Hospital
PCI Case Volume
7/18/2012 -7/17/2013

The following Code was used to determine PCI Volume:
0.66
PCI codes were not provided for attempted but failed PCI cases.

Dates	PCI Volume
7/18/2012 -7/31/2012	21
08-2012	32
Sep-12	27
10-2012	30
11-2012	31
Dec-12	26
01-2013	24
02-2013	22
03-2013	30
04-2013	34
05-2013	26
06-2013	37
07/1/2013 -7/17/2013	11
Total	**351**

Waterbury Hospital
PCI Patient Volume
7/18/2012 -7/17/2013

Dates	Patient Total
7/18/2012 -7/31/2012	20
08-2012	32
09-2012	27
10-2012	29
11-2012	30
12-2012	26
01-2013	22
02-2013	21
03-2013	29
04-2013	33
05-2013	24
06-2013	37
07/1/2013 -7/17/2013	11
Total	**341**

Saint Mary's Hospital
OHS Case Volume
7/18/2012 -7/17/2013

The following Codes were used to determine Open Heart Surgery Volume:

06.31 35.11 35.12 35.21
35.22 35.23 35.24 36.11
36.12 36.13 36.14 36.15
37.31 38.45

Dates	Open Heart Surgery Volume
7/18/2012 -7/31/2012	5
08-2012	7
09-2012	7
10-2012	3
11-2012	9
12-2012	9
01-2013	7
02-2013	1
03-2013	6
04-2013	13
05-2013	6
06-2013	7
07/1/2013 -7/17/2013	5
Total	**85**

Saint Mary's Hospital
OHS Patient Volume
7/18/2012 -7/17/2013

Dates	Patient Total
7/18/2012 -7/31/2012	6
08-2012	7
09-2012	7
10-2012	3
11-2012	9
12-2012	9
01-2013	7
02-2013	1
03-2013	6
04-2013	13
05-2013	6
06-2013	7
07/1/2013 -7/17/2013	5
Total	**86**

Saint Mary's Hospital
PCI Case Volume
7/18/2012 -7/17/2013

The following Code was used to determine PCI Volume:
0.66
PCI codes were not provided for attempted but failed PCI cases.

Dates	PCI Volume
7/18/2012 -7/31/2012	18
08-2012	34
09-2012	35
10-2012	33
11-2012	33
12-2012	28
01-2013	27
02-2013	31
03-2013	36
04-2013	28
05-2013	25
06-2013	23
07/1/2013 -7/17/2013	10
Total	**361**

Saint Mary's Hospital
PCI Patient Volume
7/18/2012-7/17/2013

Dates	Patient Total
7/18/2012 -7/31/2012	13
08-2012	29
09-2012	29
Oct-12	44
11-2012	37
12-2012	22
01-2013	19
02-2013	29
03-2013	35
04-2013	21
05-2013	34
06-2013	32
07/1/2013 -7/17/2013	14
Total	**358**



Version 4.4

Institutional Outcomes Report
2013Q1

Saint Mary's Hospital
881416

Aggregation Date: Jul 1, 2013 11:59:59 PM

Publish Date: Jul 14, 2013

If User desires to publish or otherwise distribute or use, in whole or in part, any aggregate data or reports provided by ACCF, or produced in connection with or derived from NCDR, with the exception of strictly internal use within User's organization, User must first obtain the prior express written consent of ACCF. To the extent User is permitted to publish aggregate data, such aggregate data and any related information published in connection with it must be reviewed and approved by ACCF prior to publication.

National Cardiovascular Data Registry
CathPCI Registry®
800-257-4737
www.ncdr.com •ncdr@acc.org
©2010 American College of Cardiology Foundation

Table of Contents

Inclusion Summary 3

Quarters included in this report 3

Comparison group included in this report 3

Release Notes 4

Frequently used terminology 5

Executive Summary 7

PCI Performance Measures 7

Data Quality Metrics 8

PCI Appropriate Use Criteria (AUC) Metrics 12

Detail Section Line Reference 15

Inclusion Summary

Quarters included in this report:

Timeframe	Benchmark Inclusion Status	Submission Type	Included in Executive Summary
2012Q2		All Patients	Yes
2012Q3		All Patients	Yes
2012Q4		All Patients	Yes
2013Q1		All Patients	Yes

Comparison group included in this report:

Volume Groups	Number of PCI Procedures per R4Q	Number of US Hospitals per Volume Group	Your Hospital's Volume Group	Your Annualized PCI Procedure Volume	Your Declared Procedure Volume
1	0-10	56			
2	11-200	359			
3	201-400	398	X	381	325
4	401-600	257			
5	601-1000	234			
6	1001-2000	129			
7	2001+	17			

Release Notes:

CathPCI Registry® Outcomes Report Release Notes for 2013 Q1

Report Changes:

1. Risk Adjusted Acute Kidney Injury (AKI): Risk adjusted AKI is a new PCI risk model in the institutional reports. Risk adjusted AKI is reported in metric (#39) and new detail lines (1955-1963).*
2. Risk Adjusted Dialysis: Risk adjusted dialysis is a new PCI risk model in the institutional reports. Risk adjusted dialysis is reported in detail lines (1964-1972).*
3. Acute Kidney Injury (unadjusted) – Metric 15 has been retired from the executive summary but is maintained in the detail section on line 1952.

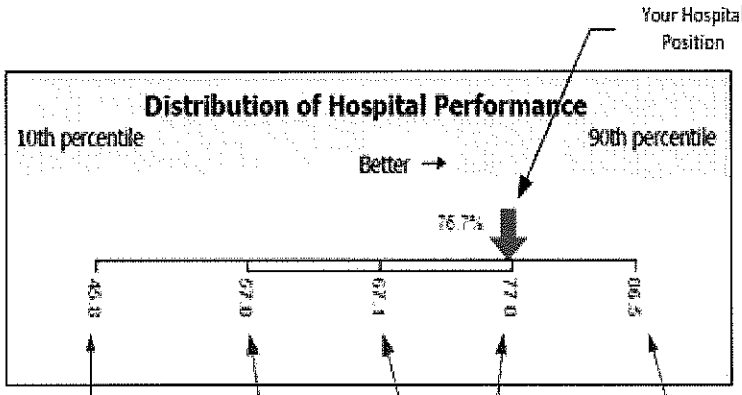
*Please refer to the "Risk Adjusted Outcomes Interpretation and Specifications" in the resources section of our website, https://www.ncdr.com/WebNCDR/RESOURCES/V4DOCUMENTS.ASPX# , for model specifications.

Frequently used terminology:

R4Q (Rolling Four Quarters)	The four (4) consecutive quarters included in this report. (Example: The 2011Q1 report includes 2010Q2, 2010Q3, 2010Q4 and 2011Q1. The "Q" in 'R4Q" indicates the last quarter of the rolling four quarters).
Benchmark Inclusion Status	Indicates whether a submission will be included in the R4Q aggregated data (benchmark) and comparison group statistics. "Green","Yellow" and "Red" stoplights denote the status. A "Green" status indicates the submission (one quarter/timeframe) is included in the benchmark and comparison group statistics. The data has successfully passed all data assessment and completeness checks. A "Yellow" status indicates the submission (one quarter/timeframe) is not included in the benchmark and comparison group statistics. Data is displayed in the quarterly column, but is not included in the "My Hospital R4Q" summary. The data has not passed the overall completeness assessment checks. A "Red" status indicates the submission (one quarter/timeframe) is not included in the benchmark or comparison group statistics. Data is not displayed in the quarterly column. A null or blank status indicates no submission has been received for that quarter/timeframe. Data is not displayed in the quarterly column.
Submission Type	Indicates the Submission Type based on the percentage of procedures performed in the submission file. A file with fewer than 50% of the procedures performed indicated as Diagnostic Catheterizations are designated as "PCI Only" submissions.
My Hospital R4Q	The values for a metric/measure (over R4Q) of data submitted by your facility with a Benchmark Inclusion Status of "Green".
US Hospital 50th Pctl	The median (or midpoint or 50th percentile) of US participant aggregated data for the metric or measure. Half of all participants will be above the median, and half will be below. This value will correspond to the midpoint of the box/whisker plot.
US Hospital 90th Pctl	The 90th percentile of US participant aggregated data for the metric or measure. 10% of all participants will be above the 90th percentile value, and 90% will be below. This value will correspond to the right-most endpoint of the box/whisker plot.
Annualized Volume	Annualized Volume is the total number of PCI procedures submitted over the R4Q period, adjusted for the number of quarters in which valid submissions were received during the R4Q period.
Volume Group Pts R4Q	The aggregated value for the metric/measure across all patients in the specified comparison group (over R4Q). Comparison Groups are based on annualized procedure volume. See the Comparison Group chart on the Inclusion Summary page of this report. To be included, data must have a Benchmark Inclusion Status of "Green".
US Registry Pts R4Q	The aggregated value for the measure/metric across US patients (over R4Q). To be included, data must have a Benchmark Inclusion Status of "Green". Only facilities in the United States and outlying territories are included.
Declared Procedure Volume	Indicates the estimated annual procedure volume as reported by the facility on the NCDR website Site Profile.
LFHS	This stands for Leapfrog Hospital Survey. This is to help identify the lines that are used for Leapfrog reporting for our participants. Please note that in the detail lines you will see "(LFHS)" to denote the lines that are to be used for Actual and Risk Adjusted Mortality Rate calculations.
Actual Mortality Rate (LFHS)	Enter your hospital's (actual) observed mortality rate (OMR) as a percentage. Using data from the My Hospital R4Q "Num" column in the current NCDR CathPCI Registry Institutional Outcomes Reports, OMR must be calculated by dividing the number for "Observed Mortality (among eligible) (LFHS)" by the number for "Eligible pts (LFHS)" to obtain the % rate for the most recent rolling four quarters where 12 consecutive months of data was submitted [i.e., Observed Mortality (among eligible) (LFHS)/Eligible pts (LFHS)].
Expected Mortality Rate (LFHS)	Enter your hospital's expected mortality rate (EMR) as a percentage. Using data from the Hospital R4Q "Num" column in the current NCDR CathPCI Registry Institutional Outcomes Reports, EMR must be calculated by dividing the number for "Expected Mortality (among eligible) (LFHS)" by the number for "Eligible pts (LFHS)" to obtain the % rate for the most recent rolling four quarters where 12 consecutive months of data was submitted [i.e., Expected Mortality (among eligible) (LFHS)/Eligible pts (LFHS)].

Box and Whisker Plots

Interpreting Box and Whisker Plots



10th percentile
If your hospital scores below the 10th percentile, the arrow will be on the left of this number.

25th Percentile

Median

75th Percentile

90th Percentile
If your hospital scores above the 90th percentile, the arrow will be on the right of this number.

10th Percentile
90% of the hospitals achieved "better" scores than the 10th percentile.

25th Percentile or 1st Quartile
75% of the hospitals achieved "better" scores than the 25th percentile.

50th Percentile or 2nd Quartile
Middle of the distribution: Half of the hospitals data is above and half are below the median.

75th Percentile or 3rd Quartile
25% of the hospitals achieved "better" scores than the 75th percentile.

90th Percentile
10% of the hospitals achieved "better" scores than the 90th percentile.

Your Hospital Position
Your 'Hospital Position' in relation to all other hospitals' data.

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jul 1, 2013 11:59:59 PM
Publish Date: Jul 14, 2013

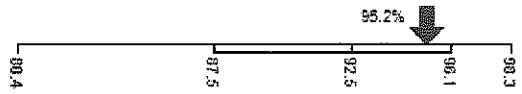
Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2013Q1

Section I: PCI Performance Measures

Endorsed by the National Quality Forum and appropriate for public reporting

	PCI Performance Measures	Distribution of Hospital Performance (10th percentile — 90th percentile; Better →)
1	**PCI in-hospital risk adjusted mortality (all patients)** My Hospital: 1.78 | US Hospitals 50th Pctl: 1.71 | US Hospitals 90th Pctl: 0.91 Your hospital's PCI in-hospital risk adjusted mortality rate for all patients adjusted using the NCDR® risk adjustment model. [Detail Line:2035]	
38	**Composite: Discharge Medications in Eligible PCI Patients** My Hospital: 95.2% | US Hospitals 50th Pctl: 92.5% | US Hospitals 90th Pctl: 98.3% Patients with a PCI procedure who receive prescriptions for all medications (aspirin, P2Y12 inhibitor, and statin) for which they are eligible for at discharge. [Detail Line:2006]	

Note

Performance measures in the CathPCI Registry® have been endorsed by the National Quality Forum. Such performance measures meeting the requirement for approval are intended not only for clinical quality improvement, but also may be considered for purposes of public reporting.

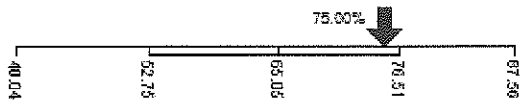
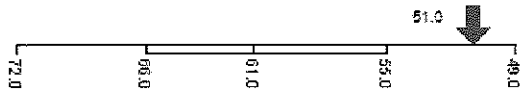
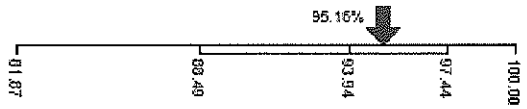
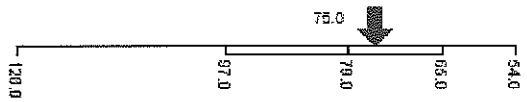
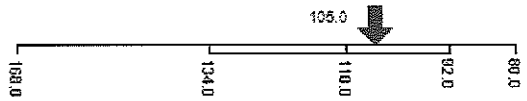
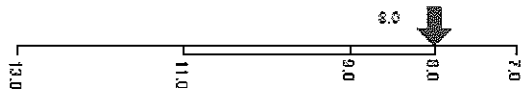
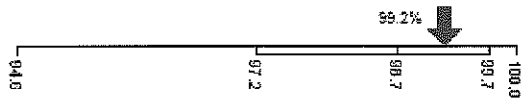
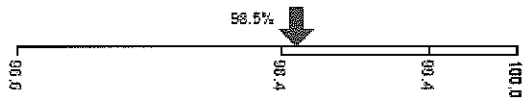
The "Registry Metrics" on the subsequent pages of this report are those measures that have been developed to support self assessment and quality improvement at the provider, hospital, and/or health care system level. While these metrics have not been formally developed by the American College of Cardiology/American Heart Association Task Force for Performance Measures Task Force, they may be identified as evolving measures worthy of consideration for further development into performance measures.

Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2013Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

	PCI Process Metrics	Distribution of Hospital Performance (10th percentile … 90th percentile; Better →)
2	**Proportion of elective PCIs with prior positive stress or imaging study** My Hospital: 75.00% | US Hospitals 50th Pctl: 65.05% | US Hospitals 90th Pctl: 87.56% Proportion of elective PCI procedures (excluding patients with ACS) with an antecedent stress or imaging study with a positive result (suggestive of ischemia) or with a fractional flow reserve value of <=0.8 during the PCI procedure [Detail Line:1513]	
3	**Median time to immediate PCI for STEMI patients (in minutes)** My Hospital: 51 | US Hospitals 50th Pctl: 61 | US Hospitals 90th Pctl: 49 Your hospital's median time from hospital arrival to immediate PCI for STEMI patients in minutes. Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1502]	
4	**Proportion of STEMI patients receiving immediate PCI w/in 90'** My Hospital: 95.16% | US Hospitals 50th Pctl: 93.94% | US Hospitals 90th Pctl: 100.00% Proportion of STEMI patients with a time from your hospital arrival (or subsequent ECG if ST elevation first noted on subsequent ECG) to immediate PCI <=90'. Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1503]	
5	**Median time from ED arrival at STEMI transferring facility to ED arrival at STEMI receiving facility among transferred patients.** My Hospital: 75 | US Hospitals 50th Pctl: 79 | US Hospitals 90th Pctl: 54 Your hospital's median time from arrival at transferring facility to ED arrival at STEMI receiving facility among transferred patients. [Detail Line:1505]	
6	**Median time from ED arrival at STEMI transferring facility to immediate PCI at STEMI receiving facility among transferred patients (in minutes)** My Hospital: 105 | US Hospitals 50th Pctl: 110 | US Hospitals 90th Pctl: 80 Your hospital's median time from arrival at referring facility to immediate PCI at STEMI receiving facility among transferred patients. Exclusions: Reasons for delay does not equal none. [Detail Line:1506]	
7	**Median fluoro time (in minutes)** My Hospital: 8 | US Hospitals 50th Pctl: 9 | US Hospitals 90th Pctl: 7 Inclusion criteria: PCI of one vessel/lesion. Exclusion criteria: Prior CABG, or "other" procedure during the same lab visit; PCI of >1 vessel/lesion. [Detail Line:1633]	
8	**Proportion of patients with aspirin prescribed at discharge** My Hospital: 99.2% | US Hospitals 50th Pctl: 98.7% | US Hospitals 90th Pctl: 100.0% Proportion of patients (without a documented contraindication) with aspirin prescribed at discharge. [Detail Line:1996]	
9	**Proportion of patients with a P2Y12 inhibitor prescribed at discharge** My Hospital: 98.5% | US Hospitals 50th Pctl: 99.4% | US Hospitals 90th Pctl: 100.0% Proportion of patients (without a documented contraindication) with a stent implanted that had a thienopyridine/P2Y12 inhibitor prescribed at discharge. [Detail Line:2005]	

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jul 1, 2013 11:59:59 PM
Publish Date: Jul 14, 2013

Executive Summary

CathPCI Registry®

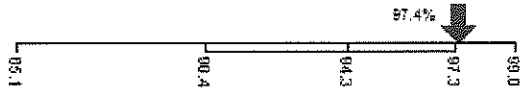
Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2013Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

10 **Statins prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
97.4%	94.3%	99.0%

Proportion of patients (without a documented contraindication) prescribed a statin at discharge. [Detail Line:2001]



PCI Outcome Metrics

Distribution of Hospital Performance

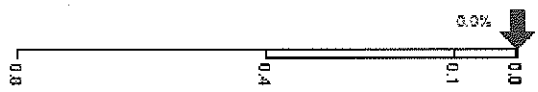
10th percentile — 90th percentile

Better →

12 **Proportion of PCI patients with emergency CABG**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.0%	0.1%	0.0%

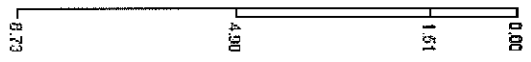
Your hospital's proportion of patients having emergency CABG (at your facility or transferred to another facility). [Detail Line:1978]



13 **Proportion of PCI procedures with a post procedure MI (among hospitals routinely collecting post-PCI biomarkers)****

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
	1.51%	0.00%

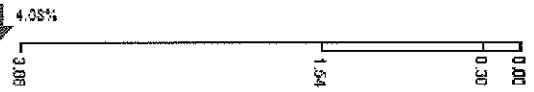
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with >= 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1803]



14 **Proportion of PCI procedures with post procedure MI (among hospitals who do not routinely collect post-PCI biomarkers)****

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
4.08%	0.30%	0.00%

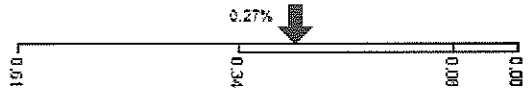
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with < 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1804]



16 **Proportion of PCI procedures with post procedure stroke**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.27%	0.08%	0.00%

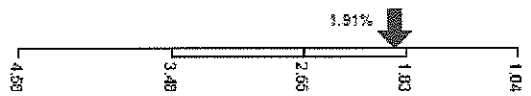
Your hospital's proportion of patients with stroke post procedure. [Detail Line:1811]



17 **Composite: Proportion of PCI patients with death, emergency CABG, stroke or repeat target vessel revascularization.**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
1.91%	2.55%	1.04%

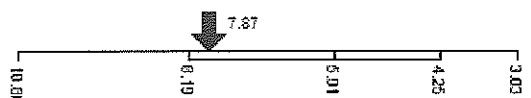
Your hospital's proportion of patients with death, emergency CABG, stroke or repeat target vessel revascularization post procedure up to hospital discharge. Excludes patients with stroke and an elective, urgent or salvage CABG during same admission. [Detail Line:1801]



18 **PCI in-hospital risk adjusted mortality (patients with STEMI)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
7.87	5.91	3.03

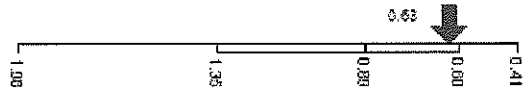
Your hospital's PCI in-hospital risk adjusted mortality rate for patients with STEMI adjusted using the NCDR® risk adjustment model. [Detail Line:2044]



19 **PCI in-hospital risk adjusted mortality (STEMI patients excluded)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.63	0.89	0.41

Your hospital's PCI in-hospital risk adjusted mortality rate for patients with other diagnoses (not STEMI) using the NCDR® risk adjustment model. [Detail Line:2053]



Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2013Q1

Section II: Quality Metrics -- to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

25 **Proportion of PCI procedures with transfusion of whole blood or RBCs**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.81%	1.27%	0.00%

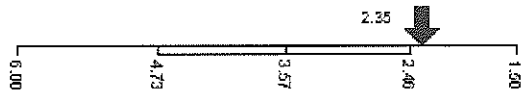
Proportion of patients who received a transfusion of whole blood or red blood cells after a PCI procedure. Inclusion: Patients with a pre-procedure hemoglobin >8 g/dL and patients with no CABG, and no other major surgery during the same admission. [Detail Line:1853]



37 **PCI in-hospital risk adjusted rate of bleeding events (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
2.35	3.57	1.50

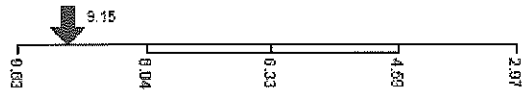
Your hospital's risk adjusted rate of bleeding events for patients with PCI procedures using the NCDR® PCI bleeding risk adjustment model. [Detail Line:1823]



39 **PCI in-hospital risk adjusted acute kidney injury (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
9.15	6.33	2.97

Your hospital's PCI in-hospital risk adjusted AKI rate for all patients adjusted using the NCDR® risk adjustment model. [Detail Line:1960]



Diagnostic Cath Process Metrics

Distribution of Hospital Performance

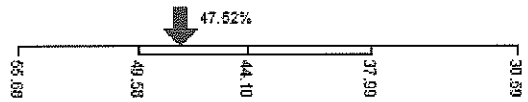
10th percentile 90th percentile

Better →

20 **Incidence of non-obstructive CAD (elective patients only)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
47.52%	44.10%	30.59%

Patients with an elective diagnostic cath and coronary angiography with all native coronary territories <50% Exclusions: Patients with prior CABG, cardiac transplant evaluation; pre-op evaluation for non-cardiac surgery and diagnostic cath treatment recommendation of "other cardiac therapy without CABG or PCI". [Detail Line:1252]



Diagnostic Cath Outcomes Metrics

Distribution of Hospital Performance

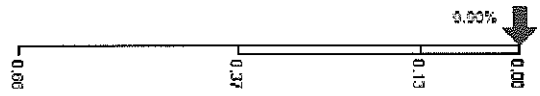
10th percentile 90th percentile

Better →

21 **Proportion of Diagnostic Catheterization procedures with vascular access site injury requiring treatment or major bleeding***

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.00%	0.13%	0.00%

Your hospital's proportion of patients with major access site related injury requiring treatment or major bleeding. [Detail Line:1301]



Utilization Metrics

Distribution of Hospital Performance

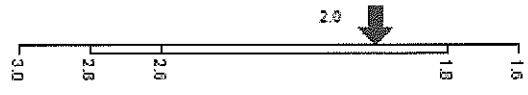
10th percentile 90th percentile

Better →

22 **Median post-procedure length of stay (in days) for PCI patients with STEMI**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
2.0	2.6	1.6

Your hospital's median post-procedure length of stay (in days) for PCI patients with STEMI. [Detail Line:2109]



Data Quality Metrics

Distribution of Hospital Performance

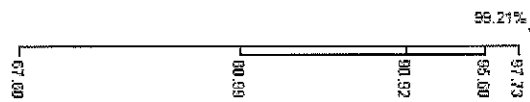
10th percentile 90th percentile

Better →

24 **Proportion of PCI procedures with creatinine assessed pre and post PCI**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
99.21%	90.92%	97.73%

Proportion of PCI patients with creatinine assessed pre and post procedure. Inclusions: LOS >=1 day. [Detail Line:1951]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jul 1, 2013 11:59:59 PM
Publish Date: Jul 14, 2013

Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2013Q1

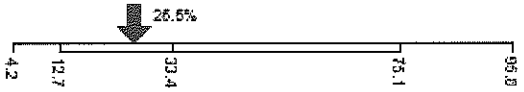
Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

Test Metrics	Distribution of Hospital Performance
	10th percentile — 90th percentile Better →

26 **Test Data Quality Metric: Proportion of PCI procedures with biomarkers assessed post-PCI for elective inpatients**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
26.5%	33.4%	95.8%

Proportion of elective procedures with biomarkers assessed post PCI.
Inclusion criteria: LOS >= 1 day and hospital status is "not outpatient".
[Detail Line:1949]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

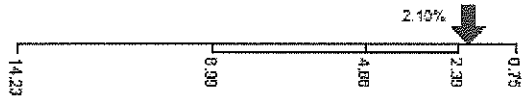
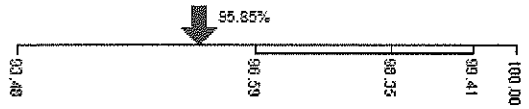
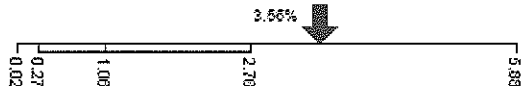
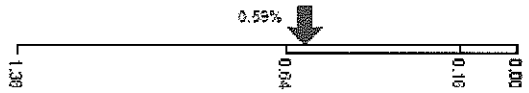
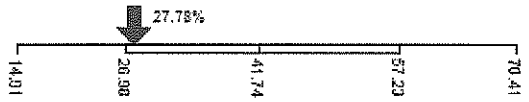
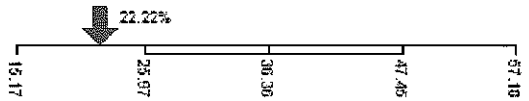
Aggregation Date: Jul 1, 2013 11:59:59 PM
Publish Date: Jul 14, 2013

Executive Summary

CathPCI Registry®

(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending

Section III: PCI Appropriate Use Criteria (AUC) Metrics – These data are based upon the 2012 Appropriateness Criteria for Coronary Revascularization Focused Update (J Am Coll Cardiol 2012 59: 857-881) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level.PCI AUC metrics are not appropriate for public/external reporting

PCI Appropriate Use Criteria (AUC) Metrics	Distribution of Hospital Performance (10th percentile … 90th percentile; Better →)
30 **Proportion of PCI procedures not classifiable for AUC reporting** My Hospital: 2.10% | US Hospitals 50th Pctl: 4.88% | US Hospitals 90th Pctl: 0.75% Proportion of PCI procedures that were not classifiable/evaluated for PCI AUC reporting due to incomplete or missing data. [Detail Line:1589]	
31 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were appropriate** My Hospital: 95.85% | US Hospitals 50th Pctl: 98.35% | US Hospitals 90th Pctl: 100.00% Proportion of PCI procedures that were evaluated as "Appropriate", among patients with ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1581]	
32 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were of uncertain appropriateness** My Hospital: 3.56% | US Hospitals 50th Pctl: 1.06% | US Hospitals 90th Pctl: 5.88% Proportion of PCI procedures that were evaluated as "Uncertain", among patients with ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1582]	
33 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate** My Hospital: 0.59% | US Hospitals 50th Pctl: 0.16% | US Hospitals 90th Pctl: 0.00% Proportion of PCI procedures that were evaluated as "Inappropriate", among patients with ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1583]	
34 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were appropriate** My Hospital: 27.78% | US Hospitals 50th Pctl: 41.74% | US Hospitals 90th Pctl: 70.41% Proportion of PCI procedures that were evaluated as "Appropriate", among patients without ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1585]	
35 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were of uncertain appropriateness** My Hospital: 22.22% | US Hospitals 50th Pctl: 36.36% | US Hospitals 90th Pctl: 57.18% Proportion of PCI procedures that were evaluated as "Uncertain", among patients without ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1586]	

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jul 1, 2013 11:59:59 PM
Publish Date: Jul 14, 2013

Executive Summary

CathPCI Registry®

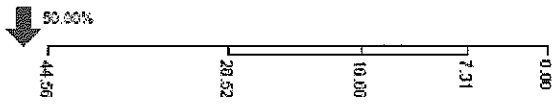
(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending

Section III: PCI Appropriate Use Criteria (AUC) Metrics – These data are based upon the 2012 Appropriateness Criteria for Coronary Revascularization Focused Update (J Am Coll Cardiol 2012 59: 857-881) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level.PCI AUC metrics are not appropriate for public/external reporting

36 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
50.00%	16.66%	0.00%

Proportion of PCI procedures that were evaluated as "Inappropriate", among patients without ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1587]



Executive Summary Footnotes

*Vascular access site injury requiring treatment or major bleeding is defined as:

1.Bleeding at access site, hematoma at access site, or retroperitoneal bleed that occur within 72 hours of the procedure. To qualify, the event must be associated with a hemoglobin drop of >= 3 g/dL; transfusion of whole or packed red blood cells, or a procedural intervention/surgery at the bleeding site to reverse/stop or correct the bleeding. This excludes "GI", "GU" and "Other" bleeds.

2.Major access site related injury requiring treatment includes access site occlusion, peripheral embolization, dissection, pseudoaneurysm, AV fistula requiring treatment anytime from the procedure until discharge.

**Your rate of post procedure MI cannot be reported if you only collected cardiac biomarkers on <90% of your patients who were in the hospital >=1 day.

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jul 1, 2013 11:59:59 PM
Publish Date: Jul 14, 2013

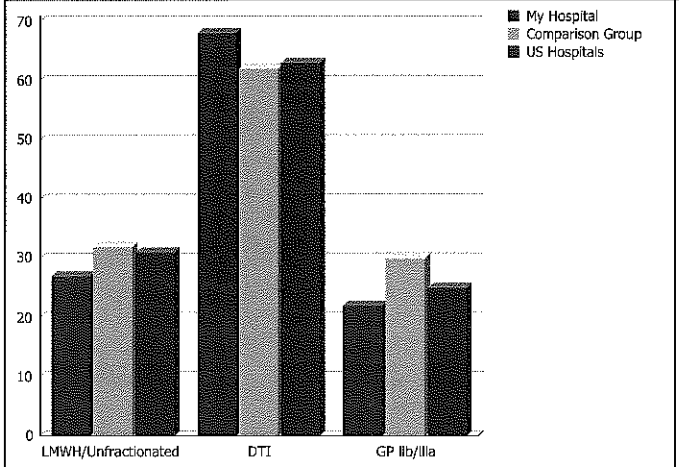
Executive Summary

CathPCI Registry®

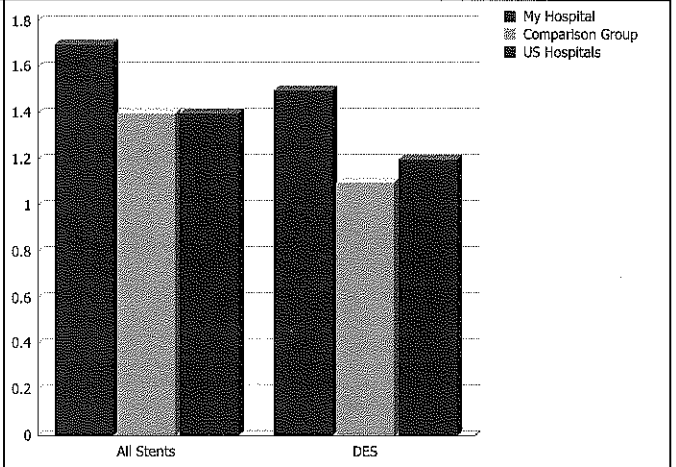
Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2013Q1

Section IV: PCI Process Comparison Metrics

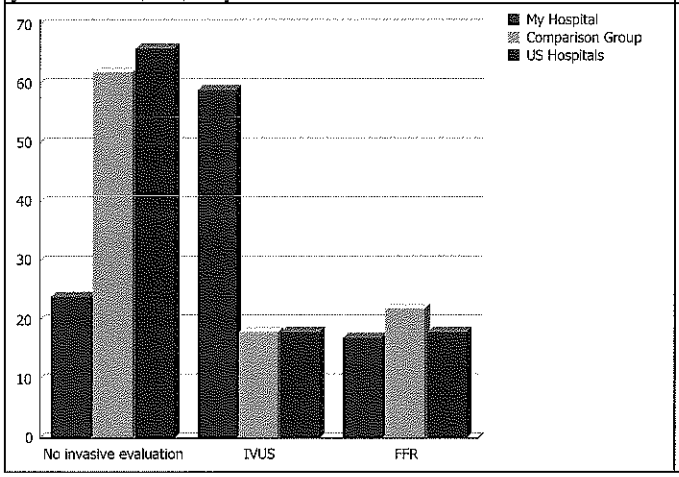
Anticoagulant Use: Any Low molecular weight/unfractionated heparin, direct thrombin inhibitors, GP IIb/IIIa inhibitor(pts with acute coronary syndrome).
[Detail Line:1600,1601,1606]



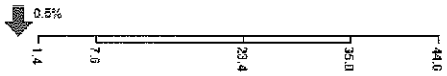
Stent Use: Average # of stents per PCI admission.
[Detail Line:1793,1794]



Intermediate stenosis lesions(40-70%): Further invasive evaluation performed (IVUS or FFR).
[Detail Line:1732,1733,1734]



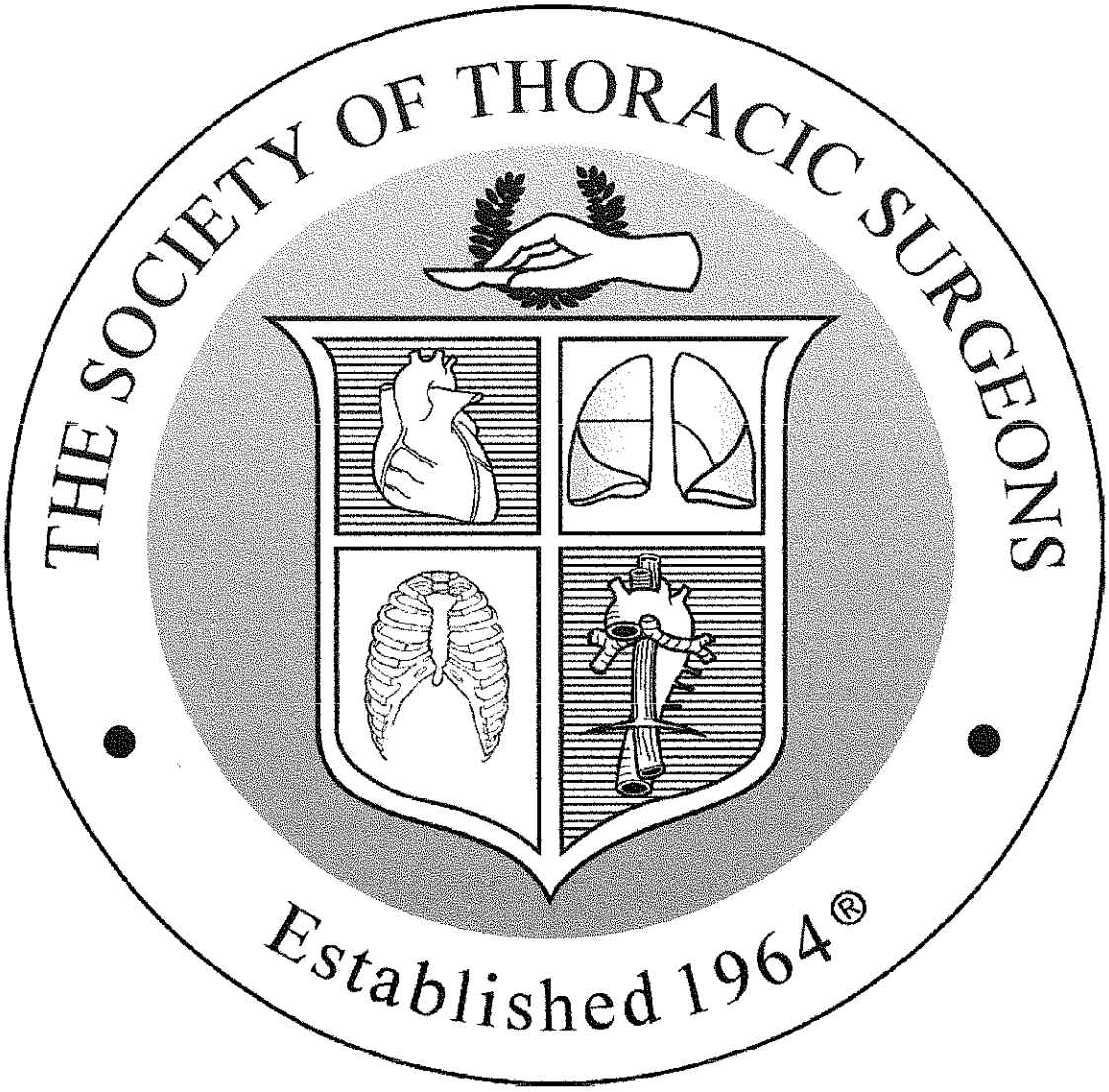
Outpatients: Proportion of PCI patient admissions whose hospital status was coded as "outpatient".
[Detail Line:1390]



Detail Section Line Reference

Population	Section	First Line #	Last Line #
All Diagnostic Cath and PCI Patients	Volume Summary	1000	1014
	Demographics and Payors	1015	1049
Diagnostic Cath with/without PCI	Demographics and Payors	1050	1084
	History and Risk Factors (on arrival)	1085	1102
	Clinical Evaluation Leading to the Procedure	1103	1139
	Stress and Imaging Studies	1140	1201
	Procedure Information	1202	1246
	Procedure Findings	1247	1273
	Discharge Information	1304	1325
Diagnostic Cath (No PCI)	Adverse Events	1274	1303
	Length of Stay	1326	1362
PCI	Demographics and Payors	1363	1401
	History and Risk Factors (on arrival)	1402	1433
	Clinical Evaluation Leading to the Procedure	1434	1474
	Procedure Indications	1475	1507
	Stress and Imaging Studies	1508	1571
	Appropriate Use Criteria	1572	1592
	Medications	1593	1612
	Procedure Information	1613	1677
	Procedure Findings	1678	1709
	PCI Lesion Information	1710	1797
	Lab Results	1948	1972
	Discharge Information	1973	2056
PCI (all patients)	Adverse Events	1798	1855
	Length of Stay	2057	2095
PCI (patients with STEMI)	Adverse Events	1856	1899
	Length of Stay	2096	2134
PCI (patients without STEMI)	Adverse Events	1900	1947
	Length of Stay	2135	2173

DATA ANALYSES OF THE SOCIETY OF THORACIC SURGEONS NATIONAL ADULT CARDIAC SURGERY DATABASE



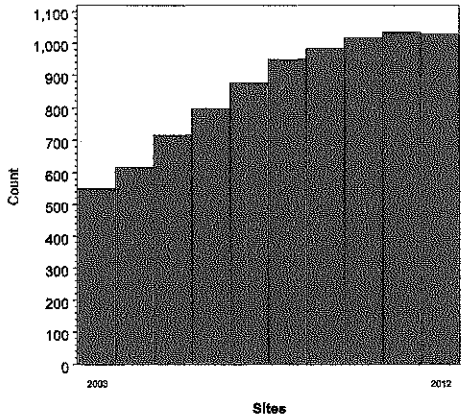
Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER

ST. MARY'S

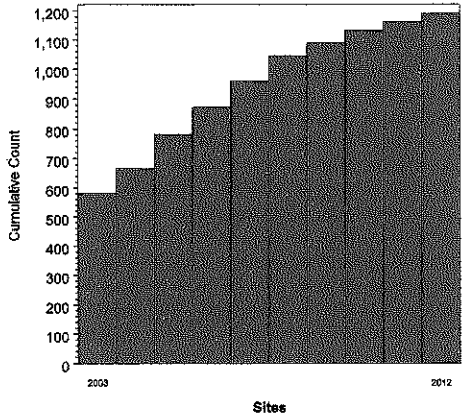
Produced April 2013

Period Ending 12/31/2012

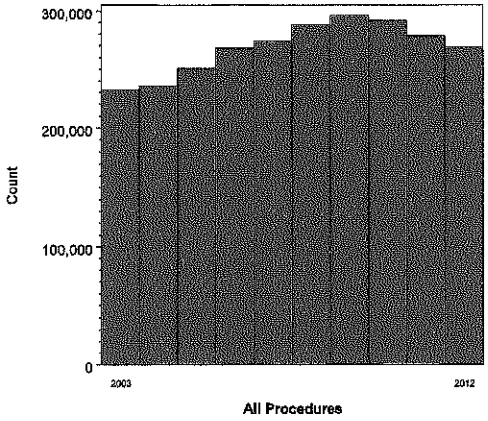
Number of Participating Sites
Yearly Count



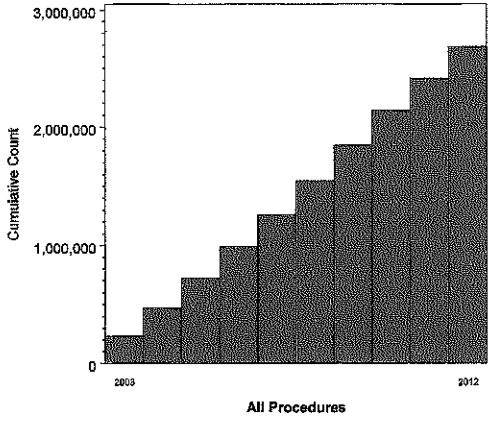
Number of Participating Sites
Cumulative over last 10 years



Number of Procedures
Yearly Count

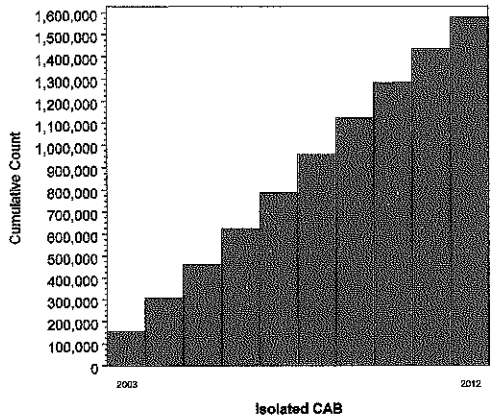


Number of Procedures
Cumulative over last 10 years



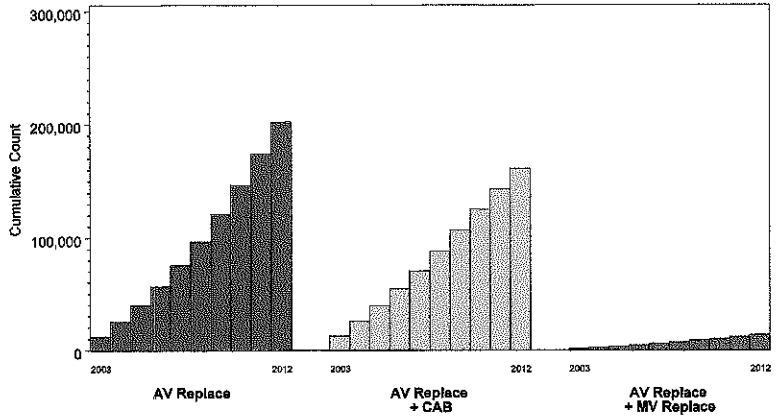
Number of Isolated CAB Procedures

Cumulative over last 10 years



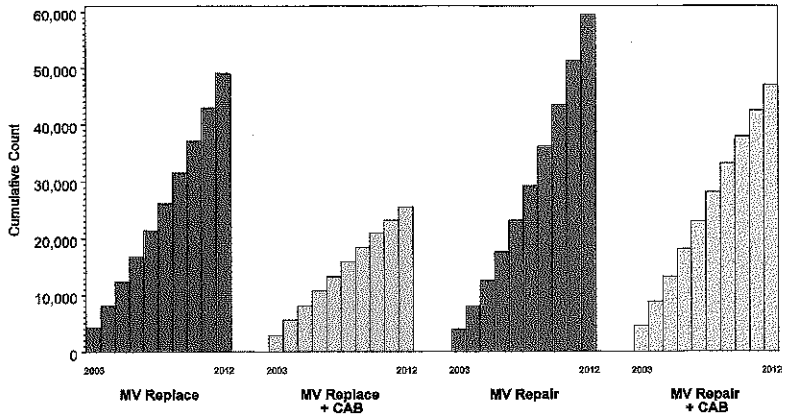
Number of Aortic Valve Procedures

Cumulative over last 10 years



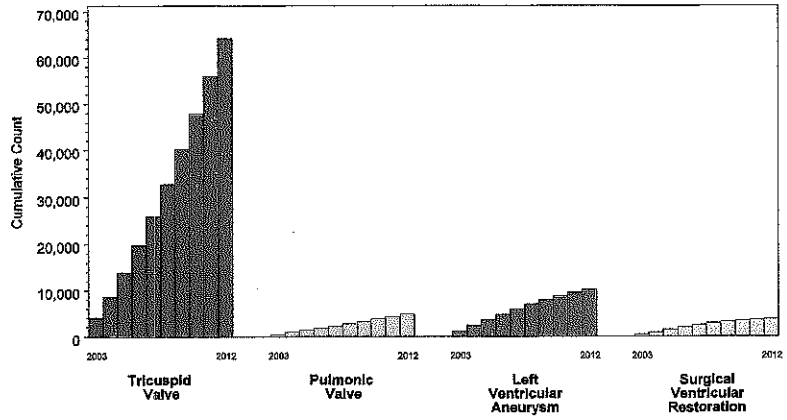
Number of Mitral Valve Procedures

Cumulative over last 10 years



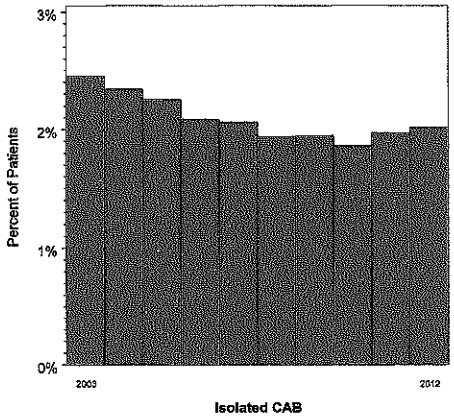
Number of Selected Other Cardiac Procedures

Cumulative over last 10 years



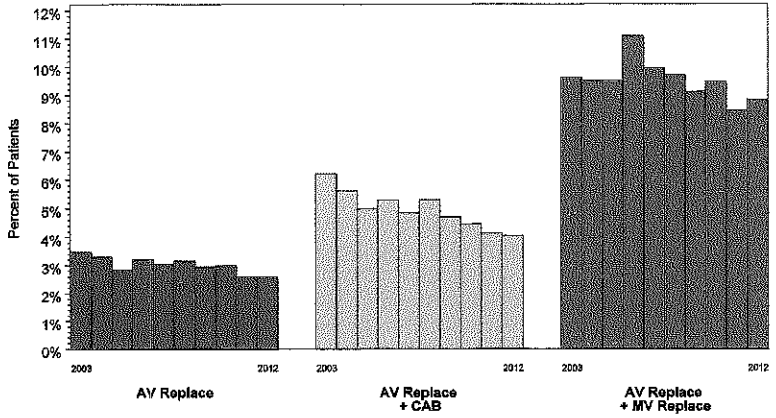
Unadjusted Isolated CAB Operative Mortality

Yearly over last 10 years



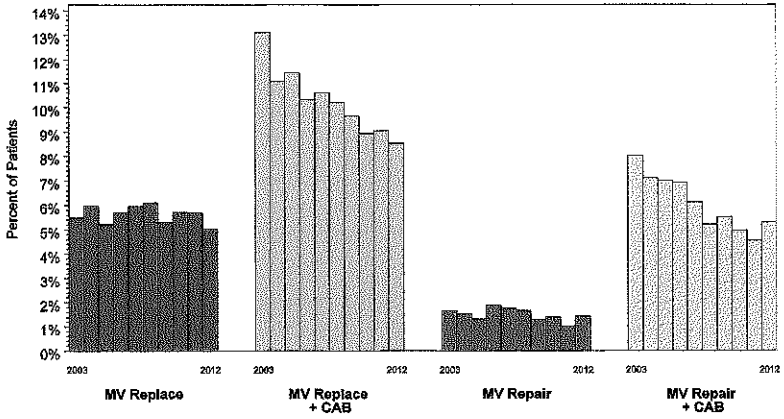
Unadjusted Aortic Valve Operative Mortality

Yearly over last 10 years



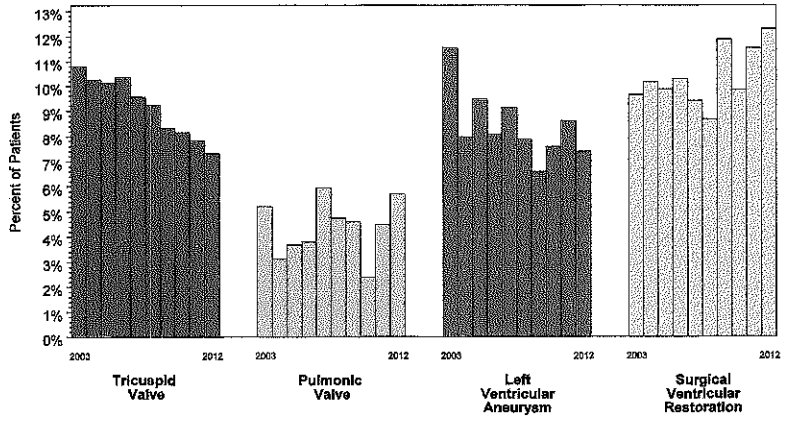
Unadjusted Mitral Valve Operative Mortality

Yearly over last 10 years

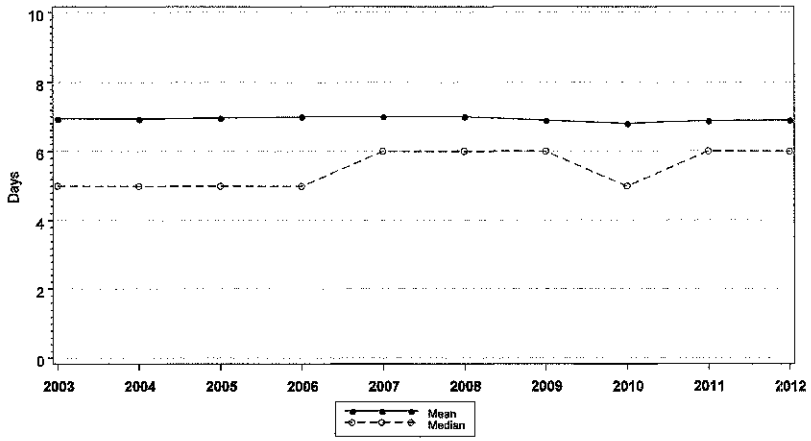


Unadjusted Other Cardiac Operative Mortality

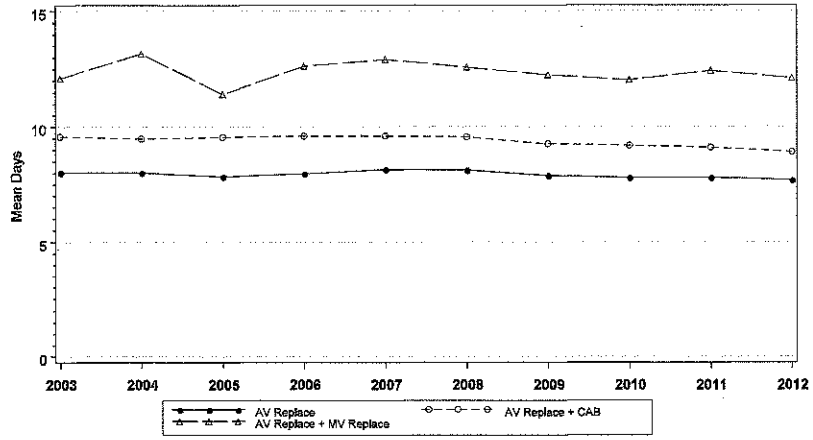
Yearly over last 10 years



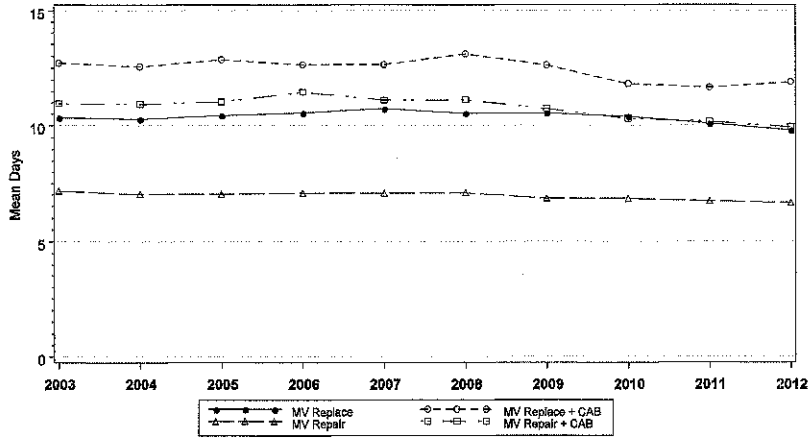
Post-Procedure LOS for Isolated CAB Procedures



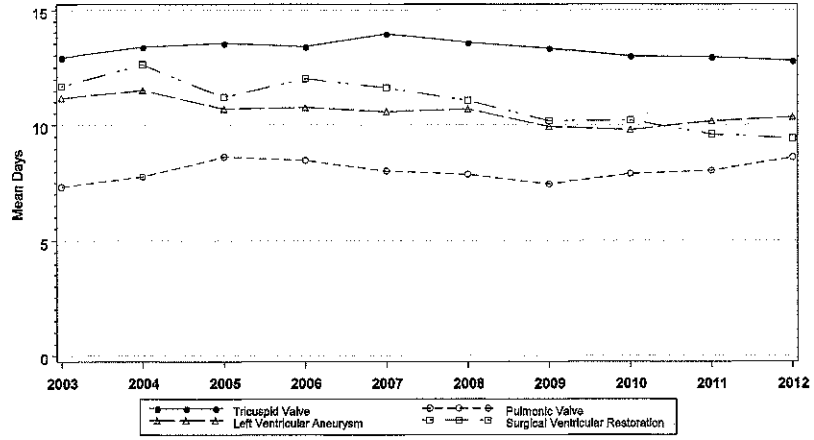
Post-Procedure LOS for Aortic Valve Procedures



Post-Procedure LOS for Mitral Valve Procedures



Post-Procedure LOS for Other Cardiac Procedures



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Yearly Number of Sites in Analysis	549	616	716	797	875	949	984	1,017	1,034	1,028
Yearly Overall Procedure Count	232,044	235,369	250,819	267,860	273,864	287,971	295,689	291,608	278,780	268,606
Major Procedures										
Isolated CAB	155,292	151,883	155,012	161,733	164,340	168,027	167,260	160,923	149,616	143,628
Isolated Aortic Valve Replacement	12,070	12,678	14,945	16,957	18,730	21,376	24,497	25,630	27,246	28,199
Isolated Mitral Valve Replacement	4,176	3,900	4,289	4,498	4,522	4,845	5,334	5,499	5,876	6,169
Aortic Valve Replacement + CAB	12,437	12,949	13,763	15,540	15,879	17,536	18,818	18,352	18,213	17,939
Mitral Valve Replacement + CAB	2,815	2,754	2,496	2,648	2,582	2,576	2,590	2,447	2,320	2,334
Aortic + Mitral Valve Replacements	1,071	1,039	1,032	1,163	1,285	1,317	1,503	1,468	1,612	1,620
Mitral Valve Repair	3,951	3,977	4,671	5,092	5,424	6,155	6,816	7,317	7,848	8,225
Mitral Valve Repair + CAB	4,453	4,310	4,518	4,838	4,854	5,177	4,894	4,762	4,597	4,599
Not Classified Above	35,779	41,879	50,093	55,391	56,248	60,962	63,977	65,210	61,452	55,893
Incidence of Other Procedures										
Pulmonic Valve	461	448	409	447	454	505	543	543	469	508
Tricuspid Valve	4,086	4,466	5,271	5,965	6,090	6,903	7,366	7,627	8,184	8,230
Ventricular Assist Device	985	1,007	1,010	1,134	1,198	1,518	1,868	2,438	3,180	3,380
LVA - Left Ventricular Aneurysm Repair	1,134	1,190	1,224	1,189	1,139	1,041	925	831	789	757
VSD - Ventricular Septal Defect Repair	468	474	566	618	575	634	625	639	671	662
ASD - Atrial Septal Defect Repair	2,357	2,361	2,826	3,158	3,372	3,940	4,285	4,238	4,657	4,917
Batista	10	19	19	38	47	47	34	42	17	-
Surgical Ventricular Restoration	394	472	597	515	436	404	303	193	208	179
Congenital Defect Repair	1,003	1,200	1,396	1,697	2,073	1,821	1,577	1,545	1,555	1,616
Transmyocardial Laser Revascularization	2,205	2,317	2,921	3,208	2,497	2,387	2,033	2,011	1,755	1,704
Cardiac Trauma	147	208	238	293	291	335	298	288	279	268
Cardiac Transplant	675	778	858	978	1,031	1,121	1,226	1,367	1,344	1,300
Arrhythmia Correction Surgery	-	676	1,586	1,409	1,275	1,370	1,212	1,160	1,037	887
Atrial Fibrillation Correction Surgery	-	3,999	12,912	14,978	15,074	16,013	16,585	16,845	17,536	20,562
Aortic Aneurysm	5,831	6,867	8,437	9,553	10,138	11,734	13,128	13,951	12,846	11,232
Ascending Aorta	-	2,119	6,822	7,896	8,501	10,024	11,430	12,143	10,603	8,791
Aortic Arch	-	572	1,967	2,298	2,415	2,762	3,183	3,500	3,145	2,693
Descending Aorta	-	331	979	1,054	1,088	1,122	1,156	1,281	1,046	700
Thoracoabdominal Aorta	-	243	558	630	571	670	632	708	655	610
Carotid Endarterectomy	2,234	2,235	2,277	2,211	2,042	2,081	1,884	1,775	1,581	1,362
Other Vascular	1,386	1,479	1,296	1,365	1,199	1,470	1,566	1,501	1,368	1,189
Other Thoracic	1,645	1,643	1,635	1,631	1,605	1,796	1,666	1,661	1,546	1,498

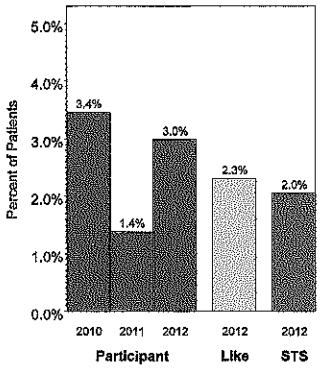
Major Procedures Mortality
CAB, Valve, and Valve+CAB Procedures Combined

Participant 30398
STS Period Ending 12/31/2012

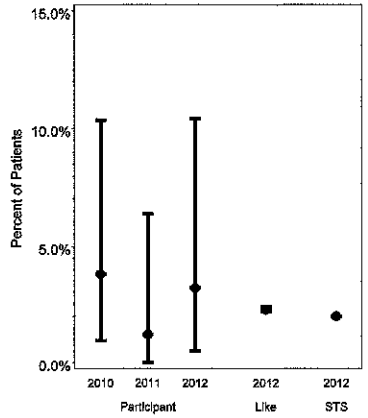
Duke Clinical Research Institute

	Participant 30398			Like Group	STS
	2010	2011	2012	2012	2012
Number of Cases	87	72	67	83,772	198,269
Mortality Summary					
In-hospital Mortality	3.4%	1.4%	3.0%	2.3%	2.0%
Operative Mortality	3.4%	1.4%	3.0%	2.8%	2.5%
Mortality Risk-Adjustment[2]					
In-hospital Mortality					
Odds Ratio	1.24	0.91	1.11	1.28	1.00
Lower 95% Confidence Limit	0.60	0.42	0.51	1.16	-
Upper 95% Confidence Limit	2.58	1.96	2.42	1.40	-
O/E Ratio	1.88	0.62	1.59	1.14	1.00
Lower 95% Confidence Limit	0.49	0.03	0.28	1.10	-
Upper 95% Confidence Limit	5.08	3.09	5.12	1.20	-
Risk-adjusted Rate	3.9%	1.3%	3.3%	2.3%	2.0%
Operative Mortality					
Odds Ratio	1.16	0.88	1.05	1.31	1.00
Lower 95% Confidence Limit	0.59	0.43	0.50	1.19	-
Upper 95% Confidence Limit	2.28	1.81	2.23	1.43	-
O/E Ratio	1.61	0.53	1.33	1.15	1.00
Lower 95% Confidence Limit	0.42	0.03	0.23	1.11	-
Upper 95% Confidence Limit	4.33	2.62	4.27	1.20	-
Risk-adjusted Rate	3.9%	1.3%	3.3%	2.8%	2.5%

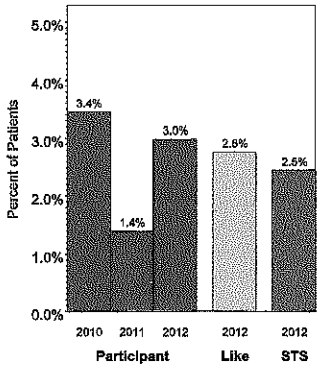
In-hospital Mortality
Observed rate



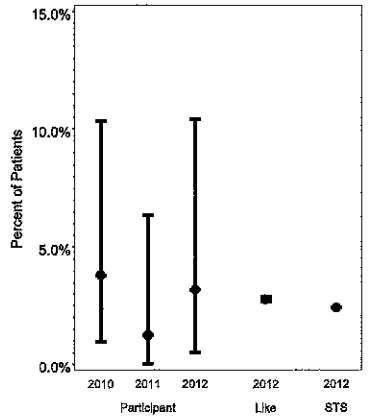
In-Hospital Mortality
Risk-adjusted rate + 95% CI



Operative Mortality
Observed rate



Operative Mortality
Risk-adjusted rate + 95% CI



[1]Does not include Mitral Valve Repairs or Mitral Valve Repairs + CABG
[2]Refer to the Report Overview for information on risk-adjustment methodology
Risk-adjustment is not performed on time periods of less than 6 months



Version 4.4

Institutional Outcomes Report
2013Q1

Waterbury Hospital
841765

Aggregation Date: Jul 1, 2013 11:59:59 PM

Publish Date: Jul 14, 2013

If User desires to publish or otherwise distribute or use, in whole or in part, any aggregate data or reports provided by ACCF, or produced in connection with or derived from NCDR, with the exception of strictly internal use within User's organization, User must first obtain the prior express written consent of ACCF. To the extent User is permitted to publish aggregate data, such aggregate data and any related information published in connection with it must be reviewed and approved by ACCF prior to publication.

National Cardiovascular Data Registry
CathPCI Registry®
800-257-4737
www.ncdr.com •ncdr@acc.org
©2010 American College of Cardiology Foundation

Table of Contents

Inclusion Summary 3

Quarters included in this report 3

Comparison group included in this report 3

Release Notes 4

Frequently used terminology 5

Executive Summary 7

PCI Performance Measures 7

Data Quality Metrics 8

PCI Appropriate Use Criteria (AUC) Metrics 12

Detail Section Line Reference 15

Inclusion Summary

Quarters included in this report:

Timeframe	Benchmark Inclusion Status	Submission Type	Included in Executive Summary
2012Q2		All Patients	Yes
2012Q3		All Patients	Yes
2012Q4		All Patients	Yes
2013Q1		All Patients	Yes

Comparison group included in this report:

Volume Groups	Number of PCI Procedures per R4Q	Number of US Hospitals per Volume Group	Your Hospital's Volume Group	Your Annualized PCI Procedure Volume	Your Declared Procedure Volume
1	0-10	56			
2	11-200	359			
3	201-400	398	X	353	386
4	401-600	257			
5	601-1000	234			
6	1001-2000	129			
7	2001+	17			

Release Notes:

CathPCI Registry® Outcomes Report Release Notes for 2013 Q1

Report Changes:

1. Risk Adjusted Acute Kidney Injury (AKI): Risk adjusted AKI is a new PCI risk model in the institutional reports. Risk adjusted AKI is reported in metric (#39) and new detail lines (1955-1963).*
2. Risk Adjusted Dialysis: Risk adjusted dialysis is a new PCI risk model in the institutional reports. Risk adjusted dialysis is reported in detail lines (1964-1972).*
3. Acute Kidney Injury (unadjusted) – Metric 15 has been retired from the executive summary but is maintained in the detail section on line 1952.

*Please refer to the "Risk Adjusted Outcomes Interpretation and Specifications" in the resources section of our website, https://www.ncdr.com/WebNCDR/RESOURCES/V4DOCUMENTS.ASPX# , for model specifications.

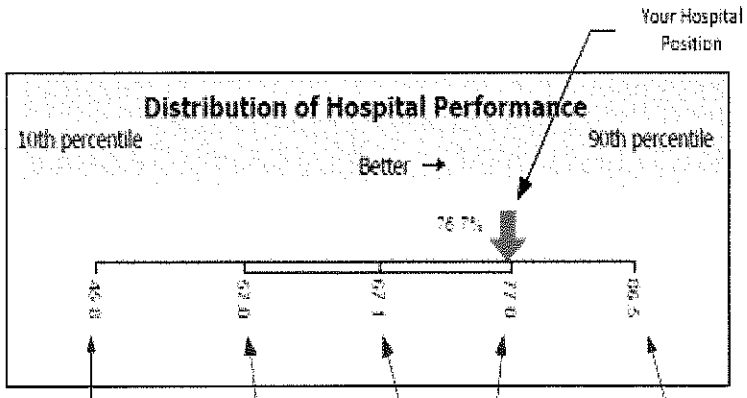
Frequently used terminology:

R4Q (Rolling Four Quarters)	The four (4) consecutive quarters included in this report. (Example: The 2011Q1 report includes 2010Q2, 2010Q3, 2010Q4 and 2011Q1. The "Q" in 'R4Q" indicates the last quarter of the rolling four quarters).
Benchmark Inclusion Status	Indicates whether a submission will be included in the R4Q aggregated data (benchmark) and comparison group statistics. "Green","Yellow" and "Red" stoplights denote the status. A "Green" status indicates the submission (one quarter/timeframe) is included in the benchmark and comparison group statistics. The data has successfully passed all data assessment and completeness checks. A "Yellow" status indicates the submission (one quarter/timeframe) is not included in the benchmark and comparison group statistics. Data is displayed in the quarterly column, but is not included in the "My Hospital R4Q" summary. The data has not passed the overall completeness assessment checks. A "Red" status indicates the submission (one quarter/timeframe) is not included in the benchmark or comparison group statistics. Data is not displayed in the quarterly column. A null or blank status indicates no submission has been received for that quarter/timeframe. Data is not displayed in the quarterly column.
Submission Type	Indicates the Submission Type based on the percentage of procedures performed in the submission file. A file with fewer than 50% of the procedures performed indicated as Diagnostic Catheterizations are designated as "PCI Only" submissions.
My Hospital R4Q	The values for a metric/measure (over R4Q) of data submitted by your facility with a Benchmark Inclusion Status of "Green".
US Hospital 50th Pctl	The median (or midpoint or 50th percentile) of US participant aggregated data for the metric or measure. Half of all participants will be above the median, and half will be below. This value will correspond to the midpoint of the box/whisker plot.
US Hospital 90th Pctl	The 90th percentile of US participant aggregated data for the metric or measure. 10% of all participants will be above the 90th percentile value, and 90% will be below. This value will correspond to the right-most endpoint of the box/whisker plot.
Annualized Volume	Annualized Volume is the total number of PCI procedures submitted over the R4Q period, adjusted for the number of quarters in which valid submissions were received during the R4Q period.
Volume Group Pts R4Q	The aggregated value for the metric/measure across all patients in the specified comparison group (over R4Q). Comparison Groups are based on annualized procedure volume. See the Comparison Group chart on the Inclusion Summary page of this report. To be included, data must have a Benchmark Inclusion Status of "Green".
US Registry Pts R4Q	The aggregated value for the measure/metric across US patients (over R4Q). To be included, data must have a Benchmark Inclusion Status of "Green". Only facilities in the United States and outlying territories are included.
Declared Procedure Volume	Indicates the estimated annual procedure volume as reported by the facility on the NCDR website Site Profile.
LFHS	This stands for Leapfrog Hospital Survey. This is to help identify the lines that are used for Leapfrog reporting for our participants. Please note that in the detail lines you will see "(LFHS)" to denote the lines that are to be used for Actual and Risk Adjusted Mortality Rate calculations.
Actual Mortality Rate (LFHS)	Enter your hospital's (actual) observed mortality rate (OMR) as a percentage. Using data from the My Hospital R4Q "Num" column in the current NCDR CathPCI Registry Institutional Outcomes Reports, OMR must be calculated by dividing the number for "Observed Mortality (among eligible) (LFHS)" by the number for "Eligible pts (LFHS)" to obtain the % rate for the most recent rolling four quarters where 12 consecutive months of data was submitted [i.e., Observed Mortality (among eligible) (LFHS)/Eligible pts (LFHS)].
Expected Mortality Rate (LFHS)	Enter your hospital's expected mortality rate (EMR) as a percentage. Using data from the Hospital R4Q "Num" column in the current NCDR CathPCI Registry Institutional Outcomes Reports, EMR must be calculated by dividing the number for "Expected Mortality (among eligible) (LFHS)" by the number for "Eligible pts (LFHS)" to obtain the % rate for the most recent rolling four quarters where 12 consecutive months of data was submitted [i.e., Expected Mortality (among eligible) (LFHS)/Eligible pts (LFHS)].

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Box and Whisker Plots

Interpreting Box and Whisker Plots



10th percentile If your hospital scores below the 10th percentile, the arrow will be on the left of this number.

90th Percentile If your hospital scores above the 90th percentile, the arrow will be on the right of this number.

10th Percentile
90% of the hospitals achieved "better" scores than the 10th percentile.

25th Percentile or 1st Quartile
75% of the hospitals achieved "better" scores than the 25th percentile.

50th Percentile or 2nd Quartile
Middle of the distribution: Half of the hospitals data is above and half are below the median.

75th Percentile or 3rd Quartile
25% of the hospitals achieved "better" scores than the 75th percentile.

90th Percentile
10% of the hospitals achieved "better" scores than the 90th percentile.

Your Hospital Position
Your 'Hospital Position' in relation to all other hospitals' data.

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jul 1, 2013 11:59:59 PM
Publish Date: Jul 14, 2013

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2013Q1

Section I: PCI Performance Measures

Endorsed by the National Quality Forum and appropriate for public reporting

PCI Performance Measures

Distribution of Hospital Performance

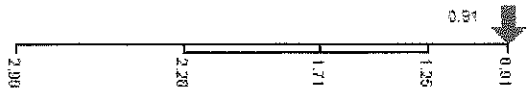
10th percentile — 90th percentile

Better →

1 **PCI in-hospital risk adjusted mortality (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.91	1.71	0.91

Your hospital's PCI in-hospital risk adjusted mortality rate for all patients adjusted using the NCDR® risk adjustment model. [Detail Line:2035]



38 **Composite: Discharge Medications in Eligible PCI Patients**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
93.7%	92.5%	98.3%

Patients with a PCI procedure who receive prescriptions for all medications (aspirin, P2Y12 inhibitor, and statin) for which they are eligible for at discharge. [Detail Line:2006]



Note

Performance measures in the CathPCI Registry® have been endorsed by the National Quality Forum. Such performance measures meeting the requirement for approval are intended not only for clinical quality improvement, but also may be considered for purposes of public reporting.

The "Registry Metrics" on the subsequent pages of this report are those measures that have been developed to support self assessment and quality improvement at the provider, hospital, and/or health care system level. While these metrics have not been formally developed by the American College of Cardiology/American Heart Association Task Force for Performance Measures Task Force, they may be identified as evolving measures worthy of consideration for further development into performance measures.

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2013Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

PCI Process Metrics

Distribution of Hospital Performance

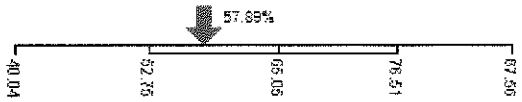
10th percentile — 90th percentile

Better →

2 **Proportion of elective PCIs with prior positive stress or imaging study**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
57.89%	65.05%	87.56%

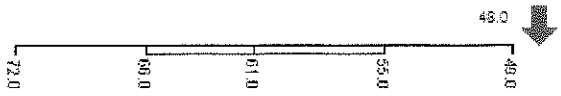
Proportion of elective PCI procedures (excluding patients with ACS) with an antecedent stress or imaging study with a positive result (suggestive of ischemia) or with a fractional flow reserve value of <=0.8 during the PCI procedure [Detail Line:1513]



3 **Median time to immediate PCI for STEMI patients (in minutes)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
48	61	49

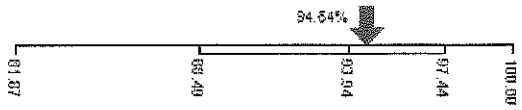
Your hospital's median time from hospital arrival to immediate PCI for STEMI patients in minutes. Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1502]



4 **Proportion of STEMI patients receiving immediate PCI w/in 90'**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
94.64%	93.94%	100.00%

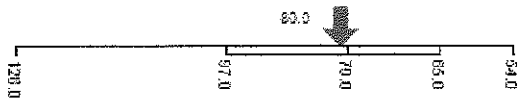
Proportion of STEMI patients with a time from your hospital arrival (or subsequent ECG if ST elevation first noted on subsequent ECG) to immediate PCI <=90'. Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1503]



5 **Median time from ED arrival at STEMI transferring facility to ED arrival at STEMI receiving facility among transferred patients.**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
80	79	54

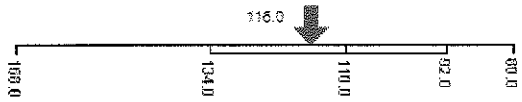
Your hospital's median time from arrival at transferring facility to ED arrival at STEMI receiving facility among transferred patients. [Detail Line:1505]



6 **Median time from ED arrival at STEMI transferring facility to immediate PCI at STEMI receiving facility among transferred patients (in minutes)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
116	110	80

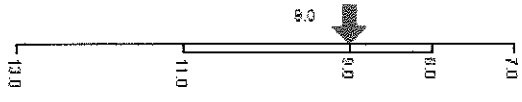
Your hospital's median time from arrival at referring facility to immediate PCI at STEMI receiving facility among transferred patients. Exclusions: Reasons for delay does not equal none. [Detail Line:1506]



7 **Median fluoro time (in minutes)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
9	9	7

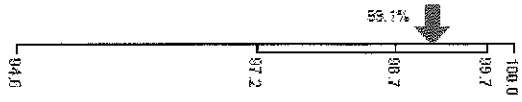
Inclusion criteria: PCI of one vessel/lesion. Exclusion criteria: Prior CABG, or "other" procedure during the same lab visit; PCI of >1 vessel/lesion. [Detail Line:1633]



8 **Proportion of patients with aspirin prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
99.1%	98.7%	100.0%

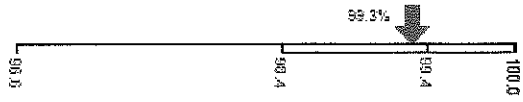
Proportion of patients (without a documented contraindication) with aspirin prescribed at discharge. [Detail Line:1996]



9 **Proportion of patients with a P2Y12 inhibitor prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
99.3%	99.4%	100.0%

Proportion of patients (without a documented contraindication) with a stent implanted that had a thienopyridine/P2Y12 inhibitor prescribed at discharge. [Detail Line:2005]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jul 1, 2013 11:59:59 PM
Publish Date: Jul 14, 2013

Executive Summary

CathPCI Registry®

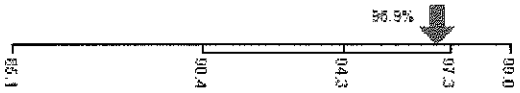
Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2013Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

10 **Statins prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
96.9%	94.3%	99.0%

Proportion of patients (without a documented contraindication) prescribed a statin at discharge. [Detail Line:2001]



PCI Outcome Metrics

Distribution of Hospital Performance

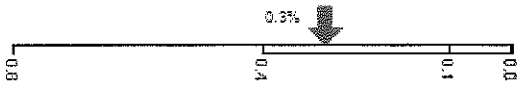
10th percentile — 90th percentile

Better →

12 **Proportion of PCI patients with emergency CABG**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.3%	0.1%	0.0%

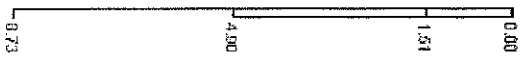
Your hospital's proportion of patients having emergency CABG (at your facility or transferred to another facility). [Detail Line:1978]



13 **Proportion of PCI procedures with a post procedure MI (among hospitals routinely collecting post-PCI biomarkers)****

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
	1.51%	0.00%

Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with >= 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1803]



14 **Proportion of PCI procedures with post procedure MI (among hospitals who do not routinely collect post-PCI biomarkers)****

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
2.24%	0.30%	0.00%

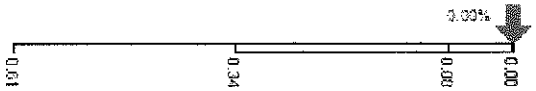
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with < 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1804]



16 **Proportion of PCI procedures with post procedure stroke**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.00%	0.08%	0.00%

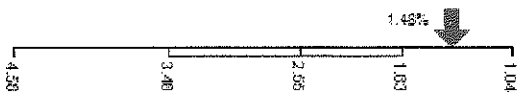
Your hospital's proportion of patients with stroke post procedure. [Detail Line:1811]



17 **Composite: Proportion of PCI patients with death, emergency CABG, stroke or repeat target vessel revascularization.**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
1.48%	2.55%	1.04%

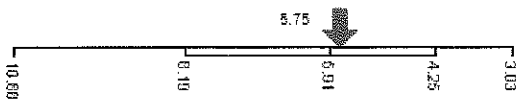
Your hospital's proportion of patients with death, emergency CABG, stroke or repeat target vessel revascularization post procedure up to hospital discharge. Excludes patients with stroke and an elective, urgent or salvage CABG during same admission. [Detail Line:1801]



18 **PCI in-hospital risk adjusted mortality (patients with STEMI)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
5.75	5.91	3.03

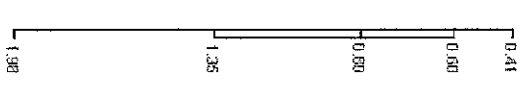
Your hospital's PCI in-hospital risk adjusted mortality rate for patients with STEMI adjusted using the NCDR® risk adjustment model. [Detail Line:2044]



19 **PCI in-hospital risk adjusted mortality (STEMI patients excluded)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
	0.89	0.41

Your hospital's PCI in-hospital risk adjusted mortality rate for patients with other diagnoses (not STEMI) using the NCDR® risk adjustment model. [Detail Line:2053]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jul 1, 2013 11:59:59 PM
Publish Date: Jul 14, 2013

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2013Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

25 **Proportion of PCI procedures with transfusion of whole blood or RBCs**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
3.20%	1.27%	0.00%

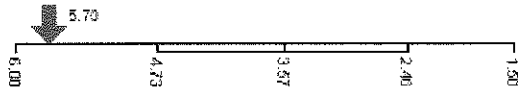
Proportion of patients who received a transfusion of whole blood or red blood cells after a PCI procedure. Inclusion: Patients with a pre-procedure hemoglobin >8 g/dL and patients with no CABG, and no other major surgery during the same admission. [Detail Line:1853]



37 **PCI in-hospital risk adjusted rate of bleeding events (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
5.70	3.57	1.50

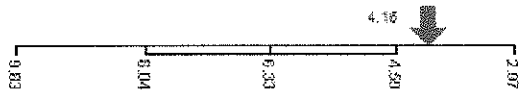
Your hospital's risk adjusted rate of bleeding events for patients with PCI procedures using the NCDR® PCI bleeding risk adjustment model. [Detail Line:1823]



39 **PCI in-hospital risk adjusted acute kidney injury (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
4.16	6.33	2.97

Your hospital's PCI in-hospital risk adjusted AKI rate for all patients adjusted using the NCDR® risk adjustment model. [Detail Line:1960]



Diagnostic Cath Process Metrics

Distribution of Hospital Performance

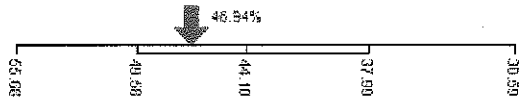
10th percentile — 90th percentile

Better →

20 **Incidence of non-obstructive CAD (elective patients only)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
46.94%	44.10%	30.59%

Patients with an elective diagnostic cath and coronary angiography with all native coronary territories <50% Exclusions: Patients with prior CABG, cardiac transplant evaluation; pre-op evaluation for non-cardiac surgery and diagnostic cath treatment recommendation of "other cardiac therapy without CABG or PCI". [Detail Line:1252]



Diagnostic Cath Outcomes Metrics

Distribution of Hospital Performance

10th percentile — 90th percentile

Better →

21 **Proportion of Diagnostic Catheterization procedures with vascular access site injury requiring treatment or major bleeding***

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.39%	0.13%	0.00%

Your hospital's proportion of patients with major access site related injury requiring treatment or major bleeding. [Detail Line:1301]



Utilization Metrics

Distribution of Hospital Performance

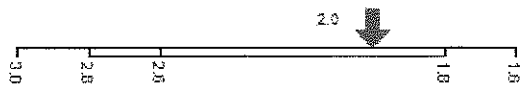
10th percentile — 90th percentile

Better →

22 **Median post-procedure length of stay (in days) for PCI patients with STEMI**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
2.0	2.6	1.6

Your hospital's median post-procedure length of stay (in days) for PCI patients with STEMI. [Detail Line:2109]



Data Quality Metrics

Distribution of Hospital Performance

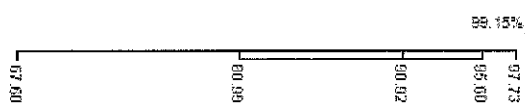
10th percentile — 90th percentile

Better →

24 **Proportion of PCI procedures with creatinine assessed pre and post PCI**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
99.15%	90.92%	97.73%

Proportion of PCI patients with creatinine assessed pre and post procedure. Inclusions: LOS >=1 day. [Detail Line:1951]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jul 1, 2013 11:59:59 PM
Publish Date: Jul 14, 2013

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2013Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

Test Metrics

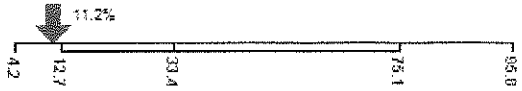
Distribution of Hospital Performance

10th percentile 90th percentile

Better →

26 **Test Data Quality Metric: Proportion of PCI procedures with biomarkers assessed post-PCI for elective inpatients**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
11.2%	33.4%	95.8%



Proportion of elective procedures with biomarkers assessed post PCI.
Inclusion criteria: LOS >= 1 day and hospital status is "not outpatient".
[Detail Line:1949]

Executive Summary

CathPCI Registry®

(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending

Section III: PCI Appropriate Use Criteria (AUC) Metrics – These data are based upon the 2012 Appropriateness Criteria for Coronary Revascularization Focused Update (J Am Coll Cardiol 2012 59: 857-881) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level.PCI AUC metrics are not appropriate for public/external reporting

PCI Appropriate Use Criteria (AUC) Metrics

Distribution of Hospital Performance

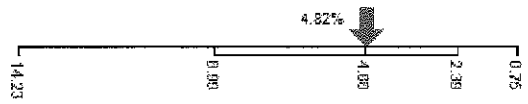
10th percentile — 90th percentile

Better →

30 **Proportion of PCI procedures not classifiable for AUC reporting**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
4.82%	4.88%	0.75%

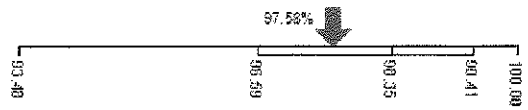
Proportion of PCI procedures that were not classifiable/evaluated for PCI AUC reporting due to incomplete or missing data. [Detail Line:1589]



31 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were appropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
97.58%	98.35%	100.00%

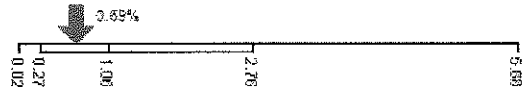
Proportion of PCI procedures that were evaluated as "Appropriate", among patients with ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1581]



32 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were of uncertain appropriateness**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.69%	1.06%	5.88%

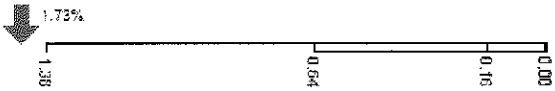
Proportion of PCI procedures that were evaluated as "Uncertain", among patients with ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1582]



33 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
1.73%	0.16%	0.00%

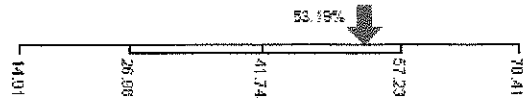
Proportion of PCI procedures that were evaluated as "Inappropriate", among patients with ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1583]



34 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were appropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
53.19%	41.74%	70.41%

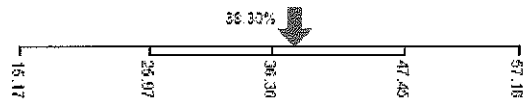
Proportion of PCI procedures that were evaluated as "Appropriate", among patients without ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1585]



35 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were of uncertain appropriateness**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
38.30%	36.36%	57.18%

Proportion of PCI procedures that were evaluated as "Uncertain", among patients without ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1586]



Executive Summary

CathPCI Registry®

(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending

Section III: PCI Appropriate Use Criteria (AUC) Metrics – These data are based upon the 2012 Appropriateness Criteria for Coronary Revascularization Focused Update (J Am Coll Cardiol 2012 59: 857-881) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level.PCI AUC metrics are not appropriate for public/external reporting

36 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
8.51%	16.66%	0.00%

Proportion of PCI procedures that were evaluated as "Inappropriate", among patients without ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1587]



Executive Summary Footnotes

*Vascular access site injury requiring treatment or major bleeding is defined as:

1.Bleeding at access site, hematoma at access site, or retroperitoneal bleed that occur within 72 hours of the procedure. To qualify, the event must be associated with a hemoglobin drop of >= 3 g/dL; transfusion of whole or packed red blood cells, or a procedural intervention/surgery at the bleeding site to reverse/stop or correct the bleeding. This excludes "GI", "GU" and "Other" bleeds.

2.Major access site related injury requiring treatment includes access site occlusion, peripheral embolization, dissection, pseudoaneurysm, AV fistula requiring treatment anytime from the procedure until discharge.

**Your rate of post procedure MI cannot be reported if you only collected cardiac biomarkers on <90% of your patients who were in the hospital >=1 day.

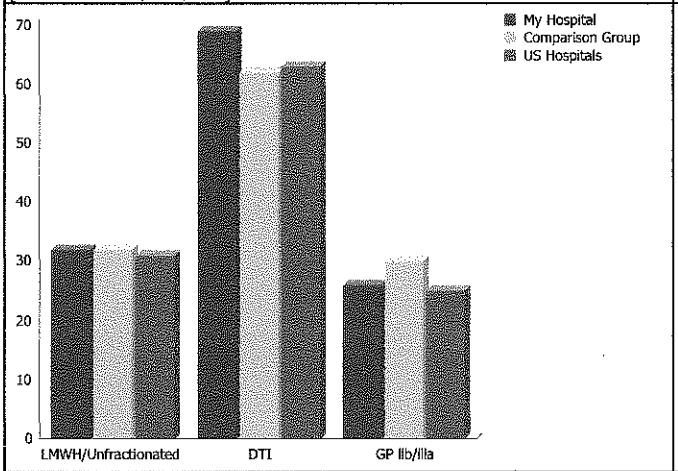
Executive Summary

CathPCI Registry®

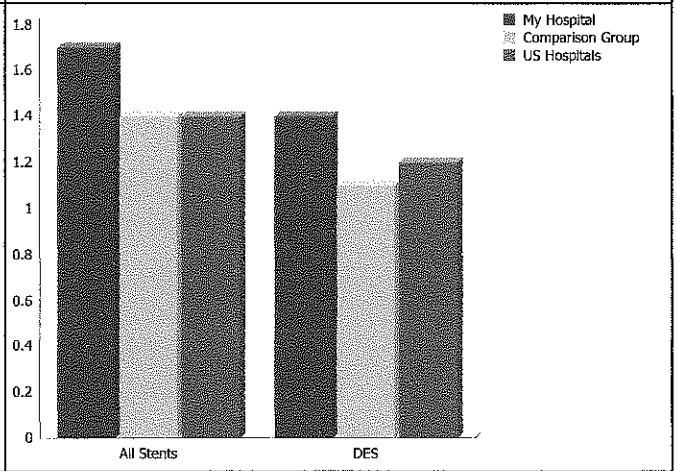
Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2013Q1

Section IV: PCI Process Comparison Metrics

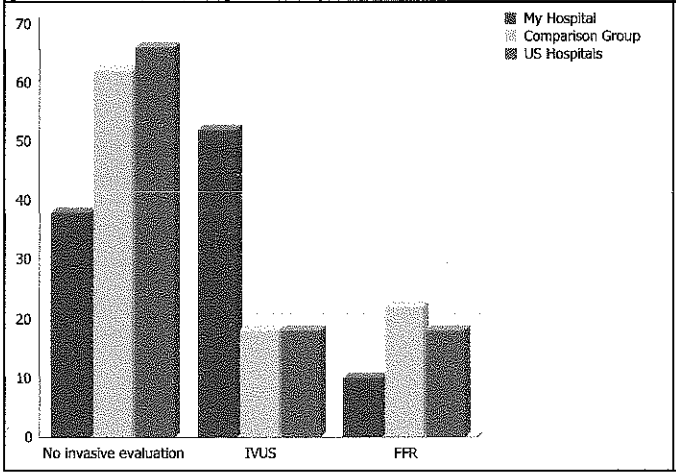
Anticoagulant Use: Any Low molecular weight/unfractionated heparin, direct thrombin inhibitors, GP IIb/IIIa inhibitor(pts with acute coronary syndrome).
[Detail Line:1600,1601,1606]



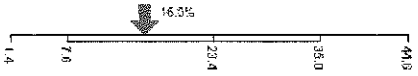
Stent Use: Average # of stents per PCI admission.
[Detail Line:1793,1794]



Intermediate stenosis lesions(40-70%): Further invasive evaluation performed (IVUS or FFR).
[Detail Line:1732,1733,1734]



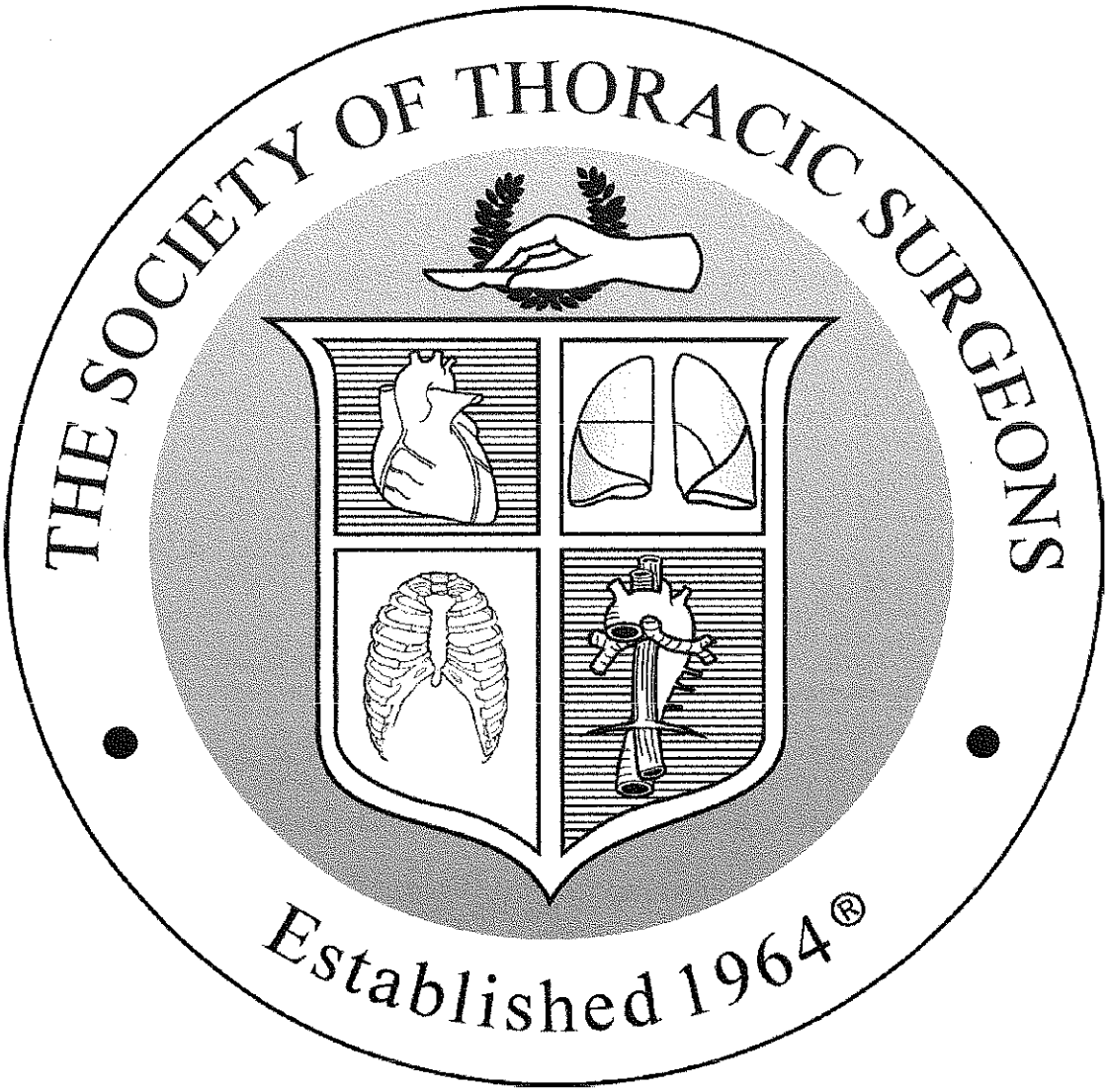
Outpatients: Proportion of PCI patient admissions whose hospital status was coded as "outpatient".
[Detail Line:1390]



Detail Section Line Reference

Population	Section	First Line #	Last Line #
All Diagnostic Cath and PCI Patients	Volume Summary	1000	1014
	Demographics and Payors	1015	1049
Diagnostic Cath with/without PCI	Demographics and Payors	1050	1084
	History and Risk Factors (on arrival)	1085	1102
	Clinical Evaluation Leading to the Procedure	1103	1139
	Stress and Imaging Studies	1140	1201
	Procedure Information	1202	1246
	Procedure Findings	1247	1273
	Discharge Information	1304	1325
Diagnostic Cath (No PCI)	Adverse Events	1274	1303
	Length of Stay	1326	1362
PCI	Demographics and Payors	1363	1401
	History and Risk Factors (on arrival)	1402	1433
	Clinical Evaluation Leading to the Procedure	1434	1474
	Procedure Indications	1475	1507
	Stress and Imaging Studies	1508	1571
	Appropriate Use Criteria	1572	1592
	Medications	1593	1612
	Procedure Information	1613	1677
	Procedure Findings	1678	1709
	PCI Lesion Information	1710	1797
	Lab Results	1948	1972
	Discharge Information	1973	2056
PCI (all patients)	Adverse Events	1798	1855
	Length of Stay	2057	2095
PCI (patients with STEMI)	Adverse Events	1856	1899
	Length of Stay	2096	2134
PCI (patients without STEMI)	Adverse Events	1900	1947
	Length of Stay	2135	2173

DATA ANALYSES OF THE SOCIETY OF THORACIC SURGEONS NATIONAL ADULT CARDIAC SURGERY DATABASE



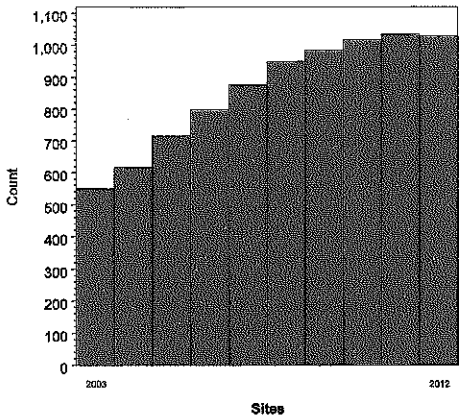
Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER

Produced April 2013

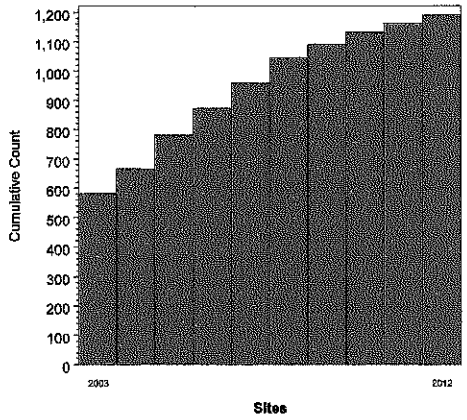
Period Ending 12/31/2012

Waterbury Hospital

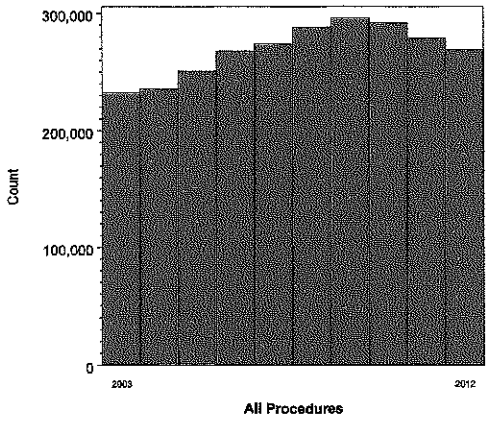
Number of Participating Sites
Yearly Count



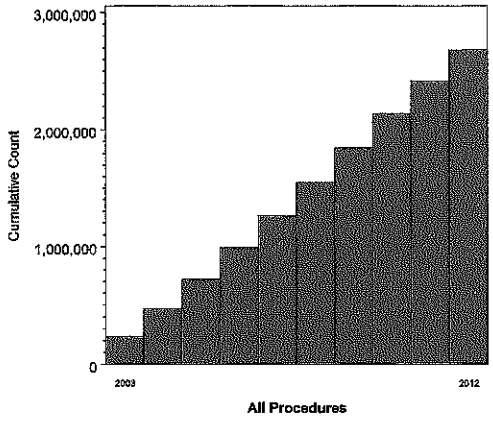
Number of Participating Sites
Cumulative over last 10 years



Number of Procedures
Yearly Count

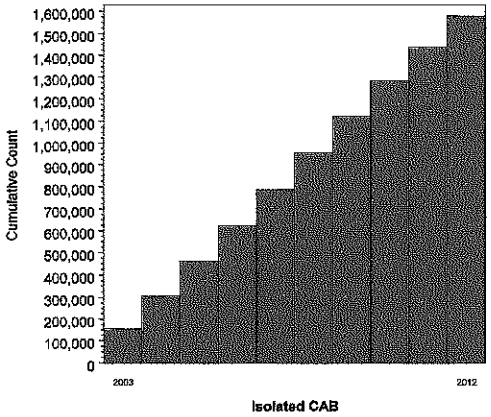


Number of Procedures
Cumulative over last 10 years



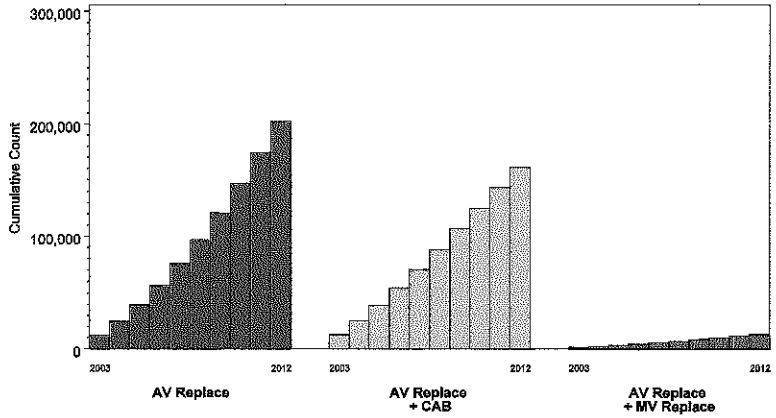
Number of Isolated CAB Procedures

Cumulative over last 10 years



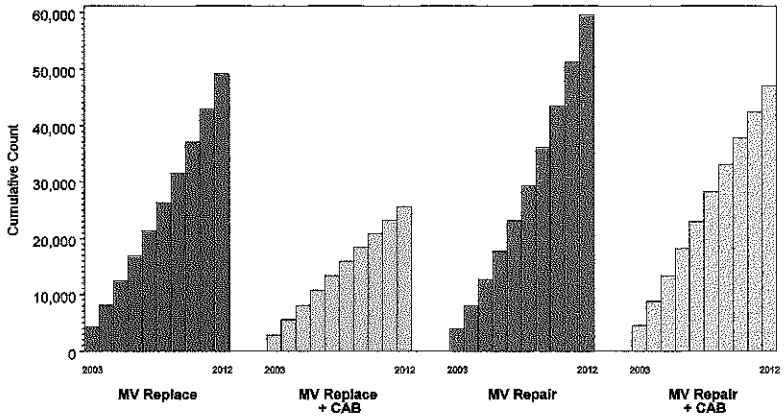
Number of Aortic Valve Procedures

Cumulative over last 10 years



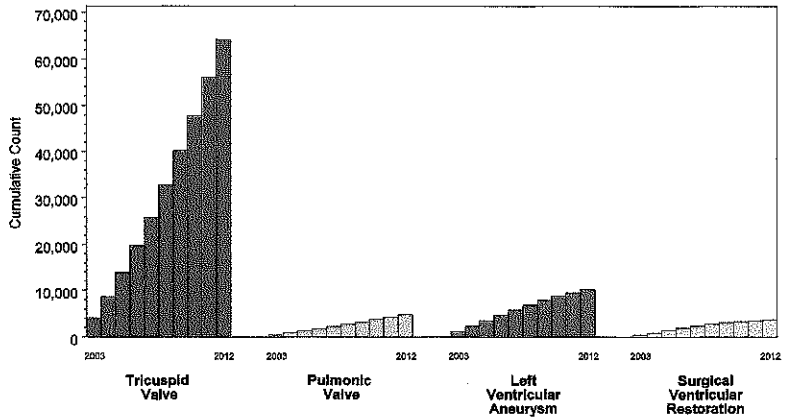
Number of Mitral Valve Procedures

Cumulative over last 10 years



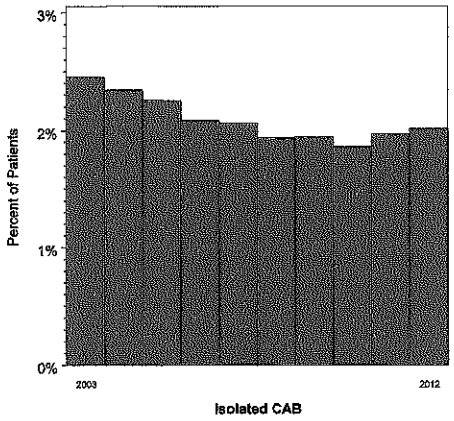
Number of Selected Other Cardiac Procedures

Cumulative over last 10 years



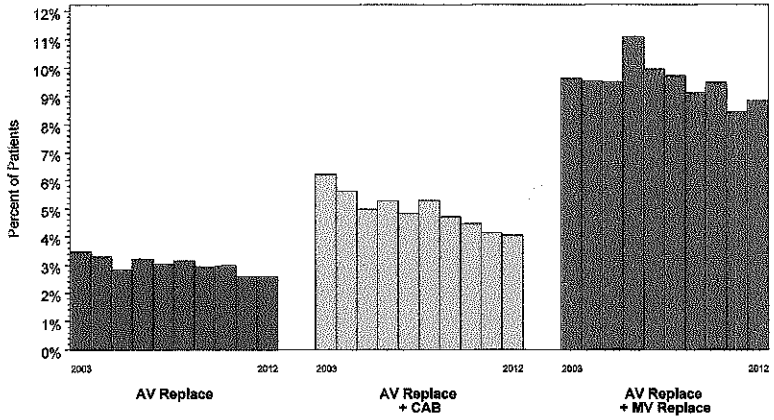
Unadjusted Isolated CAB Operative Mortality

Yearly over last 10 years



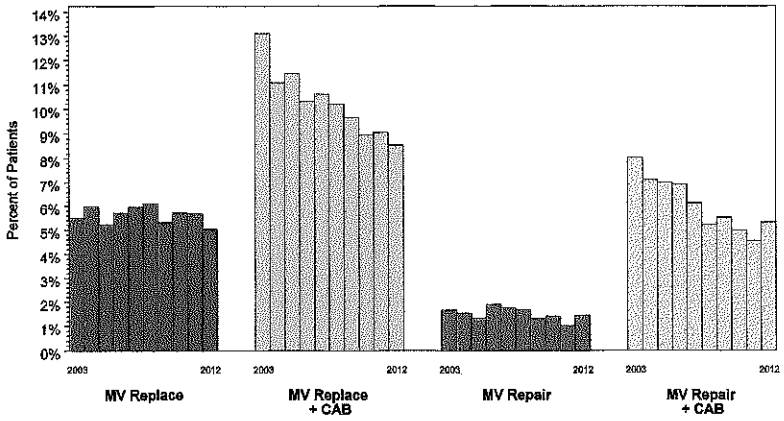
Unadjusted Aortic Valve Operative Mortality

Yearly over last 10 years



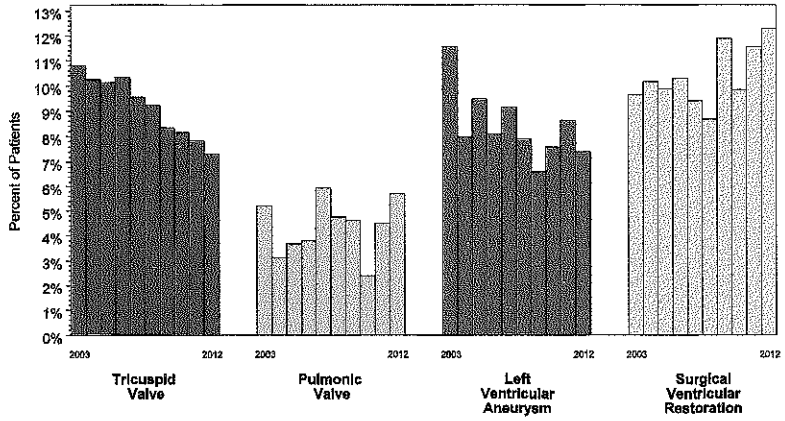
Unadjusted Mitral Valve Operative Mortality

Yearly over last 10 years

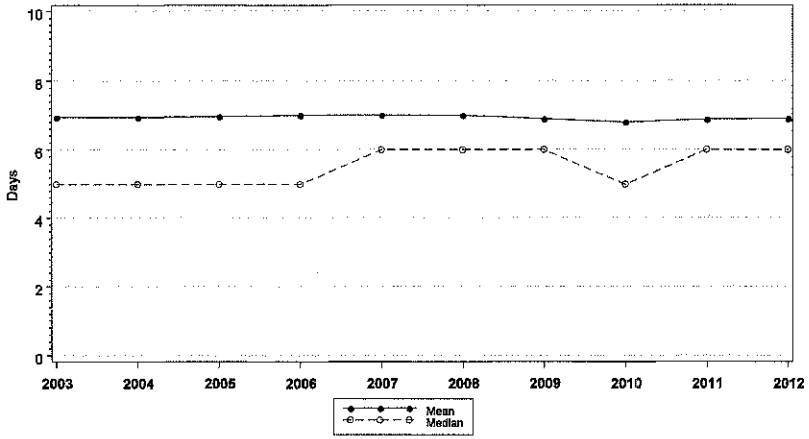


Unadjusted Other Cardiac Operative Mortality

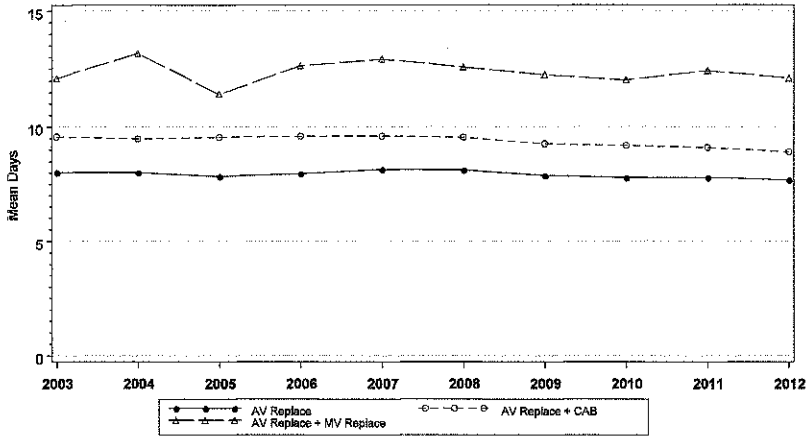
Yearly over last 10 years



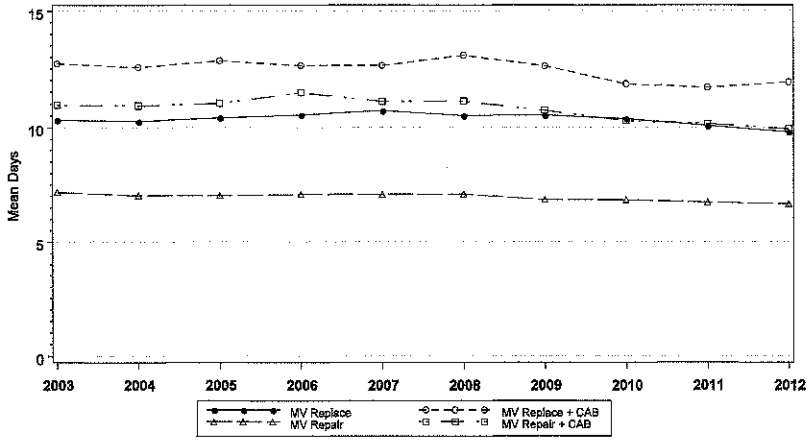
Post-Procedure LOS for Isolated CAB Procedures



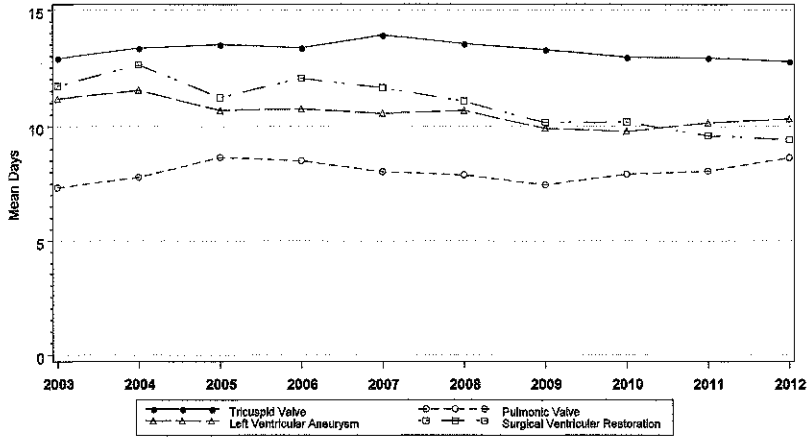
Post-Procedure LOS for Aortic Valve Procedures



Post-Procedure LOS for Mitral Valve Procedures



Post-Procedure LOS for Other Cardiac Procedures



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Yearly Number of Sites in Analysis	549	616	716	797	875	949	984	1,017	1,034	1,028
Yearly Overall Procedure Count	232,044	235,369	250,819	267,860	273,864	287,971	295,689	291,608	278,780	268,606
Major Procedures										
Isolated CAB	155,292	151,883	155,012	161,733	164,340	168,027	167,260	160,923	149,616	143,628
Isolated Aortic Valve Replacement	12,070	12,678	14,945	16,957	18,730	21,376	24,497	25,630	27,246	28,199
Isolated Mitral Valve Replacement	4,176	3,900	4,289	4,498	4,522	4,845	5,334	5,499	5,876	6,169
Aortic Valve Replacement + CAB	12,437	12,949	13,763	15,540	15,879	17,536	18,818	18,352	18,213	17,939
Mitral Valve Replacement + CAB	2,815	2,754	2,496	2,648	2,582	2,576	2,590	2,447	2,320	2,334
Aortic + Mitral Valve Replacements	1,071	1,039	1,032	1,163	1,285	1,317	1,503	1,468	1,612	1,620
Mitral Valve Repair	3,951	3,977	4,671	5,092	5,424	6,155	6,816	7,317	7,848	8,225
Mitral Valve Repair + CAB	4,453	4,310	4,518	4,838	4,854	5,177	4,894	4,762	4,597	4,599
Not Classified Above	35,779	41,879	50,093	55,391	56,248	60,962	63,977	65,210	61,452	55,893
Incidence of Other Procedures										
Pulmonic Valve	461	448	409	447	454	505	543	543	469	508
Tricuspid Valve	4,086	4,466	5,271	5,965	6,090	6,903	7,366	7,627	8,184	8,230
Ventricular Assist Device	985	1,007	1,010	1,134	1,198	1,518	1,868	2,438	3,180	3,380
LVA - Left Ventricular Aneurysm Repair	1,134	1,190	1,224	1,189	1,139	1,041	925	831	789	757
VSD - Ventricular Septal Defect Repair	468	474	566	618	575	634	625	639	671	662
ASD - Atrial Septal Defect Repair	2,357	2,361	2,826	3,158	3,372	3,940	4,285	4,238	4,657	4,917
Batista	10	19	19	38	47	47	34	42	17	-
Surgical Ventricular Restoration	394	472	597	515	436	404	303	193	208	179
Congenital Defect Repair	1,003	1,200	1,396	1,697	2,073	1,821	1,577	1,545	1,555	1,616
Transmyocardial Laser Revascularization	2,205	2,317	2,921	3,208	2,497	2,387	2,033	2,011	1,755	1,704
Cardiac Trauma	147	208	238	293	291	335	298	288	279	268
Cardiac Transplant	675	778	858	978	1,031	1,121	1,226	1,367	1,344	1,300
Arrhythmia Correction Surgery	-	676	1,586	1,409	1,275	1,370	1,212	1,160	1,037	887
Atrial Fibrillation Correction Surgery	-	3,999	12,912	14,978	15,074	16,013	16,585	16,845	17,536	20,562
Aortic Aneurysm	5,831	6,867	8,437	9,553	10,138	11,734	13,128	13,951	12,846	11,232
Ascending Aorta	-	2,119	6,822	7,896	8,501	10,024	11,430	12,143	10,603	8,791
Aortic Arch	-	572	1,967	2,298	2,415	2,762	3,183	3,500	3,145	2,693
Descending Aorta	-	331	979	1,054	1,088	1,122	1,156	1,281	1,046	700
Thoracoabdominal Aorta	-	243	558	630	571	670	632	708	655	610
Carotid Endarterectomy	2,234	2,235	2,277	2,211	2,042	2,081	1,884	1,775	1,581	1,362
Other Vascular	1,386	1,479	1,296	1,365	1,199	1,470	1,566	1,501	1,368	1,189
Other Thoracic	1,645	1,643	1,635	1,631	1,605	1,796	1,666	1,661	1,546	1,498

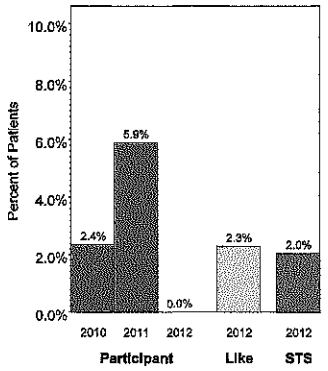
Major Procedures Mortality
CAB, Valve, and Valve+CAB Procedures Combined

Participant 30397
STS Period Ending 12/31/2012

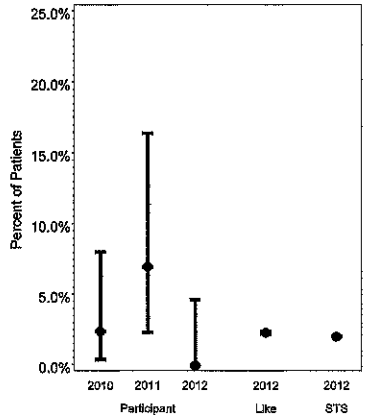
Duke Clinical Research Institute

	Participant 30397			Like Group	STS
	2010	2011	2012	2012	2012
Number of Cases	85	68	76	83,772	198,269
Mortality Summary					
In-hospital Mortality	2.4%	5.9%	0.0%	2.3%	2.0%
Operative Mortality	2.4%	5.9%	0.0%	2.8%	2.5%
Mortality Risk-Adjustment[2]					
In-hospital Mortality					
Odds Ratio	1.04	1.60	0.78	1.28	1.00
Lower 95% Confidence Limit	0.50	0.75	0.35	1.16	-
Upper 95% Confidence Limit	2.16	3.42	1.73	1.40	-
O/E Ratio	1.19	3.41	0.00	1.14	1.00
Lower 95% Confidence Limit	0.21	1.14	0.00	1.10	-
Upper 95% Confidence Limit	3.95	7.98	2.30	1.20	-
Risk-adjusted Rate	2.4%	7.0%	0.0%	2.3%	2.0%
Operative Mortality					
Odds Ratio	0.99	1.46	0.76	1.31	1.00
Lower 95% Confidence Limit	0.51	0.71	0.35	1.19	-
Upper 95% Confidence Limit	1.95	2.98	1.63	1.43	-
O/E Ratio	1.01	2.91	0.00	1.15	1.00
Lower 95% Confidence Limit	0.18	0.97	0.00	1.11	-
Upper 95% Confidence Limit	3.37	6.76	1.92	1.20	-
Risk-adjusted Rate	2.4%	7.1%	0.0%	2.8%	2.5%

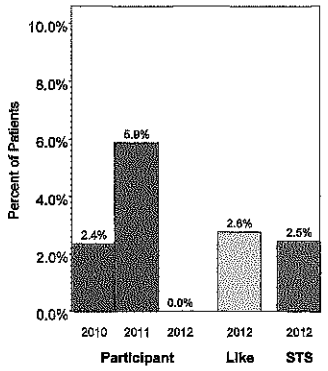
In-hospital Mortality
Observed rate



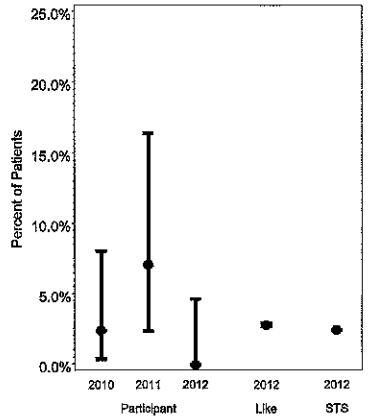
In-Hospital Mortality
Risk-adjusted rate + 95% CI



Operative Mortality
Observed rate



Operative Mortality
Risk-adjusted rate + 95% CI



[1]Does not include Mitral Valve Repairs or Mitral Valve Repairs + CABG
[2]Refer to the Report Overview for information on risk-adjustment methodology
Risk-adjustment is not performed on time periods of less than 6 months

HEART CENTER
of Greater Waterbury

RECEIVED
SEP 15 2014
Office of
HEALTHCARE ACCESS

Karen Roberts
Office of Health Care Access
410 Capital Avenue MS# 13 HCA
PO Box 340308
Hrrtford CT, 06134-0308

9-9-2014,

Re: Docket Number: 08-31202 CON The Waterbury Hospital and Saint Mary's Hospital Corporation, d/b/a Heart Center of Greater Waterbury and the University of Connecticut Health Center/ John Demsey Hospital

Dear Ms. Roberts,

Enclosed are the procedure and patient volume reports for Saint Mary's Hospital and Waterbury Hospital from July 18, 2013 through July 17, 2014.

The most recent ACC Executive Summaries from July, 2014 QTR 1 report for both Saint Mary's Hospital and Waterbury Hospital are enclosed.

The most recent STS Executive Summaries are also provided for both hospitals the latest report published, which is for period ending 7/2014.

If you have any questions, please feel free to contact me at 203-575-5560 or email me at kkniery@leevercancercenter.org.

Sincerely,

Kevin Kniery
Executive Director
Heart Center of Greater Waterbury
Enclosure

Waterbury Hospital
PCI Case Volume
7/18/2013 -7/17/2014

The following Code was used to determine PCI Volume:
0.66
PCI codes were not provided for attempted but failed PCI cases.

Dates	PCI Volume
7/18/2013 -7/31/2013	11
08-2013	30
09-2013	26
10-2013	32
11-2013	14
12-2013	28
01-2014	45
02-2014	35
03-2014	33
04-2014	27
05-2014	33
Jun-14	29
07/1/2014 -7/17/2014	14
Total	**357**

Waterbury Hospital
PCI Patient Volume
7/18/2013 -7/17/2014

Dates	Patient Total
7/18/2013 -7/31/2013	11
08-2013	30
09-2013	26
10-2013	32
11-2013	14
12-2013	28
01-2014	45
02-2014	35
03-2014	33
04-2014	27
05-2014	33
06-2014	29
07/1/2014 -7/17/2014	14
Total	**357**

Waterbury Hospital

OHS Case Volume
7/18/2013 -7/17/2014

The following Codes were used to determine Open Heart Surgery Volume:

06.31 35.11 35.12 35.21
35.22 35.23 35.24 36.11
36.12 36.13 36.14 36.15
37.31 38.45

Dates	Open Heart Surgery Volume
7/18/2013 -7/31/2013	8
08-2013	7
09-2013	12
10-2013	15
11-2013	16
12-2013	11
01-2014	9
02-2014	10
03-2014	9
04-2014	14
05-2014	8
06-2014	5
07/1/2014 -7/17/2014	4
Total	**128**

Waterbury Hospital

OHS Patient Volume
7/18/2013 -7/17/2014

Dates	Patient Total
7/18/2010 -7/31/2010	8
08-2010	7
09-2010	12
10-2013	15
11-2013	16
12-2013	11
01-2014	9
02-2014	10
03-2014	9
04-2014	14
05-2014	8
06-2014	5
07/1/2014 -7/17/2014	4
Total	**128**

Saint Mary's Hospital

OHS Case Volume
7/18/2013 -7/17/2014

The following Codes were used to determine Open Heart Surgery Volume:

06.31 35.11 35.12 35.21
35.22 35.23 35.24 36.11
36.12 36.13 36.14 36.15
37.31 38.45

Dates	Open Heart Surgery Volume
7/18/2013 -7/31/2014	3
08-2013	9
09-2013	9
10-2013	9
11-2013	7
12-2013	5
01-2014	13
02-2014	11
03-2014	5
04-2014	7
05-2014	8
06-2014	6
07/1/2014 -7/17/2014	2
Total	**94**

Saint Mary's Hospital

OHS Patient Volume
7/18/2013-7/17/2014

Dates	Patient Total
7/18/2013-7/31/2014	3
08-2013	9
09-2013	9
10-2013	9
11-2013	7
12-2013	5
01-2014	13
02-2014	11
03-2014	5
04-2014	7
05-2014	8
06-2014	6
07/1/2014 -7/17/2014	2
Total	**94**

Saint Mary's Hospital
PCI Case Volume
7/18/2013 -7/17/2014

The following Code was used to determine PCI Volume:
0.66
PCI codes were not provided for attempted but failed PCI cases.

Dates	PCI Volume
7/18/2013 -7/31/2013	15
08-2013	23
09-2013	33
10-2013	27
11-2013	32
12-2013	28
01-2014	25
02-2014	28
03-2014	25
04-2014	19
05-2014	31
06-2014	24
07/1/2014 -7/17/2014	11
Total	**321**

Saint Mary's Hospital
PCI Patient Volume
7/18/2013-7/17/2014

Dates	Patient Total
7/18/2013 -7/31/2013	15
08-2013	23
09-2013	33
Oct-13	27
11-2013	32
12-2013	28
01-2014	25
02-2014	28
03-2014	25
04-2013	19
05-2014	31
06-2014	24
07/1/2014 -7/17/2014	11
Total	**321**

NCDR®
NATIONAL CARDIOVASCULAR DATA REGISTRY

CathPCI Registry®

Version 4.4

Institutional Outcomes Report
2014Q1

Waterbury Hospital
841765

Aggregation Date: Jun 30, 2014 11:59:59 PM

Publish Date: Jul 20, 2014

If User desires to publish or otherwise distribute or use, in whole or in part, any aggregate data or reports provided by ACCF, or produced in connection with or derived from NCDR, with the exception of strictly internal use within User's organization, User must first obtain the prior express written consent of ACCF. To the extent User is permitted to publish aggregate data, such aggregate data and any related information published in connection with it must be reviewed and approved by ACCF prior to publication.

National Cardiovascular Data Registry
CathPCI Registry®
800-257-4737
www.ncdr.com •ncdr@acc.org
©2010 American College of Cardiology Foundation

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2014Q1

Section I: PCI Performance Measures

Endorsed by the National Quality Forum and appropriate for public reporting

PCI Performance Measures

1 **PCI in-hospital risk adjusted mortality (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
1.37	1.72	0.97

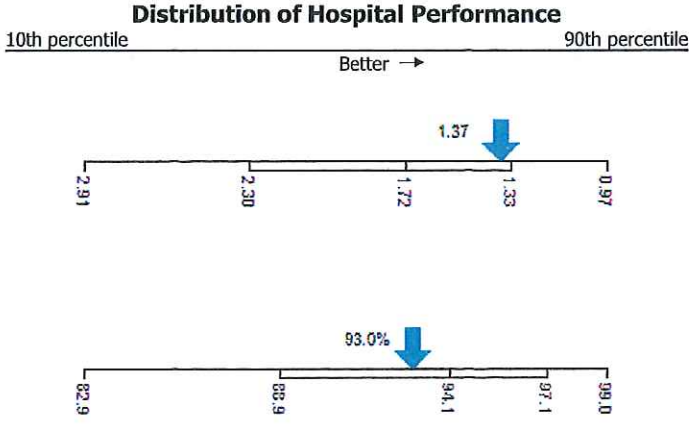
Your hospital's PCI in-hospital risk adjusted mortality rate for all patients adjusted using the NCDR® risk adjustment model. [Detail Line:2035]

38 **Composite: Discharge Medications in Eligible PCI Patients**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
93.0%	94.1%	99.0%

Patients with a PCI procedure who receive prescriptions for all medications (aspirin, P2Y12 inhibitor, and statin) for which they are eligible for at discharge. [Detail Line:2006]

Distribution of Hospital Performance



Note

Performance measures in the CathPCI Registry® have been endorsed by the National Quality Forum. Such performance measures meeting the requirement for approval are intended not only for clinical quality improvement, but also may be considered for purposes of public reporting.

The "Registry Metrics" on the subsequent pages of this report are those measures that have been developed to support self assessment and quality improvement at the provider, hospital, and/or health care system level. While these metrics have not been formally developed by the American College of Cardiology/American Heart Association Task Force for Performance Measures Task Force, they may be identified as evolving measures worthy of consideration for further development into

Executive Summary

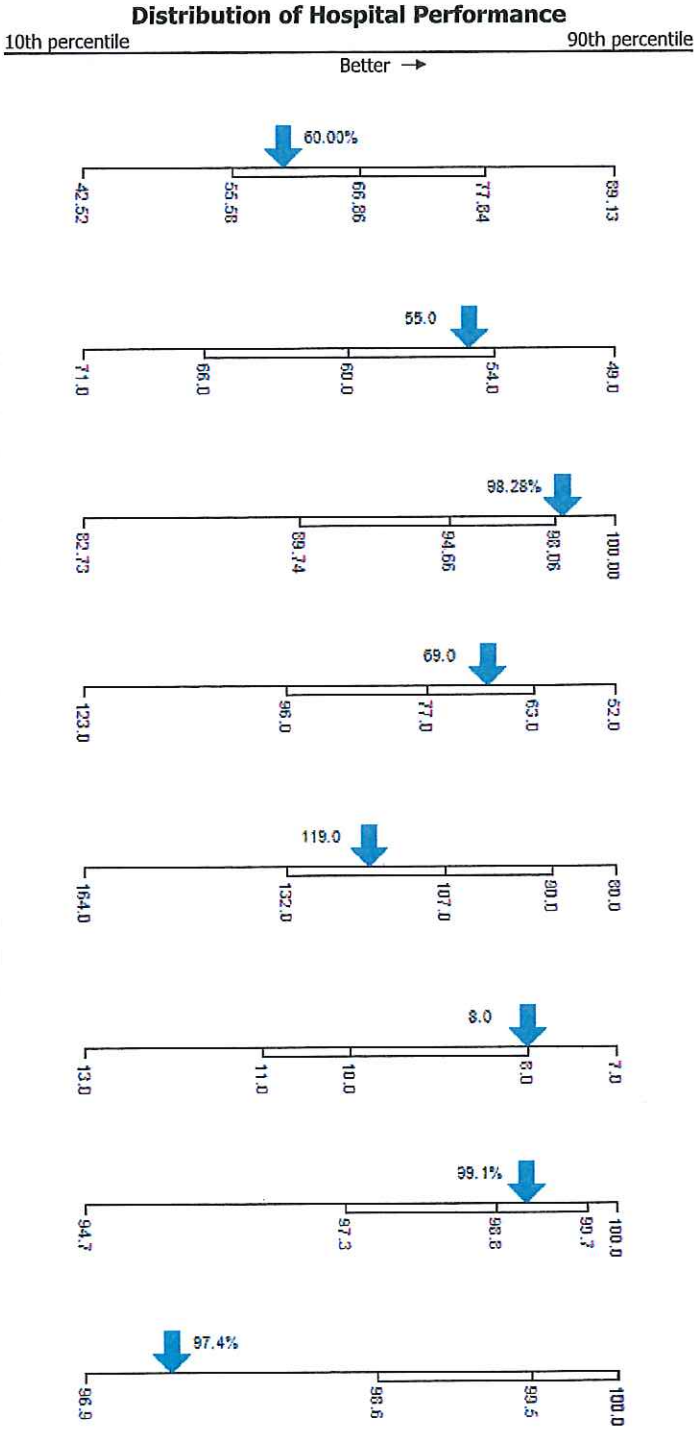
CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2014Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

PCI Process Metrics

Distribution of Hospital Performance



2 **Proportion of elective PCIs with prior positive stress or imaging study**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
60.00%	66.86%	89.13%

Proportion of elective PCI procedures (excluding patients with ACS) with an antecedent stress or imaging study with a positive result (suggestive of ischemia) or with a fractional flow reserve value of <=0.8 during the PCI procedure [Detail Line:1513]

3 **Median time to immediate PCI for STEMI patients (in minutes)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
55	60	49

Your hospital's median time from hospital arrival to immediate PCI for STEMI patients in minutes. Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1502]

4 **Proportion of STEMI patients receiving immediate PCI w/in 90'**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
98.28%	94.66%	100.00%

Proportion of STEMI patients with a time from your hospital arrival (or subsequent ECG if ST elevation first noted on subsequent ECG) to immediate PCI <=90'. Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1503]

5 **Median time from ED arrival at STEMI transferring facility to ED arrival at STEMI receiving facility among transferred patients.**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
69	77	52

Your hospital's median time from arrival at transferring facility to ED arrival at STEMI receiving facility among transferred patients. [Detail Line:1505]

6 **Median time from ED arrival at STEMI transferring facility to immediate PCI at STEMI receiving facility among transferred patients (in minutes)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
119	107	80

Your hospital's median time from arrival at referring facility to immediate PCI at STEMI receiving facility among transferred patients. Exclusions: Reasons for delay does not equal none. [Detail Line:1506]

7 **Median fluoro time (in minutes)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
8	10	7

Inclusion criteria: PCI of one vessel/lesion. Exclusion criteria: Prior CABG, or "other" procedure during the same lab visit; PCI of >1 vessel/lesion. [Detail Line:1633]

8 **Proportion of patients with aspirin prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
99.1%	98.8%	100.0%

Proportion of patients (without a documented contraindication) with aspirin prescribed at discharge. [Detail Line:1996]

9 **Proportion of patients with a P2Y12 inhibitor prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
97.4%	99.5%	100.0%

Proportion of patients (without a documented contraindication) with a stent implanted that had a thienopyridine/P2Y12 inhibitor prescribed at discharge. [Detail Line:2005]

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2014 11:59:59 PM
Publish Date: Jul 20, 2014

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2014Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

10 **Statins prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
96.6%	95.7%	99.4%

Proportion of patients (without a documented contraindication) prescribed a statin at discharge. [Detail Line:2001]



PCI Outcome Metrics

Distribution of Hospital Performance

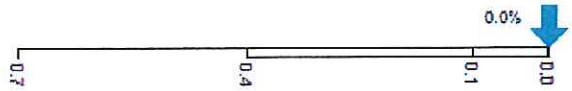
10th percentile — 90th percentile

Better →

12 **Proportion of PCI patients with emergency CABG**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.0%	0.1%	0.0%

Your hospital's proportion of patients having emergency CABG (at your facility or transferred to another facility). [Detail Line:1978]



13 **Proportion of PCI procedures with a post procedure MI (among hospitals routinely collecting post-PCI biomarkers)****

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
	1.30%	0.00%

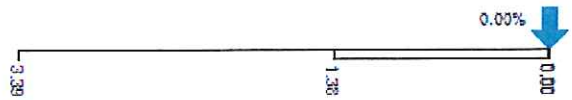
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with >= 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1803]



14 **Proportion of PCI procedures with post procedure MI (among hospitals who do not routinely collect post-PCI biomarkers)****

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.00%	0.00%	0.00%

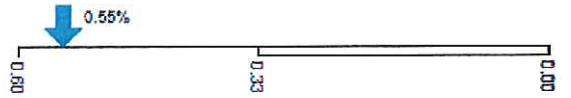
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with < 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1804]



16 **Proportion of PCI procedures with post procedure stroke**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.55%	0.00%	0.00%

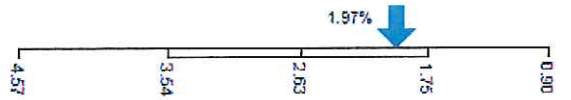
Your hospital's proportion of patients with stroke post procedure. [Detail Line:1811]



17 **Composite: Proportion of PCI patients with death, emergency CABG, stroke or repeat target vessel revascularization.**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
1.97%	2.63%	0.90%

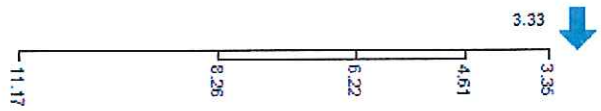
Your hospital's proportion of patients with death, emergency CABG, stroke or repeat target vessel revascularization post procedure up to hospital discharge. Excludes patients with stroke and an elective, urgent or salvage CABG during same admission. [Detail Line:1801]



18 **PCI in-hospital risk adjusted mortality (patients with STEMI)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
3.33	6.22	3.35

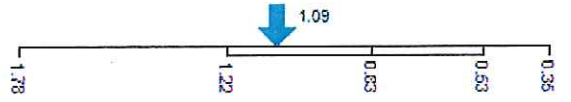
Your hospital's PCI in-hospital risk adjusted mortality rate for patients with STEMI adjusted using the NCDR® risk adjustment model. [Detail Line:2044]



19 **PCI in-hospital risk adjusted mortality (STEMI patients excluded)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
1.09	0.83	0.35

Your hospital's PCI in-hospital risk adjusted mortality rate for patients with other diagnoses (not STEMI) using the NCDR® risk adjustment model. [Detail Line:2053]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2014 11:59:59 PM
Publish Date: Jul 20, 2014

Executive Summary

CathPCI Registry®

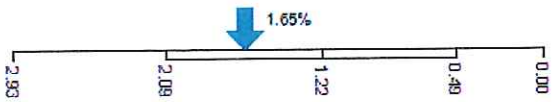
Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2014Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

25 **Proportion of PCI procedures with transfusion of whole blood or RBCs**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
1.65%	1.22%	0.00%

Proportion of patients who received a transfusion of whole blood or red blood cells after a PCI procedure. Inclusion: Patients with a pre-procedure hemoglobin >8 g/dL and patients with no CABG, and no other major surgery during the same admission. [Detail Line:1853]



37 **PCI in-hospital risk adjusted rate of bleeding events (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
5.10	4.33	1.79

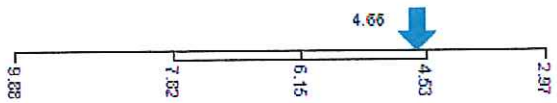
Your hospital's risk adjusted rate of bleeding events for patients with PCI procedures using the NCDR® PCI bleeding risk adjustment model. [Detail Line:1823]



39 **PCI in-hospital risk adjusted acute kidney injury (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
4.66	6.15	2.97

Your hospital's PCI in-hospital risk adjusted AKI rate for all patients adjusted using the NCDR® risk adjustment model. [Detail Line:1960]



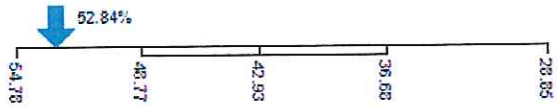
Diagnostic Cath Process Metrics



20 **Incidence of non-obstructive CAD (elective patients only)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
52.84%	42.93%	28.85%

Patients with an elective diagnostic cath and coronary angiography with all native coronary territories <50% Exclusions: Patients with prior CABG, cardiac transplant evaluation; pre-op evaluation for non-cardiac surgery and diagnostic cath treatment recommendation of "other cardiac therapy without CABG or PCI". [Detail Line:1252]



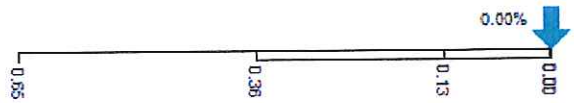
Diagnostic Cath Outcomes Metrics



21 **Proportion of Diagnostic Catheterization procedures with vascular access site injury requiring treatment or major bleeding***

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.00%	0.13%	0.00%

Your hospital's proportion of patients with major access site related injury requiring treatment or major bleeding. [Detail Line:1301]



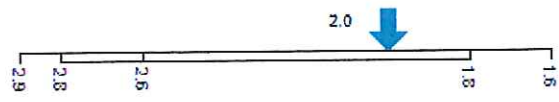
Utilization Metrics



22 **Median post-procedure length of stay (in days) for PCI patients with STEMI**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
2.0	2.6	1.6

Your hospital's median post-procedure length of stay (in days) for PCI patients with STEMI. [Detail Line:2109]



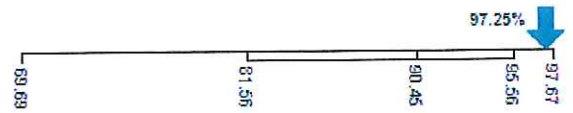
Data Quality Metrics



24 **Proportion of PCI procedures with creatinine assessed pre and post PCI**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
97.25%	90.45%	97.67%

Proportion of PCI patients with creatinine assessed pre and post procedure. Inclusions: LOS >=1 day. [Detail Line:1951]



Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2014Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

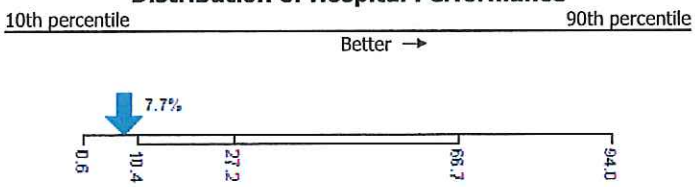
Test Metrics

26 **Test Data Quality Metric: Proportion of PCI procedures with biomarkers assessed post-PCI for elective inpatients**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
7.7%	27.2%	94.0%

Proportion of elective procedures with biomarkers assessed post PCI.
Inclusion criteria: LOS >= 1 day and hospital status is "not outpatient".
[Detail Line:1949]

Distribution of Hospital Performance



Executive Summary

CathPCI Registry®

(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending

Section III: PCI Appropriate Use Criteria (AUC) Metrics – These data are based upon the 2012 Appropriateness Criteria for Coronary Revascularization Focused Update (J Am Coll Cardiol 2012 59: 857-881) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level.PCI AUC metrics are not appropriate for public/external reporting

PCI Appropriate Use Criteria (AUC) Metrics

Distribution of Hospital Performance

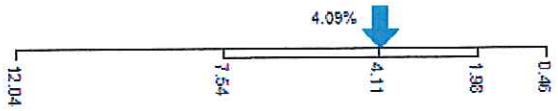
10th percentile — 90th percentile

Better →

30 **Proportion of PCI procedures not classifiable for AUC reporting**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
4.09%	4.11%	0.46%

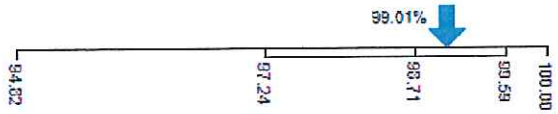
Proportion of PCI procedures that were not classifiable/evaluated for PCI AUC reporting due to incomplete or missing data. [Detail Line:1589]



31 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were appropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
99.01%	98.71%	100.00%

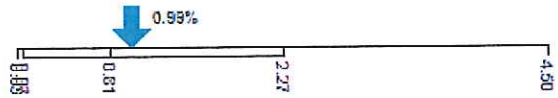
Proportion of PCI procedures that were evaluated as "Appropriate", among patients with ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1581]



32 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were of uncertain appropriateness**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.99%	0.81%	4.50%

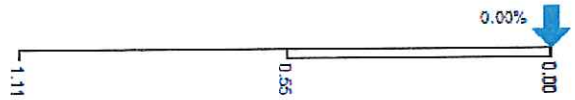
Proportion of PCI procedures that were evaluated as "Uncertain", among patients with ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1582]



33 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.00%	0.00%	0.00%

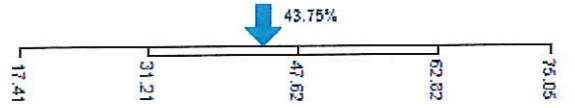
Proportion of PCI procedures that were evaluated as "Inappropriate", among patients with ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1583]



34 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were appropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
43.75%	47.62%	75.05%

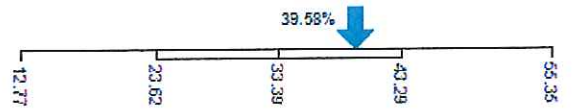
Proportion of PCI procedures that were evaluated as "Appropriate", among patients without ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1585]



35 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were of uncertain appropriateness**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
39.58%	33.39%	55.35%

Proportion of PCI procedures that were evaluated as "Uncertain", among patients without ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1586]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2014 11:59:59 PM
Publish Date: Jul 20, 2014

Executive Summary

CathPCI Registry®

(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending

Section III: PCI Appropriate Use Criteria (AUC) Metrics – These data are based upon the 2012 Appropriateness Criteria for Coronary Revascularization Focused Update (J Am Coll Cardiol 2012 59: 857-881) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level.PCI AUC metrics are not appropriate for public/external reporting

36 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
16.67%	14.95%	0.00%

Proportion of PCI procedures that were evaluated as "Inappropriate", among patients without ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1587]



Executive Summary Footnotes

*Vascular access site injury requiring treatment or major bleeding is defined as:

1.Bleeding at access site, hematoma at access site, or retroperitoneal bleed that occur within 72 hours of the procedure. To qualify, the event must be associated with a hemoglobin drop of >= 3 g/dL; transfusion of whole or packed red blood cells, or a procedural intervention/surgery at the bleeding site to reverse/stop or correct the bleeding. This excludes "GI", "GU" and "Other" bleeds.

2.Major access site related injury requiring treatment includes access site occlusion, peripheral embolization, dissection, pseudoaneurysm, AV fistula requiring treatment anytime from the procedure until discharge.

**Your rate of post procedure MI cannot be reported if you only collected cardiac biomarkers on <90% of your patients who were in the hospital >=1 day.

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2014 11:59:59 PM
Publish Date: Jul 20, 2014

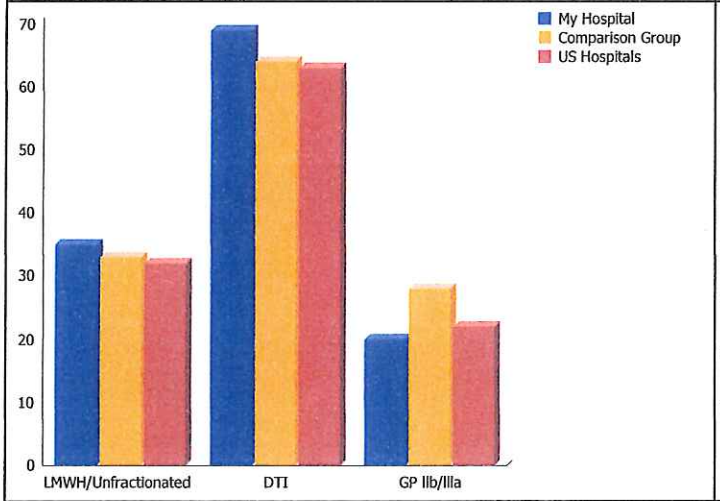
Executive Summary

CathPCI Registry®

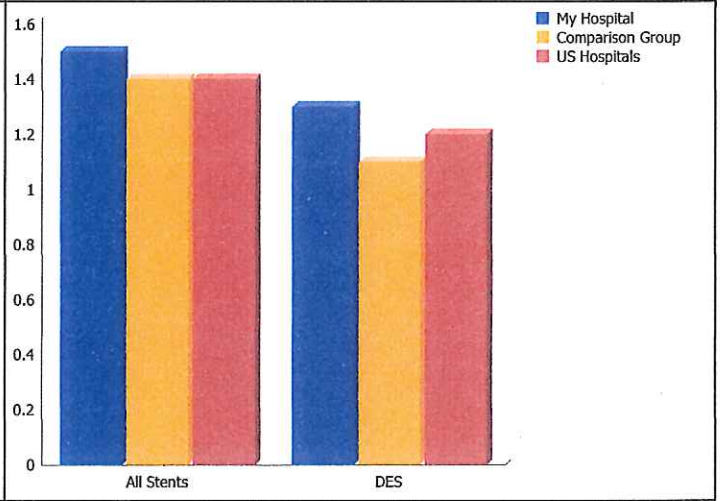
Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2014Q1

Section IV: PCI Process Comparison Metrics

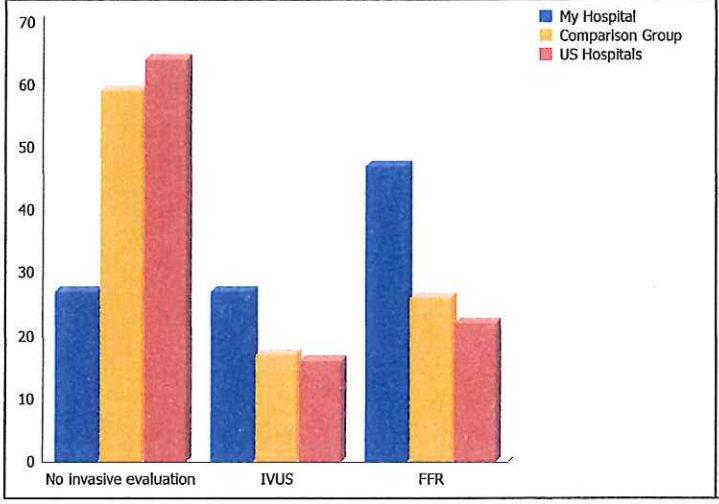
Anticoagulant Use: Any Low molecular weight/unfractionated heparin, direct thrombin inhibitors, GP IIb/IIIa inhibitor(pts with acute coronary syndrome).
[Detail Line:1600,1601,1606]



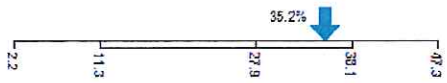
Stent Use: Average # of stents per PCI admission.
[Detail Line:1793,1794]



Intermediate stenosis lesions(40-70%): Further invasive evaluation performed (IVUS or FFR).
[Detail Line:1732,1733,1734]



Outpatients: Proportion of PCI patient admissions whose hospital status was coded as "outpatient".
[Detail Line:1390]



NCDR®
NATIONAL CARDIOVASCULAR DATA REGISTRY

CathPCI Registry®

Version 4.4

Institutional Outcomes Report
2014Q1

Saint Mary's Hospital
881416

Aggregation Date: Jun 30, 2014 11:59:59 PM

Publish Date: Jul 21, 2014

If User desires to publish or otherwise distribute or use, in whole or in part, any aggregate data or reports provided by ACCF, or produced in connection with or derived from NCDR, with the exception of strictly internal use within User's organization, User must first obtain the prior express written consent of ACCF. To the extent User is permitted to publish aggregate data, such aggregate data and any related information published in connection with it must be reviewed and approved by ACCF prior to publication.

National Cardiovascular Data Registry
CathPCI Registry®
800-257-4737
www.ncdr.com •ncdr@acc.org
©2010 American College of Cardiology Foundation

Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2014Q1

Section I: PCI Performance Measures

Endorsed by the National Quality Forum and appropriate for public reporting

PCI Performance Measures

1 **PCI in-hospital risk adjusted mortality (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
1.28	1.72	0.97

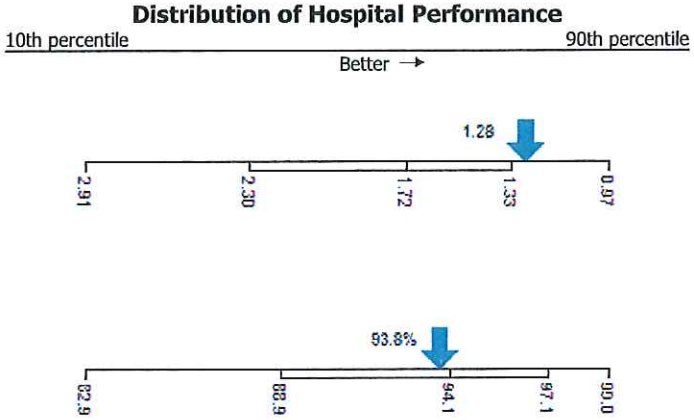
Your hospital's PCI in-hospital risk adjusted mortality rate for all patients adjusted using the NCDR® risk adjustment model. [Detail Line:2035]

38 **Composite: Discharge Medications in Eligible PCI Patients**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
93.8%	94.1%	99.0%

Patients with a PCI procedure who receive prescriptions for all medications (aspirin, P2Y12 inhibitor, and statin) for which they are eligible for at discharge. [Detail Line:2006]

Distribution of Hospital Performance



Note

Performance measures in the CathPCI Registry® have been endorsed by the National Quality Forum. Such performance measures meeting the requirement for approval are intended not only for clinical quality improvement, but also may be considered for purposes of public reporting.

The "Registry Metrics" on the subsequent pages of this report are those measures that have been developed to support self assessment and quality improvement at the provider, hospital, and/or health care system level. While these metrics have not been formally developed by the American College of Cardiology/American Heart Association Task Force for Performance Measures Task Force, they may be identified as evolving measures worthy of consideration for further development into performance measures.

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Executive Summary

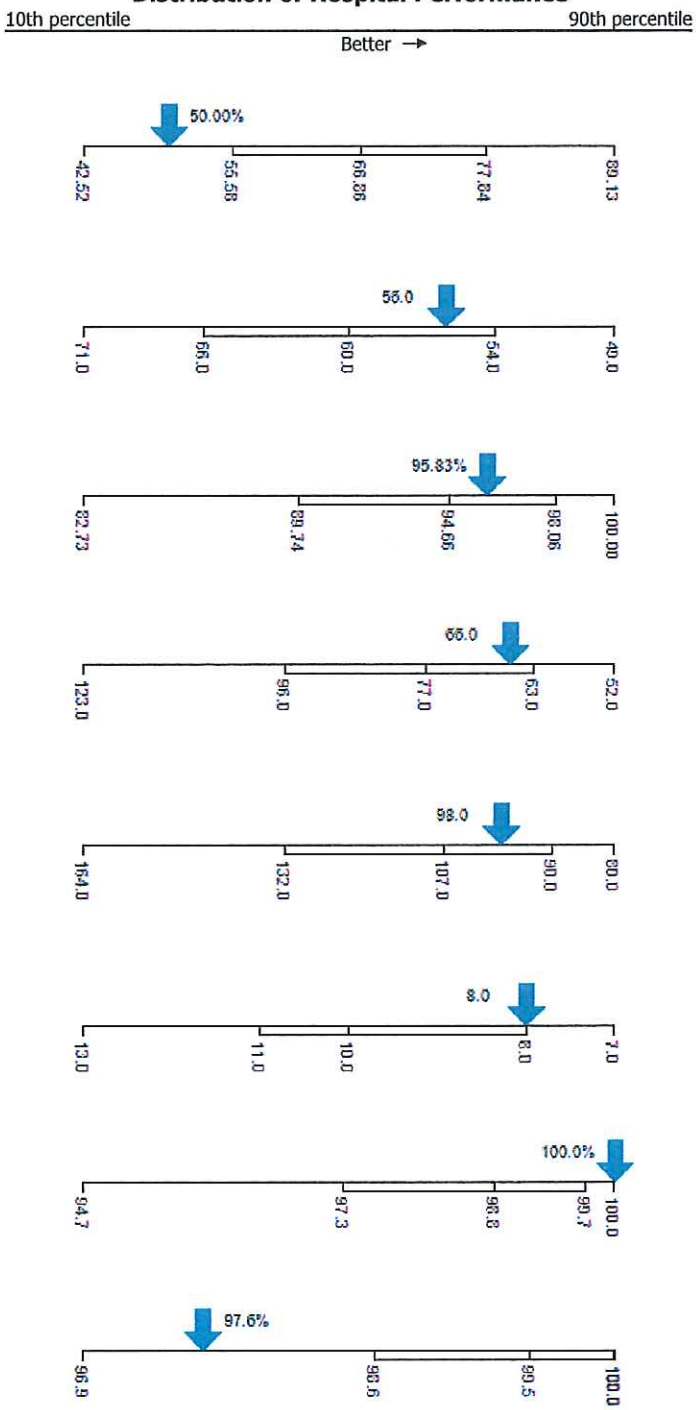
CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2014Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

PCI Process Metrics

Distribution of Hospital Performance



2 **Proportion of elective PCIs with prior positive stress or imaging study**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
50.00%	66.86%	89.13%

Proportion of elective PCI procedures (excluding patients with ACS) with an antecedent stress or imaging study with a positive result (suggestive of ischemia) or with a fractional flow reserve value of <=0.8 during the PCI procedure [Detail Line:1513]

3 **Median time to immediate PCI for STEMI patients (in minutes)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
56	60	49

Your hospital's median time from hospital arrival to immediate PCI for STEMI patients in minutes. Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1502]

4 **Proportion of STEMI patients receiving immediate PCI w/in 90'**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
95.83%	94.66%	100.00%

Proportion of STEMI patients with a time from your hospital arrival (or subsequent ECG if ST elevation first noted on subsequent ECG) to immediate PCI <=90'. Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1503]

5 **Median time from ED arrival at STEMI transferring facility to ED arrival at STEMI receiving facility among transferred patients.**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
66	77	52

Your hospital's median time from arrival at transferring facility to ED arrival at STEMI receiving facility among transferred patients. [Detail Line:1505]

6 **Median time from ED arrival at STEMI transferring facility to immediate PCI at STEMI receiving facility among transferred patients (in minutes)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
98	107	80

Your hospital's median time from arrival at referring facility to immediate PCI at STEMI receiving facility among transferred patients. Exclusions: Reasons for delay does not equal none. [Detail Line:1506]

7 **Median fluoro time (in minutes)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
8	10	7

Inclusion criteria: PCI of one vessel/lesion. Exclusion criteria: Prior CABG, or "other" procedure during the same lab visit; PCI of >1 vessel/lesion. [Detail Line:1633]

8 **Proportion of patients with aspirin prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
100.0%	98.8%	100.0%

Proportion of patients (without a documented contraindication) with aspirin prescribed at discharge. [Detail Line:1996]

9 **Proportion of patients with a P2Y12 inhibitor prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
97.6%	99.5%	100.0%

Proportion of patients (without a documented contraindication) with a stent implanted that had a thienopyridine/P2Y12 inhibitor prescribed at discharge. [Detail Line:2005]

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2014 11:59:59 PM
Publish Date: Jul 21, 2014

Executive Summary

CathPCI Registry®

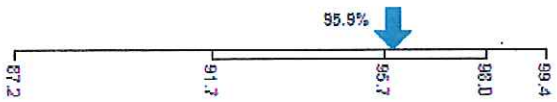
Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2014Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

10 **Statins prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
95.9%	95.7%	99.4%

Proportion of patients (without a documented contraindication) prescribed a statin at discharge. [Detail Line:2001]



PCI Outcome Metrics

Distribution of Hospital Performance

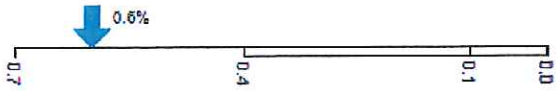
10th percentile — 90th percentile

Better →

12 **Proportion of PCI patients with emergency CABG**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.6%	0.1%	0.0%

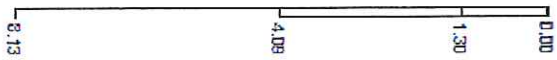
Your hospital's proportion of patients having emergency CABG (at your facility or transferred to another facility). [Detail Line:1978]



13 **Proportion of PCI procedures with a post procedure MI (among hospitals routinely collecting post-PCI biomarkers)****

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
	1.30%	0.00%

Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with >= 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1803]



14 **Proportion of PCI procedures with post procedure MI (among hospitals who do not routinely collect post-PCI biomarkers)****

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
1.59%	0.00%	0.00%

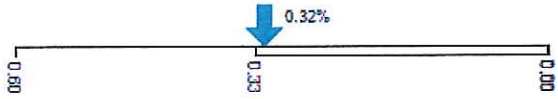
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with < 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1804]



16 **Proportion of PCI procedures with post procedure stroke**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.32%	0.00%	0.00%

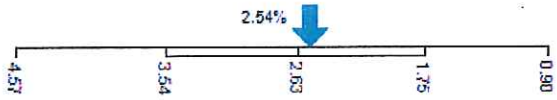
Your hospital's proportion of patients with stroke post procedure. [Detail Line:1811]



17 **Composite: Proportion of PCI patients with death, emergency CABG, stroke or repeat target vessel revascularization.**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
2.54%	2.63%	0.90%

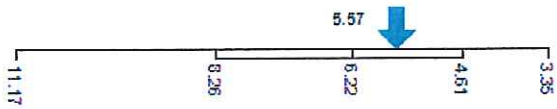
Your hospital's proportion of patients with death, emergency CABG, stroke or repeat target vessel revascularization post procedure up to hospital discharge. Excludes patients with stroke and an elective, urgent or salvage CABG during same admission. [Detail Line:1801]



18 **PCI in-hospital risk adjusted mortality (patients with STEMI)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
5.57	6.22	3.35

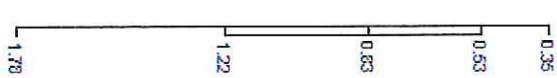
Your hospital's PCI in-hospital risk adjusted mortality rate for patients with STEMI adjusted using the NCDR® risk adjustment model. [Detail Line:2044]



19 **PCI in-hospital risk adjusted mortality (STEMI patients excluded)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
	0.83	0.35

Your hospital's PCI in-hospital risk adjusted mortality rate for patients with other diagnoses (not STEMI) using the NCDR® risk adjustment model. [Detail Line:2053]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2014 11:59:59 PM
Publish Date: Jul 21, 2014

Executive Summary

CathPCI Registry®

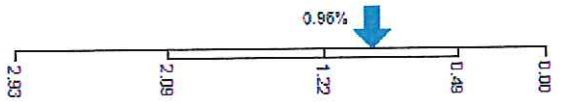
Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2014Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

25 **Proportion of PCI procedures with transfusion of whole blood or RBCs**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.96%	1.22%	0.00%

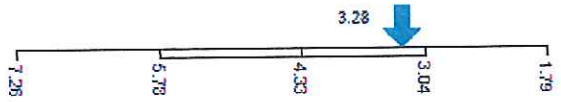
Proportion of patients who received a transfusion of whole blood or red blood cells after a PCI procedure. Inclusion: Patients with a pre-procedure hemoglobin >8 g/dL and patients with no CABG, and no other major surgery during the same admission. [Detail Line:1853]



37 **PCI in-hospital risk adjusted rate of bleeding events (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
3.28	4.33	1.79

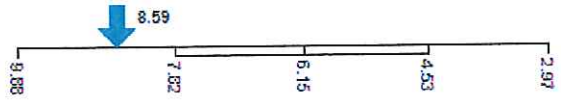
Your hospital's risk adjusted rate of bleeding events for patients with PCI procedures using the NCDR® PCI bleeding risk adjustment model. [Detail Line:1823]



39 **PCI in-hospital risk adjusted acute kidney injury (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
8.59	6.15	2.97

Your hospital's PCI in-hospital risk adjusted AKI rate for all patients adjusted using the NCDR® risk adjustment model. [Detail Line:1960]



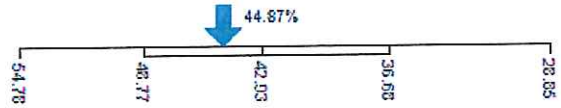
Diagnostic Cath Process Metrics



20 **Incidence of non-obstructive CAD (elective patients only)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
44.87%	42.93%	28.85%

Patients with an elective diagnostic cath and coronary angiography with all native coronary territories <50% Exclusions: Patients with prior CABG, cardiac transplant evaluation; pre-op evaluation for non-cardiac surgery and diagnostic cath treatment recommendation of "other cardiac therapy without CABG or PCI". [Detail Line:1252]



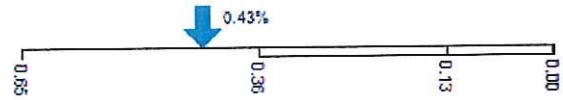
Diagnostic Cath Outcomes Metrics



21 **Proportion of Diagnostic Catheterization procedures with vascular access site injury requiring treatment or major bleeding***

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.43%	0.13%	0.00%

Your hospital's proportion of patients with major access site related injury requiring treatment or major bleeding. [Detail Line:1301]



Utilization Metrics



22 **Median post-procedure length of stay (in days) for PCI patients with STEMI**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
2.0	2.6	1.6

Your hospital's median post-procedure length of stay (in days) for PCI patients with STEMI. [Detail Line:2109]



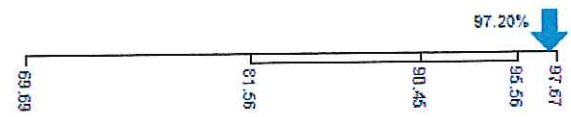
Data Quality Metrics



24 **Proportion of PCI procedures with creatinine assessed pre and post PCI**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
97.20%	90.45%	97.67%

Proportion of PCI patients with creatinine assessed pre and post procedure. Inclusions: LOS >=1 day. [Detail Line:1951]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2014 11:59:59 PM
Publish Date: Jul 21, 2014

Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2014Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

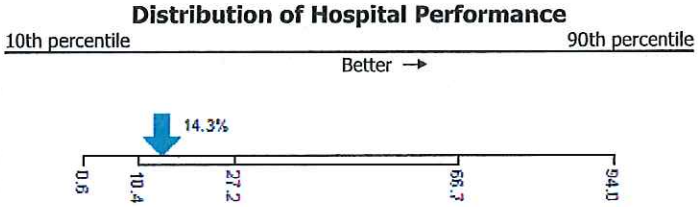
Test Metrics

26 **Test Data Quality Metric: Proportion of PCI procedures with biomarkers assessed post-PCI for elective inpatients**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
14.3%	27.2%	94.0%

Proportion of elective procedures with biomarkers assessed post PCI.
Inclusion criteria: LOS >= 1 day and hospital status is "not outpatient".
[Detail Line:1949]

Distribution of Hospital Performance



Executive Summary

CathPCI Registry®

(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending

Section III: PCI Appropriate Use Criteria (AUC) Metrics – These data are based upon the 2012 Appropriateness Criteria for Coronary Revascularization Focused Update (J Am Coll Cardiol 2012 59: 857-881) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level.PCI AUC metrics are not appropriate for public/external reporting

PCI Appropriate Use Criteria (AUC) Metrics

Distribution of Hospital Performance

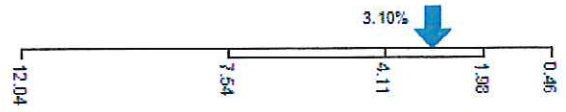
10th percentile — 90th percentile

Better →

30 **Proportion of PCI procedures not classifiable for AUC reporting**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
3.10%	4.11%	0.46%

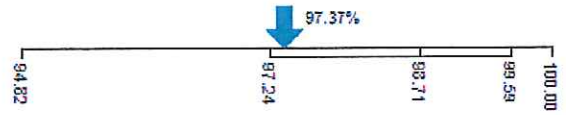
Proportion of PCI procedures that were not classifiable/evaluated for PCI AUC reporting due to incomplete or missing data. [Detail Line:1589]



31 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were appropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
97.37%	98.71%	100.00%

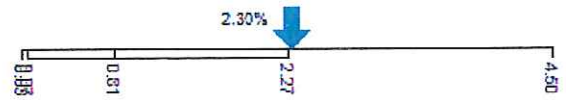
Proportion of PCI procedures that were evaluated as "Appropriate", among patients with ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1581]



32 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were of uncertain appropriateness**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
2.30%	0.81%	4.50%

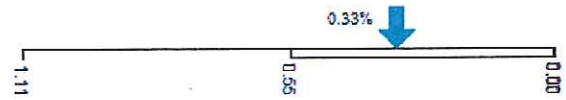
Proportion of PCI procedures that were evaluated as "Uncertain", among patients with ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1582]



33 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.33%	0.00%	0.00%

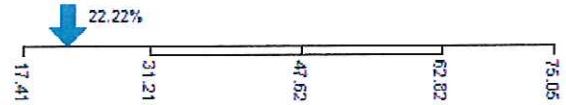
Proportion of PCI procedures that were evaluated as "Inappropriate", among patients with ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1583]



34 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were appropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
22.22%	47.62%	75.05%

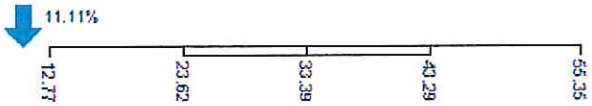
Proportion of PCI procedures that were evaluated as "Appropriate", among patients without ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1585]



35 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were of uncertain appropriateness**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
11.11%	33.39%	55.35%

Proportion of PCI procedures that were evaluated as "Uncertain", among patients without ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1586]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2014 11:59:59 PM
Publish Date: Jul 21, 2014

Executive Summary

CathPCI Registry®

(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending

Section III: PCI Appropriate Use Criteria (AUC) Metrics – These data are based upon the 2012 Appropriateness Criteria for Coronary Revascularization Focused Update (J Am Coll Cardiol 2012 59: 857-881) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level.PCI AUC metrics are not appropriate for public/external reporting

36 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
66.67%	14.95%	0.00%

Proportion of PCI procedures that were evaluated as "Inappropriate", among patients without ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1587]



Executive Summary Footnotes

*Vascular access site injury requiring treatment or major bleeding is defined as:

1.Bleeding at access site, hematoma at access site, or retroperitoneal bleed that occur within 72 hours of the procedure. To qualify, the event must be associated with a hemoglobin drop of >= 3 g/dL; transfusion of whole or packed red blood cells, or a procedural intervention/surgery at the bleeding site to reverse/stop or correct the bleeding. This excludes "GI", "GU" and "Other" bleeds.

2.Major access site related injury requiring treatment includes access site occlusion, peripheral embolization, dissection, pseudoaneurysm, AV fistula requiring treatment anytime from the procedure until discharge.

**Your rate of post procedure MI cannot be reported if you only collected cardiac biomarkers on <90% of your patients who were in the hospital >=1 day.

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2014 11:59:59 PM
Publish Date: Jul 21, 2014

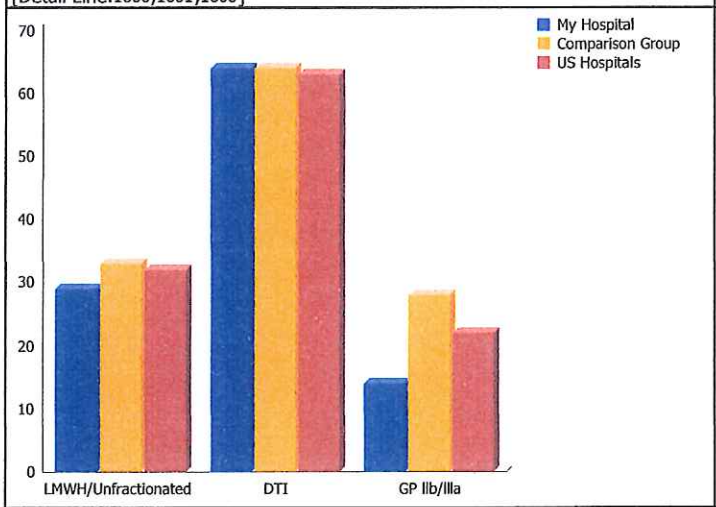
Executive Summary

CathPCI Registry®

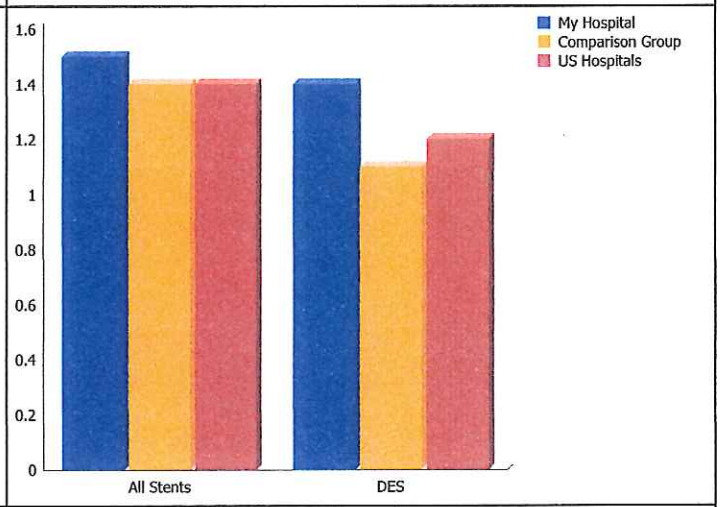
Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2014Q1

Section IV: PCI Process Comparison Metrics

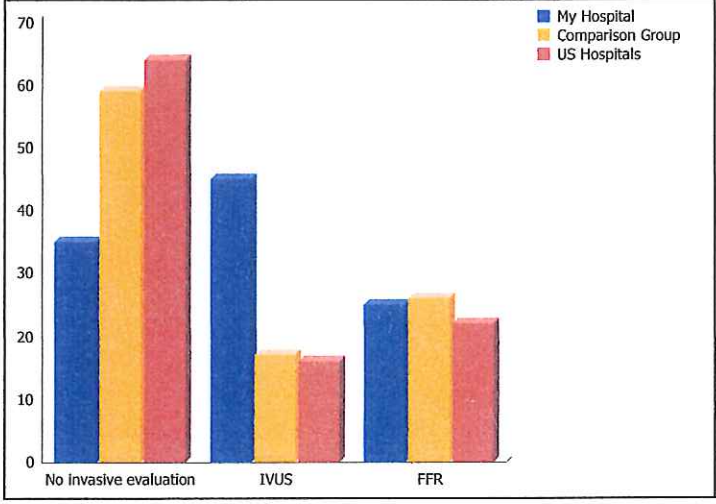
Anticoagulant Use: Any Low molecular weight/unfractionated heparin, direct thrombin inhibitors, GP IIb/IIIa inhibitor(pts with acute coronary syndrome).
[Detail Line:1600,1601,1606]



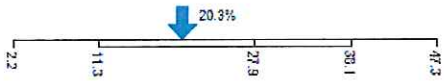
Stent Use: Average # of stents per PCI admission.
[Detail Line:1793,1794]



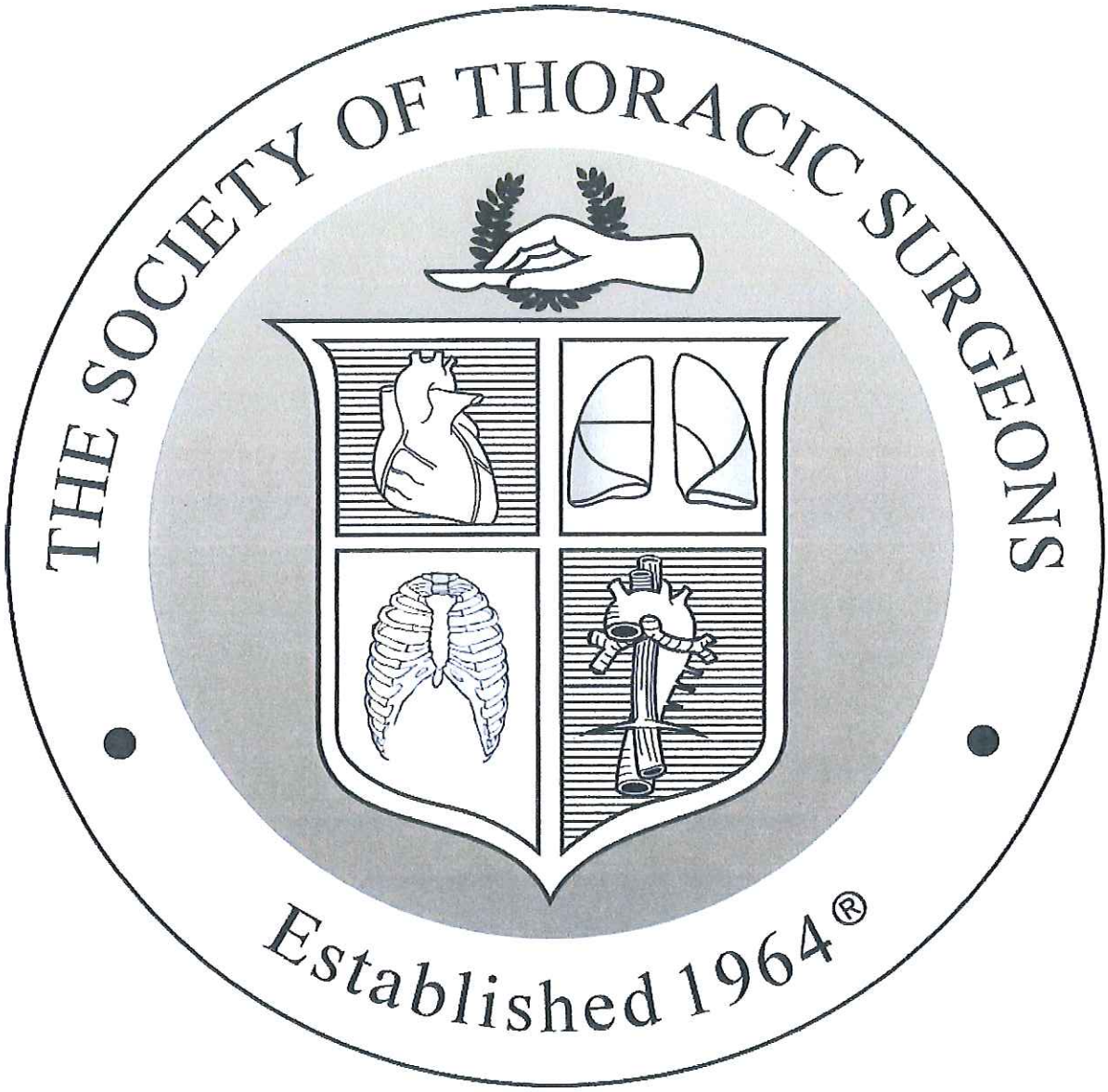
Intermediate stenosis lesions(40-70%): Further invasive evaluation performed (IVUS or FFR).
[Detail Line:1732,1733,1734]



Outpatients: Proportion of PCI patient admissions whose hospital status was coded as "outpatient".
[Detail Line:1390]



DATA ANALYSES OF THE SOCIETY OF THORACIC SURGEONS NATIONAL ADULT CARDIAC SURGERY DATABASE





Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER

July 2014

Period Ending 03/31/2014

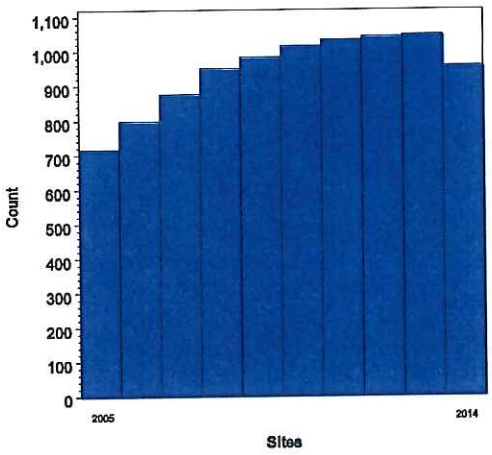
Executive Summary

Participant 30398
STS Period Ending 03/31/2014

2014 is a partial year: Jan 2014 - Mar 2014

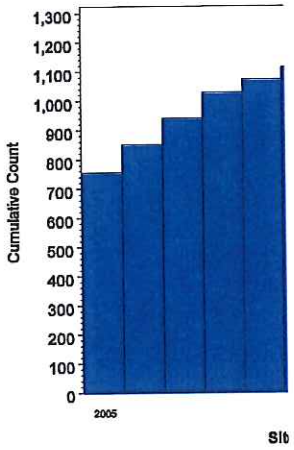
Number of Participating Sites

Yearly Count



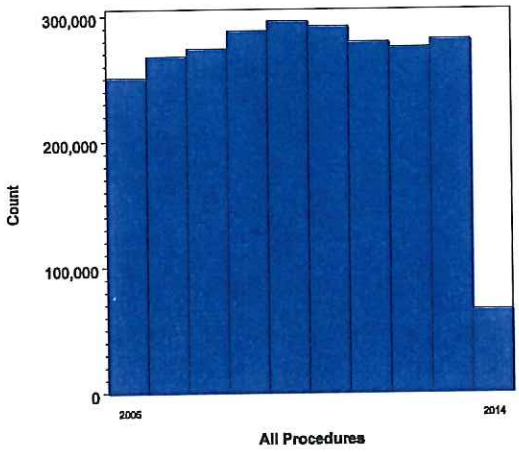
Number of Partici

Cumulative over las



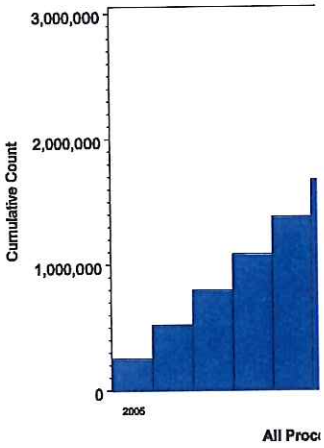
Number of Procedures

Yearly Count



Number of Pro

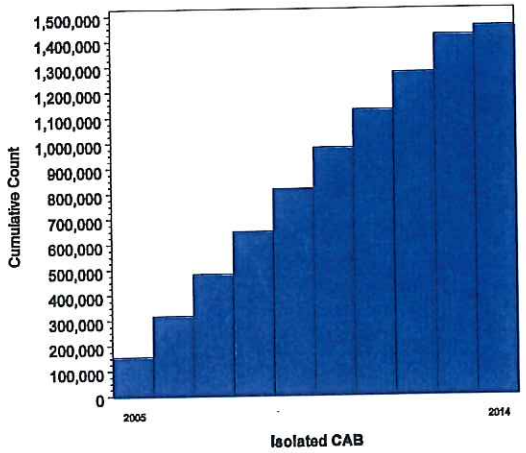
Cumulative over las



2014 is a partial year: Jan 2014 - Mar 2014

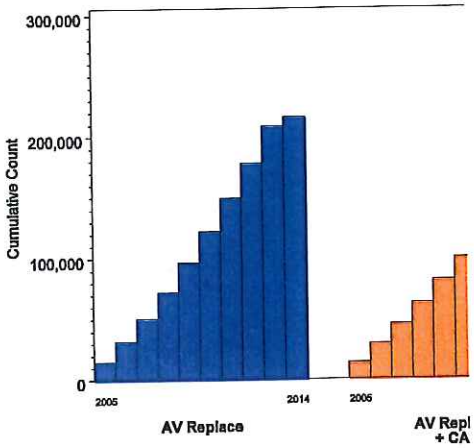
Number of Isolated CABG Procedures

Cumulative over last 10 years



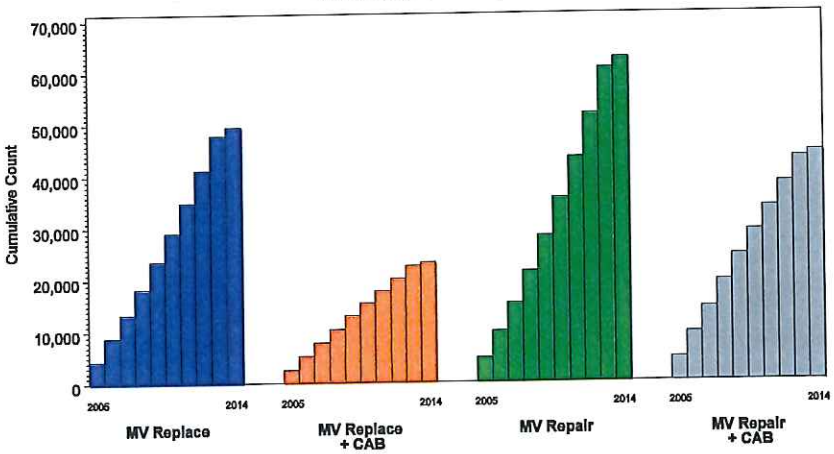
Number of Aortic Val

Cumulative over las



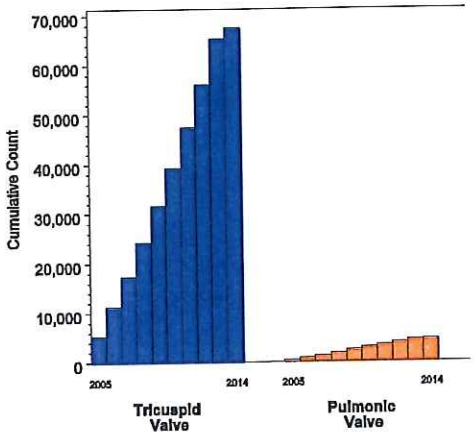
Number of Mitral Valve Procedures

Cumulative over last 10 years



Number of Selected Other

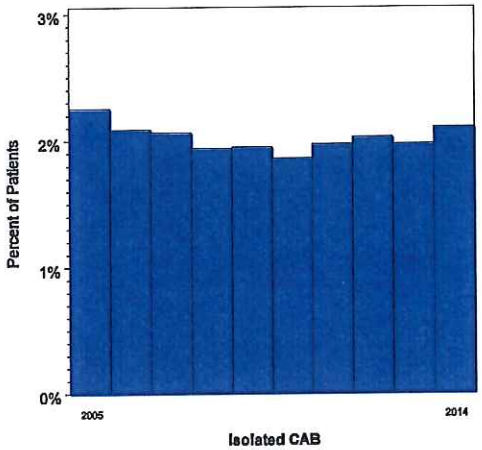
Cumulative over las



2014 is a partial year: Jan 2014 - Mar 2014

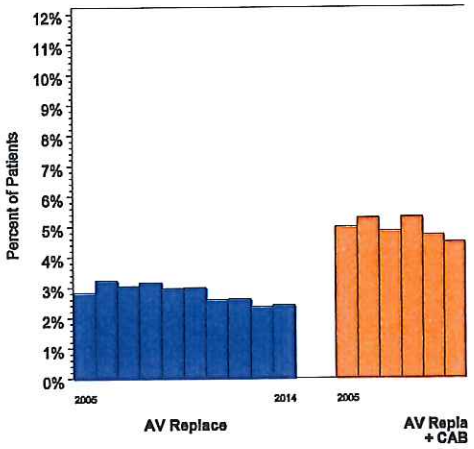
Unadjusted Isolated CABG Operative Mortality

Yearly over last 10 years



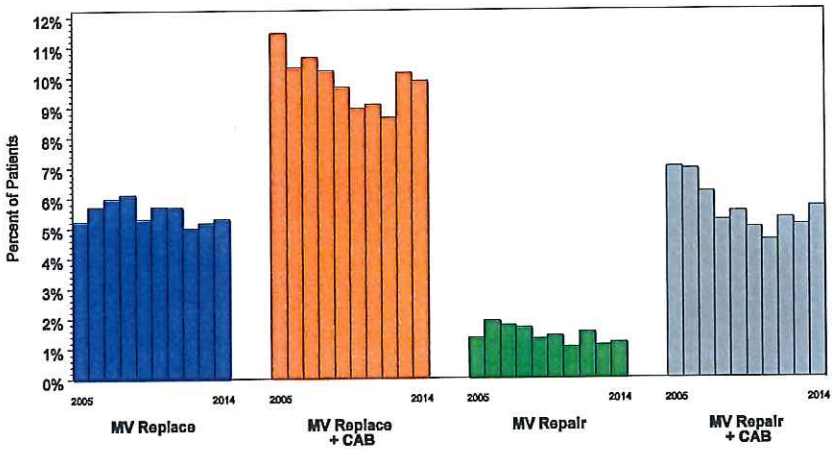
Unadjusted Aortic Valve

Yearly over last 1



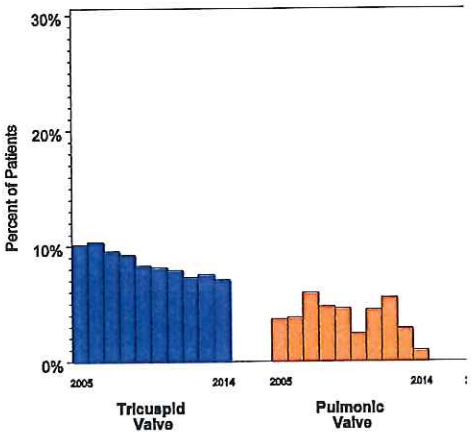
Unadjusted Mitral Valve Operative Mortality

Yearly over last 10 years



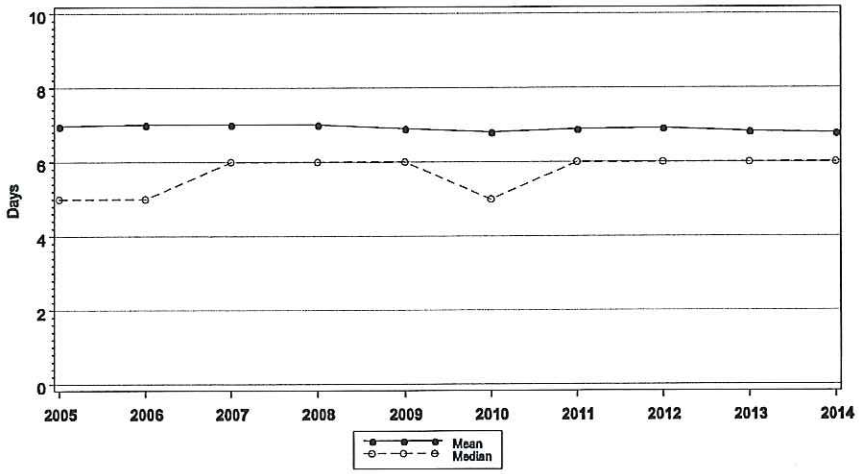
Unadjusted Other Cardiac

Yearly over last 1

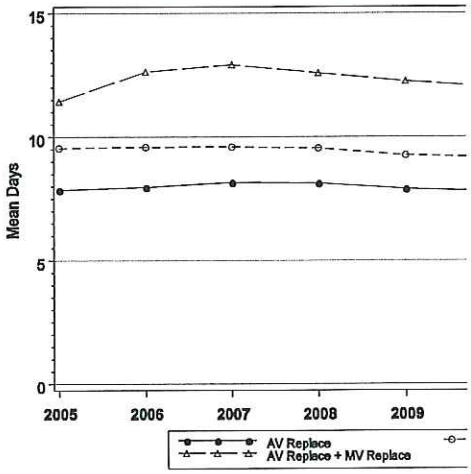


2014 is a partial year: Jan 2014 - Mar 2014

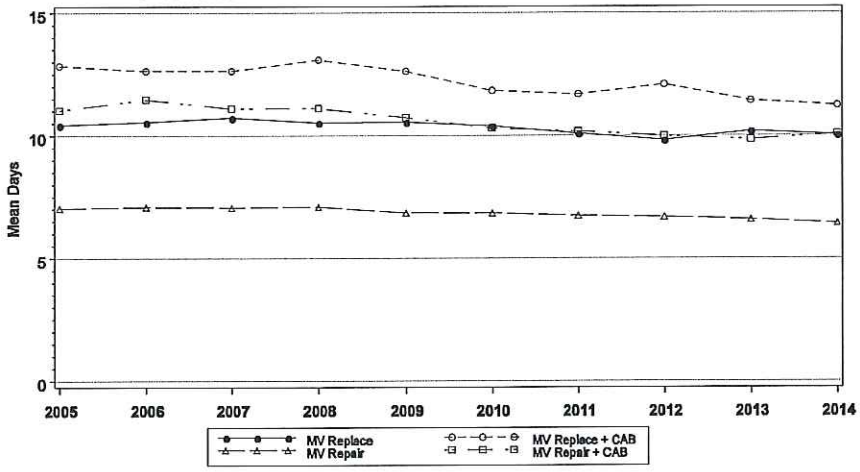
Post-Procedure LOS for Isolated CABG Procedures



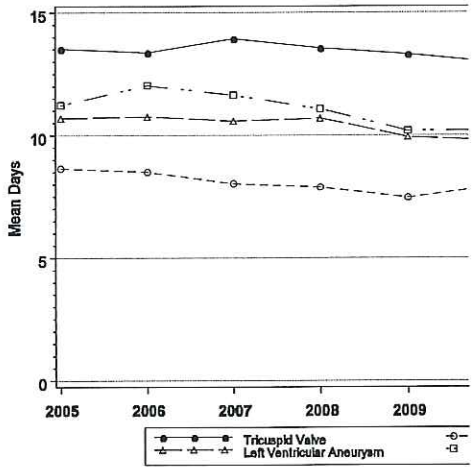
Post-Procedure LOS for Aor



Post-Procedure LOS for Mitral Valve Procedures



Post-Procedure LOS for Oth





Executive Summary

Participant 30398
STS Period Ending 03/31/2014

2014 is a partial year: Jan 2014 - Mar 2014

	2005	2006	2007	2008	2009	2010	201
Yearly Number of Sites in Analysis	716	797	875	949	982	1,014	1,03
Yearly Overall Procedure Count	250,819	267,860	273,864	287,964	295,774	291,410	278,98
Major Procedures							
Isolated CABG	155,012	161,733	164,340	168,027	167,329	160,819	149,64
Isolated Aortic Valve Replacement	14,945	16,957	18,730	21,376	24,501	25,621	27,25
Isolated Mitral Valve Replacement	4,289	4,498	4,522	4,845	5,336	5,495	5,88
Aortic Valve Replacement + CABG	13,763	15,540	15,879	17,536	18,823	18,344	18,21
Mitral Valve Replacement + CABG	2,496	2,648	2,582	2,576	2,589	2,446	2,32
Aortic + Mitral Valve Replacements	1,032	1,163	1,285	1,317	1,503	1,468	1,61
Mitral Valve Repair	4,671	5,092	5,424	6,155	6,817	7,301	7,84
Mitral Valve Repair + CABG	4,518	4,838	4,854	5,177	4,898	4,759	4,59
Not Classified Above	50,093	55,391	56,248	60,955	63,978	65,157	61,61
Incidence of Other Procedures							
Pulmonic Valve	409	447	454	505	543	543	47
Tricuspid Valve	5,271	5,965	6,090	6,903	7,369	7,625	8,20
Ventricular Assist Device	1,010	1,134	1,198	1,512	1,863	2,434	3,20
LVA - Left Ventricular Aneurysm Repair	1,224	1,189	1,139	1,041	925	831	79
VSD - Ventricular Septal Defect Repair	566	618	575	634	625	637	67
ASD - Atrial Septal Defect Repair	2,826	3,158	3,372	3,940	4,285	4,230	4,68
Batista	19	38	47	47	34	42	1
Surgical Ventricular Restoration	597	515	436	404	303	193	20
Congenital Defect Repair	1,396	1,697	2,073	1,821	1,579	1,544	1,56
Transmyocardial Laser Revascularization	2,921	3,208	2,497	2,387	2,033	2,011	1,75
Cardiac Trauma	238	293	291	335	297	287	28
Cardiac Transplant	858	978	1,031	1,121	1,226	1,367	1,35
Arrhythmia Correction Surgery	1,586	1,409	1,275	1,370	1,211	1,159	1,03
Atrial Fibrillation Correction Surgery	12,912	14,978	15,074	16,013	16,593	16,825	17,56
Aortic Aneurysm	8,437	9,553	10,138	11,734	13,127	13,947	12,88
Ascending Aorta	6,822	7,896	8,501	10,024	11,431	12,140	10,63
Aortic Arch	1,967	2,298	2,415	2,762	3,183	3,501	3,15
Descending Aorta	979	1,054	1,088	1,122	1,154	1,281	1,04
Thoracoabdominal Aorta	558	630	571	670	631	708	66
Carotid Endarterectomy	2,277	2,211	2,042	2,081	1,884	1,775	1,58
Other Vascular	1,296	1,365	1,199	1,470	1,566	1,500	1,38
Other Thoracic	1,635	1,631	1,605	1,795	1,663	1,663	1,55

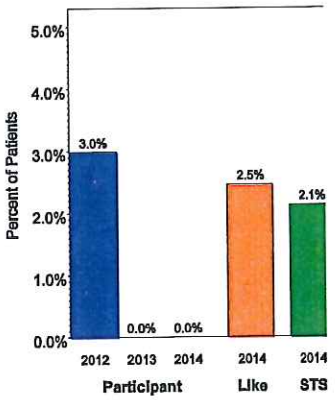
Major Procedures Mortality
CABG, Valve, and Valve+CABG Procedures Combined[1]

Participant 30398
STS Period Ending 03/31/2014

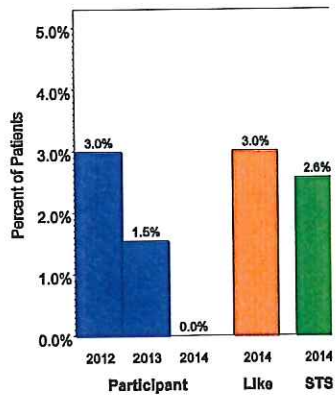
2014 is a partial year: Jan 2014 - Mar 2014

	Participant 30398			Like Group	STS
	2012	2013	2014	2014	2014
Number of Cases	67	65	27	21,168	47,909
Mortality Summary					
In-hospital Mortality	3.0%	0.0%	0.0%	2.5%	2.1%
Operative Mortality	3.0%	1.5%	0.0%	3.0%	2.6%
Mortality Risk-Adjustment[2]					
In-hospital Mortality					
Odds Ratio	1.10	0.78	-	-	-
Lower 95% Confidence Limit	0.51	0.33	-	-	-
Upper 95% Confidence Limit	2.38	1.83	-	-	-
O/E Ratio	1.58	0.00	-	-	-
Lower 95% Confidence Limit	0.27	0.00	-	-	-
Upper 95% Confidence Limit	5.10	2.45	-	-	-
Risk-adjusted Rate	3.3%	0.0%	-	-	-
Operative Mortality					
Odds Ratio	1.05	0.90	-	-	-
Lower 95% Confidence Limit	0.50	0.41	-	-	-
Upper 95% Confidence Limit	2.19	1.95	-	-	-
O/E Ratio	1.32	0.60	-	-	-
Lower 95% Confidence Limit	0.23	0.03	-	-	-
Upper 95% Confidence Limit	4.25	2.97	-	-	-
Risk-adjusted Rate	3.3%	1.5%	-	-	-

In-hospital Mortality
Observed rate



Operative Mortality
Observed rate



[1]Does not include Mitral Valve Repairs or I
[2]Refer to the Report Overview for informat
Risk-adjustment is not performed on time

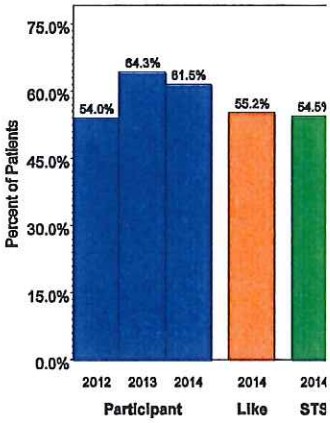
Isolated CABG Procedures
Data Summary

Participant 30398
STS Period Ending 03/31/2014

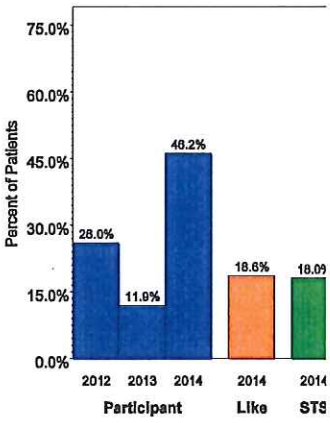
2014 is a partial year: Jan 2014 - Mar 2014

	Participant 30398			Like Group	STS
	2012	2013	2014	2014	2014
Number of Cases	50	42	13	15,538	34,020
Demographics					
Age (years)					
Mean	64.9	67.3	63.1	65.4	65.2
Median	65.0	67.5	65.0	66.0	66.0
25th Percentile	59.0	60.0	53.0	58.0	58.0
75th Percentile	71.0	74.0	68.0	73.0	73.0
Age >= 65 years old	54.0%	64.3%	61.5%	55.2%	54.5%
Gender, Female	36.0%	42.9%	23.1%	24.8%	24.8%
Missing	0.0%	0.0%	0.0%	0.1%	0.1%
Race[1]					
Caucasian	90.0%	92.9%	61.5%	85.0%	84.7%
Black	4.0%	2.4%	23.1%	7.0%	7.7%
Asian	0.0%	0.0%	0.0%	2.8%	2.8%
Native American	2.0%	0.0%	0.0%	0.8%	0.5%
Native Hawaiian/Pacific Islander	0.0%	0.0%	0.0%	0.5%	0.4%
Other	10.0%	7.1%	23.1%	3.5%	3.4%
Multiple Races	8.0%	2.4%	7.7%	0.9%	0.9%
Missing	2.0%	0.0%	0.0%	1.5%	1.4%
Hispanic or Latino Ethnicity	18.0%	9.5%	15.4%	7.2%	5.9%
Missing	0.0%	0.0%	0.0%	0.4%	0.5%
Body Mass Index[2]					
Underweight (BMI < 18.5)	2.0%	0.0%	0.0%	0.6%	0.6%
Normal (BMI 18.5 - 24.9)	26.0%	11.9%	46.2%	18.3%	18.4%
Overweight (BMI 25.0 - 29.9)	34.0%	28.6%	15.4%	36.5%	36.7%
Obese I (BMI 30.0 - 34.9)	6.0%	40.5%	30.8%	26.5%	26.5%
Obese II (BMI 35.0 - 39.9)	16.0%	4.8%	0.0%	11.7%	11.5%
Morbid Obesity (BMI 40.0+)	**14.0%**	**14.3%**	7.7%	6.0%	6.1%
Missing Height	2.0%	0.0%	0.0%	0.1%	0.1%
Missing Weight	2.0%	0.0%	0.0%	0.1%	0.1%

Age >= 65



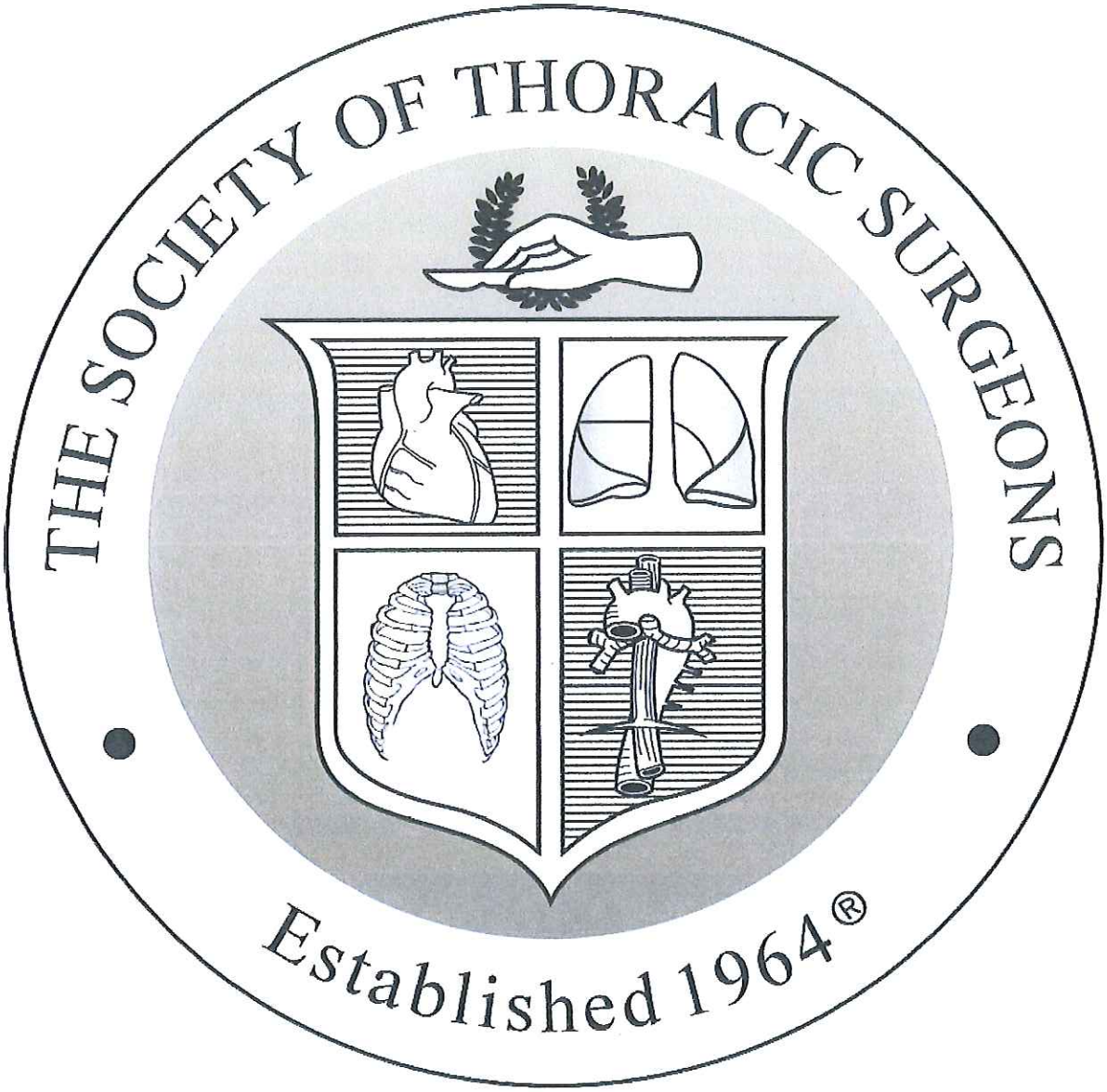
Race, Non-Caucasian



[1]Data presented in the report represent the
shown; summing the individual non-cauca
shown in the graph since non-caucasian,
ethnicities reported in combination with ca

[2]BMI = Weight(kg) / Height(m)^2

DATA ANALYSES OF THE SOCIETY OF THORACIC SURGEONS NATIONAL ADULT CARDIAC SURGERY DATABASE





Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER

July 2014

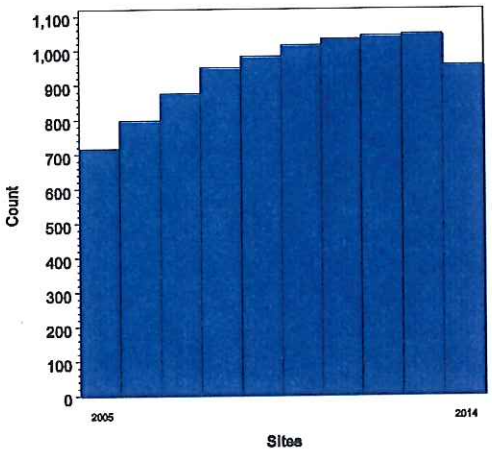
Period Ending 03/31/2014

Executive Summary

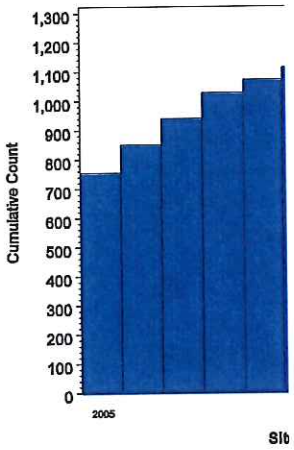
Participant 30397
STS Period Ending 03/31/2014

2014 is a partial year: Jan 2014 - Mar 2014

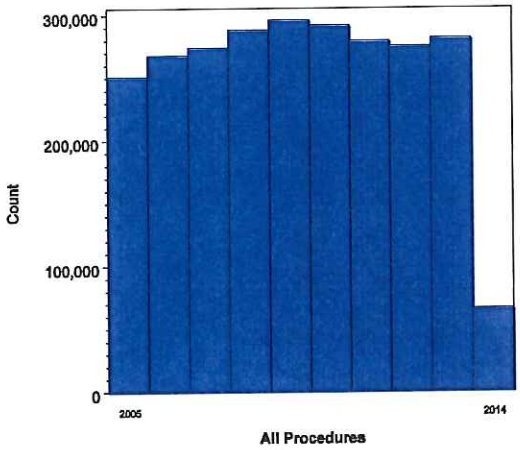
Number of Participating Sites
Yearly Count



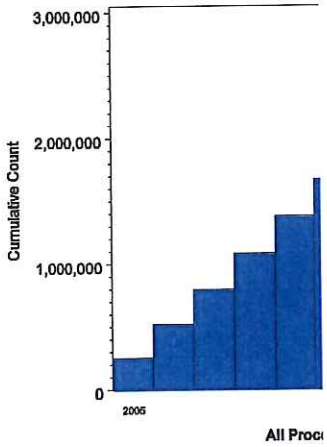
Number of Partici
Cumulative over las



Number of Procedures
Yearly Count



Number of Pro
Cumulative over las

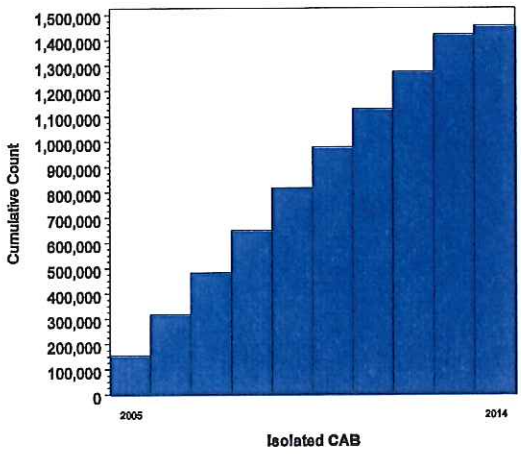


Executive Summary

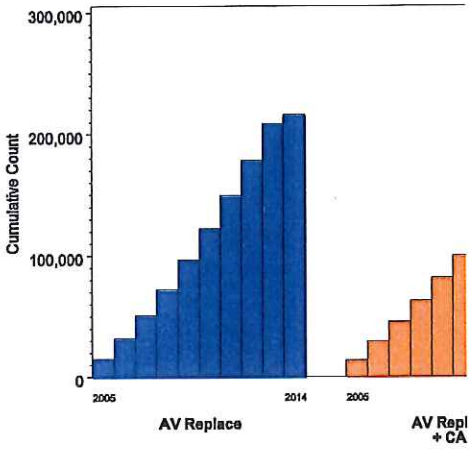
Participant 30397
STS Period Ending 03/31/2014

2014 is a partial year: Jan 2014 - Mar 2014

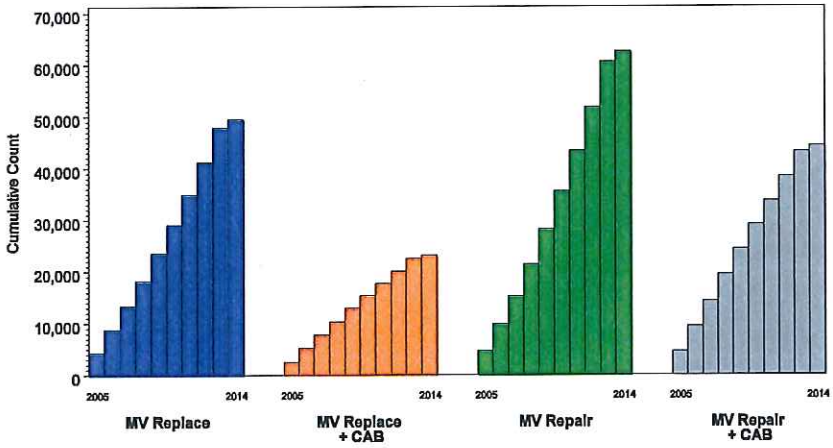
Number of Isolated CABG Procedures
Cumulative over last 10 years



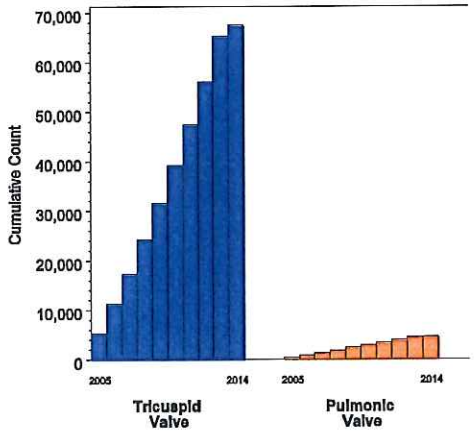
Number of Aortic Val
Cumulative over las



Number of Mitral Valve Procedures
Cumulative over last 10 years



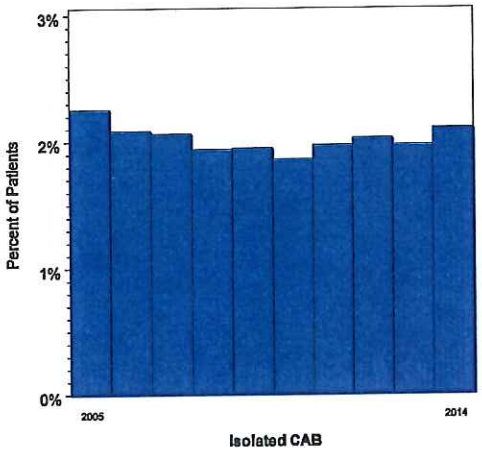
Number of Selected Other
Cumulative over las



2014 is a partial year: Jan 2014 - Mar 2014

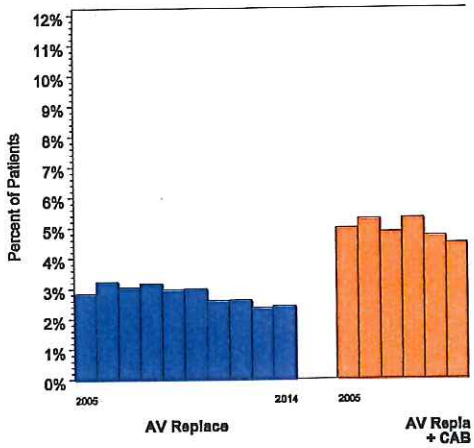
Unadjusted Isolated CABG Operative Mortality

Yearly over last 10 years



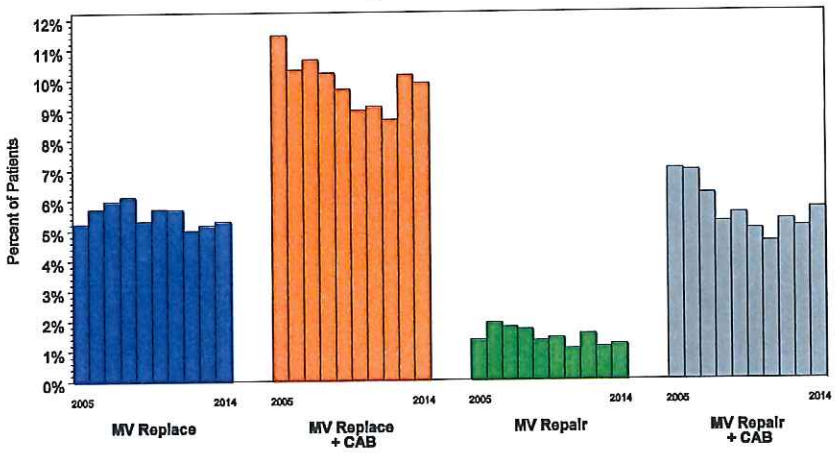
Unadjusted Aortic Valve

Yearly over last 1



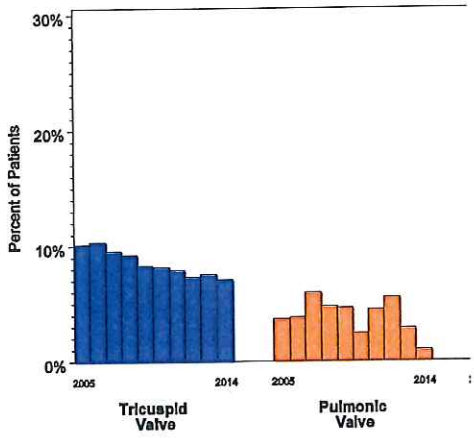
Unadjusted Mitral Valve Operative Mortality

Yearly over last 10 years



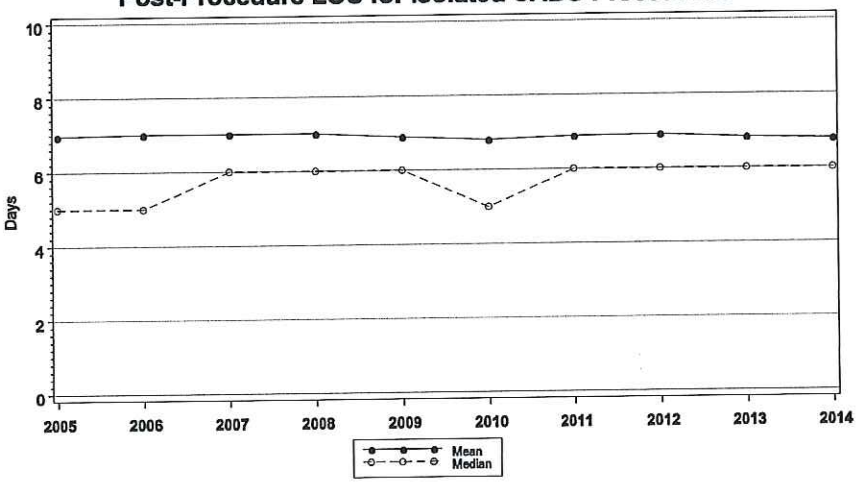
Unadjusted Other Cardiac

Yearly over last 1

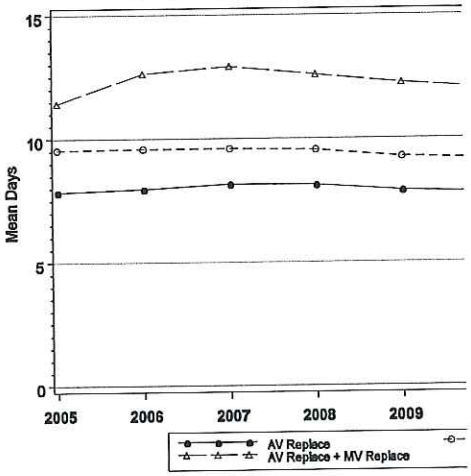


2014 is a partial year: Jan 2014 - Mar 2014

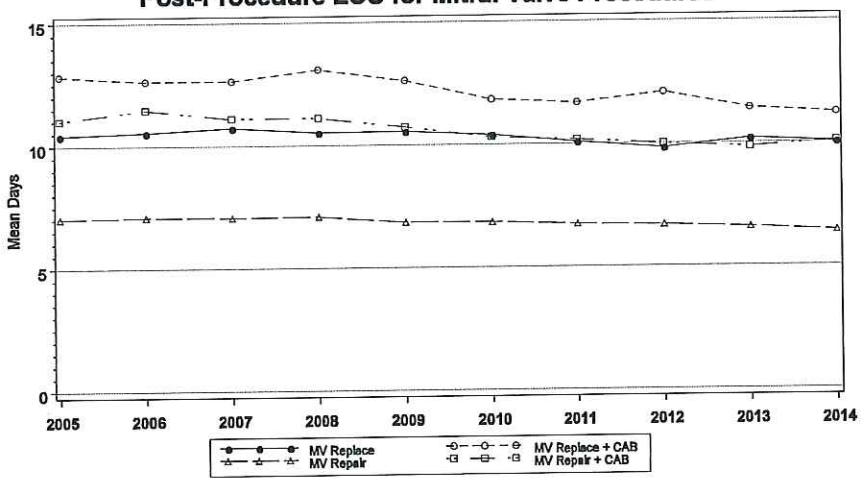
Post-Procedure LOS for Isolated CABG Procedures



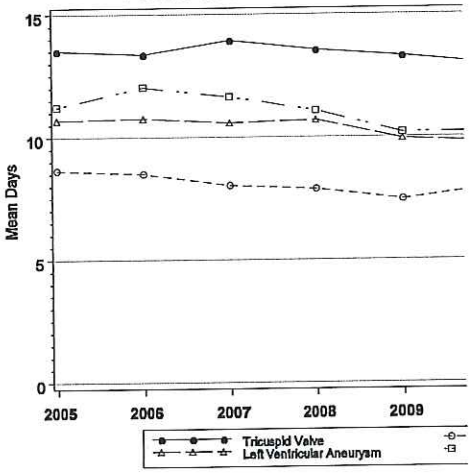
Post-Procedure LOS for Aor



Post-Procedure LOS for Mitral Valve Procedures



Post-Procedure LOS for Othe





Executive Summary

Participant 30397
STS Period Ending 03/31/2014

2014 is a partial year: Jan 2014 - Mar 2014

	2005	2006	2007	2008	2009	2010	201
Yearly Number of Sites in Analysis	716	797	875	949	982	1,014	1,03
Yearly Overall Procedure Count	250,819	267,860	273,864	287,964	295,774	291,410	278,98
Major Procedures							
Isolated CABG	155,012	161,733	164,340	168,027	167,329	160,819	149,64
Isolated Aortic Valve Replacement	14,945	16,957	18,730	21,376	24,501	25,621	27,25
Isolated Mitral Valve Replacement	4,289	4,498	4,522	4,845	5,336	5,495	5,88
Aortic Valve Replacement + CABG	13,763	15,540	15,879	17,536	18,823	18,344	18,21
Mitral Valve Replacement + CABG	2,496	2,648	2,582	2,576	2,589	2,446	2,32
Aortic + Mitral Valve Replacements	1,032	1,163	1,285	1,317	1,503	1,468	1,61
Mitral Valve Repair	4,671	5,092	5,424	6,155	6,817	7,301	7,84
Mitral Valve Repair + CABG	4,518	4,838	4,854	5,177	4,898	4,759	4,59
Not Classified Above	50,093	55,391	56,248	60,955	63,978	65,157	61,61
Incidence of Other Procedures							
Pulmonic Valve	409	447	454	505	543	543	47
Tricuspid Valve	5,271	5,965	6,090	6,903	7,369	7,625	8,20
Ventricular Assist Device	1,010	1,134	1,198	1,512	1,863	2,434	3,20
LVA - Left Ventricular Aneurysm Repair	1,224	1,189	1,139	1,041	925	831	79
VSD - Ventricular Septal Defect Repair	566	618	575	634	625	637	67
ASD - Atrial Septal Defect Repair	2,826	3,158	3,372	3,940	4,285	4,230	4,68
Batista	19	38	47	47	34	42	1
Surgical Ventricular Restoration	597	515	436	404	303	193	20
Congenital Defect Repair	1,396	1,697	2,073	1,821	1,579	1,544	1,56
Transmyocardial Laser Revascularization	2,921	3,208	2,497	2,387	2,033	2,011	1,75
Cardiac Trauma	238	293	291	335	297	287	28
Cardiac Transplant	858	978	1,031	1,121	1,226	1,367	1,35
Arrhythmia Correction Surgery	1,586	1,409	1,275	1,370	1,211	1,159	1,03
Atrial Fibrillation Correction Surgery	12,912	14,978	15,074	16,013	16,593	16,825	17,56
Aortic Aneurysm	8,437	9,553	10,138	11,734	13,127	13,947	12,88
Ascending Aorta	6,822	7,896	8,501	10,024	11,431	12,140	10,63
Aortic Arch	1,967	2,298	2,415	2,762	3,183	3,501	3,15
Descending Aorta	979	1,054	1,088	1,122	1,154	1,281	1,04
Thoracoabdominal Aorta	558	630	571	670	631	708	66
Carotid Endarterectomy	2,277	2,211	2,042	2,081	1,884	1,775	1,58
Other Vascular	1,296	1,365	1,199	1,470	1,566	1,500	1,38
Other Thoracic	1,635	1,631	1,605	1,795	1,663	1,663	1,55

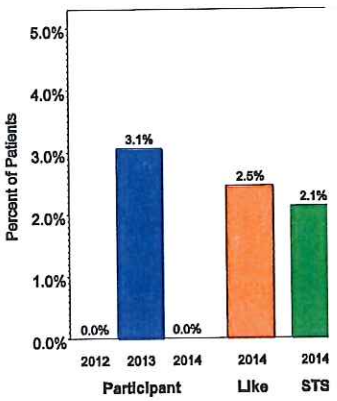
Major Procedures Mortality
CABG, Valve, and Valve+CABG Procedures Combined[1]

Participant 30397
STS Period Ending 03/31/2014

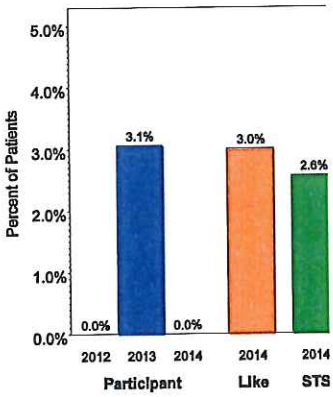
2014 is a partial year: Jan 2014 - Mar 2014

	Participant 30397			Like Group	STS
	2012	2013	2014	2014	2014
Number of Cases	76	98	19	21,168	47,909
Mortality Summary					
In-hospital Mortality	0.0%	3.1%	0.0%	2.5%	2.1%
Operative Mortality	0.0%	3.1%	0.0%	3.0%	2.6%
Mortality Risk-Adjustment[2]					
In-hospital Mortality					
Odds Ratio	0.78	1.15	-	-	-
Lower 95% Confidence Limit	0.36	0.53	-	-	-
Upper 95% Confidence Limit	1.72	2.47	-	-	-
O/E Ratio	0.00	1.21	-	-	-
Lower 95% Confidence Limit	0.00	0.33	-	-	-
Upper 95% Confidence Limit	2.29	3.27	-	-	-
Risk-adjusted Rate	0.0%	2.4%	-	-	-
Operative Mortality					
Odds Ratio	0.76	1.05	-	-	-
Lower 95% Confidence Limit	0.36	0.51	-	-	-
Upper 95% Confidence Limit	1.62	2.13	-	-	-
O/E Ratio	0.00	1.00	-	-	-
Lower 95% Confidence Limit	0.00	0.27	-	-	-
Upper 95% Confidence Limit	1.91	2.66	-	-	-
Risk-adjusted Rate	0.0%	2.4%	-	-	-

In-hospital Mortality
Observed rate



Operative Mortality
Observed rate



[1]Does not include Mitral Valve Repairs or I
[2]Refer to the Report Overview for informat
Risk-adjustment is not performed on time

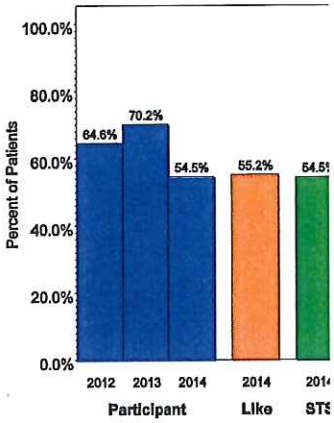
Isolated CABG Procedures
Data Summary

Participant 30397
STS Period Ending 03/31/2014

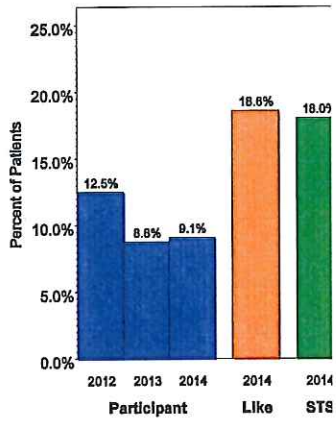
2014 is a partial year: Jan 2014 - Mar 2014

	Participant 30397			Like Group	STS
	2012	2013	2014	2014	2014
Number of Cases	48	57	11	15,538	34,020
Demographics					
Age (years)					
Mean	67.7	70.7	63.3	65.4	65.2
Median	68.5	71.0	66.0	66.0	66.0
25th Percentile	61.5	64.0	62.0	58.0	58.0
75th Percentile	75.5	80.0	69.0	73.0	73.0
Age >= 65 years old	64.6%	70.2%	54.5%	55.2%	54.5%
Gender, Female	35.4%	19.3%	18.2%	24.8%	24.8%
Missing	0.0%	0.0%	0.0%	0.1%	0.1%
Race[1]					
Caucasian	91.7%	96.5%	90.9%	85.0%	84.7%
Black	4.2%	3.5%	9.1%	7.0%	7.7%
Asian	0.0%	0.0%	0.0%	2.8%	2.8%
Native American	0.0%	0.0%	0.0%	0.8%	0.5%
Native Hawaiian/Pacific Islander	0.0%	0.0%	0.0%	0.5%	0.4%
Other	2.1%	0.0%	0.0%	3.5%	3.4%
Multiple Races	0.0%	0.0%	0.0%	0.9%	0.9%
Missing	2.1%	0.0%	0.0%	1.5%	1.4%
Hispanic or Latino Ethnicity	8.3%	5.3%	0.0%	7.2%	5.9%
Missing	0.0%	0.0%	0.0%	0.4%	0.5%
Body Mass Index[2]					
Underweight (BMI < 18.5)	0.0%	0.0%	0.0%	0.6%	0.6%
Normal (BMI 18.5 - 24.9)	16.7%	24.6%	18.2%	18.3%	18.4%
Overweight (BMI 25.0 - 29.9)	31.3%	35.1%	27.3%	36.5%	36.7%
Obese I (BMI 30.0 - 34.9)	27.1%	29.8%	36.4%	26.5%	26.5%
Obese II (BMI 35.0 - 39.9)	14.6%	5.3%	9.1%	11.7%	11.5%
Morbid Obesity (BMI 40.0+)	**10.4%**	5.3%	9.1%	6.0%	6.1%
Missing Height	0.0%	0.0%	0.0%	0.1%	0.1%
Missing Weight	0.0%	0.0%	0.0%	0.1%	0.1%

Age >= 65



Race, Non-Caucasian



[1]Data presented in the report represent the
shown; summing the individual non-cauca
shown in the graph since non-caucasian,
ethnicities reported in combination with ca

[2]BMI = Weight(kg) / Height(m)^2

Huber, Jack

From: Kevin Kniery (HLRCC) <KKniery@leevercancercenter.org>
Sent: Tuesday, July 28, 2015 11:08 AM
To: Huber, Jack
Subject: RE: Heart Center of Greater Waterbury's September 9, 2014 Compliance Filing for DN: 08-31202
Attachments: OCHA STS Report 2014.pdf

Mr. Huber,
I attached the report you requested, please confirm receipt and that it is the appropriate report. This years report is in the works. Thanks Kevin



Kevin Kniery
Executive Director
The Harold Leever Regional Cancer Center Inc. &
The Heart Center of Greater Waterbury
1075 Chase Parkway
Waterbury Ct. 06708
Phone 203 575-5560
Fax 203 575-5550
www.leevercancercenter.org

From: Huber, Jack [mailto:Jack.Huber@ct.gov]
Sent: Monday, July 27, 2015 5:02 PM
To: Kevin Kniery (HLRCC)
Subject: Heart Center of Greater Waterbury's September 9, 2014 Compliance Filing for DN: 08-31202

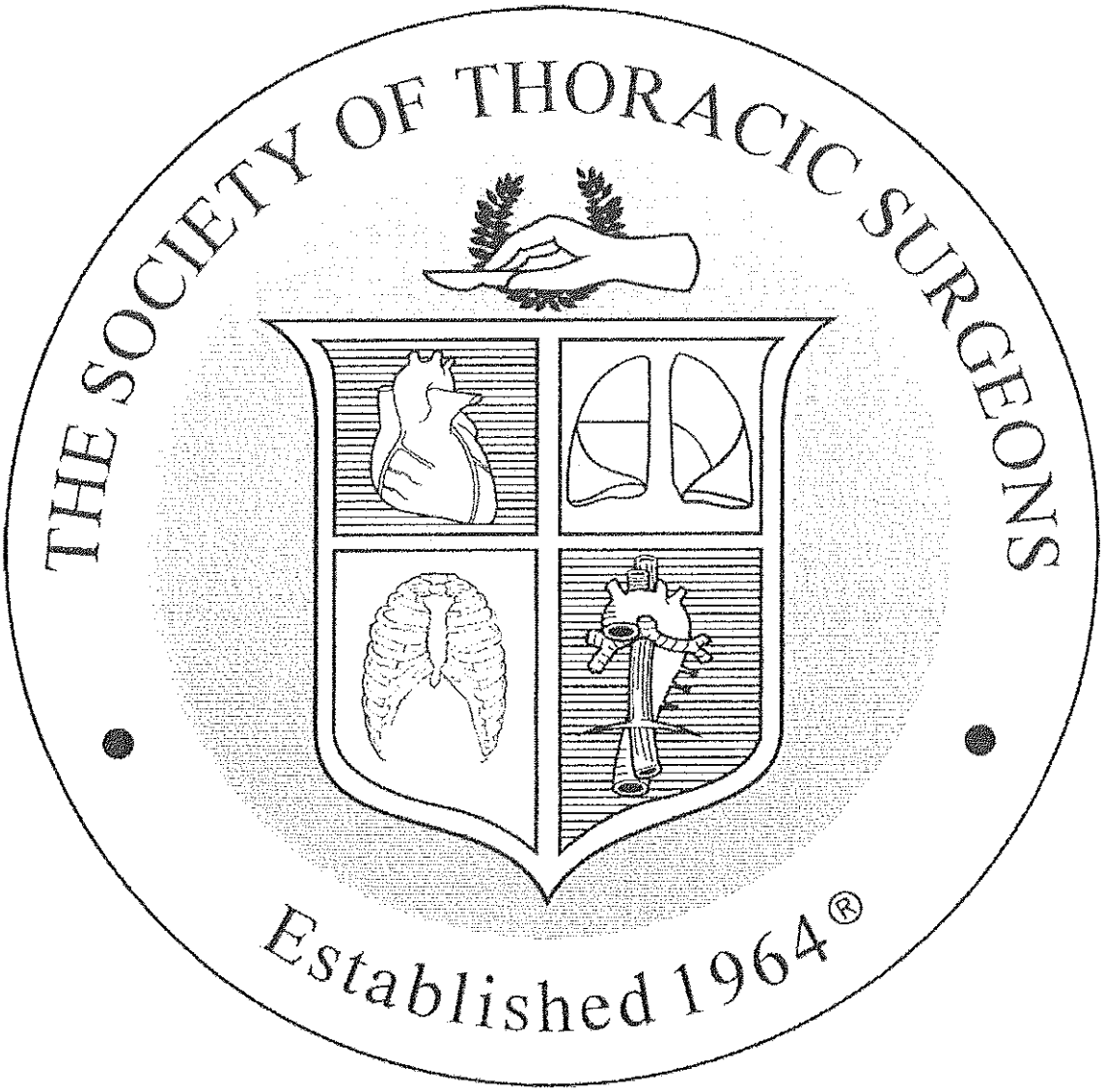
Good afternoon Mr. Kniery – By way of introduction, my name is Jack Huber. I'm a Health Care Analyst with the Connecticut Department of Public Health, Office of Health Care Access. One of my responsibilities involves the review of Certificate of Need compliance reporting. I have recently been reviewing the Heart Center's CON compliance filing dated September 9, 2014, regarding the authorization under Docket Number: 08-31202-CON. It appears that the STS Executive Summaries provided for Saint Mary's Hospital and Waterbury Hospital for the period ending July 2014 have missing information that has been cut off from the right-hand margin due to the copying process employed. Earlier versions of the STS Executive Summaries were provided in the landscape orientation. The orientation offered in the September 2014 reporting appears in the profile setting, which has unfortunately truncated information appearing in the right margin of the report copies. Kindly resend each Hospital's report so that we may include the entire version of each report in the permanent record of the authorization. Thank you for your attention to this matter. Should you have any questions relating to this correspondence you may email or reach me directly by dialing (860) 418-7069. Regards, Jack Huber

Jack A. Huber, Health Care Analyst
CT Department of Public Health | Office of Health Care Access |410 Capitol Avenue
P.O. Box 340308, MS #13HCA | Hartford, CT 06134-0308|Ph: 860-418-7069|Fax: 860-418-7053
Email: Jack.Huber@ct.gov |Web: www.ct.gov/ohca

Saint Mary's Health System Disclaimer:

The E-mail or documents attached to it,may contain confidential information belonging to the sender that is legally privileged. This information is intended only for the use of the individual or entity named above. The authorized recipient of this information is prohibited from disclosing this information to any other party and is required to destroy the information after its stated need has been fulfilled. If you are not the intended recipient of this information, you are hereby notified that any disclosure, copying, or distribution of these documents is strictly prohibited. If you have received this information in error, please notify the sender immediately to arrange for return of these documents.

DATA ANALYSES OF THE SOCIETY OF THORACIC SURGEONS NATIONAL ADULT CARDIAC SURGERY DATABASE



Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER

July 2014

Period Ending 03/31/2014

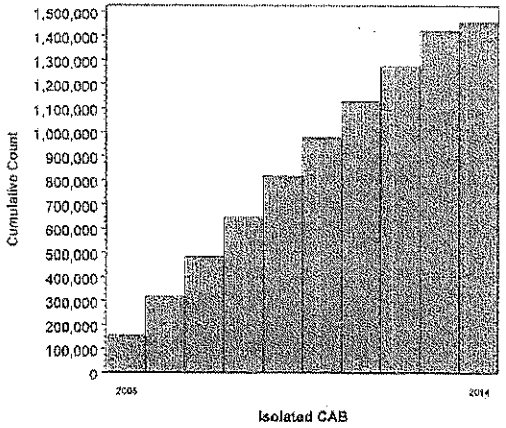
(WH)
Waterbury Hospital

Duke Clinical Research Institute

2014 is a partial year: Jan 2014 - Mar 2014

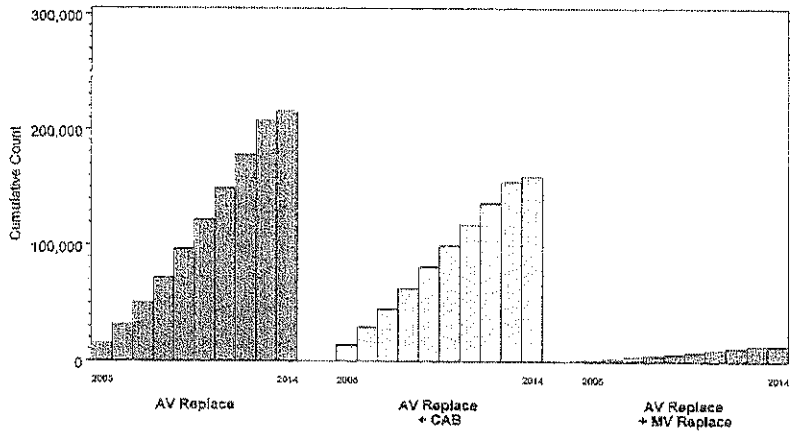
Number of Isolated CABG Procedures

Cumulative over last 10 years



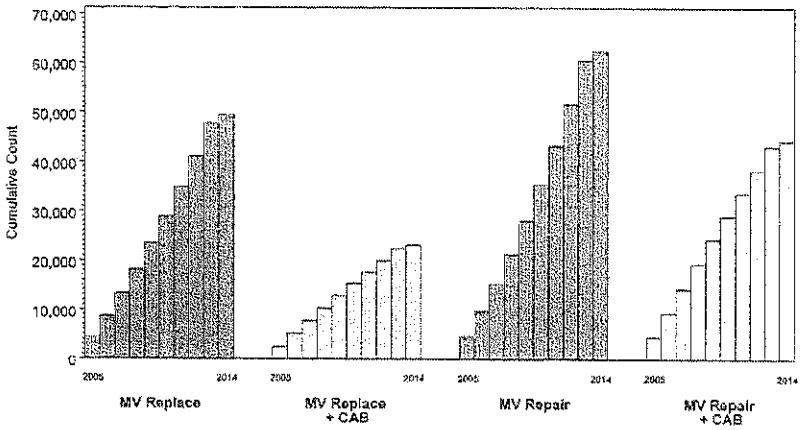
Number of Aortic Valve Procedures

Cumulative over last 10 years



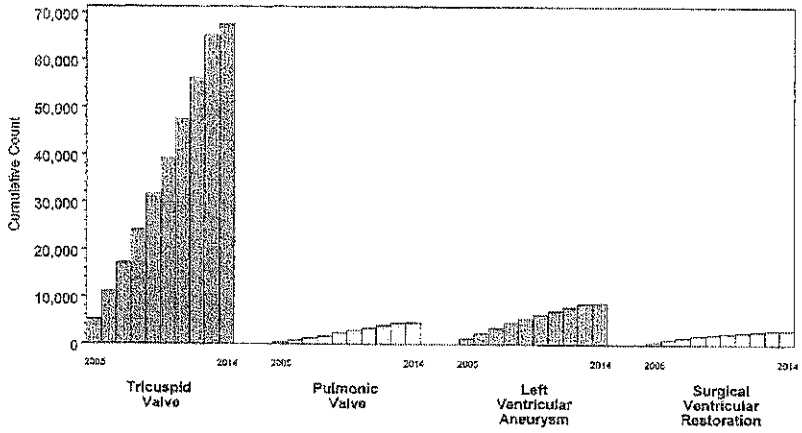
Number of Mitral Valve Procedures

Cumulative over last 10 years



Number of Selected Other Cardiac Procedures

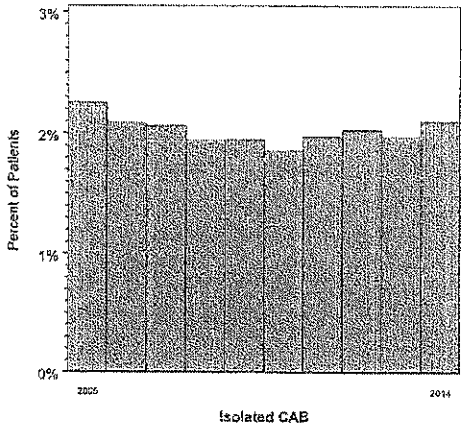
Cumulative over last 10 years



2014 is a partial year: Jan 2014 - Mar 2014

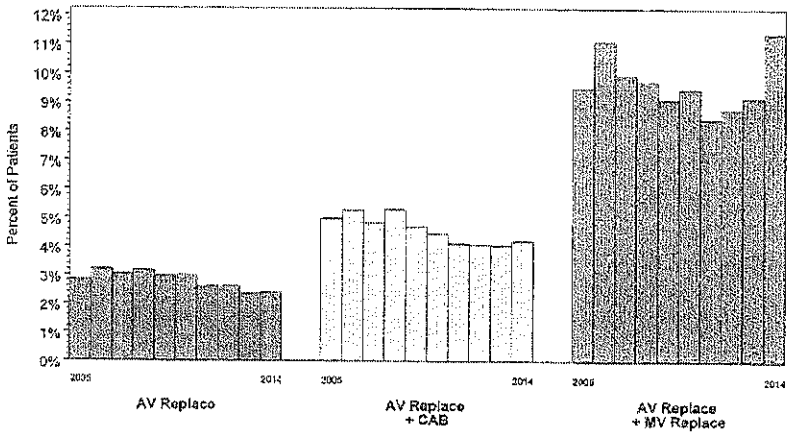
Unadjusted Isolated CABG Operative Mortality

Yearly over last 10 years



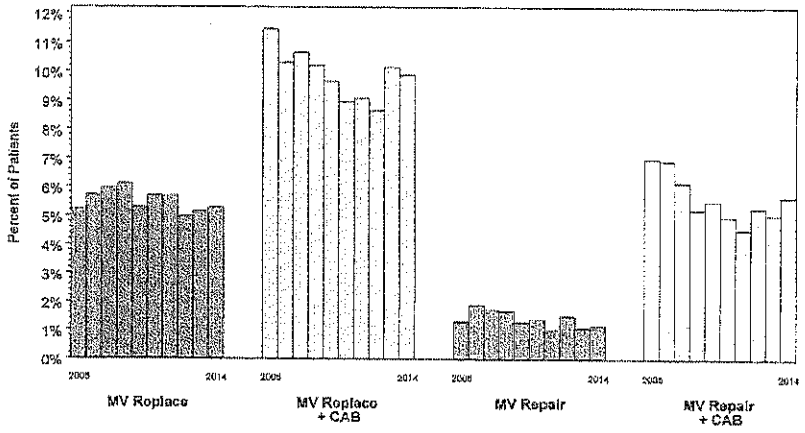
Unadjusted Aortic Valve Operative Mortality

Yearly over last 10 years



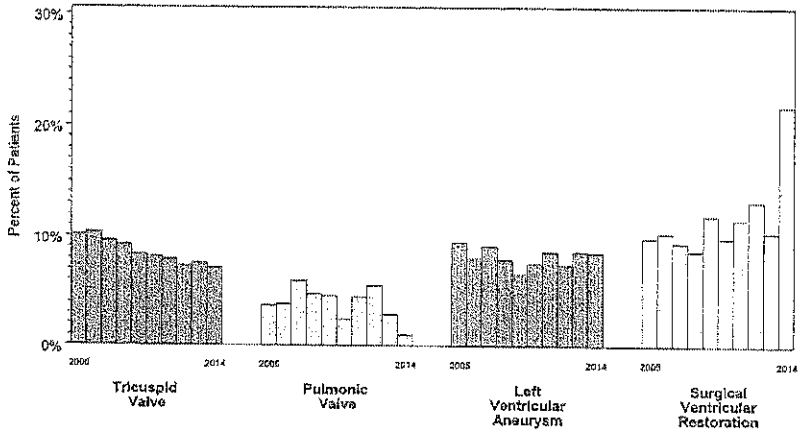
Unadjusted Mitral Valve Operative Mortality

Yearly over last 10 years



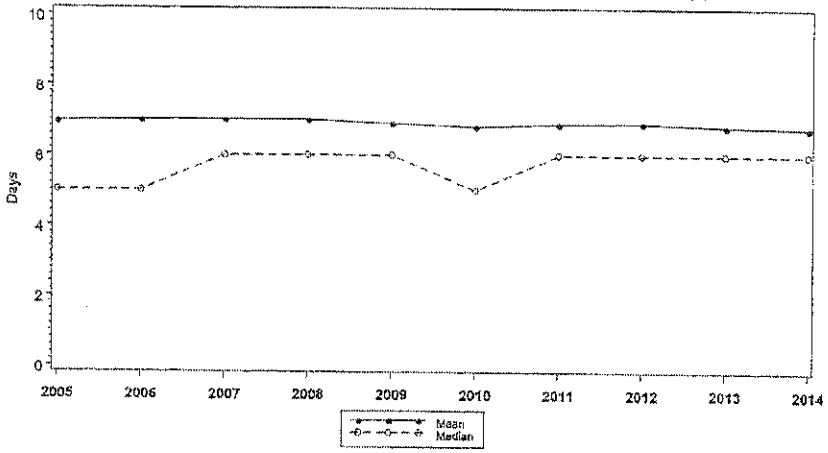
Unadjusted Other Cardiac Operative Mortality

Yearly over last 10 years

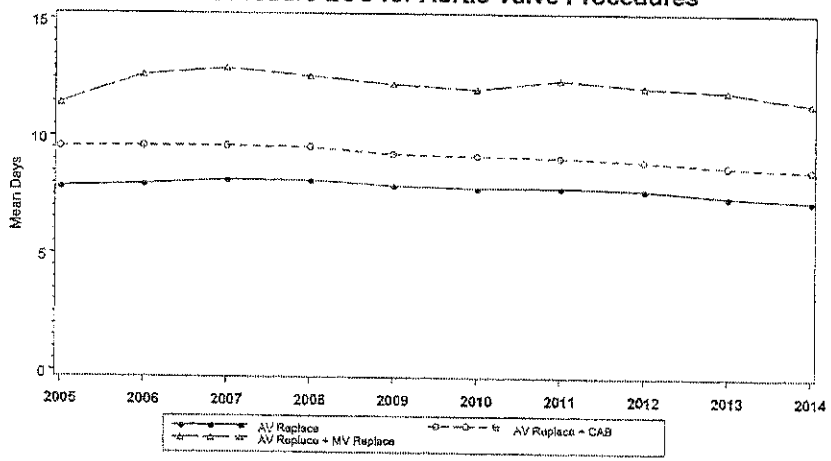


2014 is a partial year: Jan 2014 - Mar 2014

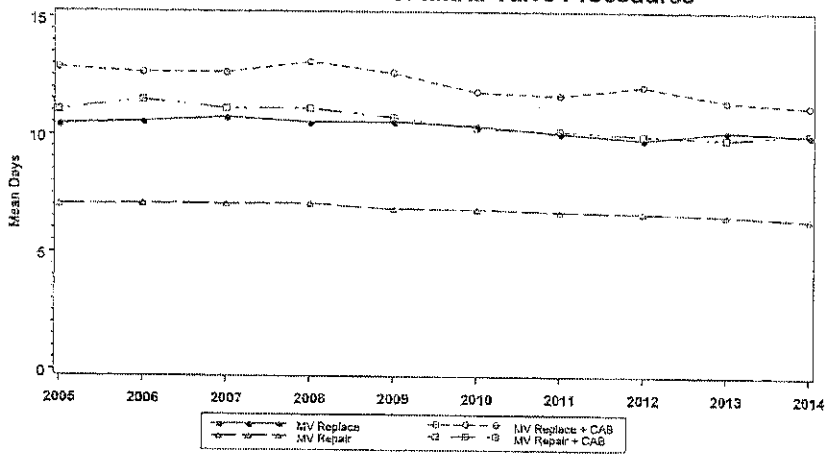
Post-Procedure LOS for Isolated CABG Procedures



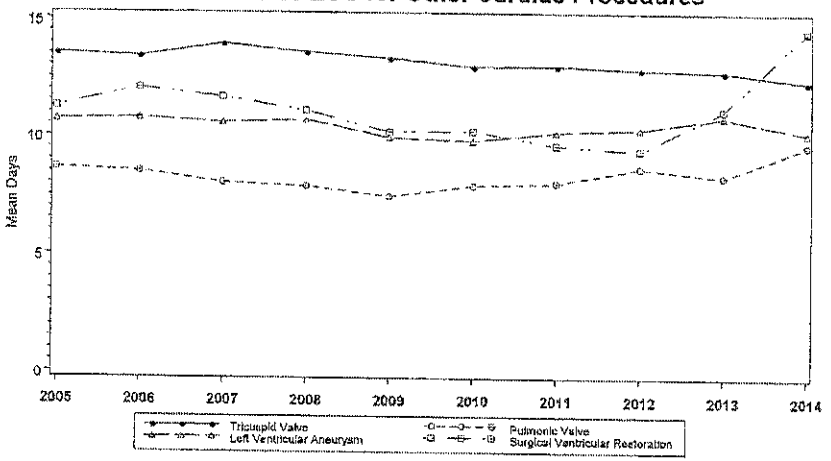
Post-Procedure LOS for Aortic Valve Procedures



Post-Procedure LOS for Mitral Valve Procedures



Post-Procedure LOS for Other Cardiac Procedures





2014 is a partial year: Jan 2014 - Mar 2014

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Yearly Number of Sites in Analysis	716	797	875	949	982	1,014	1,032	1,041	1,046	955
Yearly Overall Procedure Count	250,819	267,860	273,864	287,964	295,774	291,410	278,988	274,912	281,230	65,667
Major Procedures										
Isolated CABG	155,012	161,733	164,340	168,027	167,329	160,819	149,648	146,445	147,119	34,020
Isolated Aortic Valve Replacement	14,945	16,957	18,730	21,376	24,501	25,621	27,258	28,773	30,522	7,080
Isolated Mitral Valve Replacement	4,289	4,498	4,522	4,845	5,336	5,495	5,886	6,322	6,625	1,644
Aortic Valve Replacement + CABG	13,763	15,540	15,879	17,536	18,823	18,344	18,210	18,365	18,507	4,506
Mitral Valve Replacement + CABG	2,496	2,648	2,582	2,576	2,589	2,446	2,322	2,383	2,427	659
Aortic + Mitral Valve Replacements	1,032	1,163	1,285	1,317	1,503	1,468	1,610	1,662	1,766	422
Mitral Valve Repair	4,671	5,092	5,424	6,155	6,817	7,301	7,846	8,414	8,783	2,041
Mitral Valve Repair + CABG	4,518	4,838	4,854	5,177	4,898	4,759	4,596	4,706	4,780	1,127
Not Classified Above	50,093	55,391	56,248	60,955	63,978	65,157	61,612	57,842	60,701	14,168
Incidence of Other Procedures										
Pulmonic Valve	409	447	454	505	543	543	472	546	530	104
Tricuspid Valve	5,271	5,965	6,090	6,903	7,369	7,625	8,202	8,630	9,266	2,211
Ventricular Assist Device	1,010	1,134	1,198	1,512	1,863	2,434	3,203	3,539	4,067	912
LVA - Left Ventricular Aneurysm Repair	1,224	1,189	1,139	1,041	925	831	790	781	698	176
VSD - Ventricular Septal Defect Repair	566	618	575	634	625	637	672	700	642	138
ASD - Atrial Septal Defect Repair	2,826	3,158	3,372	3,940	4,285	4,230	4,686	5,193	5,348	1,285
Batista	19	38	47	47	34	42	17	-	-	-
Surgical Ventricular Restoration	597	515	436	404	303	193	208	197	202	46
Congenital Defect Repair	1,396	1,697	2,073	1,821	1,579	1,544	1,564	1,701	1,658	337
Transmyocardial Laser Revascularization	2,921	3,208	2,497	2,387	2,033	2,011	1,755	1,723	1,482	298
Cardiac Trauma	238	293	291	335	297	287	280	289	262	59
Cardiac Transplant	858	978	1,031	1,121	1,226	1,367	1,356	1,387	1,535	300
Arrhythmia Correction Surgery	1,586	1,409	1,275	1,370	1,211	1,159	1,039	919	923	206
Atrial Fibrillation Correction Surgery	12,912	14,978	15,074	16,013	16,593	16,825	17,562	21,154	24,510	6,330
Aortic Aneurysm	8,437	9,553	10,138	11,734	13,127	13,947	12,880	11,734	12,362	2,992
Ascending Aorta	6,822	7,896	8,501	10,024	11,431	12,140	10,631	9,143	9,678	2,353
Aortic Arch	1,967	2,298	2,415	2,762	3,183	3,501	3,156	2,853	3,071	760
Descending Aorta	979	1,054	1,088	1,122	1,154	1,281	1,047	751	763	185
Thoracoabdominal Aorta	558	630	571	670	631	708	660	652	729	167
Carotid Endarterectomy	2,277	2,211	2,042	2,081	1,884	1,775	1,581	1,396	1,373	299
Other Vascular	1,296	1,365	1,199	1,470	1,566	1,500	1,381	1,249	1,285	315
Other Thoracic	1,635	1,631	1,605	1,795	1,663	1,663	1,554	1,596	1,626	363

Major Procedures Mortality
CABG, Valve, and Valve+CABG Procedures Combined[1]

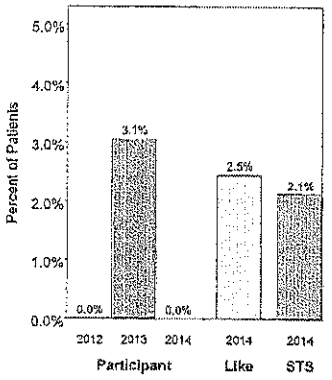
Participant 30397
STS Period Ending 03/31/2014

Duke Clinical Research Institute

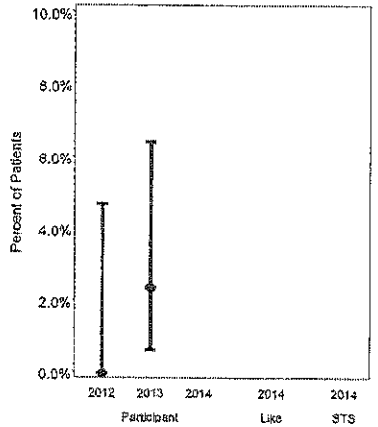
2014 is a partial year: Jan 2014 - Mar 2014

	Participant 30397			Like Group	STS
	2012	2013	2014	2014	2014
Number of Cases	76	98	19	21,168	47,909
Mortality Summary					
In-hospital Mortality	0.0%	3.1%	0.0%	2.5%	2.1%
Operative Mortality	0.0%	3.1%	0.0%	3.0%	2.6%
Mortality Risk-Adjustment[2]					
In-hospital Mortality					
Odds Ratio	0.78	1.15	-	-	-
Lower 95% Confidence Limit	0.36	0.53	-	-	-
Upper 95% Confidence Limit	1.72	2.47	-	-	-
O/E Ratio	0.00	1.21	-	-	-
Lower 95% Confidence Limit	0.00	0.33	-	-	-
Upper 95% Confidence Limit	2.29	3.27	-	-	-
Risk-adjusted Rate	0.0%	2.4%	-	-	-
Operative Mortality					
Odds Ratio	0.76	1.05	-	-	-
Lower 95% Confidence Limit	0.36	0.51	-	-	-
Upper 95% Confidence Limit	1.62	2.13	-	-	-
O/E Ratio	0.00	1.00	-	-	-
Lower 95% Confidence Limit	0.00	0.27	-	-	-
Upper 95% Confidence Limit	1.91	2.66	-	-	-
Risk-adjusted Rate	0.0%	2.4%	-	-	-

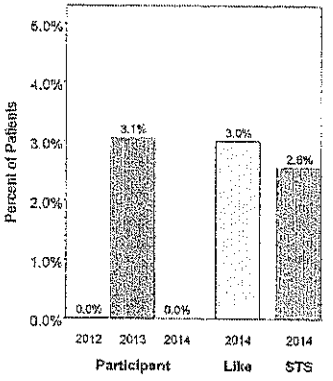
In-hospital Mortality
Observed rate



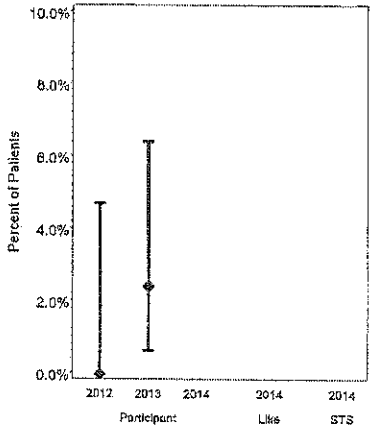
In-Hospital Mortality
Risk-adjusted rate + 95% CI



Operative Mortality
Observed rate



Operative Mortality
Risk-adjusted rate + 95% CI



[1]Does not include Mitral Valve Repairs or Mitral Valve Repairs + CABG
[2]Refer to the Report Overview for information on risk-adjustment methodology
Risk-adjustment is not performed on time periods of less than 6 months

Isolated CABG Procedures
Data Summary

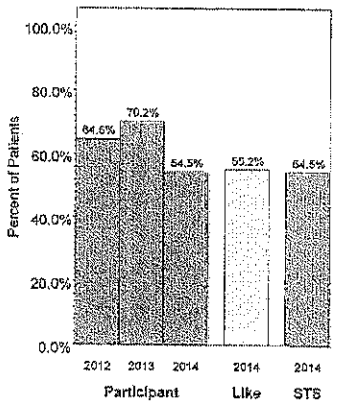
Participant 30397
STS Period Ending 03/31/2014

Duke Clinical Research Institute

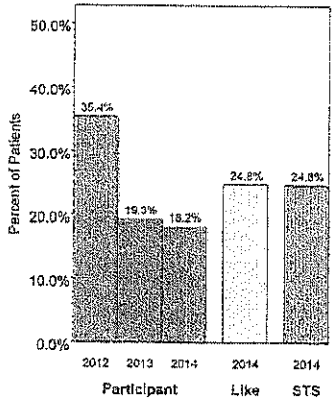
2014 is a partial year: Jan 2014 - Mar 2014

	Participant 30397			Like Group	STS
	2012	2013	2014	2014	2014
Number of Cases	48	57	11	15,538	34,020
Demographics					
Age (years)					
Mean	67.7	70.7	63.3	65.4	65.2
Median	68.5	71.0	66.0	66.0	66.0
25th Percentile	61.5	64.0	62.0	58.0	58.0
75th Percentile	75.5	80.0	69.0	73.0	73.0
Age >= 65 years old	64.6%	70.2%	54.5%	55.2%	54.5%
Gender, Female	35.4%	19.3%	18.2%	24.8%	24.8%
Missing	0.0%	0.0%	0.0%	0.1%	0.1%
Race[1]					
Caucasian	91.7%	96.5%	90.9%	85.0%	84.7%
Black	4.2%	3.5%	9.1%	7.0%	7.7%
Asian	0.0%	0.0%	0.0%	2.8%	2.8%
Native American	0.0%	0.0%	0.0%	0.8%	0.5%
Native Hawaiian/Pacific Islander	0.0%	0.0%	0.0%	0.5%	0.4%
Other	2.1%	0.0%	0.0%	3.5%	3.4%
Multiple Races	0.0%	0.0%	0.0%	0.9%	0.9%
Missing	2.1%	0.0%	0.0%	1.5%	1.4%
Hispanic or Latino Ethnicity	8.3%	5.3%	0.0%	7.2%	5.9%
Missing	0.0%	0.0%	0.0%	0.4%	0.5%
Body Mass Index[2]					
Underweight (BMI < 18.5)	0.0%	0.0%	0.0%	0.6%	0.6%
Normal (BMI 18.5 - 24.9)	16.7%	24.6%	18.2%	18.3%	18.4%
Overweight (BMI 25.0 - 29.9)	31.3%	35.1%	27.3%	36.5%	36.7%
Obese I (BMI 30.0 - 34.9)	27.1%	29.8%	36.4%	26.5%	26.5%
Obese II (BMI 35.0 - 39.9)	14.6%	5.3%	9.1%	11.7%	11.5%
Morbid Obesity (BMI 40.0+)	**10.4%**	5.3%	9.1%	6.0%	6.1%
Missing Height	0.0%	0.0%	0.0%	0.1%	0.1%
Missing Weight	0.0%	0.0%	0.0%	0.1%	0.1%

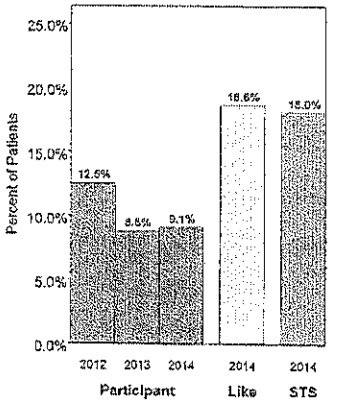
Age >= 65



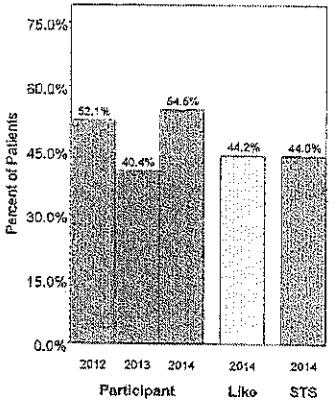
Gender, Female



Race, Non-Caucasian



Obesity (BMI 30+)



[1]Data presented in the report represent the individual response rates for each race category shown; summing the individual non-caucasian categories will not result in the same rates as shown in the graph since non-caucasian, as defined for the graph, does not include races or ethnicities reported in combination with caucasian

[2]BMI = Weight(kg) / Height(m)^2

Isolated CABG Procedures
Data Summary

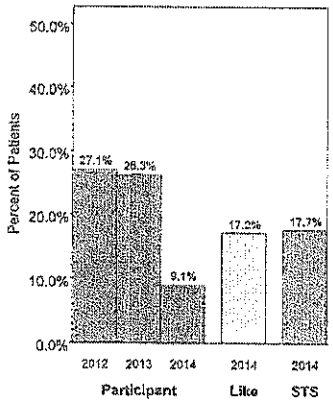
Participant 30397
STS Period Ending 03/31/2014

Duke Clinical Research Institute

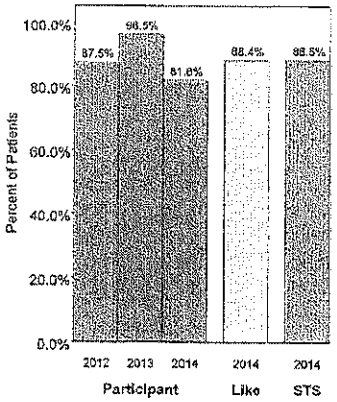
2014 is a partial year: Jan 2014 - Mar 2014

	Participant 30397			Like Group	STS
	2012	2013	2014	2014	2014
Comorbidities					
Diabetes Mellitus	50.0%	49.1%	54.5%	46.6%	46.9%
Diet Control	6.3%	3.5%	9.1%	2.6%	2.8%
Oral Control	14.6%	17.5%	36.4%	22.0%	21.5%
Insulin Control	27.1%	26.3%	9.1%	17.2%	17.7%
Other Control	0.0%	0.0%	0.0%	0.1%	0.1%
Missing Control	0.0%	0.0%	0.0%	0.1%	0.2%
Missing	0.0%	0.0%	0.0%	0.1%	0.1%
Hypertension	87.5%	**96.5%**	81.8%	88.4%	88.5%
Missing	0.0%	0.0%	0.0%	0.1%	0.1%
Dyslipidemia	91.7%	91.2%	81.8%	87.0%	87.2%
Missing	0.0%	0.0%	0.0%	0.1%	0.1%
Family History of CAD	43.8%	59.6%	27.3%	27.7%	25.6%
Missing	0.0%	0.0%	0.0%	0.4%	0.4%
Current/Recent Cigarette Smoker	16.7%	22.8%	45.5%	33.6%	31.6%
Missing	0.0%	0.0%	0.0%	0.2%	0.1%
Chronic Lung Disease					
Mild	6.3%	10.5%	0.0%	14.0%	13.8%
Moderate	12.5%	1.8%	0.0%	6.9%	6.3%
Severe	2.1%	1.8%	0.0%	4.8%	4.7%
Missing	0.0%	0.0%	0.0%	0.4%	0.3%
Congestive Heart Failure	2.1%	7.0%	**0.0%**	18.0%	19.3%
CHF / NYHA Class I[1]	0.0%	0.0%	0.0%	1.5%	1.9%
CHF / NYHA Class II	2.1%	0.0%	0.0%	4.5%	5.4%
CHF / NYHA Class III	0.0%	0.0%	0.0%	6.6%	6.8%
CHF / NYHA Class IV	0.0%	7.0%	0.0%	4.9%	4.8%
CHF / Missing Class	0.0%	0.0%	-	2.9%	2.6%
Missing	0.0%	0.0%	0.0%	0.3%	0.2%
Peripheral Arterial Disease	8.3%	7.0%	**0.0%**	14.3%	14.4%
Missing	0.0%	0.0%	0.0%	0.1%	0.1%

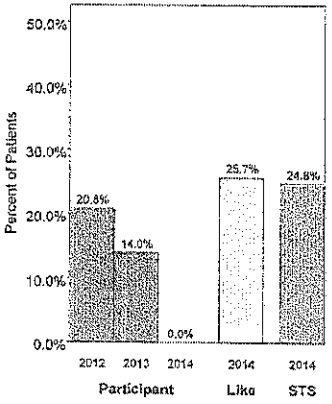
Diabetes, Insulin Dependent



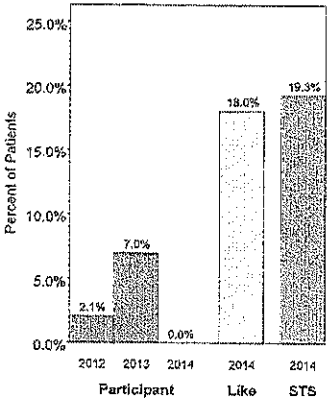
Hypertension



Chronic Lung Disease, Any



Congestive Heart Failure



[1]NYHA Class is only collected for patients with CHF
% represents proportion of cases that had both CHF and the indicated NYHA class

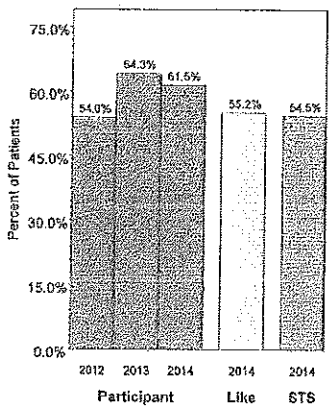
Isolated CABG Procedures
Data Summary

Participant 30398
STS Period Ending 03/31/2014

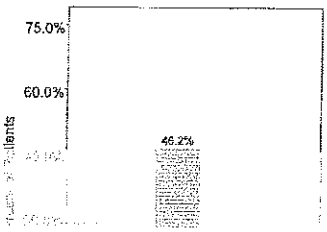
2014 is a partial year: Jan 2014 - Mar 2014

	Participant 30398			Like Group	STS
	2012	2013	2014	2014	2014
Number of Cases	50	42	13	15,538	34,020
Demographics					
Age (years)					
Mean	64.9	67.3	63.1	65.4	65.2
Median	65.0	67.5	65.0	66.0	66.0
25th Percentile	59.0	60.0	53.0	58.0	58.0
75th Percentile	71.0	74.0	68.0	73.0	73.0
Age >= 65 years old	54.0%	64.3%	61.5%	55.2%	54.5%
Gender, Female	36.0%	42.9%	23.1%	24.8%	24.8%
Missing	0.0%	0.0%	0.0%	0.1%	0.1%
Race[1]					
Caucasian	90.0%	92.9%	61.5%	85.0%	84.7%
Black	4.0%	2.4%	23.1%	7.0%	7.7%
Asian	0.0%	0.0%	0.0%	2.8%	2.8%
Native American	2.0%	0.0%	0.0%	0.8%	0.5%
Native Hawaiian/Pacific Islander	0.0%	0.0%	0.0%	0.5%	0.4%
Other	10.0%	7.1%	23.1%	3.5%	3.4%
Multiple Races	8.0%	2.4%	7.7%	0.9%	0.9%
Missing	2.0%	0.0%	0.0%	1.5%	1.4%
Hispanic or Latino Ethnicity	16.0%	9.5%	15.4%	7.2%	5.0%
Missing	0.0%	0.0%	0.0%	0.4%	0.5%

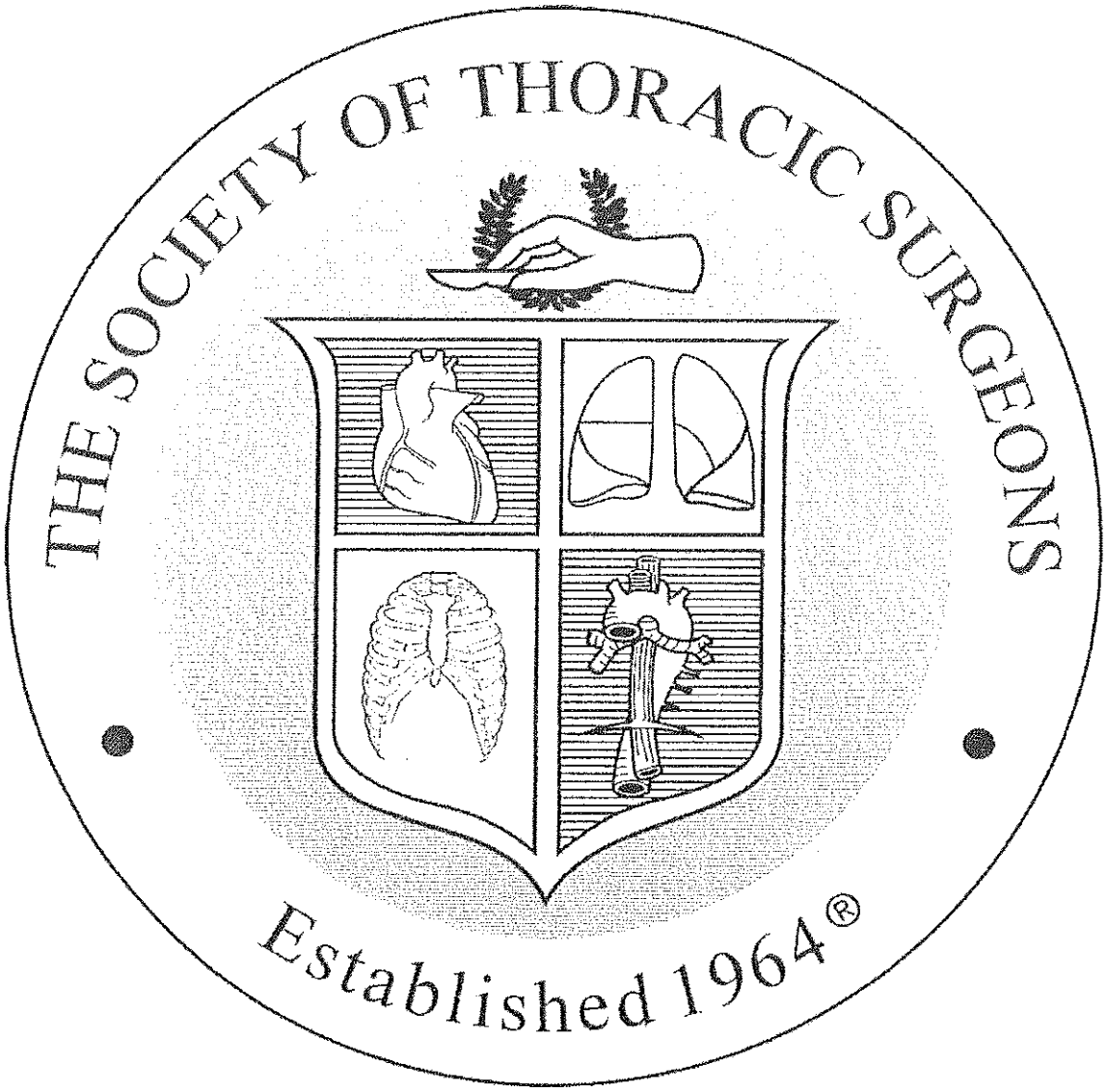
Age >= 65



Race, Non-Caucasian



DATA ANALYSES OF THE SOCIETY OF THORACIC SURGEONS NATIONAL ADULT CARDIAC SURGERY DATABASE



Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER

July 2014

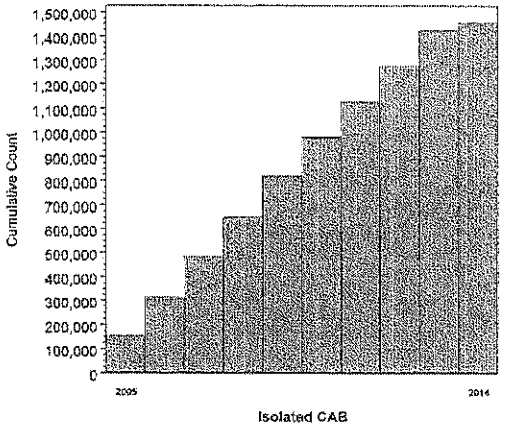
ST. MARY'S

Period Ending 03/31/2014

2014 is a partial year: Jan 2014 - Mar 2014

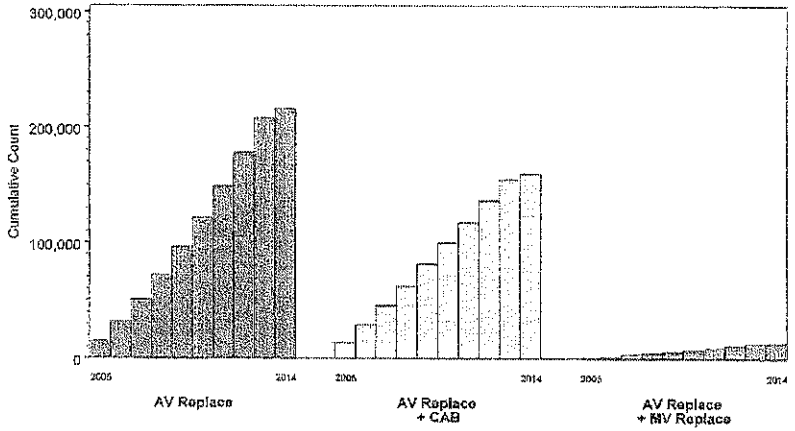
Number of Isolated CABG Procedures

Cumulative over last 10 years



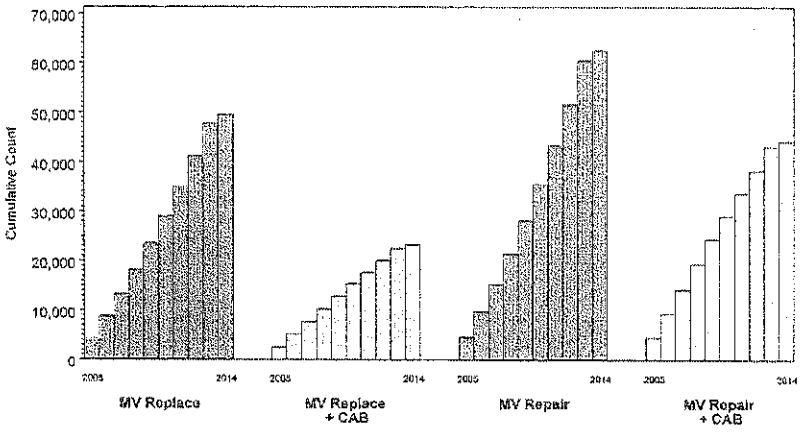
Number of Aortic Valve Procedures

Cumulative over last 10 years



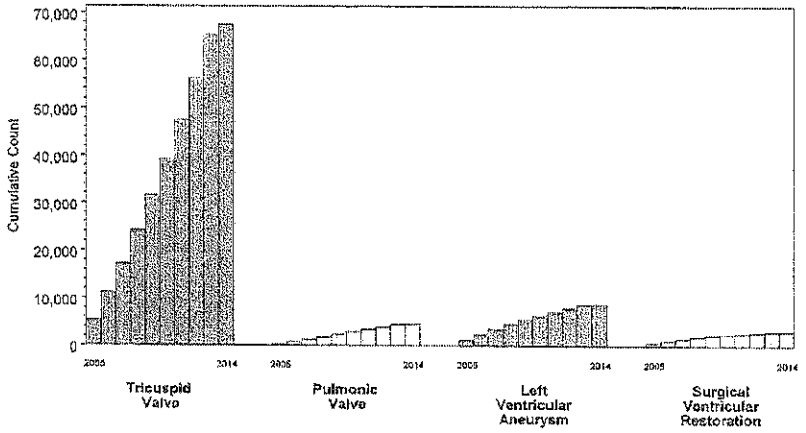
Number of Mitral Valve Procedures

Cumulative over last 10 years



Number of Selected Other Cardiac Procedures

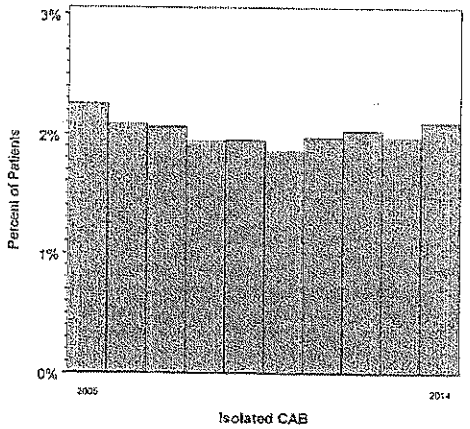
Cumulative over last 10 years



2014 is a partial year: Jan 2014 - Mar 2014

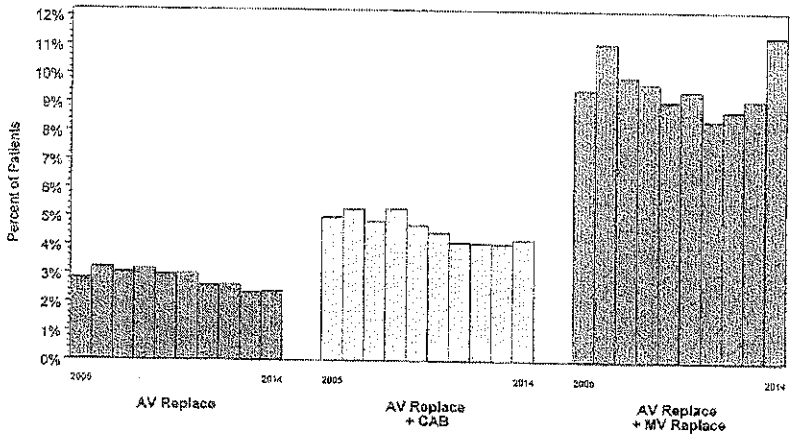
Unadjusted Isolated CABG Operative Mortality

Yearly over last 10 years



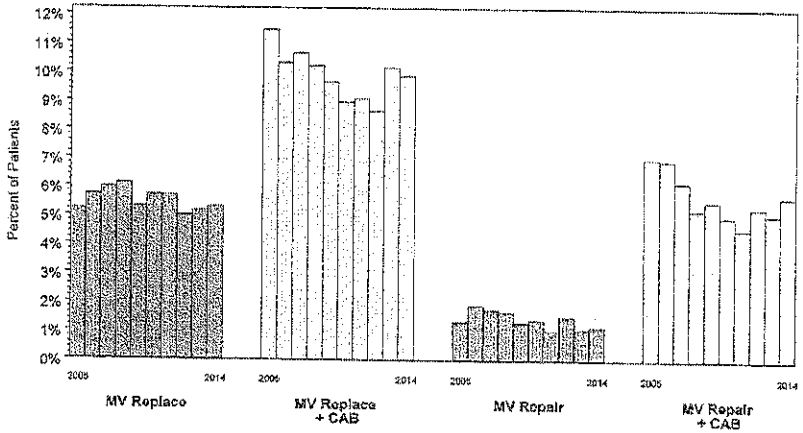
Unadjusted Aortic Valve Operative Mortality

Yearly over last 10 years



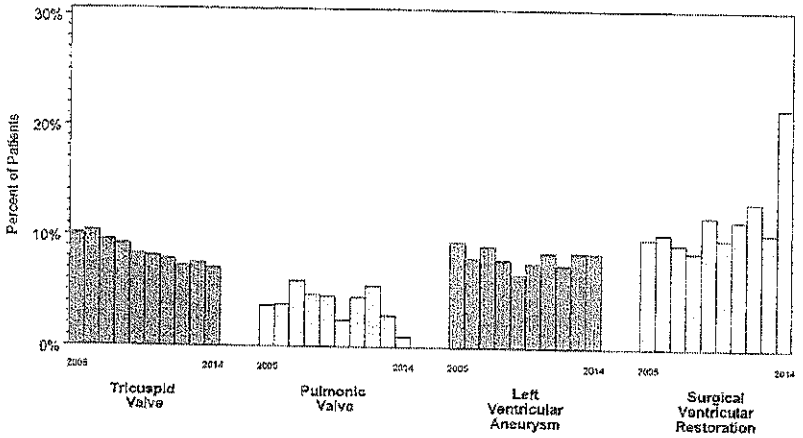
Unadjusted Mitral Valve Operative Mortality

Yearly over last 10 years



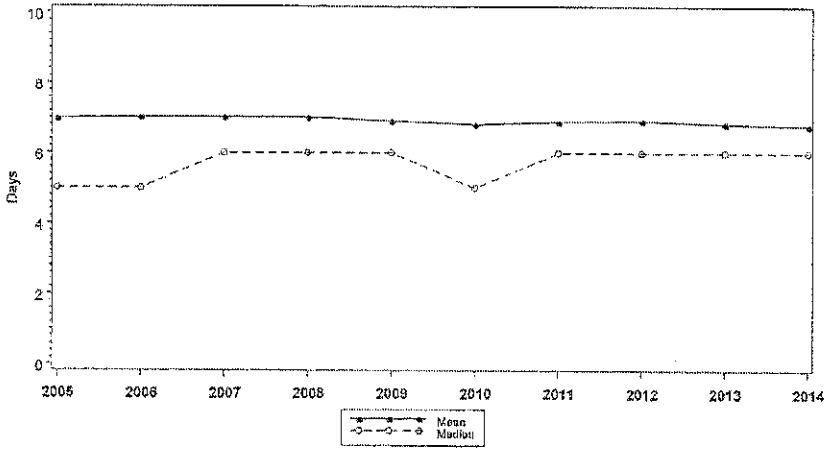
Unadjusted Other Cardiac Operative Mortality

Yearly over last 10 years

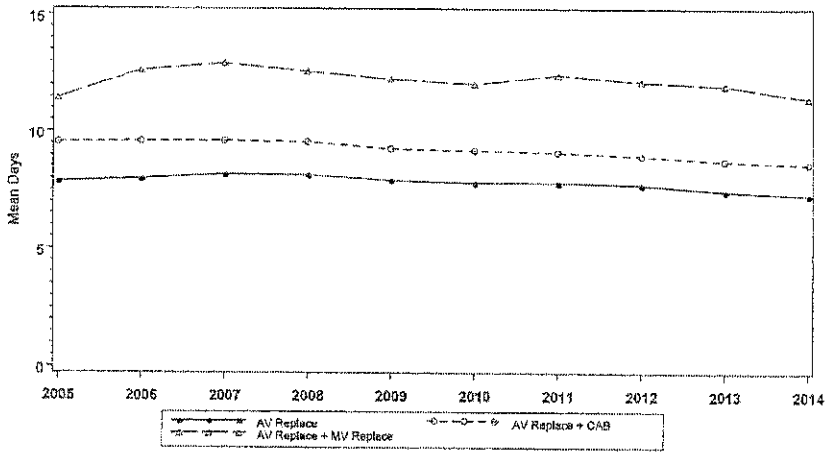


2014 is a partial year: Jan 2014 - Mar 2014

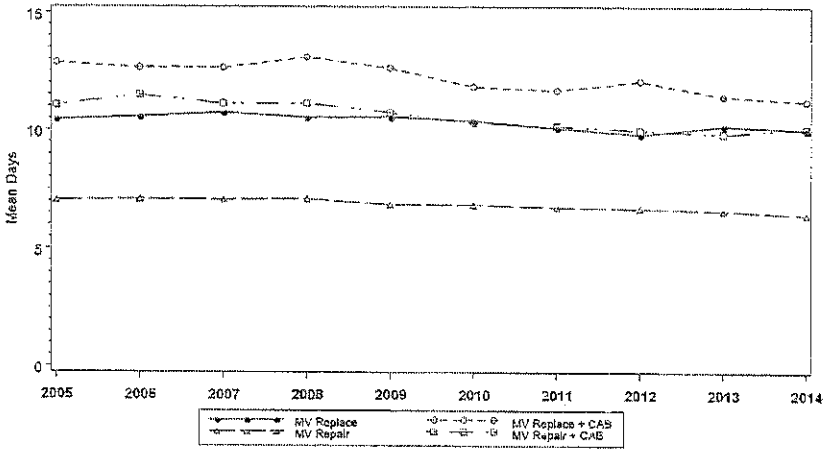
Post-Procedure LOS for Isolated CABG Procedures



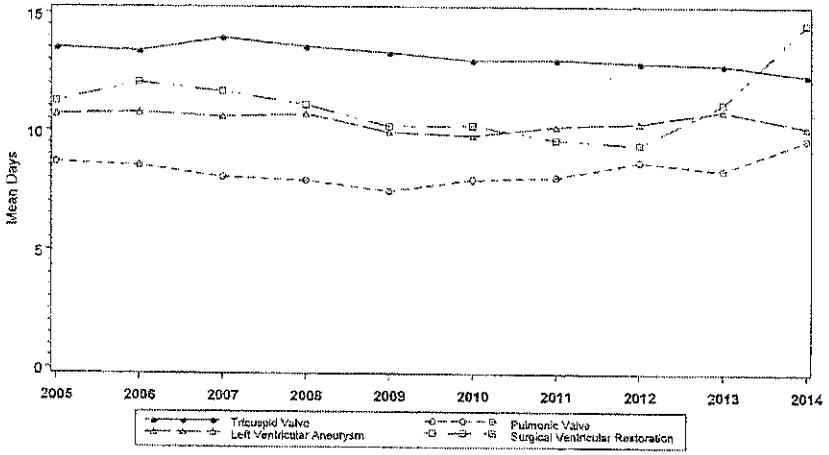
Post-Procedure LOS for Aortic Valve Procedures



Post-Procedure LOS for Mitral Valve Procedures



Post-Procedure LOS for Other Cardiac Procedures



2014 is a partial year: Jan 2014 - Mar 2014

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Yearly Number of Sites in Analysis	716	797	875	949	982	1,014	1,032	1,041	1,046	955
Yearly Overall Procedure Count	250,819	267,860	273,864	287,964	295,774	291,410	278,988	274,912	281,230	65,667
Major Procedures										
Isolated CABG	155,012	161,733	164,340	168,027	167,329	160,819	149,648	146,445	147,119	34,020
Isolated Aortic Valve Replacement	14,945	16,957	18,730	21,376	24,501	25,621	27,258	28,773	30,522	7,080
Isolated Mitral Valve Replacement	4,289	4,498	4,522	4,845	5,336	5,495	5,886	6,322	6,625	1,644
Aortic Valve Replacement + CABG	13,763	15,540	15,879	17,536	18,823	18,344	18,210	18,365	18,507	4,506
Mitral Valve Replacement + CABG	2,496	2,648	2,582	2,576	2,589	2,446	2,322	2,383	2,427	659
Aortic + Mitral Valve Replacements	1,032	1,163	1,285	1,317	1,503	1,468	1,610	1,662	1,766	422
Mitral Valve Repair	4,671	5,092	5,424	6,155	6,817	7,301	7,846	8,414	8,783	2,041
Mitral Valve Repair + CABG	4,518	4,838	4,854	5,177	4,898	4,759	4,596	4,706	4,780	1,127
Not Classified Above	50,093	55,391	56,248	60,955	63,978	65,157	61,612	57,842	60,701	14,168
Incidence of Other Procedures										
Pulmonic Valve	409	447	454	505	543	543	472	546	530	104
Tricuspid Valve	5,271	5,965	6,090	6,903	7,369	7,625	8,202	8,630	9,266	2,211
Ventricular Assist Device	1,010	1,134	1,198	1,512	1,863	2,434	3,203	3,539	4,067	912
LVA - Left Ventricular Aneurysm Repair	1,224	1,189	1,139	1,041	925	831	790	781	698	176
VSD - Ventricular Septal Defect Repair	566	618	575	634	625	637	672	700	642	138
ASD - Atrial Septal Defect Repair	2,826	3,158	3,372	3,940	4,285	4,230	4,686	5,193	5,348	1,285
Batista	19	38	47	47	34	42	17	-	-	-
Surgical Ventricular Restoration	597	515	436	404	303	193	208	197	202	46
Congenital Defect Repair	1,396	1,697	2,073	1,821	1,579	1,544	1,564	1,701	1,658	337
Transmyocardial Laser Revascularization	2,921	3,208	2,497	2,387	2,033	2,011	1,755	1,723	1,482	298
Cardiac Trauma	238	293	291	335	297	287	280	289	262	59
Cardiac Transplant	858	978	1,031	1,121	1,226	1,367	1,356	1,387	1,535	300
Arrhythmia Correction Surgery	1,586	1,409	1,275	1,370	1,211	1,159	1,039	919	923	206
Atrial Fibrillation Correction Surgery	12,912	14,978	15,074	16,013	16,593	16,825	17,562	21,154	24,510	6,330
Aortic Aneurysm	8,437	9,553	10,138	11,734	13,127	13,947	12,880	11,734	12,362	2,992
Ascending Aorta	6,822	7,896	8,501	10,024	11,431	12,140	10,631	9,143	9,678	2,353
Aortic Arch	1,967	2,298	2,415	2,762	3,183	3,501	3,156	2,853	3,071	760
Descending Aorta	979	1,054	1,088	1,122	1,154	1,281	1,047	751	763	185
Thoracoabdominal Aorta	558	630	571	670	631	708	660	652	729	167
Carotid Endarterectomy	2,277	2,211	2,042	2,081	1,884	1,775	1,581	1,396	1,373	299
Other Vascular	1,296	1,365	1,199	1,470	1,566	1,500	1,381	1,249	1,285	315
Other Thoracic	1,635	1,631	1,605	1,795	1,663	1,663	1,554	1,596	1,626	363

Major Procedures Mortality
CABG, Valve, and Valve+CABG Procedures Combined[1]

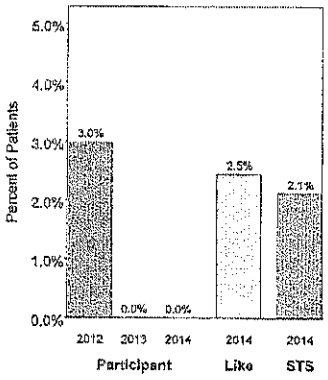
Participant 30398
STS Period Ending 03/31/2014

Duke Clinical Research Institute

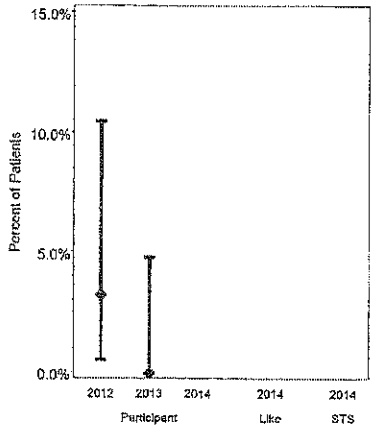
2014 is a partial year: Jan 2014 - Mar 2014

	Participant 30398			Like Group	STS
	2012	2013	2014	2014	2014
Number of Cases	67	65	27	21,168	47,909
Mortality Summary					
In-hospital Mortality	3.0%	0.0%	0.0%	2.5%	2.1%
Operative Mortality	3.0%	1.5%	0.0%	3.0%	2.6%
Mortality Risk-Adjustment[2]					
In-hospital Mortality					
Odds Ratio	1.10	0.78	-	-	-
Lower 95% Confidence Limit	0.51	0.33	-	-	-
Upper 95% Confidence Limit	2.38	1.83	-	-	-
O/E Ratio	1.58	0.00	-	-	-
Lower 95% Confidence Limit	0.27	0.00	-	-	-
Upper 95% Confidence Limit	5.10	2.45	-	-	-
Risk-adjusted Rate	3.3%	0.0%	-	-	-
Operative Mortality					
Odds Ratio	1.05	0.90	-	-	-
Lower 95% Confidence Limit	0.50	0.41	-	-	-
Upper 95% Confidence Limit	2.19	1.95	-	-	-
O/E Ratio	1.32	0.60	-	-	-
Lower 95% Confidence Limit	0.23	0.03	-	-	-
Upper 95% Confidence Limit	4.25	2.97	-	-	-
Risk-adjusted Rate	3.3%	1.5%	-	-	-

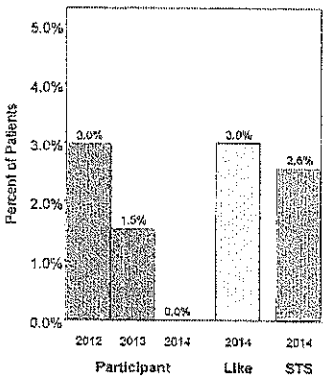
In-hospital Mortality
Observed rate



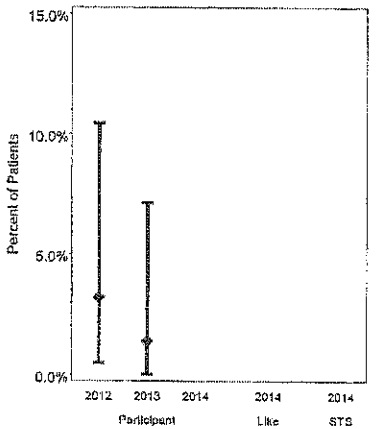
In-Hospital Mortality
Risk-adjusted rate + 95% CI



Operative Mortality
Observed rate



Operative Mortality
Risk-adjusted rate + 95% CI



[1]Does not include Mitral Valve Repairs or Mitral Valve Repairs + CABG
[2]Refer to the Report Overview for information on risk-adjustment methodology
Risk-adjustment is not performed on time periods of less than 6 months

Isolated CABG Procedures
Data Summary

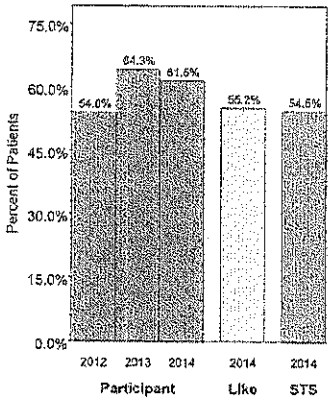
Participant 30398
STS Period Ending 03/31/2014

Duke Clinical Research Institute

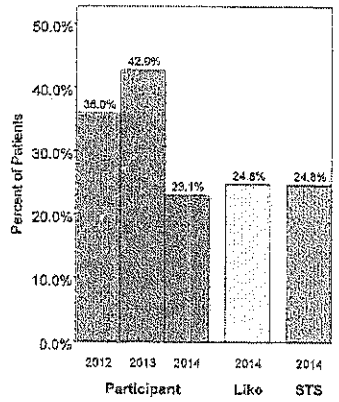
2014 is a partial year: Jan 2014 - Mar 2014

	Participant 30398			Like Group	STS
	2012	2013	2014	2014	2014
Number of Cases	50	42	13	15,538	34,020
Demographics					
Age (years)					
Mean	64.9	67.3	63.1	65.4	65.2
Median	65.0	67.5	65.0	66.0	66.0
25th Percentile	59.0	60.0	53.0	58.0	58.0
75th Percentile	71.0	74.0	68.0	73.0	73.0
Age >= 65 years old	54.0%	64.3%	61.5%	55.2%	54.5%
Gender, Female	36.0%	42.9%	23.1%	24.8%	24.8%
Missing	0.0%	0.0%	0.0%	0.1%	0.1%
Race[1]					
Caucasian	90.0%	92.9%	61.5%	85.0%	84.7%
Black	4.0%	2.4%	23.1%	7.0%	7.7%
Asian	0.0%	0.0%	0.0%	2.8%	2.8%
Native American	2.0%	0.0%	0.0%	0.8%	0.5%
Native Hawaiian/Pacific Islander	0.0%	0.0%	0.0%	0.5%	0.4%
Other	10.0%	7.1%	23.1%	3.5%	3.4%
Multiple Races	8.0%	2.4%	7.7%	0.9%	0.9%
Missing	2.0%	0.0%	0.0%	1.5%	1.4%
Hispanic or Latino Ethnicity	18.0%	9.5%	15.4%	7.2%	5.9%
Missing	0.0%	0.0%	0.0%	0.4%	0.5%
Body Mass Index[2]					
Underweight (BMI < 18.5)	2.0%	0.0%	0.0%	0.6%	0.6%
Normal (BMI 18.5 - 24.9)	26.0%	11.9%	46.2%	18.3%	18.4%
Overweight (BMI 25.0 - 29.9)	34.0%	28.6%	15.4%	36.5%	36.7%
Obese I (BMI 30.0 - 34.9)	6.0%	40.5%	30.8%	26.5%	26.5%
Obese II (BMI 35.0 - 39.9)	16.0%	4.8%	0.0%	11.7%	11.5%
Morbid Obesity (BMI 40.0+)	**14.0%**	**14.3%**	7.7%	6.0%	6.1%
Missing Height	2.0%	0.0%	0.0%	0.1%	0.1%
Missing Weight	2.0%	0.0%	0.0%	0.1%	0.1%

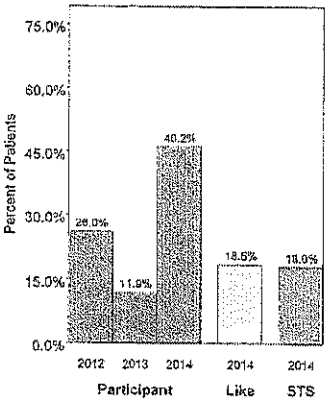
Age >= 65



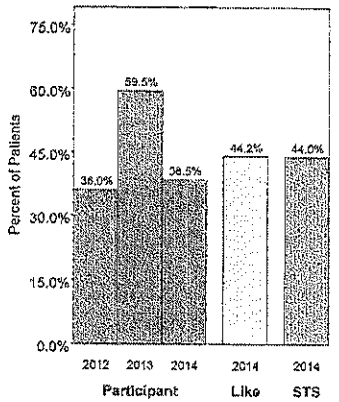
Gender, Female



Race, Non-Caucasian



Obesity (BMI 30+)



[1]Data presented in the report represent the individual response rates for each race category shown; summing the individual non-caucasian categories will not result in the same rates as shown in the graph since non-caucasian, as defined for the graph, does not include races or ethnicities reported in combination with caucasian

[2]BMI = Weight(kg) / Height(m)^2

HEART CENTER
of Greater Waterbury

RECEIVED
SEP 17 2015
Office of
HEALTHCARE ACCESS

Karen Roberts
Office of Health Care Access
410 Capital Avenue MS# 13 HCA
PO Box 340308
Hrrtford CT, 06134-0308

9-15-2015,

Re: Docket Number: 08-31202 CON The Waterbury Hospital and Saint Mary's Hospital Corporation, d/b/a Heart Center of Greater Waterbury and the University of Connecticut Health Center/ John Demsey Hospital

Dear Ms. Roberts,

Enclosed are the procedure and patient volume reports for Saint Mary's Hospital and Waterbury Hospital from July 18, 2014 through July 17, 2015.

The most recent ACC Executive Summaries from July, 2015 report for both Saint Mary's Hospital and Waterbury Hospital are enclosed.

The most recent STS Executive Summaries are also provided for both hospitals the latest report published.

If you have any questions, please feel free to contact me at 203-575-5560 or email me at kkniery@leevercancercenter.org.

Sincerely,

Kevin Kniery
Executive Director
Heart Center of Greater Waterbury
Enclosure

Saint Mary's Hospital

PCI Case Volume
7/18/2014 -7/17/2015

The following Code was used to determine PCI Volume:
0.66
PCI codes were not provided for attempted but failed PCI cases.

Dates	PCI Volume
7/18/2014-7/31/2015	9
08-2014	24
09-2014	16
10-2014	22
11-2014	20
12-2014	28
01-2015	25
02-2015	28
03-2015	25
04-2015	19
05-2015	31
06-2015	24
07/1/2015-7/17/2015	11
Total	**282**

Saint Mary's Hospital

PCI Patient Volume
7/18/2014-7/17/2015

Dates	Patient Total
7/18/2014 -7/31/2015	9
08-2014	24
09-2014	16
Oct-14	22
11-2014	20
12-2014	28
01-2015	25
02-2015	28
03-2015	25
04-2015	19
05-2015	31
06-2015	24
07/1/2015 -7/17/2015	11
Total	**282**

Saint Mary's Hospital

OHS Case Volume
7/18/2013 -7/17/2014

The following Codes were used to determine Open Heart Surgery Volume:

06.31 35.11 35.12 35.21
35.22 35.23 35.24 36.11
36.12 36.13 36.14 36.15
37.31 38.45

Dates	Open Heart Surgery Volume
7/18/2014 -7/31/2015	2
08-2014	10
09-2014	14
10-2014	15
11-2014	5
12-2014	8
01-2015	6
02-2015	13
03-2015	15
04-2015	14
05-2015	11
06-2015	18
07/1/2015 -7/17/2015	3
Total	**134**

Saint Mary's Hospital

OHS Patient Volume
7/18/2013-7/17/2014

Dates	Patient Total
7/18/2014-7/31/2015	2
08-2014	10
09-2014	14
10-2014	15
11-2014	5
12-2014	8
01-2015	6
02-2015	13
03-2015	15
04-2015	14
05-2015	11
06-2015	18
07/1/2015 -7/17/2015	3
Total	**134**

Waterbury Hospital

OHS Case Volume
7/18/2014-7/17/2015

The following Codes were used to determine Open Heart Surgery Volume:

06.31 35.11 35.12 35.21
35.22 35.23 35.24 36.11
36.12 36.13 36.14 36.15
37.31 38.45

Dates	Open Heart Surgery Volume
7/18/2014 -7/31/2014	8
08-2014	8
09-2014	8
10-2014	8
11-2014	8
12-2014	6
01-2015	4
02-2015	7
03-2015	6
04-2015	7
05-2015	5
06-2015	6
07/1/2015 -7/17/2015	5
Total	**86**

Waterbury Hospital

OHS Patient Volume
7/18/2014-7/17/2015

Dates	Patient Total
7/18/2014-7/31/2014	8
08-2014	8
09-2014	8
10-2014	8
11-2014	8
12-2014	6
01-2015	4
02-2015	7
03-2015	6
04-2015	7
05-2015	5
06-2015	6
07/1/2015 -7/17/2015	5
Total	**86**

Waterbury Hospital

PCI Case Volume
7/18/2014 -7/17/2015

The following Code was used to determine PCI Volume:
0.66
PCI codes were not provided for attempted but failed PCI cases.

Dates	PCI Volume
7/18/2014 -7/31/2014	9
08-2014	24
09-2014	32
10-2014	46
11-2014	20
12-2014	38
01-2015	21
02-2015	16
03-2015	31
04-2015	27
05-2015	36
Jun-15	24
07/1/2015 -7/17/2015	19
Total	**343**

Waterbury Hospital

PCI Patient Volume
7/18/2014 -7/17/2015

Dates	Patient Total
7/18/2014 -7/31/2014	9
08-2014	24
09-2014	32
10-2014	46
11-2014	20
12-2014	38
01-2015	21
02-2015	16
03-2015	31
04-2015	27
05-2015	36
06-2015	24
07/1/2015 -7/17/2015	19
Total	**343**

NCDR®
NATIONAL CARDIOVASCULAR DATA REGISTRY

CathPCI Registry®

Version 4.4

Institutional Outcomes Report
2015Q1

Saint Mary's Hospital
881416

Aggregation Date: Jun 30, 2015 11:59:59 PM

Publish Date: Jul 16, 2015

If User desires to publish or otherwise distribute or use, in whole or in part, any aggregate data or reports provided by ACCF, or produced in connection with or derived from NCDR, with the exception of strictly internal use within User's organization, User must first obtain the prior express written consent of ACCF. To the extent User is permitted to publish aggregate data, such aggregate data and any related information published in connection with it must be reviewed and approved by ACCF prior to publication.

National Cardiovascular Data Registry
CathPCI Registry®
800-257-4737
www.ncdr.com •ncdr@acc.org
©2010 American College of Cardiology Foundation

Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2015Q1

Section I: PCI Performance Measures

Endorsed by the National Quality Forum and appropriate for public reporting

PCI Performance Measures

Distribution of Hospital Performance

10th percentile — 90th percentile

Better →

1 **PCI in-hospital risk adjusted mortality (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
2.23	1.83	0.97

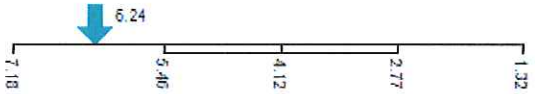
Your hospital's PCI in-hospital risk adjusted mortality rate for all patients adjusted using the NCDR® risk adjustment model. [Detail Line:2036]



37 **PCI in-hospital risk adjusted rate of bleeding events (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
6.24	4.12	1.32

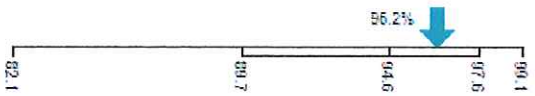
Your hospital's risk adjusted rate of bleeding events for patients with PCI procedures using the NCDR® PCI bleeding risk adjustment model. [Detail Line:1823]



38 **Composite: Discharge Medications in Eligible PCI Patients**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
96.2%	94.6%	99.1%

Patients with a PCI procedure who receive prescriptions for all medications (aspirin, P2Y12 inhibitor, and statin) for which they are eligible for at discharge. [Detail Line:2007]



Note

Performance measures in the CathPCI Registry® have been endorsed by the National Quality Forum. Such performance measures meeting the requirement for approval are intended not only for clinical quality improvement, but also may be considered for purposes of public reporting.

The "Registry Metrics" on the subsequent pages of this report are those measures that have been developed to support self assessment and quality improvement at the provider, hospital, and/or health care system level. While these metrics have not been formally developed by the American College of Cardiology/American Heart Association Task Force for Performance Measures Task Force, they may be identified as evolving measures worthy of consideration for further development into performance measures.

Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2015Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

PCI Process Metrics

Distribution of Hospital Performance

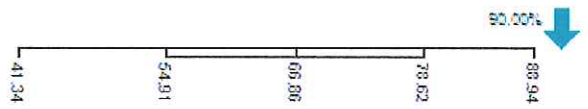
10th percentile — 90th percentile

Better →

2 **Proportion of elective PCIs with prior positive stress or imaging study**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
90.00%	66.86%	88.94%

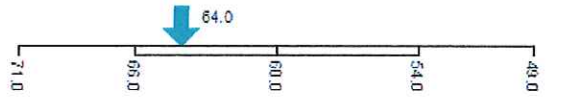
Proportion of elective PCI procedures (excluding patients with ACS) with an antecedent stress or imaging study with a positive result (suggestive of ischemia) or with a fractional flow reserve value of <=0.8 during the PCI procedure [Detail Line:1513]



3 **Median time to immediate PCI for STEMI patients (in minutes)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
64	60	49

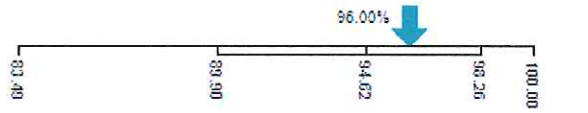
Your hospital's median time from hospital arrival to immediate PCI for STEMI patients in minutes. Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1502]



4 **Proportion of STEMI patients receiving immediate PCI w/in 90'**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
96.00%	94.62%	100.00%

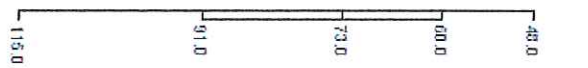
Proportion of STEMI patients with a time from your hospital arrival (or subsequent ECG if ST elevation first noted on subsequent ECG) to immediate PCI <=90'. Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1503]



5 **Median time from ED arrival at STEMI transferring facility to ED arrival at STEMI receiving facility among transferred patients.**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
	73	48

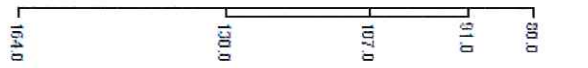
Your hospital's median time from arrival at transferring facility to ED arrival at STEMI receiving facility among transferred patients. [Detail Line:1505]



6 **Median time from ED arrival at STEMI transferring facility to immediate PCI at STEMI receiving facility among transferred patients (in minutes)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
	107	80

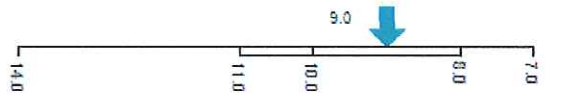
Your hospital's median time from arrival at referring facility to immediate PCI at STEMI receiving facility among transferred patients. Exclusions: Reasons for delay does not equal none. [Detail Line:1506]



7 **Median fluoro time (in minutes)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
9	10	7

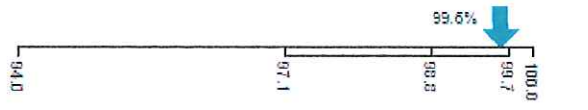
Inclusion criteria: PCI of one vessel/lesion. Exclusion criteria: Prior CABG, or "other" procedure during the same lab visit; PCI of >1 vessel/lesion. [Detail Line:1633]



8 **Proportion of patients with aspirin prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
99.6%	98.8%	100.0%

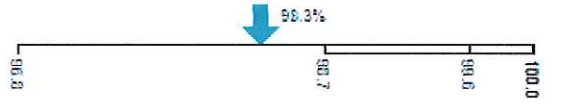
Proportion of patients (without a documented contraindication) with aspirin prescribed at discharge. [Detail Line:1997]



9 **Proportion of patients with a P2Y12 inhibitor prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
98.3%	99.6%	100.0%

Proportion of patients (without a documented contraindication) with a stent implanted that had a thienopyridine/P2Y12 inhibitor prescribed at discharge. [Detail Line:2006]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2015 11:59:59 PM
Publish Date: Jul 16, 2015

Executive Summary

CathPCI Registry®

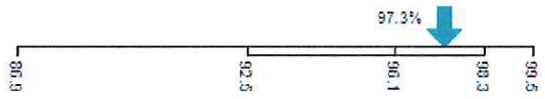
Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2015Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

10 **Statins prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
97.3%	96.1%	99.5%

Proportion of patients (without a documented contraindication) prescribed a statin at discharge. [Detail Line:2002]



PCI Outcome Metrics

Distribution of Hospital Performance

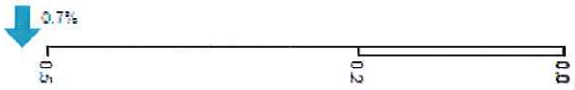
10th percentile — 90th percentile

Better →

12 **Emergency CABG post PCI**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.7%	0.0%	0.0%

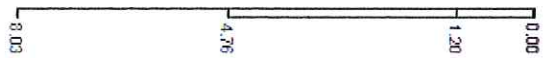
Proportion of PCI patients with post procedure Emergency CABG. [Detail Line:1980]



13 **Proportion of PCI procedures with a post procedure MI (among hospitals routinely collecting post-PCI biomarkers)****

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
	1.20%	0.00%

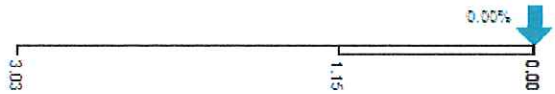
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with >= 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1803]



14 **Proportion of PCI procedures with post procedure MI (among hospitals who do not routinely collect post-PCI biomarkers)****

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.00%	0.00%	0.00%

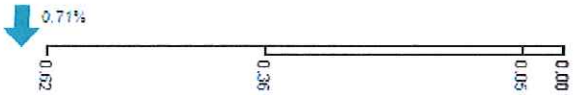
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with < 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1804]



16 **Proportion of PCI procedures with post procedure stroke**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.71%	0.05%	0.00%

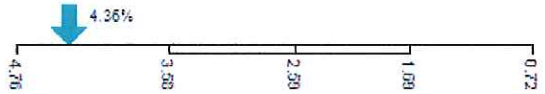
Your hospital's proportion of patients with stroke post procedure. [Detail Line:1811]



17 **Composite: Proportion of PCI patients with death, emergency CABG, stroke or repeat target vessel revascularization.**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
4.36%	2.59%	0.72%

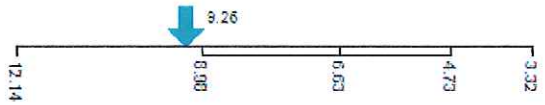
Your hospital's proportion of patients with death, emergency CABG, stroke or repeat target vessel revascularization post procedure up to hospital discharge. Excludes patients with stroke and an elective, urgent or salvage CABG during same admission. [Detail Line:1801]



18 **PCI in-hospital risk adjusted mortality (patients with STEMI)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
9.26	6.63	3.32

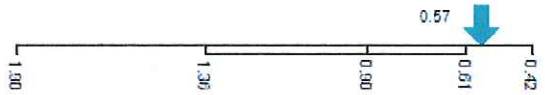
Your hospital's PCI in-hospital risk adjusted mortality rate for patients with STEMI adjusted using the NCDR® risk adjustment model. [Detail Line:2045]



19 **PCI in-hospital risk adjusted mortality (STEMI patients excluded)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.57	0.90	0.42

Your hospital's PCI in-hospital risk adjusted mortality rate for patients with other diagnoses (not STEMI) using the NCDR® risk adjustment model. [Detail Line:2054]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2015 11:59:59 PM
Publish Date: Jul 16, 2015

Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2015Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

25 **Proportion of PCI procedures with transfusion of whole blood or RBCs**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
3.23%	1.06%	0.00%

Proportion of patients who received a transfusion of whole blood or red blood cells after a PCI procedure. Inclusion: Patients with a pre-procedure hemoglobin >8 g/dL and patients with no CABG, and no other major surgery during the same admission. [Detail Line:1853]



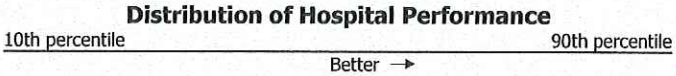
39 **PCI in-hospital risk adjusted acute kidney injury (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
5.78	6.39	3.05

Your hospital's PCI in-hospital risk adjusted AKI rate for all patients adjusted using the NCDR® risk adjustment model. [Detail Line:1960]



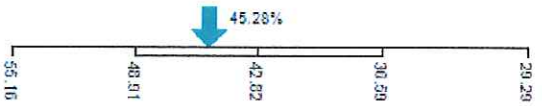
Diagnostic Cath Process Metrics



20 **Incidence of non-obstructive CAD (elective patients only)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
45.28%	42.82%	29.29%

Patients with an elective diagnostic cath and coronary angiography with all native coronary territories <50% Exclusions: Patients with prior CABG, cardiac transplant evaluation; pre-op evaluation for non-cardiac surgery and diagnostic cath treatment recommendation of "other cardiac therapy without CABG or PCI". [Detail Line:1252]



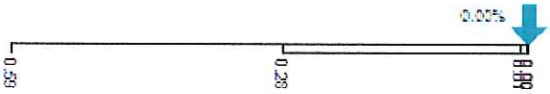
Diagnostic Cath Outcomes Metrics



21 **Proportion of Diagnostic Catheterization procedures with vascular access site injury requiring treatment or major bleeding***

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.00%	0.01%	0.00%

Your hospital's proportion of patients with major access site related injury requiring treatment or major bleeding. [Detail Line:1301]



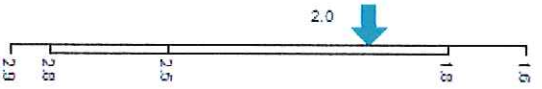
Utilization Metrics



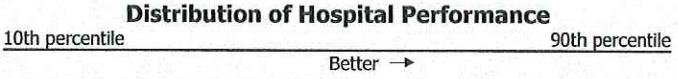
22 **Median post-procedure length of stay (in days) for PCI patients with STEMI**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
2.0	2.5	1.6

Your hospital's median post-procedure length of stay (in days) for PCI patients with STEMI. [Detail Line:2110]



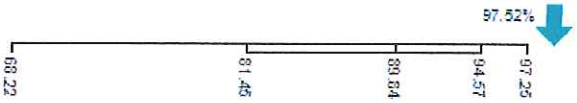
Data Quality Metrics



24 **Proportion of PCI procedures with creatinine assessed pre and post PCI**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
97.52%	89.84%	97.25%

Proportion of PCI patients with creatinine assessed pre and post procedure. Exclusions: LOS<1 day and death in lab. [Detail Line:1951]



26 **Proportion of PCI procedures with biomarkers assessed post-PCI for elective inpatients**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
11.5%	24.0%	90.1%

Proportion of elective procedures with biomarkers assessed post PCI. Exclusions: LOS<1 day, or hospital status=outpatient, or death in lab. [Detail



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Executive Summary

CathPCI Registry®

Saint Mary's Hospital(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2015Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

Line:1949]	

Executive Summary

CathPCI Registry®

(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending

Section III: PCI Appropriate Use Criteria (AUC) Metrics – These data are based upon the 2012 Appropriateness Criteria for Coronary Revascularization Focused Update (J Am Coll Cardiol 2012 59: 857-881) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level.PCI AUC metrics are not appropriate for public/external reporting

PCI Appropriate Use Criteria (AUC) Metrics

Distribution of Hospital Performance

10th percentile — 90th percentile

Better →

30 **Proportion of PCI procedures not classifiable for AUC reporting**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
5.57%	3.58%	0.25%

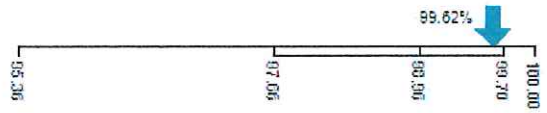
Proportion of PCI procedures that were not classifiable/evaluated for PCI AUC reporting due to incomplete or missing data. [Detail Line:1589]



31 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were appropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
99.62%	98.96%	100.00%

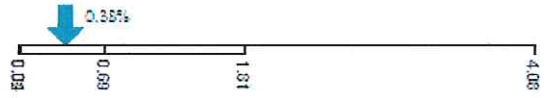
Proportion of PCI procedures that were evaluated as "Appropriate", among patients with ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1581]



32 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were of uncertain appropriateness**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.38%	0.69%	4.08%

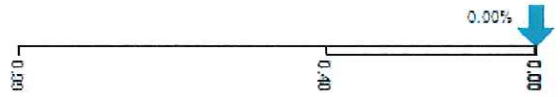
Proportion of PCI procedures that were evaluated as "Uncertain", among patients with ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1582]



33 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.00%	0.00%	0.00%

Proportion of PCI procedures that were evaluated as "Inappropriate", among patients with ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1583]



34 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were appropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
54.55%	50.53%	78.13%

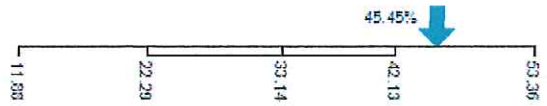
Proportion of PCI procedures that were evaluated as "Appropriate", among patients without ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1585]



35 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were of uncertain appropriateness**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
45.45%	33.14%	53.36%

Proportion of PCI procedures that were evaluated as "Uncertain", among patients without ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1586]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2015 11:59:59 PM
Publish Date: Jul 16, 2015

Executive Summary

CathPCI Registry®

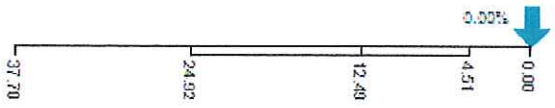
(881416) compared to Rolling Four Quarters (R4Q) for US Hospitals ending

Section III: PCI Appropriate Use Criteria (AUC) Metrics – These data are based upon the 2012 Appropriateness Criteria for Coronary Revascularization Focused Update (J Am Coll Cardiol 2012 59: 857-881) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level.PCI AUC metrics are not appropriate for public/external reporting

36 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.00%	12.49%	0.00%

Proportion of PCI procedures that were evaluated as "Inappropriate", among patients without ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1587]



Executive Summary Footnotes

*Vascular access site injury requiring treatment or major bleeding is defined as:

1.Bleeding at access site, hematoma at access site, or retroperitoneal bleed that occur within 72 hours of the procedure. To qualify, the event must be associated with a hemoglobin drop of >= 3 g/dL; transfusion of whole or packed red blood cells, or a procedural intervention/surgery at the bleeding site to reverse/stop or correct the bleeding. This excludes "GI", "GU" and "Other" bleeds.

2.Major access site related injury requiring treatment includes access site occlusion, peripheral embolization, dissection, pseudoaneurysm, AV fistula requiring treatment anytime from the procedure until discharge.

**Your rate of post procedure MI cannot be reported if you only collected cardiac biomarkers on <90% of your patients who were in the hospital >=1 day.

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2015 11:59:59 PM
Publish Date: Jul 16, 2015

NCDR®
NATIONAL CARDIOVASCULAR DATA REGISTRY

CathPCI Registry®

Version 4.4

Institutional Outcomes Report
2015Q1

Waterbury Hospital
841765

Aggregation Date: Jun 30, 2015 11:59:59 PM

Publish Date: Jul 15, 2015

If User desires to publish or otherwise distribute or use, in whole or in part, any aggregate data or reports provided by ACCF, or produced in connection with or derived from NCDR, with the exception of strictly internal use within User's organization, User must first obtain the prior express written consent of ACCF. To the extent User is permitted to publish aggregate data, such aggregate data and any related information published in connection with it must be reviewed and approved by ACCF prior to publication.

National Cardiovascular Data Registry
CathPCI Registry®
800-257-4737
www.ncdr.com •ncdr@acc.org
©2010 American College of Cardiology Foundation

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2015Q1

Section I: PCI Performance Measures

Endorsed by the National Quality Forum and appropriate for public reporting

PCI Performance Measures

Distribution of Hospital Performance

10th percentile — 90th percentile

Better →

1 **PCI in-hospital risk adjusted mortality (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
1.13	1.83	0.97

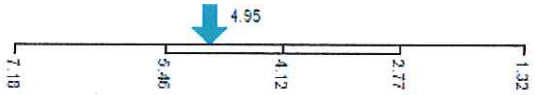
Your hospital's PCI in-hospital risk adjusted mortality rate for all patients adjusted using the NCDR® risk adjustment model. [Detail Line:2036]



37 **PCI in-hospital risk adjusted rate of bleeding events (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
4.95	4.12	1.32

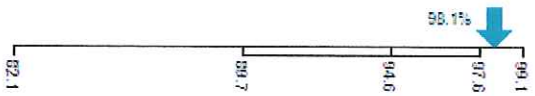
Your hospital's risk adjusted rate of bleeding events for patients with PCI procedures using the NCDR® PCI bleeding risk adjustment model. [Detail Line:1823]



38 **Composite: Discharge Medications in Eligible PCI Patients**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
98.1%	94.6%	99.1%

Patients with a PCI procedure who receive prescriptions for all medications (aspirin, P2Y12 inhibitor, and statin) for which they are eligible for at discharge. [Detail Line:2007]



Note

Performance measures in the CathPCI Registry® have been endorsed by the National Quality Forum. Such performance measures meeting the requirement for approval are intended not only for clinical quality improvement, but also may be considered for purposes of public reporting.

The "Registry Metrics" on the subsequent pages of this report are those measures that have been developed to support self assessment and quality improvement at the provider, hospital, and/or health care system level. While these metrics have not been formally developed by the American College of Cardiology/American Heart Association Task Force for Performance Measures Task Force, they may be identified as evolving measures worthy of consideration for further development into performance measures.

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2015 11:59:59 PM
Publish Date: Jul 15, 2015

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2015Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

PCI Process Metrics

Distribution of Hospital Performance

10th percentile — 90th percentile

Better →

2 **Proportion of elective PCIs with prior positive stress or imaging study**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
65.22%	66.86%	88.94%

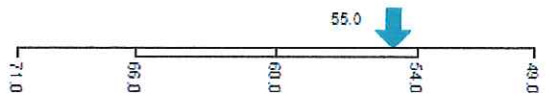
Proportion of elective PCI procedures (excluding patients with ACS) with an antecedent stress or imaging study with a positive result (suggestive of ischemia) or with a fractional flow reserve value of <=0.8 during the PCI procedure [Detail Line:1513]



3 **Median time to immediate PCI for STEMI patients (in minutes)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
55	60	49

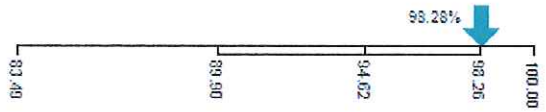
Your hospital's median time from hospital arrival to immediate PCI for STEMI patients in minutes. Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1502]



4 **Proportion of STEMI patients receiving immediate PCI w/in 90'**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
98.28%	94.62%	100.00%

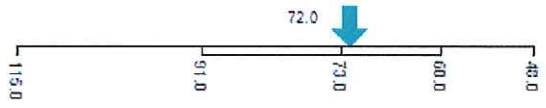
Proportion of STEMI patients with a time from your hospital arrival (or subsequent ECG if ST elevation first noted on subsequent ECG) to immediate PCI <=90'. Exclusions: Patients transferred in from another acute care facility; Reasons for delay does not equal none. [Detail Line:1503]



5 **Median time from ED arrival at STEMI transferring facility to ED arrival at STEMI receiving facility among transferred patients.**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
72	73	48

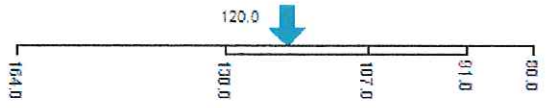
Your hospital's median time from arrival at transferring facility to ED arrival at STEMI receiving facility among transferred patients. [Detail Line:1505]



6 **Median time from ED arrival at STEMI transferring facility to immediate PCI at STEMI receiving facility among transferred patients (in minutes)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
120	107	80

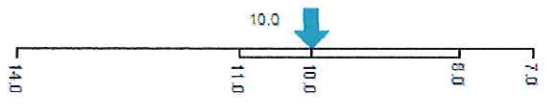
Your hospital's median time from arrival at referring facility to immediate PCI at STEMI receiving facility among transferred patients. Exclusions: Reasons for delay does not equal none. [Detail Line:1506]



7 **Median fluoro time (in minutes)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
10	10	7

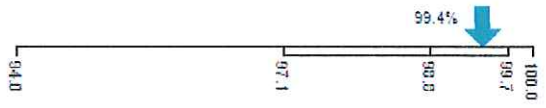
Inclusion criteria: PCI of one vessel/lesion. Exclusion criteria: Prior CABG, or "other" procedure during the same lab visit; PCI of >1 vessel/lesion. [Detail Line:1633]



8 **Proportion of patients with aspirin prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
99.4%	98.8%	100.0%

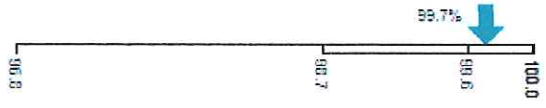
Proportion of patients (without a documented contraindication) with aspirin prescribed at discharge. [Detail Line:1997]



9 **Proportion of patients with a P2Y12 inhibitor prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
99.7%	99.6%	100.0%

Proportion of patients (without a documented contraindication) with a stent implanted that had a thienopyridine/P2Y12 inhibitor prescribed at discharge. [Detail Line:2006]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Executive Summary

CathPCI Registry®

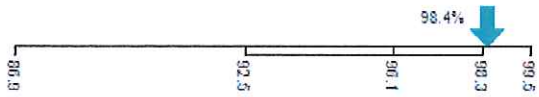
Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2015Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

10 **Statins prescribed at discharge**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
98.4%	96.1%	99.5%

Proportion of patients (without a documented contraindication) prescribed a statin at discharge. [Detail Line:2002]



PCI Outcome Metrics

Distribution of Hospital Performance

10th percentile — 90th percentile

Better →

12 **Emergency CABG post PCI**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.3%	0.0%	0.0%

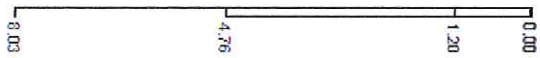
Proportion of PCI patients with post procedure Emergency CABG. [Detail Line:1980]



13 **Proportion of PCI procedures with a post procedure MI (among hospitals routinely collecting post-PCI biomarkers)****

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
	1.20%	0.00%

Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with >= 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1803]



14 **Proportion of PCI procedures with post procedure MI (among hospitals who do not routinely collect post-PCI biomarkers)****

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.00%	0.00%	0.00%

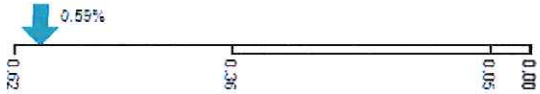
Your hospital's proportion of biomarker positive, post procedure myocardial infarction. Inclusions: Submissions with < 90% of pts with biomarkers coded; LOS>=1; Elective patients [Detail Line:1804]



16 **Proportion of PCI procedures with post procedure stroke**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.59%	0.05%	0.00%

Your hospital's proportion of patients with stroke post procedure. [Detail Line:1811]



17 **Composite: Proportion of PCI patients with death, emergency CABG, stroke or repeat target vessel revascularization.**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
3.05%	2.59%	0.72%

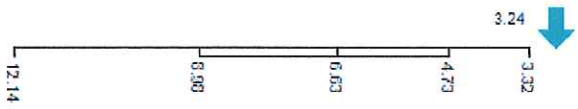
Your hospital's proportion of patients with death, emergency CABG, stroke or repeat target vessel revascularization post procedure up to hospital discharge. Excludes patients with stroke and an elective, urgent or salvage CABG during same admission. [Detail Line:1801]



18 **PCI in-hospital risk adjusted mortality (patients with STEMI)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
3.24	6.63	3.32

Your hospital's PCI in-hospital risk adjusted mortality rate for patients with STEMI adjusted using the NCDR® risk adjustment model. [Detail Line:2045]



19 **PCI in-hospital risk adjusted mortality (STEMI patients excluded)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.68	0.90	0.42

Your hospital's PCI in-hospital risk adjusted mortality rate for patients with other diagnoses (not STEMI) using the NCDR® risk adjustment model. [Detail Line:2054]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2015 11:59:59 PM
Publish Date: Jul 15, 2015

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2015Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

25 **Proportion of PCI procedures with transfusion of whole blood or RBCs**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.59%	1.06%	0.00%

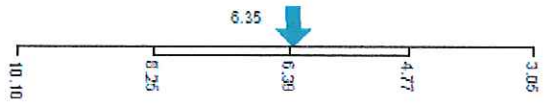
Proportion of patients who received a transfusion of whole blood or red blood cells after a PCI procedure. Inclusion: Patients with a pre-procedure hemoglobin >8 g/dL and patients with no CABG, and no other major surgery during the same admission. [Detail Line:1853]



39 **PCI in-hospital risk adjusted acute kidney injury (all patients)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
6.35	6.39	3.05

Your hospital's PCI in-hospital risk adjusted AKI rate for all patients adjusted using the NCDR® risk adjustment model. [Detail Line:1960]



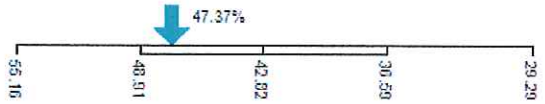
Diagnostic Cath Process Metrics



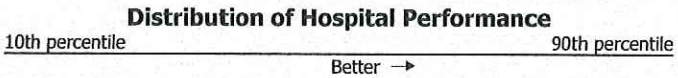
20 **Incidence of non-obstructive CAD (elective patients only)**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
47.37%	42.82%	29.29%

Patients with an elective diagnostic cath and coronary angiography with all native coronary territories <50% Exclusions: Patients with prior CABG, cardiac transplant evaluation; pre-op evaluation for non-cardiac surgery and diagnostic cath treatment recommendation of "other cardiac therapy without CABG or PCI". [Detail Line:1252]



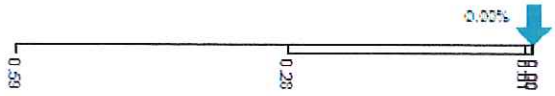
Diagnostic Cath Outcomes Metrics



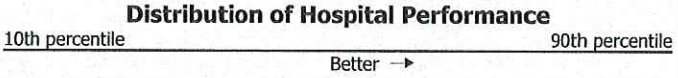
21 **Proportion of Diagnostic Catheterization procedures with vascular access site injury requiring treatment or major bleeding***

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.00%	0.01%	0.00%

Your hospital's proportion of patients with major access site related injury requiring treatment or major bleeding. [Detail Line:1301]



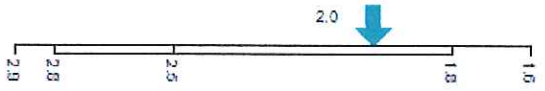
Utilization Metrics



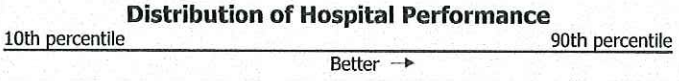
22 **Median post-procedure length of stay (in days) for PCI patients with STEMI**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
2.0	2.5	1.6

Your hospital's median post-procedure length of stay (in days) for PCI patients with STEMI. [Detail Line:2110]



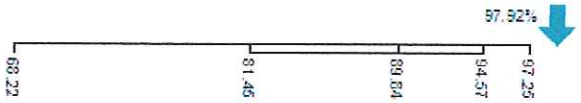
Data Quality Metrics



24 **Proportion of PCI procedures with creatinine assessed pre and post PCI**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
97.92%	89.84%	97.25%

Proportion of PCI patients with creatinine assessed pre and post procedure. Exclusions: LOS<1 day and death in lab. [Detail Line:1951]



26 **Proportion of PCI procedures with biomarkers assessed post-PCI for elective inpatients**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
22.2%	24.0%	90.1%

Proportion of elective procedures with biomarkers assessed post PCI. Exclusions: LOS<1 day, or hospital status=outpatient, or death in lab. [Detail



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2015 11:59:59 PM
Publish Date: Jul 15, 2015

Executive Summary

CathPCI Registry®

Waterbury Hospital(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending 2015Q1

Section II: Quality Metrics – to support self assessment and quality improvement at the provider, hospital, and/or health care system level.

Line:1949]	

Executive Summary

CathPCI Registry®

(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending

Section III: PCI Appropriate Use Criteria (AUC) Metrics – These data are based upon the 2012 Appropriateness Criteria for Coronary Revascularization Focused Update (J Am Coll Cardiol 2012 59: 857-881) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level.PCI AUC metrics are not appropriate for public/external reporting

PCI Appropriate Use Criteria (AUC) Metrics

Distribution of Hospital Performance

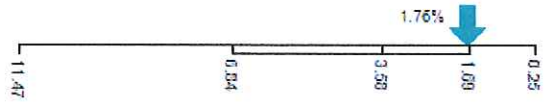
10th percentile — 90th percentile

Better →

30 **Proportion of PCI procedures not classifiable for AUC reporting**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
1.76%	3.58%	0.25%

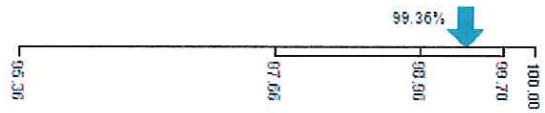
Proportion of PCI procedures that were not classifiable/evaluated for PCI AUC reporting due to incomplete or missing data. [Detail Line:1589]



31 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were appropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
99.36%	98.96%	100.00%

Proportion of PCI procedures that were evaluated as "Appropriate", among patients with ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1581]



32 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were of uncertain appropriateness**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.32%	0.69%	4.08%

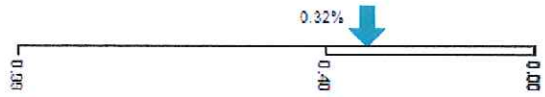
Proportion of PCI procedures that were evaluated as "Uncertain", among patients with ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1582]



33 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
0.32%	0.00%	0.00%

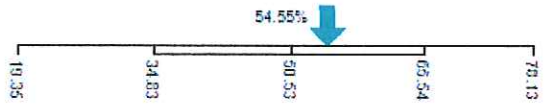
Proportion of PCI procedures that were evaluated as "Inappropriate", among patients with ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1583]



34 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were appropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
54.55%	50.53%	78.13%

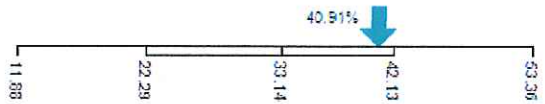
Proportion of PCI procedures that were evaluated as "Appropriate", among patients without ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1585]



35 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were of uncertain appropriateness**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
40.91%	33.14%	53.36%

Proportion of PCI procedures that were evaluated as "Uncertain", among patients without ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1586]



©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2015 11:59:59 PM
Publish Date: Jul 15, 2015

Executive Summary

CathPCI Registry®

(841765) compared to Rolling Four Quarters (R4Q) for US Hospitals ending

Section III: PCI Appropriate Use Criteria (AUC) Metrics – These data are based upon the 2012 Appropriateness Criteria for Coronary Revascularization Focused Update (J Am Coll Cardiol 2012 59: 857-881) document developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies. These metrics are designed to provide sites feedback on the appropriateness of percutaneous coronary intervention procedures at the hospital level.PCI AUC metrics are not appropriate for public/external reporting

36 **Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
4.55%	12.49%	0.00%

Proportion of PCI procedures that were evaluated as "Inappropriate", among patients without ACS, meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival. [Detail Line:1587]



Executive Summary Footnotes

*Vascular access site injury requiring treatment or major bleeding is defined as:

1.Bleeding at access site, hematoma at access site, or retroperitoneal bleed that occur within 72 hours of the procedure. To qualify, the event must be associated with a hemoglobin drop of >= 3 g/dL; transfusion of whole or packed red blood cells, or a procedural intervention/surgery at the bleeding site to reverse/stop or correct the bleeding. This excludes "GI", "GU" and "Other" bleeds.

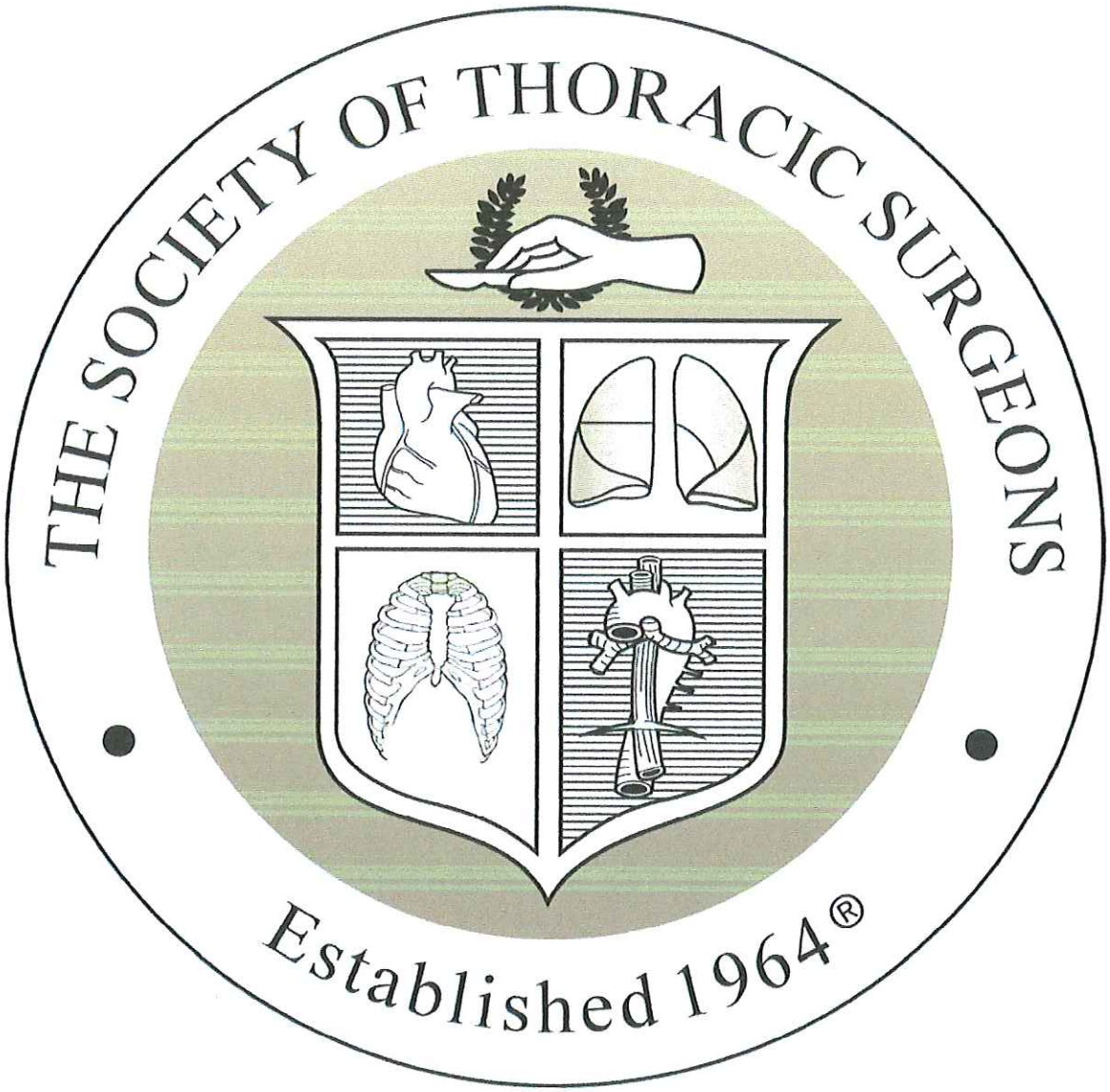
2.Major access site related injury requiring treatment includes access site occlusion, peripheral embolization, dissection, pseudoaneurysm, AV fistula requiring treatment anytime from the procedure until discharge.

**Your rate of post procedure MI cannot be reported if you only collected cardiac biomarkers on <90% of your patients who were in the hospital >=1 day.

©2010 American College of Cardiology Foundation
NCDR® CathPCI Registry®

Aggregation Date: Jun 30, 2015 11:59:59 PM
Publish Date: Jul 15, 2015

DATA ANALYSES OF THE SOCIETY OF THORACIC SURGEONS NATIONAL ADULT CARDIAC SURGERY DATABASE



Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER

July 2015

Saint Mary's is #303988

Period Ending 03/31/2015

Isolated CABG Procedures
Data Summary

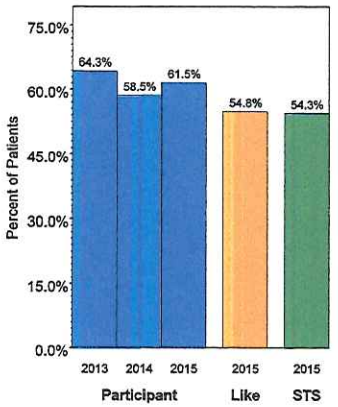
Participant 30398
STS Period Ending 03/31/2015

Duke Clinical Research Institute

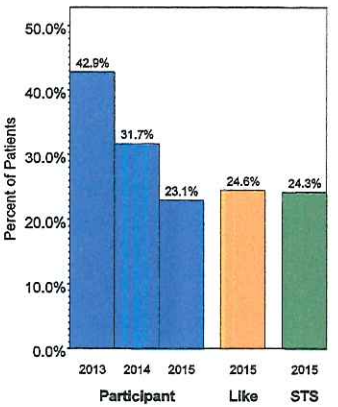
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30398			Like Group	STS
	2013	2014	2015	2015	2015
Number of Cases	42	41	13	15,840	34,539
Demographics					
Age (years)					
Mean	67.3	64.4	68.1	65.3	65.1
Median	67.5	65.0	68.0	66.0	66.0
25th Percentile	60.0	55.0	64.0	59.0	58.0
75th Percentile	74.0	72.0	73.0	72.0	72.0
Age >= 65 years old	64.3%	58.5%	61.5%	54.8%	54.3%
Gender, Female	42.9%	31.7%	23.1%	24.6%	24.3%
Missing	0.0%	0.0%	0.0%	0.0%	0.0%
Race[1]					
Caucasian	92.9%	73.2%	92.3%	82.4%	82.9%
Black	2.4%	14.6%	7.7%	6.7%	7.6%
Asian	0.0%	4.9%	0.0%	3.1%	3.0%
Native American	0.0%	0.0%	0.0%	0.8%	0.6%
Native Hawaiian/Pacific Islander	0.0%	0.0%	0.0%	0.5%	0.5%
Other	7.1%	12.2%	0.0%	3.0%	3.0%
Multiple Races	2.4%	4.9%	0.0%	0.8%	0.9%
Missing / Not Documented	0.0%	0.0%	0.0%	4.4%	3.5%
Pt. Declined to Disclose[2]	-	0.0%	0.0%	0.4%	0.5%
Hispanic or Latino or Spanish Ethnicity	9.5%	12.2%	7.7%	7.7%	6.5%
Missing/ Not Documented	0.0%	0.0%	0.0%	5.3%	5.0%
Body Mass Index[3]					
Underweight (BMI < 18.5)	0.0%	0.0%	0.0%	0.6%	0.6%
Normal (BMI 18.5 - 24.9)	11.9%	14.6%	15.4%	17.6%	17.8%
Overweight (BMI 25.0 - 29.9)	28.6%	26.8%	38.5%	35.9%	36.4%
Obese I (BMI 30.0 - 34.9)	40.5%	34.1%	30.8%	27.6%	27.2%
Obese II (BMI 35.0 - 39.9)	4.8%	14.6%	7.7%	11.8%	11.5%
Morbid Obesity (BMI 40.0+)	**14.3%**	9.8%	7.7%	6.3%	6.3%
Missing Height	0.0%	0.0%	0.0%	0.1%	0.1%
Missing Weight	0.0%	0.0%	0.0%	0.1%	0.1%

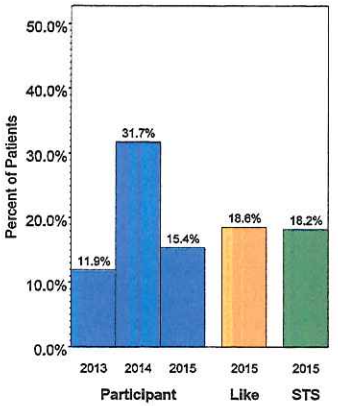
Age >= 65



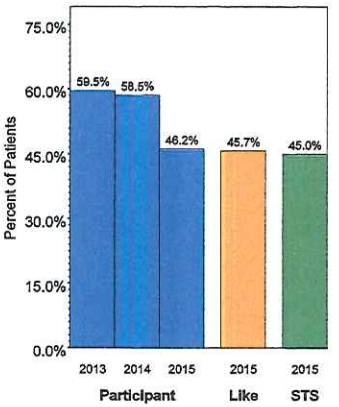
Gender, Female



Race, Non-Caucasian



Obesity (BMI 30+)



[1]Data presented in the report represent the individual response rates for each race category shown; summing the individual non-caucasian categories will not result in the same rates as shown in the graph since non-caucasian, as defined for the graph, does not include races or ethnicities reported in combination with caucasian

[2]Option added in v2.81

[3]BMI = Weight(kg) / Height(m)^2

Isolated CABG Procedures
Data Summary

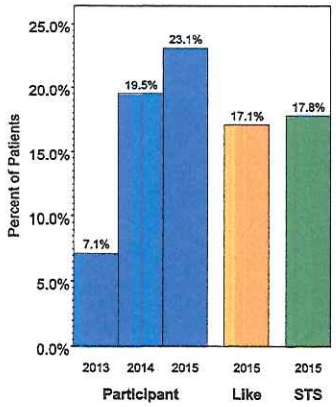
Participant 30398
STS Period Ending 03/31/2015

Duke Clinical Research Institute

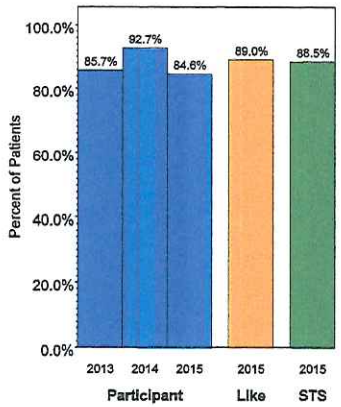
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30398			Like Group	STS
	2013	2014	2015	2015	2015
Comorbidities					
Diabetes Mellitus	38.1%	46.3%	46.2%	47.0%	47.6%
Diet Control	2.4%	2.4%	0.0%	2.6%	2.7%
Oral Control	19.0%	19.5%	15.4%	21.7%	21.9%
Insulin Control	7.1%	19.5%	23.1%	17.1%	17.8%
Other SQ Medication Control[1]	-	0.0%	0.0%	0.2%	0.2%
Other Control	0.0%	0.0%	0.0%	0.1%	0.1%
Missing Control	0.0%	0.0%	16.7%	1.5%	1.1%
Missing	0.0%	0.0%	0.0%	0.4%	0.4%
Hypertension	85.7%	92.7%	84.6%	89.0%	88.5%
Missing	0.0%	0.0%	0.0%	0.4%	0.5%
Dyslipidemia	95.2%	95.1%	84.6%	86.5%	87.0%
Missing	0.0%	0.0%	0.0%	0.7%	0.7%
Family History of CAD	52.4%	53.7%	53.8%	27.2%	25.2%
Missing	0.0%	2.4%	7.7%	6.4%	6.2%
Current/Recent Cigarette Smoker	26.2%	17.1%	0.0%	23.2%	22.8%
Smoker, Current Status Unknown[1]	-	0.0%	0.0%	0.8%	0.6%
Missing	0.0%	0.0%	0.0%	0.9%	0.8%
Chronic Lung Disease					
Mild	7.1%	9.8%	7.7%	11.7%	11.3%
Moderate	11.9%	7.3%	7.7%	5.8%	5.2%
Severe	0.0%	0.0%	0.0%	4.5%	4.6%
Unknown Severity[1]	-	2.4%	0.0%	5.0%	4.7%
Missing	0.0%	2.4%	0.0%	4.2%	3.6%
Congestive Heart Failure	2.4%	2.4%	15.4%	18.8%	20.2%
CHF / NYHA Class I[2]	0.0%	0.0%	0.0%	1.4%	1.5%
CHF / NYHA Class II	0.0%	0.0%	0.0%	5.4%	6.1%
CHF / NYHA Class III	0.0%	2.4%	0.0%	6.6%	7.1%
CHF / NYHA Class IV	2.4%	0.0%	15.4%	4.6%	4.7%
CHF / Missing Class	0.0%	0.0%	0.0%	4.5%	3.9%
Missing	0.0%	0.0%	0.0%	1.5%	1.2%
Peripheral Arterial Disease	**2.4%**	**2.4%**	7.7%	13.6%	14.1%
Missing	0.0%	0.0%	0.0%	1.2%	0.9%

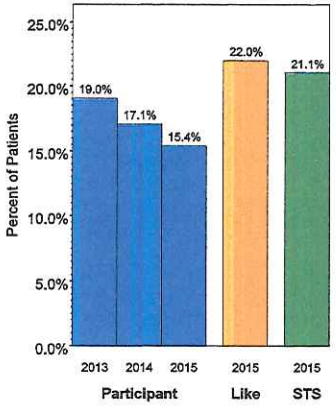
Diabetes, Insulin Dependent



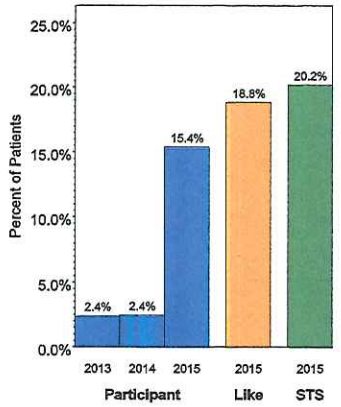
Hypertension



Chronic Lung Disease, Any



Congestive Heart Failure



[1]Option added in v2.81
[2]NYHA Class is only collected for patients with CHF
% represents proportion of cases that had both CHF and the indicated NYHA class



Isolated CABG Procedures
Data Summary

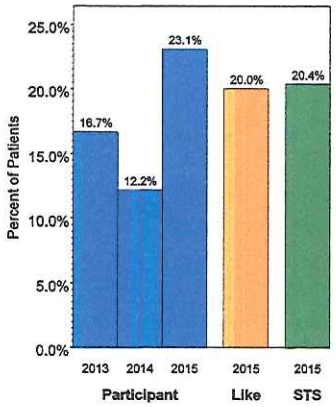
Participant 30398
STS Period Ending 03/31/2015

Duke Clinical Research Institute

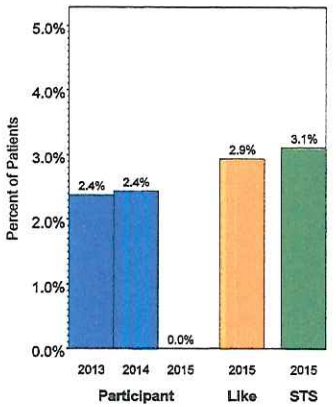
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30398			Like Group	STS
	2013	2014	2015	2015	2015
Cerebrovascular Disease	16.7%	12.2%	23.1%	20.0%	20.4%
Missing	0.0%	0.0%	0.0%	0.9%	0.9%
Coma/Nonresponsive State	0.0%	0.0%	0.0%	0.4%	0.3%
Missing	0.0%	0.0%	0.0%	0.5%	0.6%
CVD TIA	4.8%	4.9%	0.0%	4.1%	4.2%
Missing	0.0%	0.0%	0.0%	1.5%	1.3%
Carotid Stenosis[1]					
None	97.6%	100.0%	84.6%	87.7%	88.1%
50-79%[2]	-	0.0%	0.0%	8.2%	8.2%
80-100%	2.4%	0.0%	0.0%	2.2%	2.1%
Missing/Not Documented	0.0%	0.0%	15.4%	1.9%	1.7%
CVD Prior Carotid Surgery	9.5%	4.9%	15.4%	3.6%	3.8%
Missing	0.0%	0.0%	0.0%	1.0%	1.0%
Cerebrovascular Accident	4.8%	7.3%	15.4%	7.4%	7.7%
Missing	0.0%	0.0%	0.0%	1.2%	1.1%
Renal Failure, Dialysis-Dependent	2.4%	2.4%	**0.0%**	2.9%	3.1%
Missing	0.0%	0.0%	0.0%	0.3%	0.4%
Last Creatinine Preop					
Mean	1.1	1.2	1.0	1.2	1.2
Median	1.0	1.0	1.0	1.0	1.0
25th Percentile	0.8	0.8	0.8	0.8	0.8
75th Percentile	1.2	1.2	1.1	1.2	1.2
Missing	0.0%	0.0%	0.0%	0.4%	0.4%
Value >= 4.0 mg/dL	2.4%	2.4%	0.0%	2.4%	2.5%
Immunosuppressive Treatment	**0.0%**	**0.0%**	**0.0%**	2.8%	3.3%
Missing	0.0%	0.0%	0.0%	1.0%	0.7%
Previous Interventions					
Previous Cardiac Surgery[3]	0.0%	0.0%	0.0%	2.5%	2.8%
First reoperation	**0.0%**	**0.0%**	**0.0%**	2.3%	2.6%
Previous CABG	0.0%	0.0%	0.0%	2.0%	2.3%

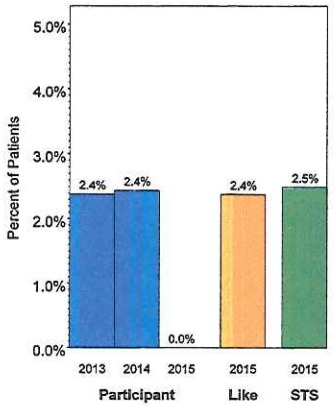
Cerebrovascular Disease



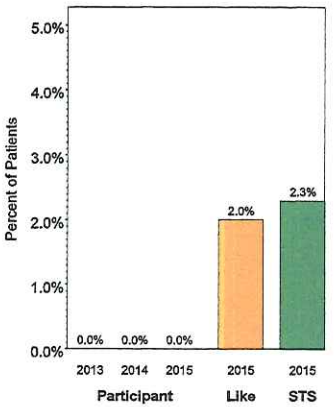
Dialysis



Last Creatinine Preop >= 4.0



Previous CABG



[1]Defined as highest level of occlusion in either carotid.
[2]Option added in v2.81
[3]Previous cardiac surgery reflects any prior CABG, valve, or other cardiac surgery

Isolated CABG Procedures
Data Summary

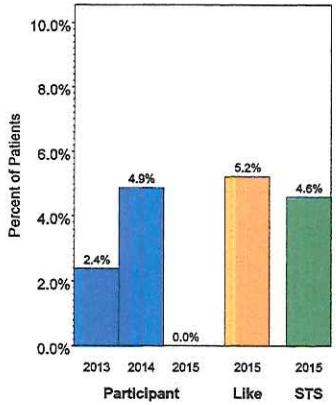
Participant 30398
STS Period Ending 03/31/2015

Duke Clinical Research Institute

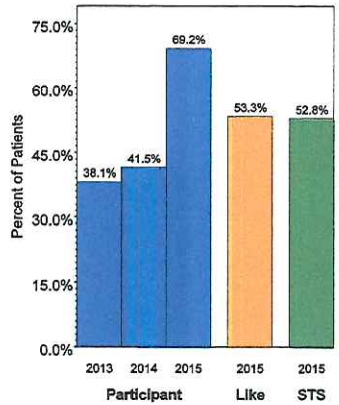
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30398			Like Group	STS
	2013	2014	2015	2015	2015
Previous AICD	0.0%	0.0%	0.0%	0.7%	0.9%
Previous Pacemaker	2.4%	2.4%	0.0%	1.7%	1.8%
Previous PCI	31.0%	36.6%	46.2%	30.0%	30.5%
<= 6 hours prior to surgery	**0.0%**	4.9%	**0.0%**	1.1%	1.0%
> 6 hours prior to surgery	31.0%	31.7%	46.2%	28.9%	29.4%
Missing timing	0.0%	0.0%	0.0%	0.1%	0.2%
Previous PCI Stent	92.3%	66.7%	100.0%	83.9%	85.9%
Status					
Surgery Status					
Elective	23.8%	29.3%	23.1%	38.1%	36.3%
Urgent	73.8%	65.9%	76.9%	56.6%	59.1%
Emergent	2.4%	4.9%	**0.0%**	5.0%	4.4%
Emergent Salvage	**0.0%**	**0.0%**	**0.0%**	0.2%	0.2%
Missing	0.0%	0.0%	0.0%	0.1%	0.1%
MI	38.1%	41.5%	69.2%	53.3%	52.8%
<= 7 days prior to surgery	26.2%	19.5%	38.5%	29.7%	28.7%
8-21 days prior to surgery	0.0%	7.3%	7.7%	5.0%	5.1%
>21 days prior to surgery	11.9%	14.6%	23.1%	18.4%	18.9%
Missing timing	0.0%	0.0%	0.0%	0.3%	0.4%
Missing	0.0%	0.0%	0.0%	1.2%	1.1%
Cardiogenic Shock					
At the time of surgery	4.8%	2.4%	**0.0%**	1.7%	1.6%
Within 24 hrs of surgery[1]	-	0.0%	0.0%	0.7%	0.6%
Missing	0.0%	0.0%	0.0%	0.1%	0.3%
Resuscitation					
<= 1 hr prior to surgery	4.8%	2.4%	**0.0%**	0.4%	0.3%
1-24 hrs prior to surgery[1]	-	0.0%	0.0%	0.6%	0.5%
Missing	0.0%	0.0%	0.0%	0.2%	0.3%

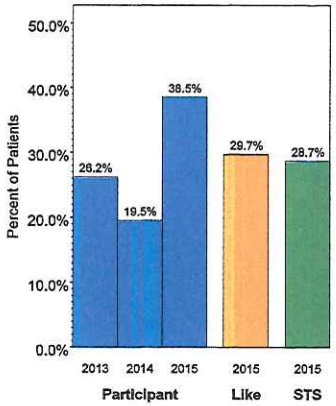
Emergent or Salvage Status



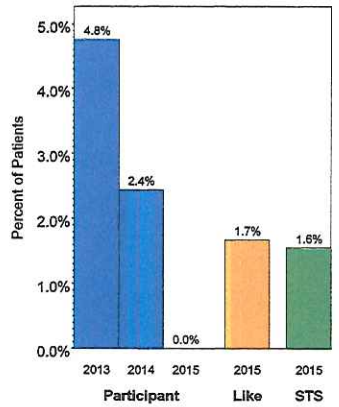
Prior MI



MI within 7 days



Cardiogenic Shock



[1]Option added in v2.81

Isolated CABG Procedures
Data Summary

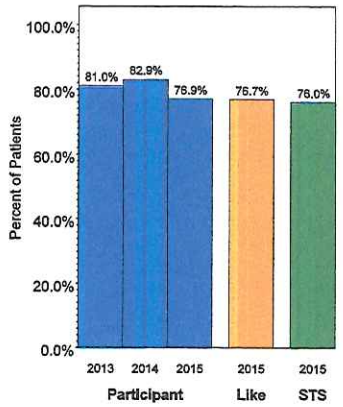
Participant 30398
STS Period Ending 03/31/2015

Duke Clinical Research Institute

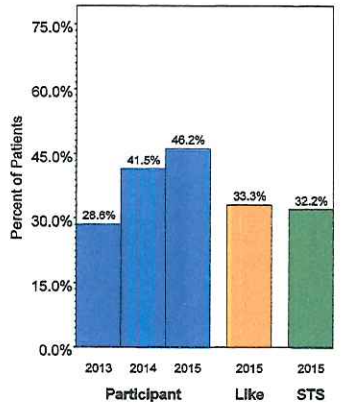
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30398			Like Group	STS
	2013	2014	2015	2015	2015
Cardiac Pres. on Admission					
No Symptoms or Angina	19.0%	2.4%	0.0%	10.3%	9.8%
Symptoms Unlikely to be Ischemia[1]	0.0%	0.0%	-	-	-
Stable Angina	14.3%	24.4%	46.2%	14.9%	14.7%
Unstable Angina	40.5%	43.9%	15.4%	34.3%	36.4%
Non-ST Elevation MI (Non-STEMI)	19.0%	22.0%	30.8%	26.9%	26.0%
ST Elevation MI (STEMI)	7.1%	4.9%	0.0%	6.0%	5.7%
Angina Equivalent[2]	-	0.0%	0.0%	3.7%	3.4%
Other[2]	-	2.4%	7.7%	3.8%	3.7%
Missing	0.0%	0.0%	0.0%	0.2%	0.3%
Any Arrhythmia[3]	14.3%	14.6%	7.7%	13.4%	13.6%
Recent	14.3%	12.2%	7.7%	11.9%	11.9%
Remote	0.0%	2.4%	0.0%	1.1%	1.2%
Missing	0.0%	0.0%	0.0%	0.8%	0.8%
Ventricular Tachycardia/Fibrillation[4]	4.8%	2.4%	0.0%	3.3%	3.3%
Missing	0.0%	0.0%	0.0%	0.9%	0.6%
3rd degree Heart Block[4]	0.0%	0.0%	0.0%	0.7%	0.7%
Missing	0.0%	0.0%	0.0%	1.0%	0.7%
Atrial Fibrillation/Flutter[5]	7.1%	8.0%	-	-	-
Missing	0.0%	0.0%	-	-	-
Atrial Fibrillation[4, 5]	-	12.5%	7.7%	8.8%	9.0%
Missing	-	0.0%	0.0%	0.6%	0.4%
Atrial Flutter[4, 5]	-	0.0%	0.0%	1.1%	1.2%
Missing	-	0.0%	0.0%	0.9%	0.6%
Hemodynamics and Catheterization					
Number of Diseased Coronary Vessels					
One	0.0%	7.3%	0.0%	4.0%	4.1%
Two	19.0%	9.8%	15.4%	18.3%	18.8%
Three	81.0%	82.9%	76.9%	76.7%	76.0%
Missing	0.0%	0.0%	0.0%	0.9%	1.0%
Left Main Disease (>=50% Stenosis)	28.6%	41.5%	46.2%	33.3%	32.2%
Missing	0.0%	0.0%	7.7%	32.2%	33.9%

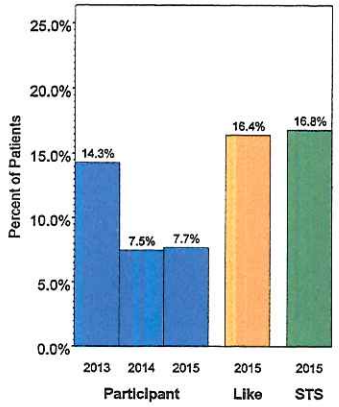
Triple Vessel Disease



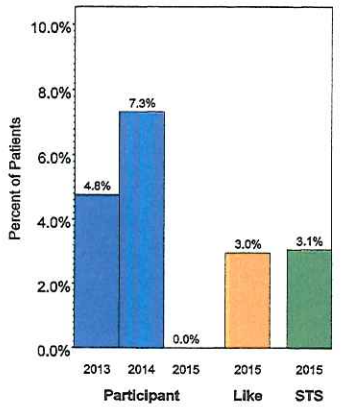
Left Main Disease



Ejection Fraction <40%



Aortic Stenosis



[1]Option dropped in v2.81
[2]Option added in v2.81
[3]Includes VTach/VFib, 2nd and 3rd degree HB, Sick Sinus Syndrome, AFib, and AFlutter
[4]For v2.81 data, includes recent or remote arrhythmias
[5] For v2.81 data, AFib and AFlutter were separated.



Isolated CABG Procedures
Data Summary

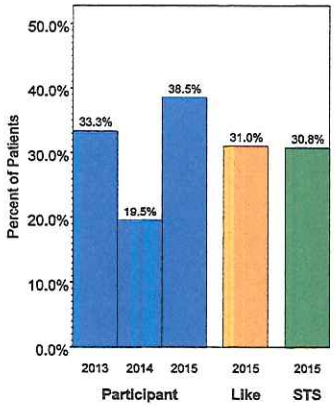
Participant 30398
STS Period Ending 03/31/2015

Duke Clinical Research Institute

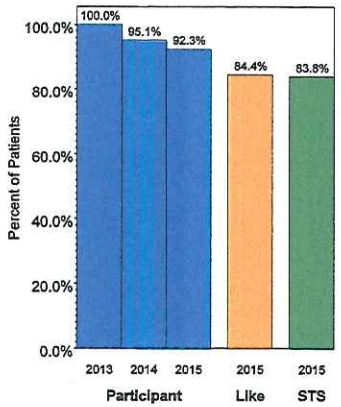
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30398			Like Group	STS
	2013	2014	2015	2015	2015
Ejection Fraction					
Mean	52.4	55.2	56.5	51.4	51.2
Median	55.0	60.0	60.0	55.0	55.0
25th Percentile	45.0	50.0	55.0	45.0	45.0
75th Percentile	60.0	60.0	60.0	60.0	60.0
EF missing or not measured	0.0%	2.4%	0.0%	3.5%	3.3%
EF <40%[1]	14.3%	7.5%	7.7%	16.4%	16.8%
Pulmonary Hypertension[2]	40.0%	15.8%	14.3%	36.9%	36.2%
PA mean/systolic pressure missing or not measured	76.2%	53.7%	46.2%	64.9%	65.2%
Aortic Stenosis	4.8%	7.3%	0.0%	3.0%	3.1%
Missing	0.0%	0.0%	0.0%	2.5%	2.3%
Mitral Insufficiency					
Trivial	11.9%	14.6%	15.4%	22.4%	23.4%
Mild	21.4%	9.8%	30.8%	24.0%	23.7%
Moderate	11.9%	9.8%	7.7%	6.5%	6.6%
Severe	0.0%	0.0%	0.0%	0.5%	0.5%
Missing/Not Documented	0.0%	0.0%	0.0%	1.2%	1.1%
Preoperative Medications					
Aspirin	100.0%	95.1%	92.3%	83.9%	83.2%
Among Eligible Cases	100.0%	95.1%	92.3%	84.4%	83.8%
Contraindicated / Not Indicated[3]	0.0%	0.0%	0.0%	0.6%	0.7%
Missing	0.0%	0.0%	0.0%	0.7%	0.6%
Inotropics	0.0%	2.4%	0.0%	1.6%	1.5%
Missing	0.0%	0.0%	0.0%	0.2%	0.3%
Beta Blockers	88.1%	95.1%	100.0%	88.6%	89.8%
Among Eligible Cases	90.0%	94.9%	100.0%	93.5%	94.7%
Contraindicated / Not Indicated	2.4%	0.0%	0.0%	4.3%	4.4%
Missing	0.0%	0.0%	0.0%	0.1%	0.1%

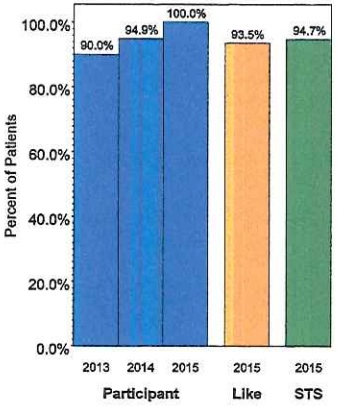
Mitral Insufficiency, Mild+



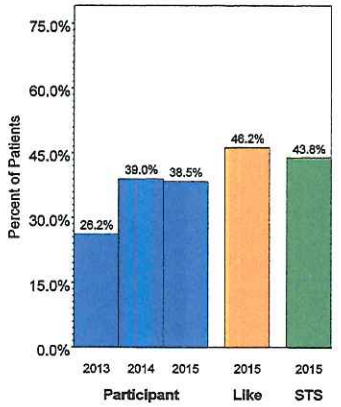
Preoperative Aspirin



Preoperative Beta Blocker



Preoperative ACE Inhibitors



[1]Among patients with measured EF
[2]PA systolic pressure > 35mmHg
[3]For v2.73 data, the Contraindicated/Not Indicated option was deleted

Isolated CABG Procedures
Data Summary

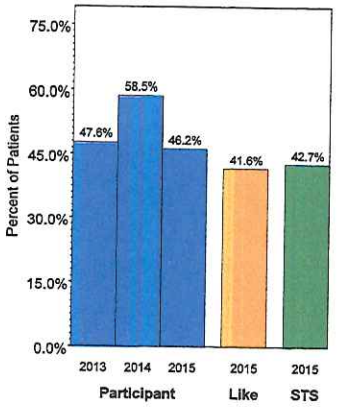
Participant 30398
STS Period Ending 03/31/2015

Duke Clinical Research Institute

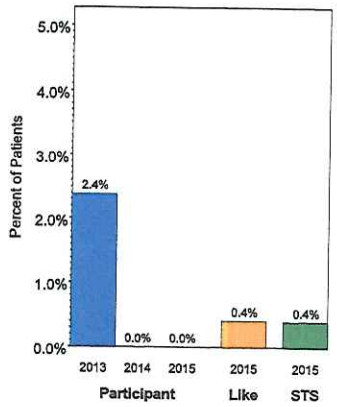
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30398			Like Group	STS
	2013	2014	2015	2015	2015
Steroids	0.0%	12.2%	7.7%	2.3%	2.3%
Among Eligible Cases	0.0%	12.2%	7.7%	2.3%	2.3%
Contraindicated / Not Indicated[1]	0.0%	0.0%	0.0%	0.0%	0.1%
Missing	0.0%	0.0%	0.0%	0.7%	0.5%
Nitrates IV	4.8%	4.9%	7.7%	9.8%	9.2%
Missing	0.0%	0.0%	0.0%	0.6%	0.6%
ACE Inhibitors	26.2%	39.0%	38.5%	46.2%	43.8%
Among Eligible Cases	26.2%	39.0%	38.5%	46.2%	43.8%
Contraindicated / Not Indicated	0.0%	0.0%	0.0%	0.0%	0.0%
Missing	0.0%	0.0%	0.0%	0.9%	0.9%
Anticoagulants	47.6%	58.5%	46.2%	41.6%	42.7%
Missing	0.0%	0.0%	0.0%	0.4%	0.4%
Coumadin	2.4%	0.0%	0.0%	0.4%	0.4%
Missing	0.0%	0.0%	0.0%	0.5%	0.6%
Lipid-Lowering agents	90.5%	87.8%	92.3%	77.7%	77.6%
Among Eligible Cases	90.5%	87.8%	92.3%	78.5%	78.4%
Contraindicated / Not Indicated[1]	0.0%	0.0%	0.0%	1.0%	1.0%
Missing	0.0%	0.0%	0.0%	0.9%	0.9%
Glycoprotein IIb/IIIa Inhibitor	0.0%	2.4%	0.0%	2.3%	1.9%
Missing	0.0%	0.0%	0.0%	0.5%	0.6%
ADP Inhibitors within 5 Days	9.5%	14.6%	7.7%	9.1%	10.5%
Among Eligible Cases	9.5%	14.6%	7.7%	9.2%	10.5%
Contraindicated / Not Indicated[1]	0.0%	0.0%	0.0%	0.5%	0.6%
Missing	0.0%	0.0%	0.0%	0.3%	0.4%
ADP Inhibitor Discontinuation[2]					
< 1 Day	0.0%	33.3%	0.0%	13.7%	15.2%
1 Day	0.0%	16.7%	100.0%	16.8%	19.2%
2 Days	25.0%	0.0%	0.0%	17.7%	17.9%
3 Days	50.0%	16.7%	0.0%	19.8%	18.9%
4 Days	25.0%	0.0%	0.0%	20.0%	18.5%
5 Days	0.0%	33.3%	0.0%	10.0%	9.3%
Missing	0.0%	0.0%	0.0%	2.0%	1.0%

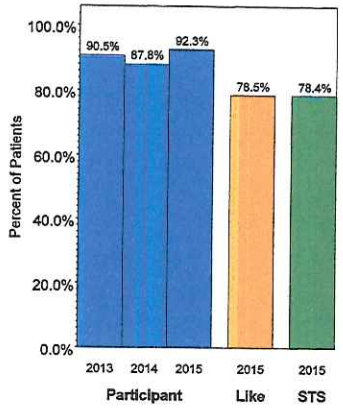
Preoperative Anticoagulants



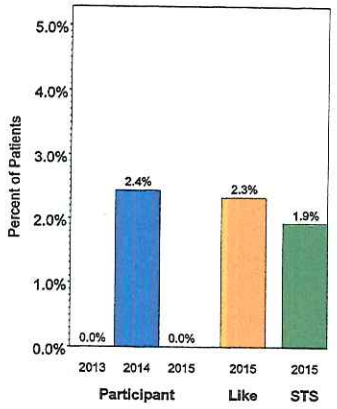
Preoperative Coumadin



Preoperative Lipid-Lowering Agent



Preoperative GP IIb-IIIa Inhibitors



[1]For v2.73 data, the Contraindicated/Not Indicated option was deleted
[2]Excludes patients not on ADP Inhibitors within 5 Days

Isolated CABG Procedures
Data Summary

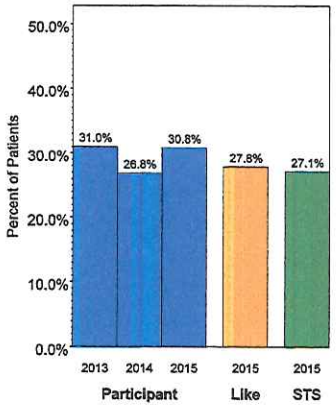
Participant 30398
STS Period Ending 03/31/2015

Duke Clinical Research Institute

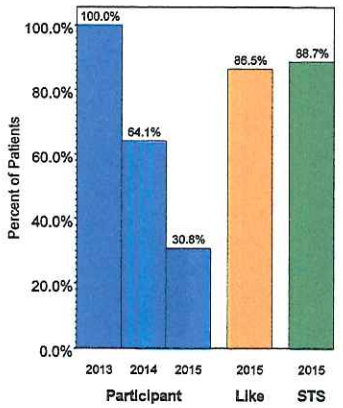
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30398			Like Group	STS
	2013	2014	2015	2015	2015
Antiplatelets within 5 Days	95.2%	87.8%	7.7%	4.1%	4.4%
Among Eligible Cases	95.2%	87.8%	7.7%	4.1%	4.4%
Contraindicated / Not Indicated[1]	0.0%	0.0%	0.0%	0.2%	0.2%
Missing	0.0%	0.0%	0.0%	0.6%	0.6%
Operative Information					
Blood Products Used	31.0%	26.8%	30.8%	27.8%	27.1%
Number of Blood Product Units Used					
1 Red Blood Cell Unit	4.8%	9.8%	0.0%	5.5%	5.9%
2 Red Blood Cell Units	11.9%	2.4%	7.7%	8.6%	8.3%
3 Red Blood Cell Units	2.4%	9.8%	0.0%	2.7%	2.7%
4+ Red Blood Cell Units	2.4%	4.9%	15.4%	3.6%	3.1%
1+ Fresh Frozen Plasma Units	2.4%	7.3%	7.7%	8.3%	7.2%
1+ Cryoprecipitate Units	0.0%	9.8%	0.0%	2.1%	2.1%
1+ Platelet Units	14.3%	9.8%	15.4%	13.4%	12.6%
Missing	0.0%	0.0%	0.0%	1.7%	1.6%
Number of Distal Anastamoses, Total					
1	2.4%	7.3%	7.7%	4.9%	5.2%
2	14.3%	9.8%	23.1%	17.2%	17.5%
3	35.7%	31.7%	38.5%	38.8%	39.2%
4	38.1%	36.6%	30.8%	29.0%	28.4%
5+	9.5%	14.6%	0.0%	9.8%	9.5%
Missing[2]	0.0%	0.0%	0.0%	0.1%	0.1%
Vein Harvest Technique[3]					
Endovascular/Endoscopic	100.0%	64.1%	30.8%	86.5%	88.7%
Direct Vision	0.0%	33.3%	69.2%	10.6%	8.7%
Both	0.0%	2.6%	0.0%	2.1%	1.8%
Cryopreserved	0.0%	0.0%	0.0%	0.1%	0.0%
Missing	0.0%	0.0%	0.0%	0.7%	0.8%
Internal Mammary Artery Used[4]					
Any	97.6%	92.5%	83.3%	98.5%	98.7%
Left	95.2%	92.5%	83.3%	94.4%	93.6%
Right	0.0%	0.0%	0.0%	0.5%	0.5%
Both	2.4%	0.0%	0.0%	3.6%	4.6%
Missing	0.0%	0.0%	0.0%	0.2%	0.1%

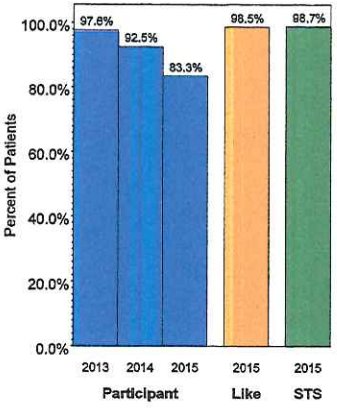
Intraop Blood Products Used



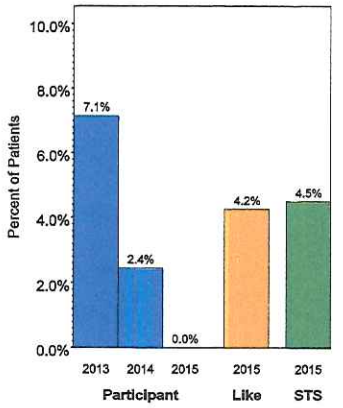
Endovascular Vein Harvest Technique



Internal Mammary Artery Used



Radial Artery Used



[1]For v2.73 data, the Contraindicated/Not Indicated option was deleted
[2]Where number of arterial conduits and number of vein grafts both missing
[3]Where at least 1 vein was harvested
[4]Excludes patients with prior CABG surgery



Isolated CABG Procedures
Data Summary

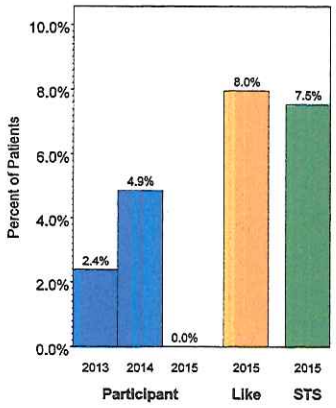
Participant 30398
STS Period Ending 03/31/2015

Duke Clinical Research Institute

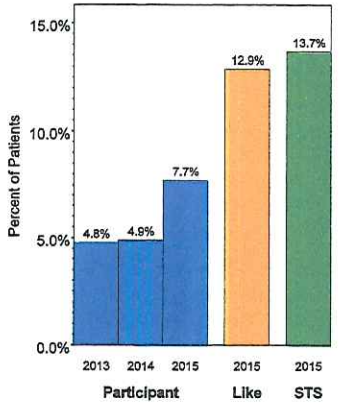
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30398			Like Group	STS
	2013	2014	2015	2015	2015
Radial Artery Used	7.1%	2.4%	0.0%	4.2%	4.5%
Missing	0.0%	0.0%	0.0%	1.1%	1.0%
Radial Artery Harvest Technique					
Endovascular/Endoscopic	66.7%	100.0%	-	36.0%	40.1%
Direct Vision	33.3%	0.0%	-	56.3%	53.0%
Both	0.0%	0.0%	-	0.1%	0.5%
Missing	0.0%	0.0%	-	7.6%	6.4%
IABP Used	4.8%	4.9%	0.0%	10.5%	10.0%
Preop	2.4%	4.9%	**0.0%**	8.0%	7.5%
Intraop	2.4%	0.0%	0.0%	2.1%	2.0%
Postop	0.0%	0.0%	0.0%	0.4%	0.4%
Missing Timing	0.0%	0.0%	-	0.1%	0.0%
Missing	0.0%	0.0%	0.0%	0.4%	0.4%
Robotic Technology Assisted	0.0%	0.0%	0.0%	0.5%	0.9%
Missing	0.0%	0.0%	0.0%	0.4%	0.4%
Off-pump Procedure (see following section for detail)	4.8%	4.9%	7.7%	12.9%	13.7%
Cross-Clamp Time (min)					
Mean	65.3	64.9	64.5	70.3	68.4
Median	67.0	63.0	67.0	66.0	64.0
25th Percentile	54.0	51.0	55.5	49.0	47.0
75th Percentile	77.0	76.0	74.5	87.0	85.0
Cardiopulmonary Bypass Time (min)					
Mean	96.3	105.2	116.6	96.7	94.9
Median	95.0	106.0	119.0	91.0	90.0
25th Percentile	80.0	78.0	105.5	70.0	69.0
75th Percentile	113.5	127.0	127.5	117.0	115.0

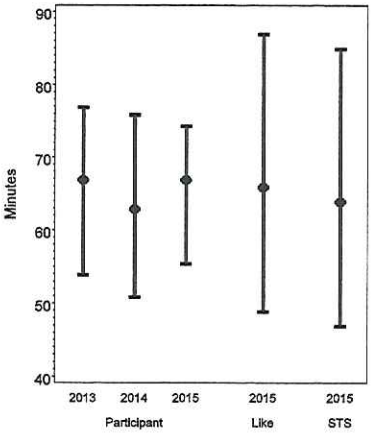
Preoperative IABP



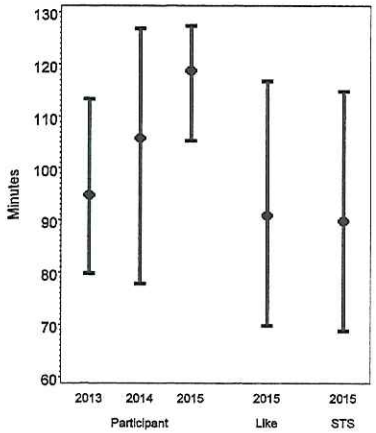
Off-Pump Procedure



Cross-Clamp Time (min)
Median + 25th/75th Percentiles



CPB Time (min)
Median + 25th/75th Percentiles



Isolated CABG Procedures
Data Summary

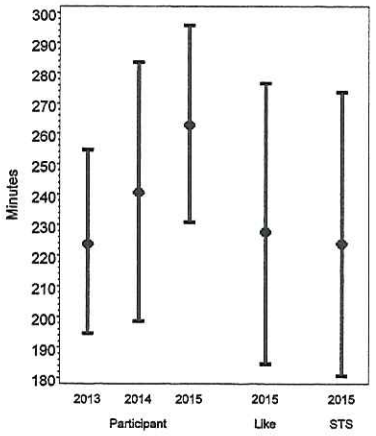
Participant 30398
STS Period Ending 03/31/2015

Duke Clinical Research Institute

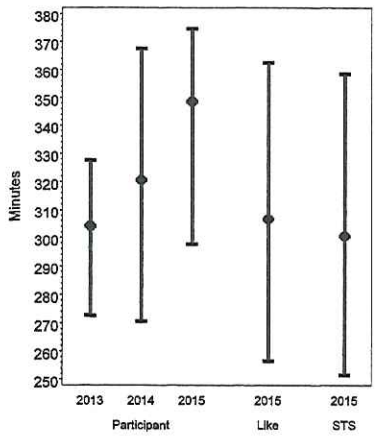
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30398			Like Group	STS
	2013	2014	2015	2015	2015
Circulatory Arrest	0.0%	31.7%	0.0%	0.5%	0.3%
Missing	0.0%	0.0%	0.0%	0.9%	0.7%
Circulatory Arrest Time (min)					
Mean	-	0.0	-	12.9	11.4
Median	-	0.0	-	0.0	0.0
25th Percentile	-	0.0	-	0.0	0.0
75th Percentile	-	0.0	-	10.0	7.0
Skin Incision Duration (min)					
Mean	225.4	245.1	256.2	236.1	232.3
Median	224.0	241.0	263.0	228.0	224.0
25th Percentile	195.0	199.0	231.0	185.0	181.0
75th Percentile	255.0	284.0	296.0	277.0	274.0
OR Duration (min)					
Mean	302.7	325.6	332.8	316.3	310.9
Median	304.5	321.0	349.0	307.0	301.0
25th Percentile	273.0	271.0	298.0	257.0	252.0
75th Percentile	328.0	368.0	375.0	363.0	359.0
Antibiotic Selection[1, 2]	100.0%	100.0%	100.0%	99.1%	99.0%
Exclusions	0.0%	0.0%	0.0%	1.0%	1.0%
Missing	0.0%	0.0%	0.0%	0.6%	0.5%
Antibiotic Timing[1, 3]	100.0%	100.0%	100.0%	98.9%	98.7%
Exclusions	0.0%	0.0%	0.0%	0.6%	0.5%
Missing	0.0%	0.0%	0.0%	0.5%	0.5%
Antibiotics Discontinued[1,4]	100.0%	100.0%	100.0%	98.7%	98.4%
Exclusions	2.4%	2.4%	0.0%	1.7%	1.3%
Missing	0.0%	0.0%	0.0%	0.8%	0.6%
Clotting Agents[5]	57.1%	43.9%	76.9%	83.7%	81.5%
Missing	0.0%	0.0%	0.0%	0.8%	1.2%

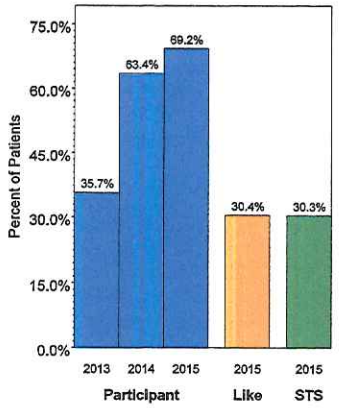
Skin Incision Duration (min)
Median + 25th/75th Percentiles



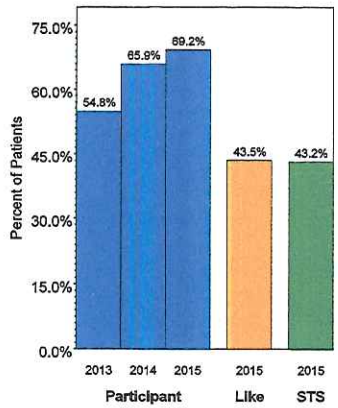
OR Duration (min)
Median + 25th/75th Percentiles



Postop Blood Products Used



Intraop/Postop Products Used



[1]All antibiotic measures are calculated among patients without exclusions
[2]First or second generation cephalosporin prescribed/given prophylactically
[3]Appropriate timing of prophylactic antibiotics
[4]Prophylactic antibiotics discontinued within 48 hours
[5]Includes one or more of the following: Aprotinin, Epsilon Amino-Caproic Acid, Desmopressin, or Tranexamic Acid

Isolated CABG Procedures
Data Summary

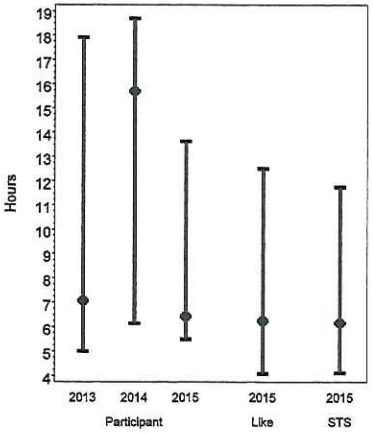
Participant 30398
STS Period Ending 03/31/2015

Duke Clinical Research Institute

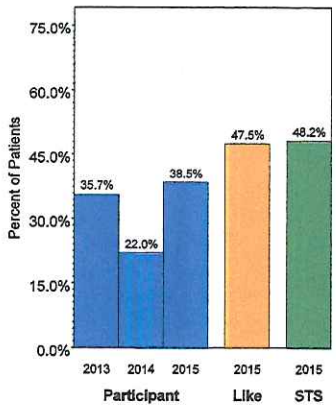
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30398			Like Group	STS
	2013	2014	2015	2015	2015
Postoperative Information					
Blood Products Used	35.7%	63.4%	69.2%	30.4%	30.3%
Number of Blood Product Units Used					
1 Red Blood Cell Unit	9.5%	22.0%	15.4%	9.3%	9.7%
2 Red Blood Cell Units	11.9%	17.1%	23.1%	10.1%	9.7%
3 Red Blood Cell Units	7.1%	12.2%	0.0%	3.2%	3.2%
4+ Red Blood Cell Units	7.1%	7.3%	23.1%	5.2%	5.1%
1+ Fresh Frozen Plasma Units	7.1%	7.3%	15.4%	6.8%	6.7%
1+ Cryoprecipitate Units	2.4%	7.3%	7.7%	2.8%	3.2%
1+ Platelet Units	9.5%	12.2%	7.7%	7.5%	7.6%
Missing	0.0%	0.0%	0.0%	0.3%	0.4%
Intraop/Postop Products Used	54.8%	65.9%	69.2%	43.5%	43.2%
Total Number of Blood Product Units					
1 Red Blood Cell Unit	9.5%	14.6%	15.4%	8.8%	9.3%
2 Red Blood Cell Units	11.9%	19.5%	15.4%	12.4%	12.1%
3 Red Blood Cell Units	14.3%	12.2%	0.0%	5.2%	5.5%
4+ Red Blood Cell Units	11.9%	17.1%	38.5%	11.5%	10.8%
1+ Fresh Frozen Plasma Units	9.5%	12.2%	15.4%	13.3%	12.3%
1+ Cryoprecipitate Units	2.4%	14.6%	7.7%	4.5%	5.0%
1+ Platelet Units	21.4%	17.1%	23.1%	18.4%	17.9%
Missing	0.0%	0.0%	0.0%	0.2%	0.3%
Ventilation					
Total Ventilation Hours					
Mean	11.6	19.5	10.1	18.4	18.7
Median	7.1	15.8	6.5	6.3	6.2
25th Percentile	5.1	6.2	5.5	4.1	4.2
75th Percentile	18.0	18.8	13.7	12.6	11.8
Initial Ventilation Hours					
Mean	10.4	19.0	10.1	13.6	13.9
Median	7.1	15.8	6.5	6.2	6.1
Initial Ventilation <6 hours[1]	35.7%	22.0%	38.5%	47.5%	48.2%
Extubated in OR	0.0%	0.0%	0.0%	2.8%	2.5%
Missing	0.0%	0.0%	0.0%	0.2%	0.3%
Reintubation	2.4%	2.4%	7.7%	3.7%	3.5%
Missing	0.0%	0.0%	0.0%	0.3%	0.4%

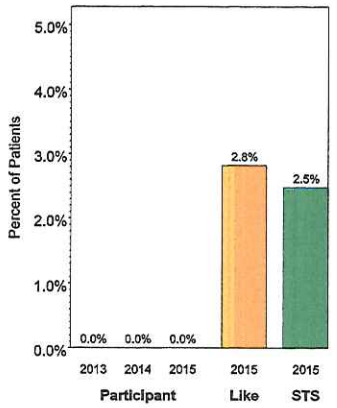
Total Ventilation Hours
Median + 25th/75th Percentiles



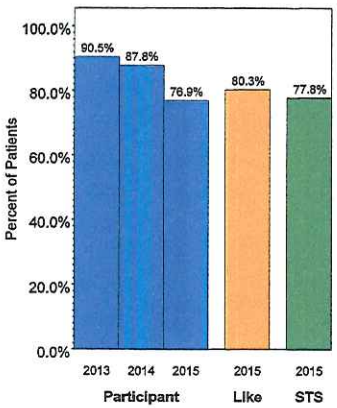
Initial Ventilation <6 Hrs



Extubated in OR



Total ICU >24 hours



[1]Excludes patients extubated in the OR

Isolated CABG Procedures
Data Summary

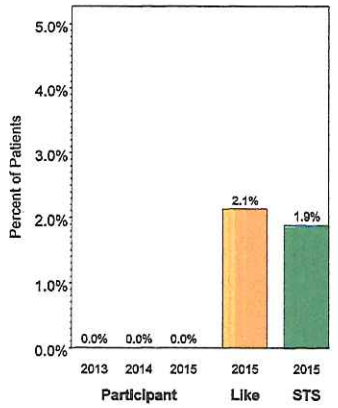
Participant 30398
STS Period Ending 03/31/2015

Duke Clinical Research Institute

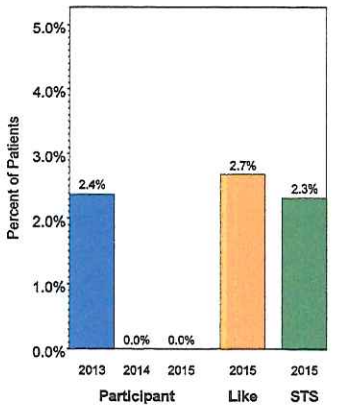
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30398			Like Group	STS
	2013	2014	2015	2015	2015
Additional Ventilation Hours[1]					
Mean	50.0	23.0	-	128.2	135.3
Median	50.0	23.0	-	63.2	64.8
ICU Stay					
Total ICU Hours					
Mean	60.0	66.7	47.1	73.1	72.0
Median	51.5	59.0	43.0	49.5	48.0
75th Percentile	36.0	37.0	27.0	27.3	26.0
25th Percentile	72.0	73.5	67.0	85.7	79.0
Initial ICU Hours					
Mean	58.2	61.9	47.1	70.0	68.7
Median	50.5	51.0	43.0	49.0	47.7
Readmitted to ICU	2.4%	7.3%	0.0%	2.4%	2.6%
Additional ICU Hours[2]					
Mean	78.0	65.1	-	129.0	124.1
Median	78.0	76.0	-	72.2	69.8
Mortality Summary					
In-hospital Mortality	0.0%	0.0%	0.0%	2.1%	1.9%
Operative Mortality	2.4%	**0.0%**	**0.0%**	2.7%	2.3%
Mortality Risk-Adjustment[3]					
In-hospital Mortality					
Odds Ratio	0.88	0.88	-	-	-
Lower 95% Confidence Limit	0.37	0.36	-	-	-
Upper 95% Confidence Limit	2.10	2.14	-	-	-
O/E Ratio	0.00	0.00	-	-	-
Lower 95% Confidence Limit	0.00	0.00	-	-	-
Upper 95% Confidence Limit	5.17	4.61	-	-	-
Risk-adjusted Rate	0.0%	0.0%	-	-	-

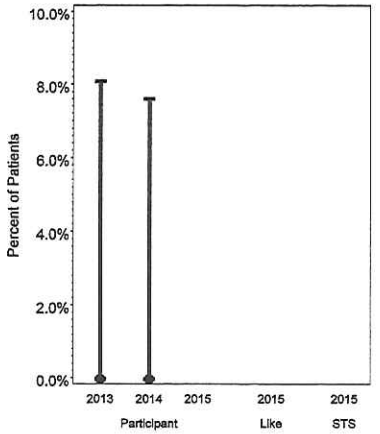
In-Hospital Mortality



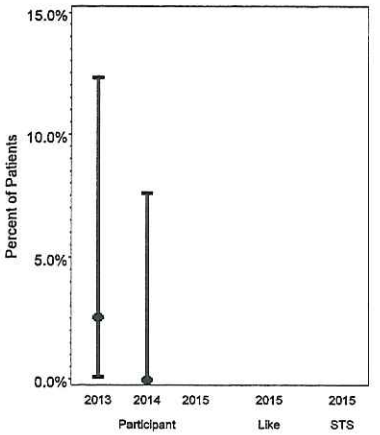
Operative Mortality



In-Hospital Mortality
Risk-adjusted rate + 95% CI



Operative Mortality
Risk-adjusted rate + 95% CI



[1]Among patients reintubated
[2]Among patients readmitted to the ICU
[3]Refer to the Report Overview for information on risk-adjustment methodology
Risk-adjustment is not performed on time periods of less than 6 months

Isolated CABG Procedures
Data Summary

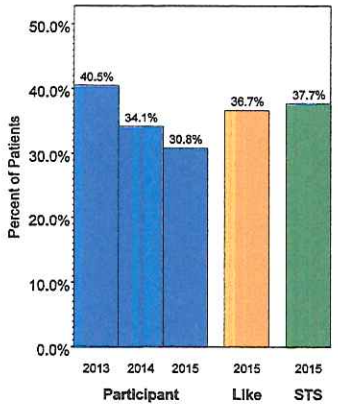
Participant 30398
STS Period Ending 03/31/2015

Duke Clinical Research Institute

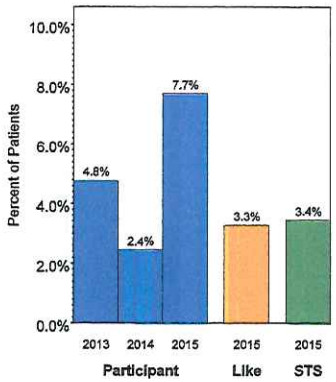
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30398			Like Group	STS
	2013	2014	2015	2015	2015
Operative Mortality					
Odds Ratio	1.03	0.87	-	-	-
Lower 95% Confidence Limit	0.49	0.39	-	-	-
Upper 95% Confidence Limit	2.13	1.97	-	-	-
O/E Ratio	1.31	0.00	-	-	-
Lower 95% Confidence Limit	0.07	0.00	-	-	-
Upper 95% Confidence Limit	6.26	3.70	-	-	-
Risk-adjusted Rate	2.6%	0.0%	-	-	-
Complications Summary					
Any Complications	40.5%	34.1%	30.8%	36.7%	37.7%
Any Major Complications / Operative Mortality	9.5%	9.8%	23.1%	12.6%	12.1%
Operative Complications					
Any Reoperation	4.8%	2.4%	7.7%	3.3%	3.4%
Any Reoperation (NQF Definition)[1]	2.4%	2.4%	7.7%	2.1%	2.2%
Reoperation for Bleeding	2.4%	2.4%	7.7%	1.6%	1.6%
Reoperation for Valvular Dysfunction[2]	0.0%	0.0%	0.0%	0.0%	0.0%
Reoperation for Graft Occlusion[2]	0.0%	0.0%	0.0%	0.2%	0.2%
Reoperation for Other Cardiac	0.0%	0.0%	0.0%	0.4%	0.4%
Reoperation for Other Non-Cardiac	2.4%	0.0%	0.0%	1.3%	1.4%
Infection Complications					
Any Infection	2.4%	0.0%	0.0%	2.0%	2.0%
Deep Sternal Infection/Mediastinitis	**0.0%**	**0.0%**	**0.0%**	0.2%	0.3%
Septicemia/Sepsis	0.0%	0.0%	0.0%	0.8%	0.8%
Conduit Harvest or Cannulation Site[3]	0.0%	0.0%	0.0%	0.4%	0.4%
Neurological Complications					
Any Neurological	2.4%	0.0%	0.0%	2.9%	3.1%
Coma/Encephalopathy	2.4%	0.0%	0.0%	1.5%	1.8%
Permanent Stroke	**0.0%**	**0.0%**	**0.0%**	1.4%	1.4%
Transient Ischemic Attack	0.0%	0.0%	0.0%	0.3%	0.2%
Paralysis	0.0%	0.0%	0.0%	0.2%	0.2%

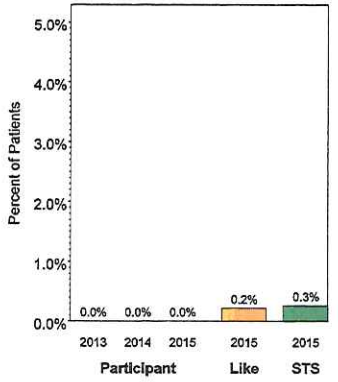
Any Complication



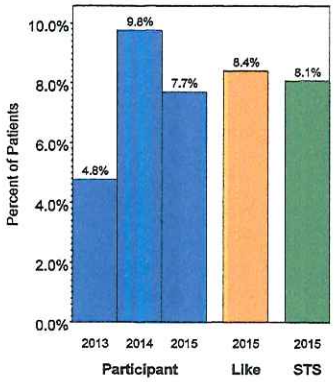
Any Reoperation
Observed rate



Deep Sternal Infx/Mediastinitis
Observed rate



Prolonged Ventilation
Observed rate



[1]Includes reoperations for bleeding/tamponade, valvular dysfunction, graft occlusion, and other cardiac problems.
[2]Includes surgical and PCI/Transcatheter interventions
[3]Excludes patients with zero vein grafts

Isolated CABG Procedures
Data Summary

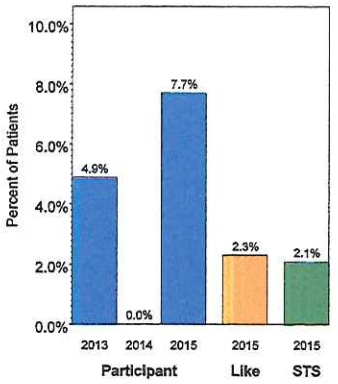
Participant 30398
STS Period Ending 03/31/2015

Duke Clinical Research Institute

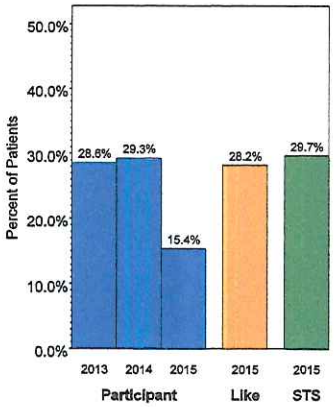
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30398			Like Group	STS
	2013	2014	2015	2015	2015
Pulmonary Complications					
Any Pulmonary	4.8%	9.8%	7.7%	12.1%	11.8%
Prolonged Ventilation	4.8%	9.8%	7.7%	8.4%	8.1%
Pneumonia	0.0%	2.4%	0.0%	2.6%	2.4%
Pulmonary Embolism	0.0%	0.0%	0.0%	0.2%	0.2%
Pleural Effusion Requiring Drainage	2.4%	0.0%	0.0%	3.3%	3.5%
Renal Complications					
Renal Failure[1]	4.9%	**0.0%**	7.7%	2.3%	2.1%
Vascular Complications					
Any Vascular	0.0%	0.0%	0.0%	0.4%	0.4%
Acute Limb Ischemia	0.0%	0.0%	0.0%	0.3%	0.3%
Other Complications					
Any Other	28.6%	29.3%	15.4%	28.2%	29.7%
New Onset Atrial Fibrillation[2]	27.8%	22.2%	16.7%	23.2%	24.2%
Recent Recurrent Atrial Fibrillation[3]	0.0%	25.0%	0.0%	22.4%	24.5%
Cardiac Arrest	0.0%	0.0%	0.0%	2.1%	1.9%
Anticoagulant Complication	0.0%	2.4%	0.0%	0.5%	0.5%
Tamponade	0.0%	0.0%	0.0%	0.1%	0.1%
Gastro-Intestinal Complication	0.0%	0.0%	7.7%	1.6%	2.0%
Multi-System Failure	0.0%	0.0%	0.0%	0.7%	0.7%
Complications Risk-Adjustment[4]					
Major Complications or Op. Mortality					
Odds Ratio	0.91	0.92	-	-	-
Lower 95% Confidence Limit	0.48	0.49	-	-	-
Upper 95% Confidence Limit	1.73	1.74	-	-	-
O/E Ratio	0.82	0.83	-	-	-
Lower 95% Confidence Limit	0.27	0.27	-	-	-
Upper 95% Confidence Limit	1.83	1.82	-	-	-
Risk-adjusted Rate	10.7%	10.1%	-	-	-

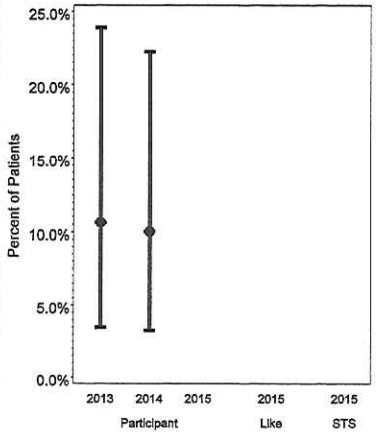
Renal Failure Complication
Observed rate



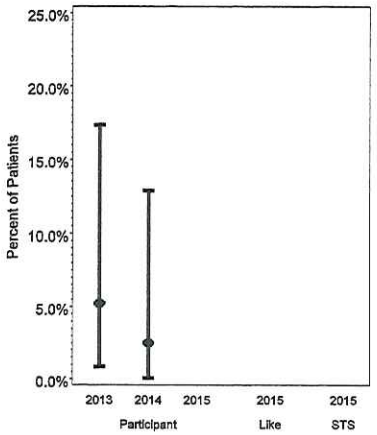
Any Other Complications



Major Complication or Mortality
Risk-adjusted rate + 95% CI



Any Reoperation
Risk-adjusted rate + 95% CI



[1]Excludes patients with preoperative dialysis or last creatinine >=4
[2]New Onset AFib is only among patients with no history of arrhythmias
[3]Recent Recurrent AFib is among patients with history of recent AFib
[4]Refer to the Report Overview for information on risk-adjustment methodology
Risk-adjustment is not performed on time periods of less than 6 months

Isolated CABG Procedures
Data Summary

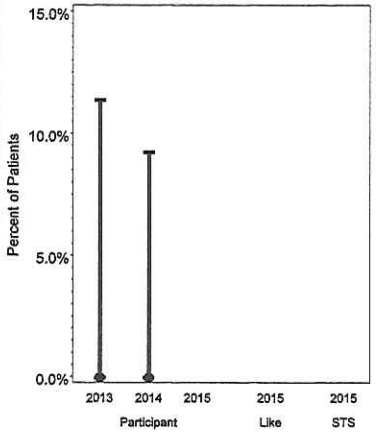
Participant 30398
STS Period Ending 03/31/2015

Duke Clinical Research Institute

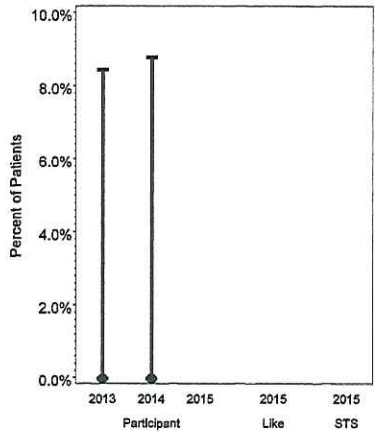
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30398			Like Group	STS
	2013	2014	2015	2015	2015
Any Reoperation					
Odds Ratio	1.10	0.96	-	-	-
Lower 95% Confidence Limit	0.52	0.46	-	-	-
Upper 95% Confidence Limit	2.33	1.98	-	-	-
O/E Ratio	1.45	0.73	-	-	-
Lower 95% Confidence Limit	0.25	0.04	-	-	-
Upper 95% Confidence Limit	4.75	3.68	-	-	-
Risk-adjusted Rate	5.3%	2.6%	-	-	-
Deep Sternal Infection/Mediastinitis					
Odds Ratio	0.96	0.95	-	-	-
Lower 95% Confidence Limit	0.25	0.23	-	-	-
Upper 95% Confidence Limit	3.70	3.90	-	-	-
O/E Ratio	0.00	0.00	-	-	-
Lower 95% Confidence Limit	0.00	0.00	-	-	-
Upper 95% Confidence Limit	41.34	34.91	-	-	-
Risk-adjusted Rate	0.0%	0.0%	-	-	-
Permanent Stroke					
Odds Ratio	0.95	0.96	-	-	-
Lower 95% Confidence Limit	0.50	0.54	-	-	-
Upper 95% Confidence Limit	1.79	1.71	-	-	-
O/E Ratio	0.00	0.00	-	-	-
Lower 95% Confidence Limit	0.00	0.00	-	-	-
Upper 95% Confidence Limit	6.74	6.88	-	-	-
Risk-adjusted Rate	0.0%	0.0%	-	-	-
Renal Failure					
Odds Ratio	1.56	0.77	-	-	-
Lower 95% Confidence Limit	0.54	0.26	-	-	-
Upper 95% Confidence Limit	4.51	2.25	-	-	-
O/E Ratio	3.21	0.00	-	-	-
Lower 95% Confidence Limit	0.56	0.00	-	-	-
Upper 95% Confidence Limit	10.18	3.70	-	-	-
Risk-adjusted Rate	6.9%	0.0%	-	-	-

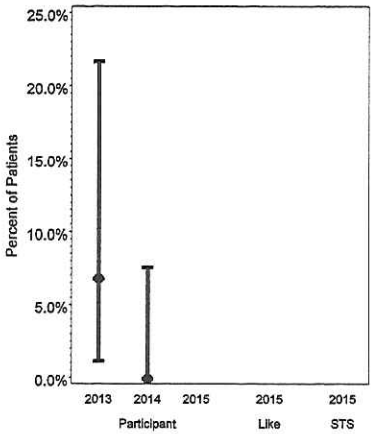
Deep Sternal Infx/Mediastinitis
Risk-adjusted rate + 95% CI



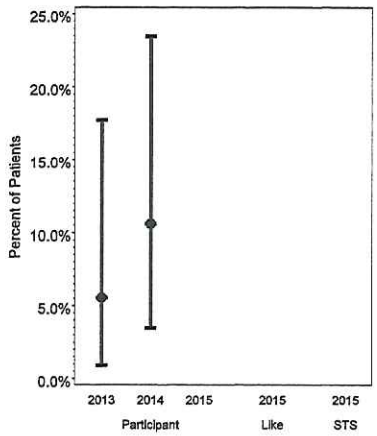
Permanent Stroke
Risk-adjusted rate + 95% CI



Renal Failure Complication
Risk-adjusted rate + 95% CI



Prolonged Ventilation
Risk-adjusted rate + 95% CI





Isolated CABG Procedures
Data Summary

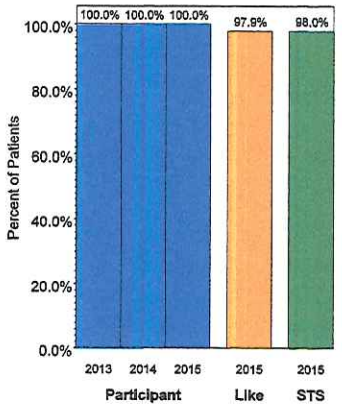
Participant 30398
STS Period Ending 03/31/2015

Duke Clinical Research Institute

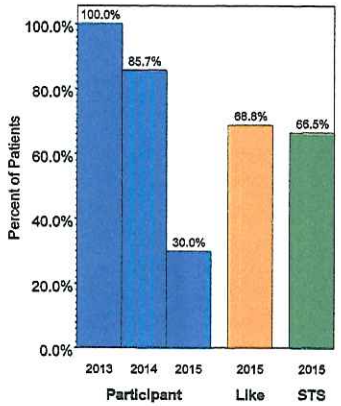
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30398			Like Group	STS
	2013	2014	2015	2015	2015
Prolonged Ventilation					
Odds Ratio	0.84	1.21	-	-	-
Lower 95% Confidence Limit	0.37	0.55	-	-	-
Upper 95% Confidence Limit	1.92	2.69	-	-	-
O/E Ratio	0.63	1.30	-	-	-
Lower 95% Confidence Limit	0.11	0.43	-	-	-
Upper 95% Confidence Limit	2.00	2.87	-	-	-
Risk-adjusted Rate	5.6%	10.7%	-	-	-
Discharge Location[1]					
Home	52.4%	58.5%	46.2%	76.4%	77.8%
Extended Care/TCU	42.9%	36.6%	53.8%	19.0%	17.5%
Other Acute Care Hospital	2.4%	4.9%	0.0%	0.8%	0.8%
Nursing Home	0.0%	0.0%	0.0%	2.9%	3.0%
Hospice	0.0%	0.0%	0.0%	0.2%	0.2%
Left AMA[2]	-	0.0%	0.0%	0.1%	0.1%
Other	2.4%	0.0%	0.0%	0.5%	0.3%
Missing	0.0%	0.0%	0.0%	0.2%	0.3%
Discharge Medications[1]					
Aspirin	100.0%	100.0%	100.0%	96.7%	96.6%
Among Eligible Cases	100.0%	100.0%	100.0%	97.9%	98.0%
Contraindicated / Not Indicated	0.0%	0.0%	0.0%	1.2%	1.4%
Missing	0.0%	0.0%	0.0%	0.3%	0.4%
ACE inhibitors	21.4%	29.3%	23.1%	42.9%	39.7%
Among Eligible Cases	100.0%	85.7%	30.0%	68.8%	66.5%
Contraindicated / Not Indicated	78.6%	65.9%	23.1%	37.7%	40.3%
Missing	0.0%	0.0%	0.0%	0.3%	0.4%
Beta Blockers	100.0%	97.6%	92.3%	94.3%	94.5%
Among Eligible Cases	100.0%	97.6%	100.0%	97.7%	98.0%
Contraindicated / Not Indicated	0.0%	0.0%	7.7%	3.5%	3.6%
Missing	0.0%	0.0%	0.0%	0.3%	0.4%
Any Lipid-Lowering Agents[3]	97.6%	96.0%	-	-	-
Among Eligible Cases	100.0%	100.0%	-	-	-
Contraindicated / Not Indicated	2.4%	4.0%	-	-	-
Missing	0.0%	0.0%	-	-	-

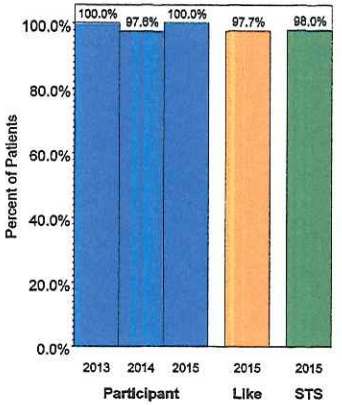
Discharge Aspirin



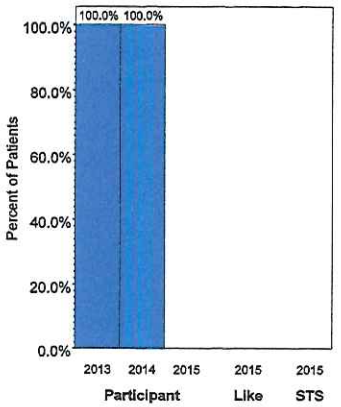
Discharge ACE Inhibitors



Discharge Beta Blocker

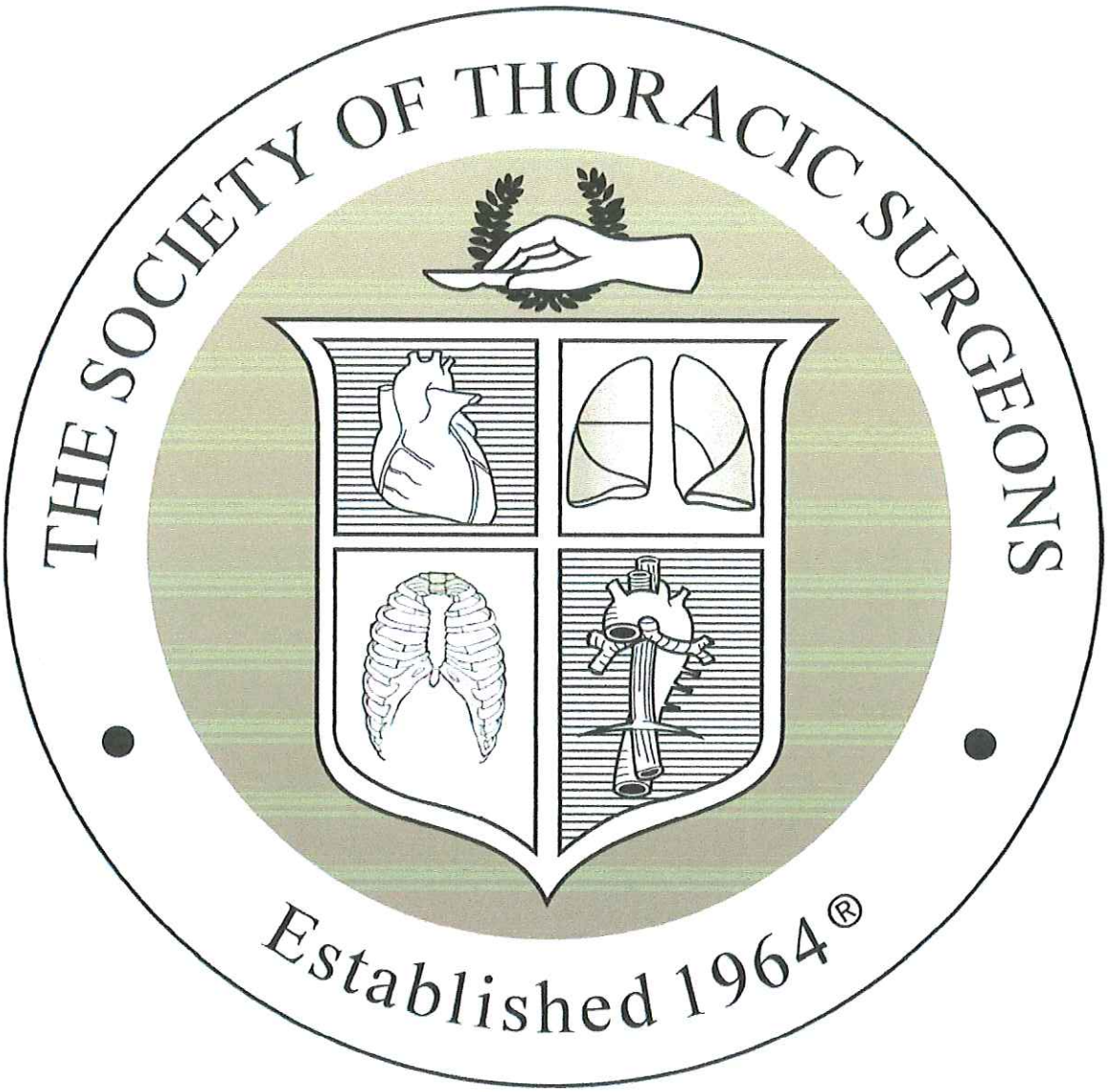


Discharge Lipid-Lowering Agent



[1]Excludes in-hospital mortalities
[2]Option added in v2.81
[3]Variable dropped in v2.81

DATA ANALYSES OF
THE SOCIETY OF THORACIC SURGEONS
NATIONAL ADULT CARDIAC SURGERY DATABASE



Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER

July 2015

Period Ending 03/31/2015

Waterbury Hospital

Isolated CABG Procedures
Data Summary

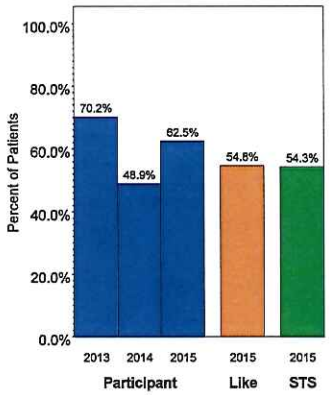
Participant 30397
STS Period Ending 03/31/2015

Duke Clinical Research Institute

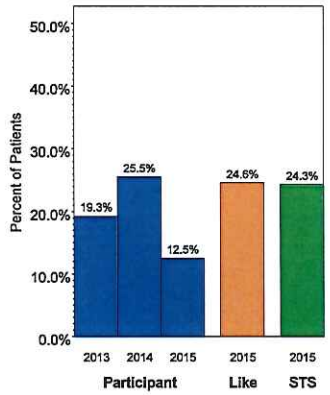
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30397			Like Group	STS
	2013	2014	2015	2015	2015
Number of Cases	57	47	8	15,840	34,539
Demographics					
Age (years)					
Mean	70.7	64.4	62.5	65.3	65.1
Median	71.0	64.0	65.0	66.0	66.0
25th Percentile	64.0	59.0	60.5	59.0	58.0
75th Percentile	80.0	71.0	69.5	72.0	72.0
Age >= 65 years old	70.2%	48.9%	62.5%	54.8%	54.3%
Gender, Female	19.3%	25.5%	12.5%	24.6%	24.3%
Missing	0.0%	0.0%	0.0%	0.0%	0.0%
Race[1]					
Caucasian	96.5%	89.4%	100.0%	82.4%	82.9%
Black	3.5%	6.4%	0.0%	6.7%	7.6%
Asian	0.0%	0.0%	0.0%	3.1%	3.0%
Native American	0.0%	0.0%	0.0%	0.8%	0.6%
Native Hawaiian/Pacific Islander	0.0%	2.1%	0.0%	0.5%	0.5%
Other	0.0%	4.3%	0.0%	3.0%	3.0%
Multiple Races	0.0%	2.1%	0.0%	0.8%	0.9%
Missing / Not Documented	0.0%	0.0%	0.0%	4.4%	3.5%
Pt. Declined to Disclose[2]	-	0.0%	0.0%	0.4%	0.5%
Hispanic or Latino or Spanish Ethnicity	5.3%	0.0%	0.0%	7.7%	6.5%
Missing/ Not Documented	0.0%	8.5%	0.0%	5.3%	5.0%
Body Mass Index[3]					
Underweight (BMI < 18.5)	0.0%	2.1%	0.0%	0.6%	0.6%
Normal (BMI 18.5 - 24.9)	24.6%	12.8%	12.5%	17.6%	17.8%
Overweight (BMI 25.0 - 29.9)	35.1%	38.3%	37.5%	35.9%	36.4%
Obese I (BMI 30.0 - 34.9)	29.8%	25.5%	37.5%	27.6%	27.2%
Obese II (BMI 35.0 - 39.9)	5.3%	12.8%	12.5%	11.8%	11.5%
Morbid Obesity (BMI 40.0+)	5.3%	8.5%	**0.0%**	6.3%	6.3%
Missing Height	0.0%	0.0%	0.0%	0.1%	0.1%
Missing Weight	0.0%	0.0%	0.0%	0.1%	0.1%

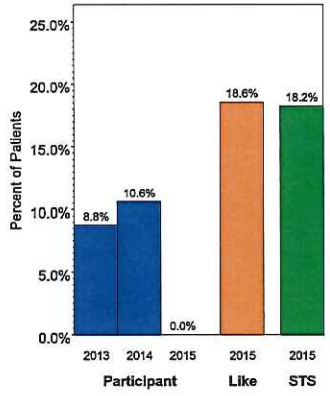
Age >= 65



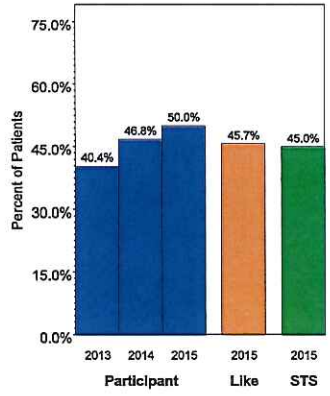
Gender, Female



Race, Non-Caucasian



Obesity (BMI 30+)



[1]Data presented in the report represent the individual response rates for each race category shown; summing the individual non-caucasian categories will not result in the same rates as shown in the graph since non-caucasian, as defined for the graph, does not include races or ethnicities reported in combination with caucasian

[2]Option added in v2.81

[3]BMI = Weight(kg) / Height(m)^2

Isolated CABG Procedures
Data Summary

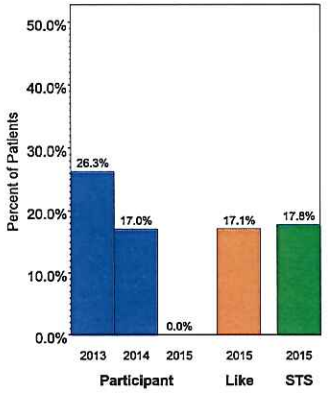
Participant 30397
STS Period Ending 03/31/2015

Duke Clinical Research Institute

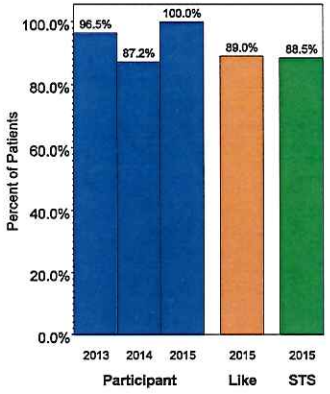
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30397			Like Group	STS
	2013	2014	2015	2015	2015
Comorbidities					
Diabetes Mellitus	49.1%	48.9%	37.5%	47.0%	47.6%
Diet Control	3.5%	8.5%	0.0%	2.6%	2.7%
Oral Control	17.5%	19.1%	25.0%	21.7%	21.9%
Insulin Control	26.3%	17.0%	0.0%	17.1%	17.8%
Other SQ Medication Control[1]	-	0.0%	0.0%	0.2%	0.2%
Other Control	0.0%	2.1%	0.0%	0.1%	0.1%
Missing Control	0.0%	0.0%	0.0%	1.5%	1.1%
Missing	0.0%	2.1%	0.0%	0.4%	0.4%
Hypertension	**96.5%**	87.2%	**100.0%**	89.0%	88.5%
Missing	0.0%	2.1%	0.0%	0.4%	0.5%
Dyslipidemia	91.2%	80.9%	87.5%	86.5%	87.0%
Missing	0.0%	2.1%	0.0%	0.7%	0.7%
Family History of CAD	59.6%	34.0%	50.0%	27.2%	25.2%
Missing	0.0%	4.3%	0.0%	6.4%	6.2%
Current/Recent Cigarette Smoker	19.3%	34.0%	37.5%	23.2%	22.8%
Smoker, Current Status Unknown[1]	-	0.0%	0.0%	0.8%	0.6%
Missing	0.0%	6.4%	0.0%	0.9%	0.8%
Chronic Lung Disease					
Mild	10.5%	0.0%	12.5%	11.7%	11.3%
Moderate	1.8%	4.3%	12.5%	5.8%	5.2%
Severe	1.8%	2.1%	0.0%	4.5%	4.6%
Unknown Severity[1]	-	6.4%	0.0%	5.0%	4.7%
Missing	0.0%	8.5%	0.0%	4.2%	3.6%
Congestive Heart Failure	7.0%	2.1%	**0.0%**	18.8%	20.2%
CHF / NYHA Class I[2]	0.0%	0.0%	0.0%	1.4%	1.5%
CHF / NYHA Class II	0.0%	0.0%	0.0%	5.4%	6.1%
CHF / NYHA Class III	0.0%	0.0%	0.0%	6.6%	7.1%
CHF / NYHA Class IV	7.0%	2.1%	0.0%	4.6%	4.7%
CHF / Missing Class	0.0%	0.0%	-	4.5%	3.9%
Missing	0.0%	0.0%	0.0%	1.5%	1.2%
Peripheral Arterial Disease	7.0%	6.4%	**0.0%**	13.6%	14.1%
Missing	0.0%	0.0%	0.0%	1.2%	0.9%

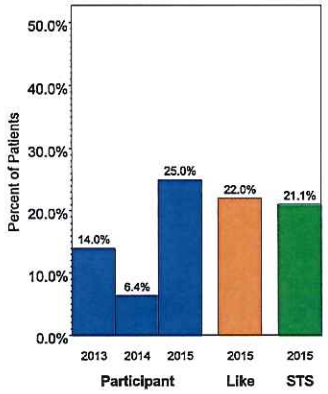
Diabetes, Insulin Dependent



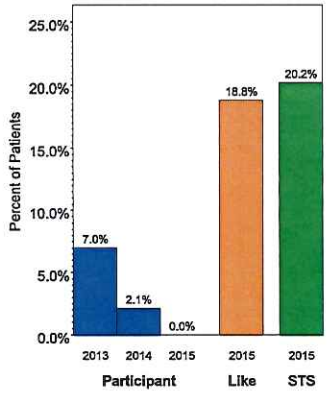
Hypertension



Chronic Lung Disease, Any



Congestive Heart Failure



[1]Option added in v2.81

[2]NYHA Class is only collected for patients with CHF

% represents proportion of cases that had both CHF and the indicated NYHA class

Isolated CABG Procedures
Data Summary

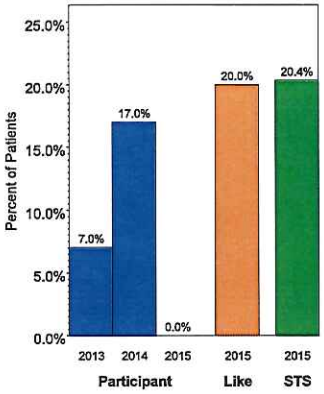
Participant 30397
STS Period Ending 03/31/2015

Duke Clinical Research Institute

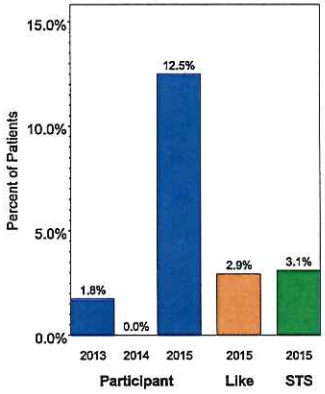
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30397			Like Group	STS
	2013	2014	2015	2015	2015
Cerebrovascular Disease	7.0%	17.0%	**0.0%**	20.0%	20.4%
Missing	0.0%	0.0%	0.0%	0.9%	0.9%
Coma/Nonresponsive State	0.0%	0.0%	0.0%	0.4%	0.3%
Missing	0.0%	0.0%	0.0%	0.5%	0.6%
CVD TIA	0.0%	2.1%	0.0%	4.1%	4.2%
Missing	0.0%	2.1%	0.0%	1.5%	1.3%
Carotid Stenosis[1]					
None	98.2%	91.5%	100.0%	87.7%	88.1%
50-79%[2]	-	0.0%	0.0%	8.2%	8.2%
80-100%	1.8%	8.5%	0.0%	2.2%	2.1%
Missing/Not Documented	0.0%	0.0%	0.0%	1.9%	1.7%
CVD Prior Carotid Surgery	1.8%	4.3%	0.0%	3.6%	3.8%
Missing	0.0%	0.0%	0.0%	1.0%	1.0%
Cerebrovascular Accident	3.5%	10.6%	**0.0%**	7.4%	7.7%
Missing	0.0%	2.1%	0.0%	1.2%	1.1%
Renal Failure, Dialysis-Dependent	1.8%	**0.0%**	**12.5%**	2.9%	3.1%
Missing	0.0%	2.1%	0.0%	0.3%	0.4%
Last Creatinine Preop					
Mean	1.1	1.1	1.6	1.2	1.2
Median	1.0	1.0	0.9	1.0	1.0
25th Percentile	0.8	0.8	0.7	0.8	0.8
75th Percentile	1.1	1.1	1.1	1.2	1.2
Missing	0.0%	0.0%	0.0%	0.4%	0.4%
Value >= 4.0 mg/dL	0.0%	2.1%	12.5%	2.4%	2.5%
Immunosuppressive Treatment	5.3%	**12.8%**	**0.0%**	2.8%	3.3%
Missing	0.0%	2.1%	0.0%	1.0%	0.7%
Previous Interventions					
Previous Cardiac Surgery[3]	5.3%	0.0%	0.0%	2.5%	2.8%
First reoperation	5.3%	**0.0%**	**0.0%**	2.3%	2.6%
Previous CABG	0.0%	0.0%	0.0%	2.0%	2.3%

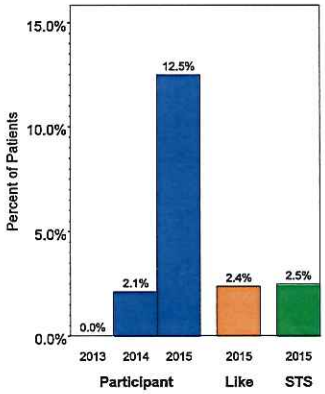
Cerebrovascular Disease



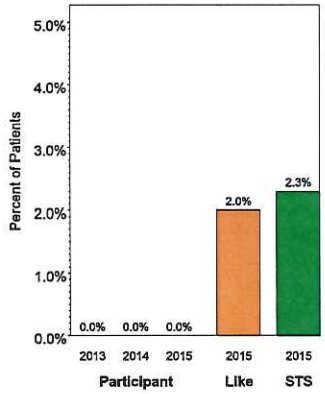
Dialysis



Last Creatinine Preop >= 4.0



Previous CABG



[1]Defined as highest level of occlusion in either carotid.
[2]Option added in v2.81
[3]Previous cardiac surgery reflects any prior CABG, valve, or other cardiac surgery

Isolated CABG Procedures
Data Summary

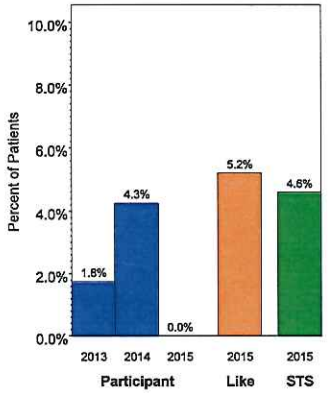
Participant 30397
STS Period Ending 03/31/2015

Duke Clinical Research Institute

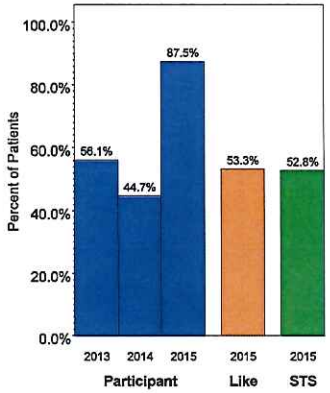
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30397			Like Group	STS
	2013	2014	2015	2015	2015
Previous AICD	0.0%	2.1%	0.0%	0.7%	0.9%
Previous Pacemaker	1.8%	0.0%	0.0%	1.7%	1.8%
Previous PCI	21.1%	25.5%	0.0%	30.0%	30.5%
<= 6 hours prior to surgery	**0.0%**	**0.0%**	**0.0%**	1.1%	1.0%
> 6 hours prior to surgery	21.1%	25.5%	0.0%	28.9%	29.4%
Missing timing	0.0%	0.0%	-	0.1%	0.2%
Previous PCI Stent	75.0%	83.3%	-	83.9%	85.9%
Status					
Surgery Status					
Elective	52.6%	25.5%	0.0%	38.1%	36.3%
Urgent	45.6%	70.2%	100.0%	56.6%	59.1%
Emergent	1.8%	4.3%	**0.0%**	5.0%	4.4%
Emergent Salvage	**0.0%**	**0.0%**	**0.0%**	0.2%	0.2%
Missing	0.0%	0.0%	0.0%	0.1%	0.1%
MI	56.1%	44.7%	**87.5%**	53.3%	52.8%
<= 7 days prior to surgery	29.8%	27.7%	75.0%	29.7%	28.7%
8-21 days prior to surgery	10.5%	8.5%	12.5%	5.0%	5.1%
>21 days prior to surgery	15.8%	8.5%	0.0%	18.4%	18.9%
Missing timing	0.0%	0.0%	0.0%	0.3%	0.4%
Missing	0.0%	4.3%	0.0%	1.2%	1.1%
Cardiogenic Shock					
At the time of surgery	**0.0%**	4.3%	**0.0%**	1.7%	1.6%
Within 24 hrs of surgery[1]	-	0.0%	0.0%	0.7%	0.6%
Missing	0.0%	0.0%	0.0%	0.1%	0.3%
Resuscitation					
<= 1 hr prior to surgery	3.5%	2.1%	**0.0%**	0.4%	0.3%
1-24 hrs prior to surgery[1]	-	0.0%	0.0%	0.6%	0.5%
Missing	0.0%	0.0%	0.0%	0.2%	0.3%

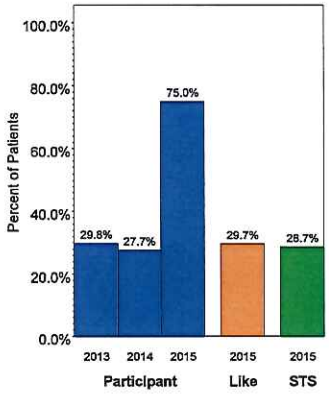
Emergent or Salvage Status



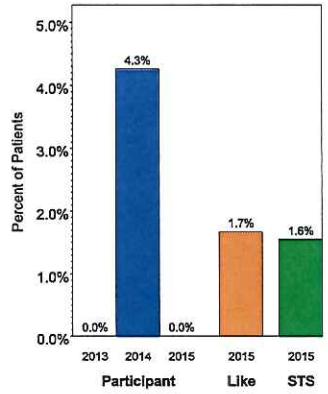
Prior MI



MI within 7 days



Cardiogenic Shock



[1]Option added in v2.81



Isolated CABG Procedures
Data Summary

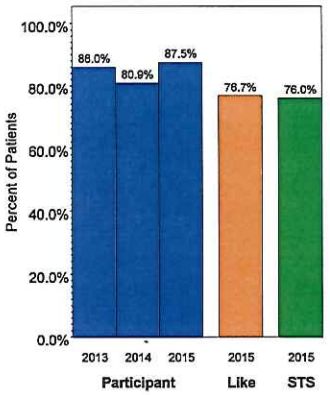
Participant 30397
STS Period Ending 03/31/2015

Duke Clinical Research Institute

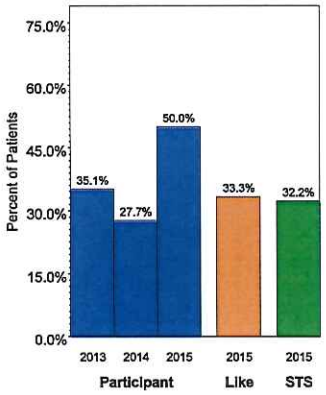
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30397			Like Group	STS
	2013	2014	2015	2015	2015
Cardiac Pres. on Admission					
No Symptoms or Angina	26.3%	27.7%	25.0%	10.3%	9.8%
Symptoms Unlikely to be Ischemia[1]	0.0%	0.0%	-	-	-
Stable Angina	26.3%	27.7%	0.0%	14.9%	14.7%
Unstable Angina	7.0%	**4.3%**	**0.0%**	34.3%	36.4%
Non-ST Elevation MI (Non-STEMI)	40.4%	34.0%	75.0%	26.9%	26.0%
ST Elevation MI (STEMI)	0.0%	4.3%	0.0%	6.0%	5.7%
Angina Equivalent[2]	-	2.1%	0.0%	3.7%	3.4%
Other[2]	-	0.0%	0.0%	3.8%	3.7%
Missing	0.0%	0.0%	0.0%	0.2%	0.3%
Any Arrhythmia[3]	10.5%	10.6%	0.0%	13.4%	13.6%
Recent	7.0%	10.6%	0.0%	11.9%	11.9%
Remote	3.5%	0.0%	0.0%	1.1%	1.2%
Missing	0.0%	0.0%	0.0%	0.8%	0.8%
Ventricular Tachycardia/Fibrillation[4]	3.5%	6.4%	0.0%	3.3%	3.3%
Missing	0.0%	0.0%	-	0.9%	0.6%
3rd degree Heart Block[4]	0.0%	0.0%	0.0%	0.7%	0.7%
Missing	0.0%	0.0%	-	1.0%	0.7%
Atrial Fibrillation/Flutter[5]	3.5%	4.0%	-	-	-
Missing	0.0%	0.0%	-	-	-
Atrial Fibrillation[4, 5]	-	9.1%	0.0%	8.8%	9.0%
Missing	-	0.0%	-	0.6%	0.4%
Atrial Flutter[4, 5]	-	0.0%	0.0%	1.1%	1.2%
Missing	-	0.0%	-	0.9%	0.6%
Hemodynamics and Catheterization					
Number of Diseased Coronary Vessels					
One	1.8%	4.3%	0.0%	4.0%	4.1%
Two	12.3%	14.9%	12.5%	18.3%	18.8%
Three	86.0%	80.9%	87.5%	76.7%	76.0%
Missing	0.0%	0.0%	0.0%	0.9%	1.0%
Left Main Disease (>=50% Stenosis)	35.1%	27.7%	**50.0%**	33.3%	32.2%
Missing	0.0%	2.1%	0.0%	32.2%	33.9%

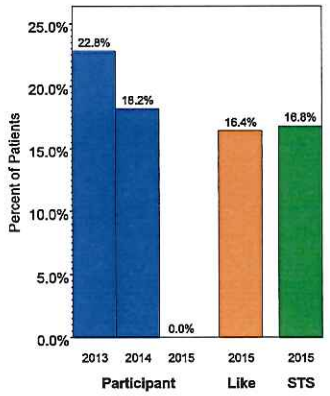
Triple Vessel Disease



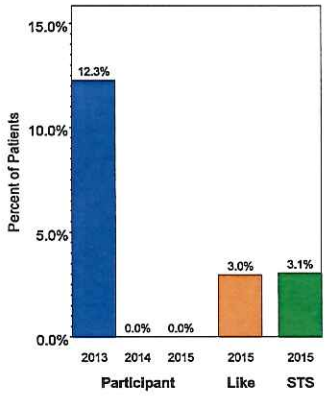
Left Main Disease



Ejection Fraction <40%



Aortic Stenosis



[1]Option dropped in v2.81
[2]Option added in v2.81
[3]Includes VTach/VFib, 2nd and 3rd degree HB, Sick Sinus Syndrome, AFib, and AFlutter
[4]For v2.81 data, includes recent or remote arrhythmias
[5] For v2.81 data, AFib and AFlutter were separated.

Isolated CABG Procedures
Data Summary

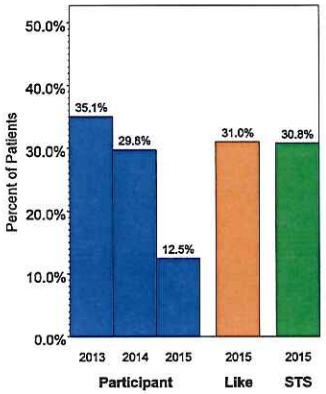
Participant 30397
STS Period Ending 03/31/2015

Duke Clinical Research Institute

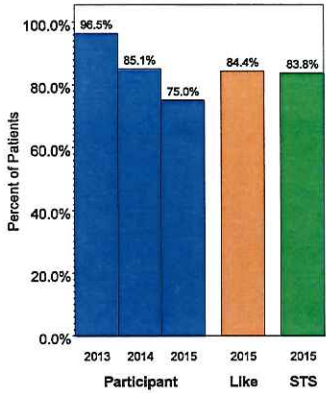
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30397			Like Group	STS
	2013	2014	2015	2015	2015
Ejection Fraction					
Mean	49.5	51.0	57.9	51.4	51.2
Median	55.0	54.0	60.0	55.0	55.0
25th Percentile	43.0	45.0	55.0	45.0	45.0
75th Percentile	60.0	60.0	60.0	60.0	60.0
EF missing or not measured	0.0%	6.4%	0.0%	3.5%	3.3%
EF <40%[1]	22.8%	18.2%	0.0%	16.4%	16.8%
Pulmonary Hypertension[2]	35.7%	56.3%	0.0%	36.9%	36.2%
PA mean/systolic pressure missing or not measured	54.4%	66.0%	87.5%	64.9%	65.2%
Aortic Stenosis	12.3%	0.0%	0.0%	3.0%	3.1%
Missing	0.0%	0.0%	0.0%	2.5%	2.3%
Mitral Insufficiency					
Trivial	17.5%	10.6%	0.0%	22.4%	23.4%
Mild	22.8%	19.1%	12.5%	24.0%	23.7%
Moderate	12.3%	10.6%	0.0%	6.5%	6.6%
Severe	0.0%	0.0%	0.0%	0.5%	0.5%
Missing/Not Documented	0.0%	0.0%	0.0%	1.2%	1.1%
Preoperative Medications					
Aspirin	96.5%	85.1%	75.0%	83.9%	83.2%
Among Eligible Cases	96.5%	85.1%	75.0%	84.4%	83.8%
Contraindicated / Not Indicated[3]	0.0%	0.0%	0.0%	0.6%	0.7%
Missing	0.0%	0.0%	0.0%	0.7%	0.6%
Inotropics	0.0%	0.0%	0.0%	1.6%	1.5%
Missing	0.0%	0.0%	0.0%	0.2%	0.3%
Beta Blockers	86.0%	74.5%	87.5%	88.6%	89.8%
Among Eligible Cases	92.3%	87.5%	100.0%	93.5%	94.7%
Contraindicated / Not Indicated	7.0%	10.6%	12.5%	4.3%	4.4%
Missing	0.0%	0.0%	0.0%	0.1%	0.1%

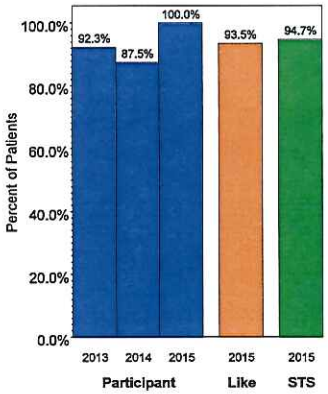
Mitral Insufficiency, Mild+



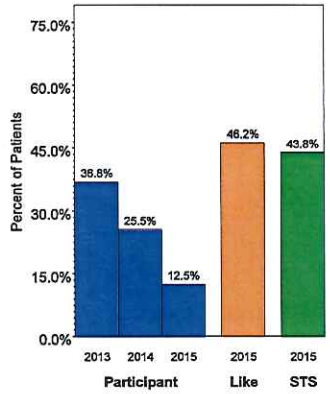
Preoperative Aspirin



Preoperative Beta Blocker



Preoperative ACE Inhibitors



[1]Among patients with measured EF
[2]PA systolic pressure > 35mmHg
[3]For v2.73 data, the Contraindicated/Not Indicated option was deleted



Isolated CABG Procedures
Data Summary

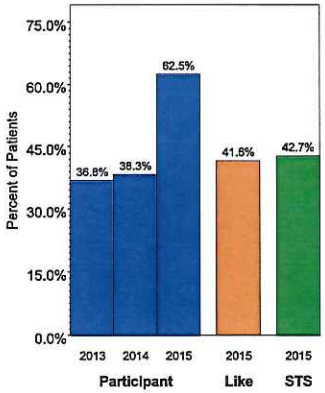
Participant 30397
STS Period Ending 03/31/2015

Duke Clinical Research Institute

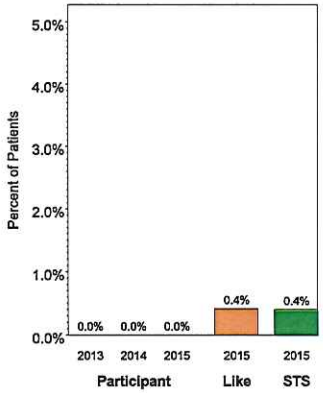
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30397			Like Group	STS
	2013	2014	2015	2015	2015
Steroids	1.8%	8.5%	12.5%	2.3%	2.3%
Among Eligible Cases	1.8%	8.5%	12.5%	2.3%	2.3%
Contraindicated / Not Indicated[1]	0.0%	0.0%	0.0%	0.0%	0.1%
Missing	0.0%	0.0%	0.0%	0.7%	0.5%
Nitrates IV	3.5%	12.8%	0.0%	9.8%	9.2%
Missing	0.0%	0.0%	0.0%	0.6%	0.6%
ACE Inhibitors	36.8%	25.5%	12.5%	46.2%	43.8%
Among Eligible Cases	36.8%	25.5%	12.5%	46.2%	43.8%
Contraindicated / Not Indicated	0.0%	0.0%	0.0%	0.0%	0.0%
Missing	0.0%	0.0%	0.0%	0.9%	0.9%
Anticoagulants	36.8%	38.3%	62.5%	41.6%	42.7%
Missing	0.0%	0.0%	0.0%	0.4%	0.4%
Coumadin	0.0%	0.0%	0.0%	0.4%	0.4%
Missing	0.0%	0.0%	0.0%	0.5%	0.6%
Lipid-Lowering agents	96.5%	89.4%	87.5%	77.7%	77.6%
Among Eligible Cases	96.5%	91.3%	87.5%	78.5%	78.4%
Contraindicated / Not Indicated[1]	0.0%	2.1%	0.0%	1.0%	1.0%
Missing	0.0%	0.0%	0.0%	0.9%	0.9%
Glycoprotein IIb/IIIa Inhibitor	0.0%	0.0%	0.0%	2.3%	1.9%
Missing	0.0%	0.0%	0.0%	0.5%	0.6%
ADP Inhibitors within 5 Days	7.0%	4.3%	0.0%	9.1%	10.5%
Among Eligible Cases	7.0%	4.3%	0.0%	9.2%	10.5%
Contraindicated / Not Indicated[1]	0.0%	0.0%	0.0%	0.5%	0.6%
Missing	0.0%	0.0%	0.0%	0.3%	0.4%
ADP Inhibitor Discontinuation[2]					
< 1 Day	25.0%	50.0%	-	13.7%	15.2%
1 Day	0.0%	0.0%	-	16.8%	19.2%
2 Days	0.0%	0.0%	-	17.7%	17.9%
3 Days	25.0%	50.0%	-	19.8%	18.9%
4 Days	50.0%	0.0%	-	20.0%	18.5%
5 Days	0.0%	0.0%	-	10.0%	9.3%
Missing	0.0%	0.0%	-	2.0%	1.0%

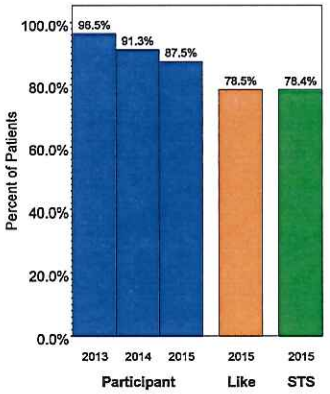
Preoperative Anticoagulants



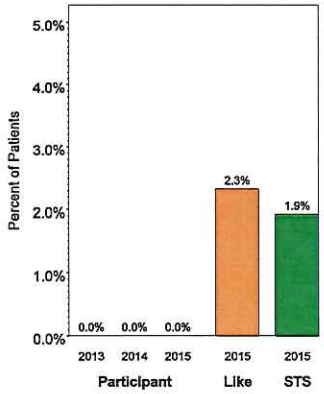
Preoperative Coumadin



Preoperative Lipid-Lowering Agent



Preoperative GP IIb-IIIa Inhibitors



[1]For v2.73 data, the Contraindicated/Not Indicated option was deleted

[2]Excludes patients not on ADP Inhibitors within 5 Days

Isolated CABG Procedures
Data Summary

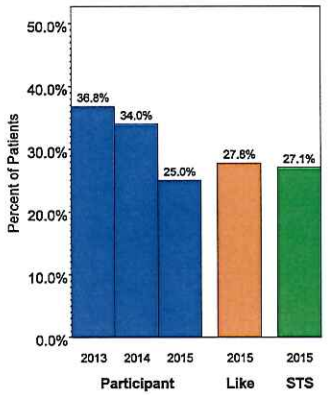
Participant 30397
STS Period Ending 03/31/2015

Duke Clinical Research Institute

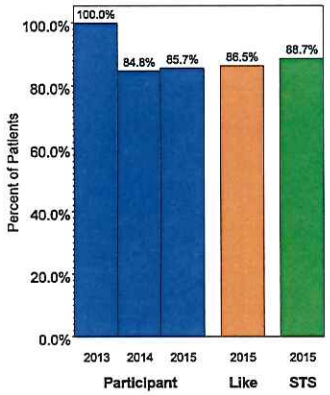
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30397			Like Group	STS
	2013	2014	2015	2015	2015
Antiplatelets within 5 Days	0.0%	2.1%	0.0%	4.1%	4.4%
Among Eligible Cases	0.0%	2.1%	0.0%	4.1%	4.4%
Contraindicated / Not Indicated[1]	0.0%	0.0%	0.0%	0.2%	0.2%
Missing	0.0%	0.0%	0.0%	0.6%	0.6%
Operative Information					
Blood Products Used	36.8%	34.0%	25.0%	27.8%	27.1%
Number of Blood Product Units Used					
1 Red Blood Cell Unit	14.0%	12.8%	0.0%	5.5%	5.9%
2 Red Blood Cell Units	12.3%	4.3%	12.5%	8.6%	8.3%
3 Red Blood Cell Units	3.5%	2.1%	12.5%	2.7%	2.7%
4+ Red Blood Cell Units	5.3%	2.1%	0.0%	3.6%	3.1%
1+ Fresh Frozen Plasma Units	10.5%	4.3%	12.5%	8.3%	7.2%
1+ Cryoprecipitate Units	1.8%	0.0%	0.0%	2.1%	2.1%
1+ Platelet Units	10.5%	17.0%	0.0%	13.4%	12.6%
Missing	0.0%	0.0%	0.0%	1.7%	1.6%
Number of Distal Anastamoses, Total					
1	3.5%	4.3%	0.0%	4.9%	5.2%
2	12.3%	17.0%	12.5%	17.2%	17.5%
3	31.6%	27.7%	25.0%	38.8%	39.2%
4	26.3%	38.3%	25.0%	29.0%	28.4%
5+	26.3%	12.8%	37.5%	9.8%	9.5%
Missing[2]	0.0%	0.0%	0.0%	0.1%	0.1%
Vein Harvest Technique[3]					
Endovascular/Endoscopic	100.0%	84.8%	85.7%	86.5%	88.7%
Direct Vision	0.0%	13.0%	14.3%	10.6%	8.7%
Both	0.0%	2.2%	0.0%	2.1%	1.8%
Cryopreserved	0.0%	0.0%	0.0%	0.1%	0.0%
Missing	0.0%	0.0%	0.0%	0.7%	0.8%
Internal Mammary Artery Used[4]					
Any	100.0%	95.6%	100.0%	98.5%	98.7%
Left	98.2%	95.6%	100.0%	94.4%	93.6%
Right	0.0%	0.0%	0.0%	0.5%	0.5%
Both	1.8%	0.0%	0.0%	3.6%	4.6%
Missing	0.0%	0.0%	0.0%	0.2%	0.1%

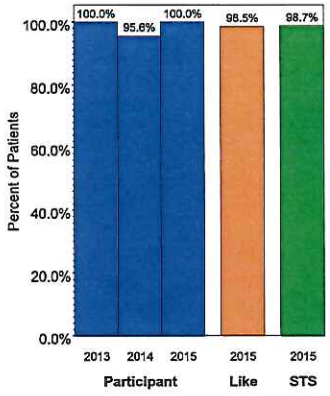
Intraop Blood Products Used



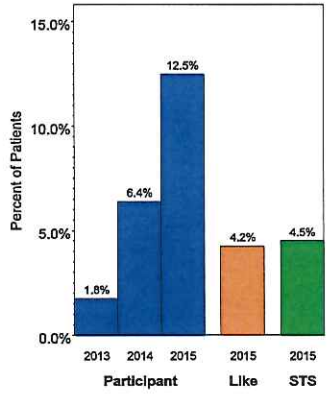
Endovascular Vein Harvest Technique



Internal Mammary Artery Used



Radial Artery Used



[1]For v2.73 data, the Contraindicated/Not Indicated option was deleted
[2]Where number of arterial conduits and number of vein grafts both missing
[3]Where at least 1 vein was harvested
[4]Excludes patients with prior CABG surgery

Isolated CABG Procedures
Data Summary

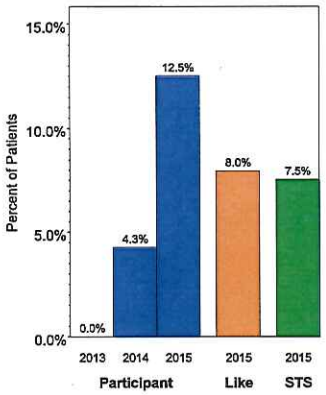
Participant 30397
STS Period Ending 03/31/2015

Duke Clinical Research Institute

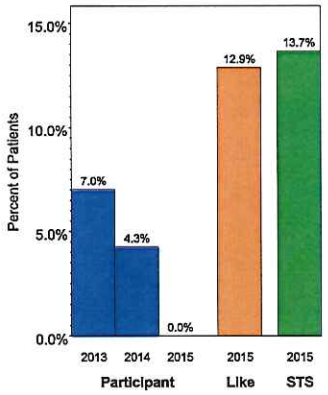
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30397			Like Group	STS
	2013	2014	2015	2015	2015
Radial Artery Used	1.8%	6.4%	12.5%	4.2%	4.5%
Missing	0.0%	0.0%	0.0%	1.1%	1.0%
Radial Artery Harvest Technique					
Endovascular/Endoscopic	100.0%	66.7%	100.0%	36.0%	40.1%
Direct Vision	0.0%	0.0%	0.0%	56.3%	53.0%
Both	0.0%	33.3%	0.0%	0.1%	0.5%
Missing	0.0%	0.0%	0.0%	7.6%	6.4%
IABP Used	0.0%	4.3%	12.5%	10.5%	10.0%
Preop	**0.0%**	4.3%	12.5%	8.0%	7.5%
Intraop	0.0%	0.0%	0.0%	2.1%	2.0%
Postop	0.0%	0.0%	0.0%	0.4%	0.4%
Missing Timing	-	0.0%	0.0%	0.1%	0.0%
Missing	0.0%	0.0%	0.0%	0.4%	0.4%
Robotic Technology Assisted	0.0%	0.0%	0.0%	0.5%	0.9%
Missing	0.0%	0.0%	0.0%	0.4%	0.4%
Off-pump Procedure (see following section for detail)	7.0%	4.3%	0.0%	12.9%	13.7%
Cross-Clamp Time (min)					
Mean	68.5	64.0	60.9	70.3	68.4
Median	64.5	61.0	48.5	66.0	64.0
25th Percentile	53.0	51.5	42.0	49.0	47.0
75th Percentile	85.0	78.5	85.5	87.0	85.0
Cardiopulmonary Bypass Time (min)					
Mean	99.6	98.0	84.8	96.7	94.9
Median	97.0	85.0	70.0	91.0	90.0
25th Percentile	78.0	76.0	60.5	70.0	69.0
75th Percentile	118.0	118.5	108.0	117.0	115.0

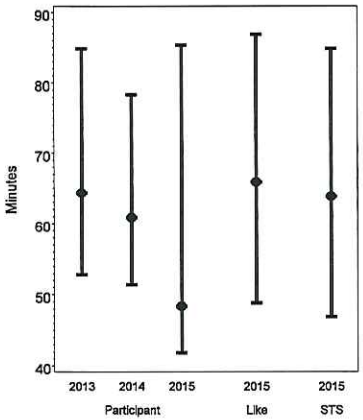
Preoperative IABP



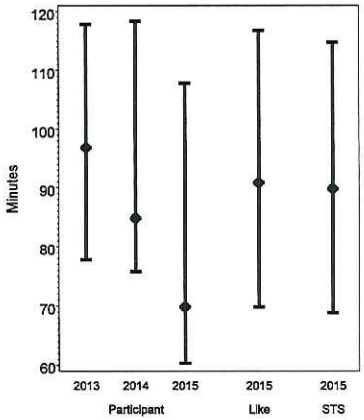
Off-Pump Procedure



Cross-Clamp Time (min)
Median + 25th/75th Percentiles



CPB Time (min)
Median + 25th/75th Percentiles



Isolated CABG Procedures
Data Summary

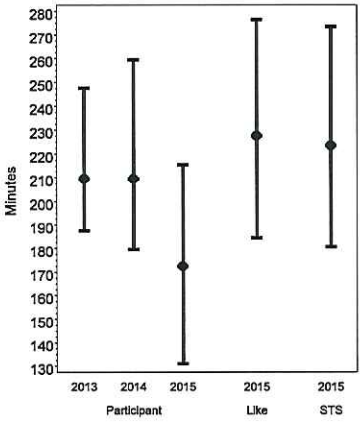
Participant 30397
STS Period Ending 03/31/2015

Duke Clinical Research Institute

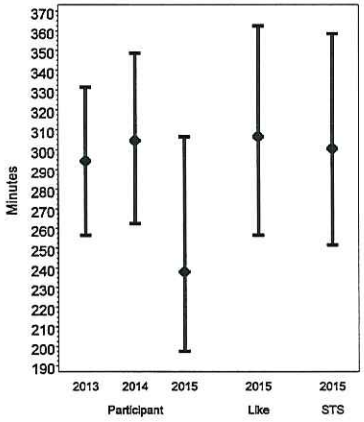
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30397			Like Group	STS
	2013	2014	2015	2015	2015
Circulatory Arrest	0.0%	0.0%	0.0%	0.5%	0.3%
Missing	0.0%	0.0%	0.0%	0.9%	0.7%
Circulatory Arrest Time (min)					
Mean	-	-	-	12.9	11.4
Median	-	-	-	0.0	0.0
25th Percentile	-	-	-	0.0	0.0
75th Percentile	-	-	-	10.0	7.0
Skin Incision Duration (min)					
Mean	218.1	223.5	182.4	236.1	232.3
Median	210.0	210.0	173.0	228.0	224.0
25th Percentile	188.0	180.0	131.5	185.0	181.0
75th Percentile	248.0	260.0	216.0	277.0	274.0
OR Duration (min)					
Mean	299.5	309.8	260.9	316.3	310.9
Median	295.0	305.0	238.5	307.0	301.0
25th Percentile	257.0	263.0	198.0	257.0	252.0
75th Percentile	332.0	349.0	307.0	363.0	359.0
Antibiotic Selection[1,2]	100.0%	100.0%	100.0%	99.1%	99.0%
Exclusions	0.0%	0.0%	0.0%	1.0%	1.0%
Missing	0.0%	0.0%	0.0%	0.6%	0.5%
Antibiotic Timing[1,3]	100.0%	100.0%	100.0%	98.9%	98.7%
Exclusions	0.0%	0.0%	0.0%	0.6%	0.5%
Missing	0.0%	0.0%	0.0%	0.5%	0.5%
Antibiotics Discontinued[1,4]	100.0%	100.0%	100.0%	98.7%	98.4%
Exclusions	0.0%	0.0%	0.0%	1.7%	1.3%
Missing	0.0%	0.0%	0.0%	0.8%	0.6%
Clotting Agents[5]	66.7%	51.1%	12.5%	83.7%	81.5%
Missing	0.0%	0.0%	0.0%	0.8%	1.2%

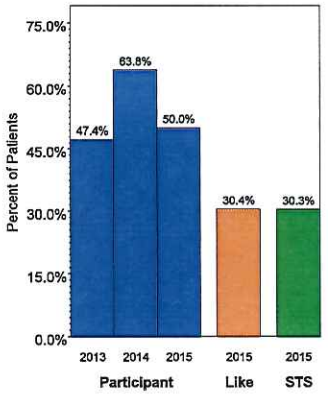
Skin Incision Duration (min)
Median + 25th/75th Percentiles



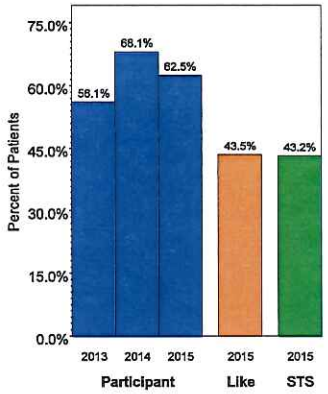
OR Duration (min)
Median + 25th/75th Percentiles



Postop Blood Products Used



Intraop/Postop Products Used



[1]All antibiotic measures are calculated among patients without exclusions
[2]First or second generation cephalosporin prescribed/given prophylactically
[3]Appropriate timing of prophylactic antibiotics
[4]Prophylactic antibiotics discontinued within 48 hours
[5]Includes one or more of the following: Aprotinin, Epsilon Amino-Caproic Acid, Desmopressin, or Tranexamic Acid

Isolated CABG Procedures
Data Summary

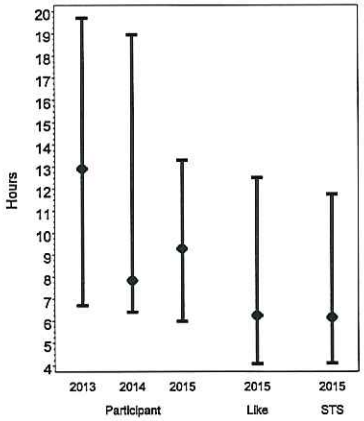
Participant 30397
STS Period Ending 03/31/2015

Duke Clinical Research Institute

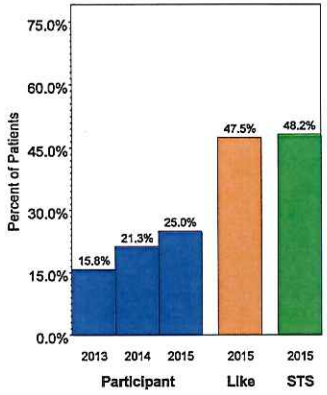
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30397			Like Group	STS
	2013	2014	2015	2015	2015
Postoperative Information					
Blood Products Used	47.4%	63.8%	50.0%	30.4%	30.3%
Number of Blood Product Units Used					
1 Red Blood Cell Unit	14.0%	17.0%	0.0%	9.3%	9.7%
2 Red Blood Cell Units	14.0%	19.1%	37.5%	10.1%	9.7%
3 Red Blood Cell Units	7.0%	14.9%	0.0%	3.2%	3.2%
4+ Red Blood Cell Units	10.5%	12.8%	0.0%	5.2%	5.1%
1+ Fresh Frozen Plasma Units	15.8%	17.0%	12.5%	6.8%	6.7%
1+ Cryoprecipitate Units	0.0%	4.3%	0.0%	2.8%	3.2%
1+ Platelet Units	14.0%	12.8%	12.5%	7.5%	7.6%
Missing	0.0%	0.0%	0.0%	0.3%	0.4%
Intraop/Postop Products Used	56.1%	68.1%	62.5%	43.5%	43.2%
Total Number of Blood Product Units					
1 Red Blood Cell Unit	8.8%	12.8%	0.0%	8.8%	9.3%
2 Red Blood Cell Units	12.3%	12.8%	25.0%	12.4%	12.1%
3 Red Blood Cell Units	15.8%	21.3%	12.5%	5.2%	5.5%
4+ Red Blood Cell Units	17.5%	19.1%	12.5%	11.5%	10.8%
1+ Fresh Frozen Plasma Units	22.8%	19.1%	25.0%	13.3%	12.3%
1+ Cryoprecipitate Units	1.8%	4.3%	0.0%	4.5%	5.0%
1+ Platelet Units	21.1%	23.4%	12.5%	18.4%	17.9%
Missing	0.0%	0.0%	0.0%	0.2%	0.3%
Ventilation					
Total Ventilation Hours					
Mean	28.0	25.1	10.7	18.4	18.7
Median	13.0	7.9	9.3	6.3	6.2
25th Percentile	6.8	6.5	6.0	4.1	4.2
75th Percentile	19.8	19.0	13.4	12.6	11.8
Initial Ventilation Hours					
Mean	16.2	14.7	10.7	13.6	13.9
Median	13.0	7.9	9.3	6.2	6.1
Initial Ventilation <6 hours[1]	15.8%	21.3%	25.0%	47.5%	48.2%
Extubated in OR	0.0%	0.0%	0.0%	2.8%	2.5%
Missing	0.0%	0.0%	0.0%	0.2%	0.3%
Reintubation	1.8%	4.3%	0.0%	3.7%	3.5%
Missing	0.0%	0.0%	0.0%	0.3%	0.4%

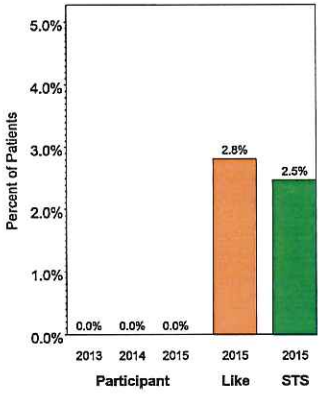
Total Ventilation Hours
Median + 25th/75th Percentiles



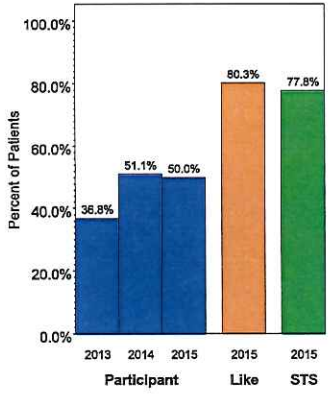
Initial Ventilation <6 Hrs



Extubated in OR



Total ICU >24 hours



[1]Excludes patients extubated in the OR

Isolated CABG Procedures
Data Summary

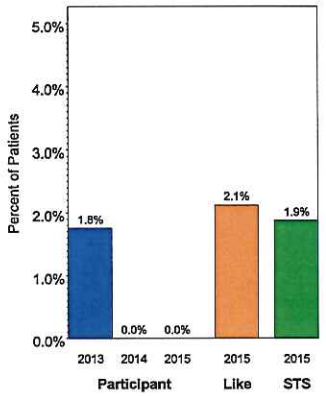
Participant 30397
STS Period Ending 03/31/2015

Duke Clinical Research Institute

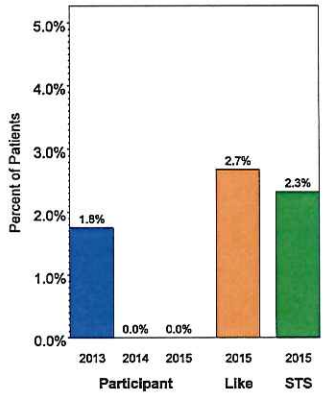
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30397			Like Group	STS
	2013	2014	2015	2015	2015
Additional Ventilation Hours[1]					
Mean	672.0	238.8	-	128.2	135.3
Median	672.0	238.8	-	63.2	64.8
ICU Stay					
Total ICU Hours					
Mean	33.8	42.1	26.5	73.1	72.0
Median	24.0	24.5	21.8	49.5	48.0
75th Percentile	21.0	21.0	17.0	27.3	26.0
25th Percentile	27.0	45.0	35.5	85.7	79.0
Initial ICU Hours					
Mean	33.4	35.7	26.5	70.0	68.7
Median	24.0	23.5	21.8	49.0	47.7
Readmitted to ICU	1.8%	4.3%	0.0%	2.4%	2.6%
Additional ICU Hours[2]					
Mean	20.5	152.0	-	129.0	124.1
Median	20.5	152.0	-	72.2	69.8
Mortality Summary					
In-hospital Mortality	1.8%	0.0%	0.0%	2.1%	1.9%
Operative Mortality	1.8%	**0.0%**	**0.0%**	2.7%	2.3%
Mortality Risk-Adjustment[3]					
In-hospital Mortality					
Odds Ratio	1.00	0.89	-	-	-
Lower 95% Confidence Limit	0.44	0.36	-	-	-
Upper 95% Confidence Limit	2.32	2.16	-	-	-
O/E Ratio	0.96	0.00	-	-	-
Lower 95% Confidence Limit	0.05	0.00	-	-	-
Upper 95% Confidence Limit	4.71	5.15	-	-	-
Risk-adjusted Rate	1.5%	0.0%	-	-	-

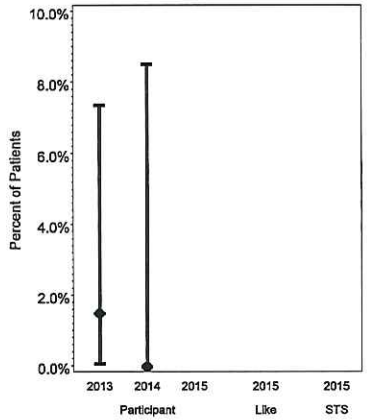
In-Hospital Mortality



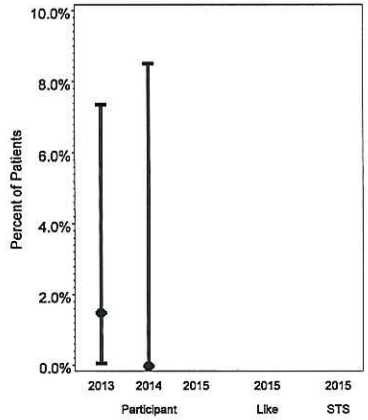
Operative Mortality



In-Hospital Mortality
Risk-adjusted rate + 95% CI



Operative Mortality
Risk-adjusted rate + 95% CI



[1]Among patients reintubated
[2]Among patients readmitted to the ICU
[3]Refer to the Report Overview for information on risk-adjustment methodology
Risk-adjustment is not performed on time periods of less than 6 months

Isolated CABG Procedures
Data Summary

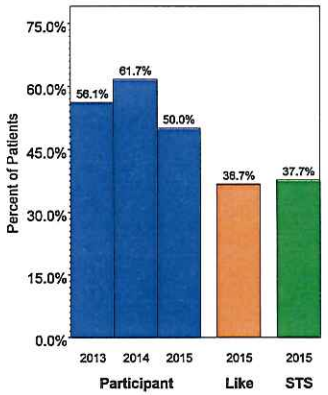
Participant 30397
STS Period Ending 03/31/2015

Duke Clinical Research Institute

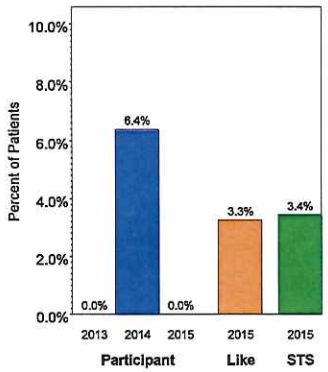
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30397			Like Group	STS
	2013	2014	2015	2015	2015
Operative Mortality					
Odds Ratio	0.97	0.88	-	-	-
Lower 95% Confidence Limit	0.48	0.39	-	-	-
Upper 95% Confidence Limit	1.97	1.98	-	-	-
O/E Ratio	0.77	0.00	-	-	-
Lower 95% Confidence Limit	0.04	0.00	-	-	-
Upper 95% Confidence Limit	3.75	4.13	-	-	-
Risk-adjusted Rate	1.5%	0.0%	-	-	-
Complications Summary					
Any Complications	56.1%	61.7%	50.0%	36.7%	37.7%
Any Major Complications / Operative Mortality	10.5%	14.9%	**0.0%**	12.6%	12.1%
Operative Complications					
Any Reoperation	**0.0%**	6.4%	**0.0%**	3.3%	3.4%
Any Reoperation (NQF Definition)[1]	0.0%	6.4%	0.0%	2.1%	2.2%
Reoperation for Bleeding	0.0%	6.4%	0.0%	1.6%	1.6%
Reoperation for Valvular Dysfunction[2]	0.0%	0.0%	0.0%	0.0%	0.0%
Reoperation for Graft Occlusion[2]	0.0%	0.0%	0.0%	0.2%	0.2%
Reoperation for Other Cardiac	0.0%	0.0%	0.0%	0.4%	0.4%
Reoperation for Other Non-Cardiac	0.0%	0.0%	0.0%	1.3%	1.4%
Infection Complications					
Any Infection	1.8%	0.0%	0.0%	2.0%	2.0%
Deep Sternal Infection/Mediastinitis	**0.0%**	**0.0%**	**0.0%**	0.2%	0.3%
Septicemia/Sepsis	1.8%	0.0%	0.0%	0.8%	0.8%
Conduit Harvest or Cannulation Site[3]	0.0%	0.0%	0.0%	0.4%	0.4%
Neurological Complications					
Any Neurological	5.3%	4.3%	0.0%	2.9%	3.1%
Coma/Encephalopathy	0.0%	2.1%	0.0%	1.5%	1.8%
Permanent Stroke	3.5%	2.1%	**0.0%**	1.4%	1.4%
Transient Ischemic Attack	1.8%	0.0%	0.0%	0.3%	0.2%
Paralysis	1.8%	0.0%	0.0%	0.2%	0.2%

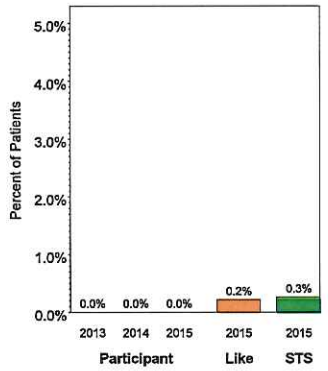
Any Complication



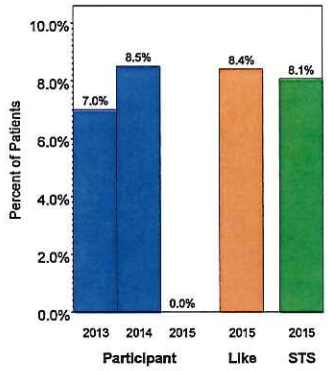
Any Reoperation
Observed rate



Deep Sternal Infx/Mediastinitis
Observed rate



Prolonged Ventilation
Observed rate



[1]Includes reoperations for bleeding/tamponade, valvular dysfunction, graft occlusion, and other cardiac problems.
[2]Includes surgical and PCI/Transcatheter interventions
[3]Excludes patients with zero vein grafts

Isolated CABG Procedures
Data Summary

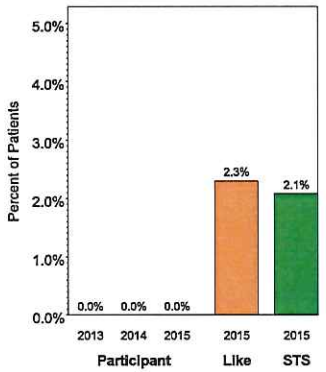
Participant 30397
STS Period Ending 03/31/2015

Duke Clinical Research Institute

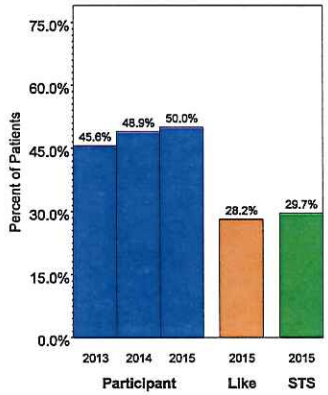
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30397			Like Group	STS
	2013	2014	2015	2015	2015
Pulmonary Complications					
Any Pulmonary	21.1%	19.1%	0.0%	12.1%	11.8%
Prolonged Ventilation	7.0%	8.5%	**0.0%**	8.4%	8.1%
Pneumonia	3.5%	6.4%	0.0%	2.6%	2.4%
Pulmonary Embolism	3.5%	0.0%	0.0%	0.2%	0.2%
Pleural Effusion Requiring Drainage	10.5%	8.5%	0.0%	3.3%	3.5%
Renal Complications					
Renal Failure[1]	**0.0%**	**0.0%**	**0.0%**	2.3%	2.1%
Vascular Complications					
Any Vascular	1.8%	0.0%	0.0%	0.4%	0.4%
Acute Limb Ischemia	1.8%	0.0%	0.0%	0.3%	0.3%
Other Complications					
Any Other	45.6%	48.9%	50.0%	28.2%	29.7%
New Onset Atrial Fibrillation[2]	37.3%	27.9%	25.0%	23.2%	24.2%
Recent Recurrent Atrial Fibrillation[3]	50.0%	66.7%	-	22.4%	24.5%
Cardiac Arrest	1.8%	2.1%	0.0%	2.1%	1.9%
Anticoagulant Complication	1.8%	0.0%	0.0%	0.5%	0.5%
Tamponade	0.0%	2.1%	0.0%	0.1%	0.1%
Gastro-Intestinal Complication	0.0%	0.0%	0.0%	1.6%	2.0%
Multi-System Failure	0.0%	0.0%	0.0%	0.7%	0.7%
Complications Risk-Adjustment[4]					
Major Complications or Op. Mortality					
Odds Ratio	0.94	1.20	-	-	-
Lower 95% Confidence Limit	0.52	0.66	-	-	-
Upper 95% Confidence Limit	1.68	2.20	-	-	-
O/E Ratio	0.81	1.40	-	-	-
Lower 95% Confidence Limit	0.34	0.64	-	-	-
Upper 95% Confidence Limit	1.57	2.53	-	-	-
Risk-adjusted Rate	10.6%	17.1%	-	-	-

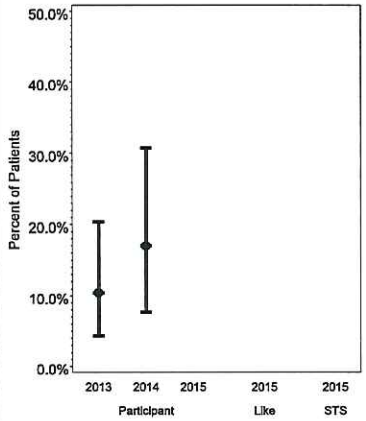
Renal Failure Complication
Observed rate



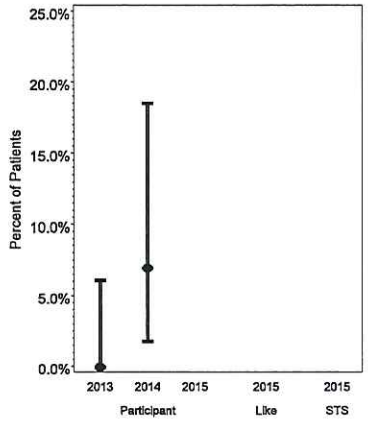
Any Other Complications



Major Complication or Mortality
Risk-adjusted rate + 95% CI



Any Reoperation
Risk-adjusted rate + 95% CI



[1]Excludes patients with preoperative dialysis or last creatinine >=4
[2]New Onset AFib is only among patients with no history of arrhythmias
[3]Recent Recurrent AFib is among patients with history of recent AFib
[4]Refer to the Report Overview for information on risk-adjustment methodology
Risk-adjustment is not performed on time periods of less than 6 months



Isolated CABG Procedures
Data Summary

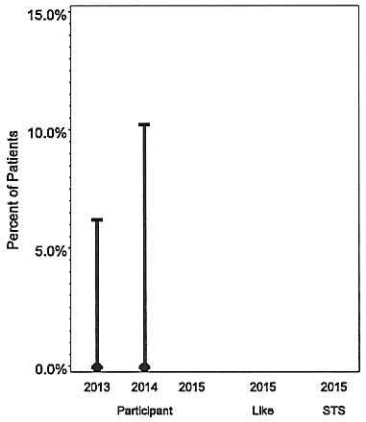
Participant 30397
STS Period Ending 03/31/2015

Duke Clinical Research Institute

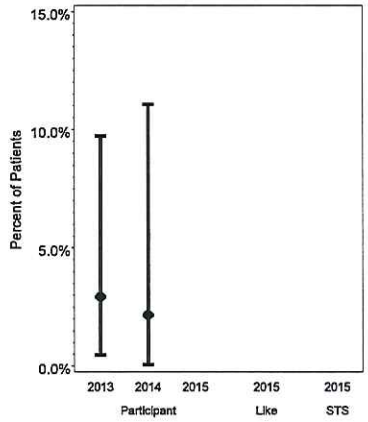
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30397			Like Group	STS
	2013	2014	2015	2015	2015
Any Reoperation					
Odds Ratio	0.77	1.23	-	-	-
Lower 95% Confidence Limit	0.36	0.61	-	-	-
Upper 95% Confidence Limit	1.62	2.50	-	-	-
O/E Ratio	0.00	1.99	-	-	-
Lower 95% Confidence Limit	0.00	0.52	-	-	-
Upper 95% Confidence Limit	1.67	5.27	-	-	-
Risk-adjusted Rate	0.0%	7.0%	-	-	-
Deep Sternal Infection/Mediastinitis					
Odds Ratio	0.94	0.95	-	-	-
Lower 95% Confidence Limit	0.25	0.23	-	-	-
Upper 95% Confidence Limit	3.59	3.92	-	-	-
O/E Ratio	0.00	0.00	-	-	-
Lower 95% Confidence Limit	0.00	0.00	-	-	-
Upper 95% Confidence Limit	22.63	38.66	-	-	-
Risk-adjusted Rate	0.0%	0.0%	-	-	-
Permanent Stroke					
Odds Ratio	1.14	1.04	-	-	-
Lower 95% Confidence Limit	0.61	0.58	-	-	-
Upper 95% Confidence Limit	2.12	1.84	-	-	-
O/E Ratio	2.37	1.72	-	-	-
Lower 95% Confidence Limit	0.41	0.09	-	-	-
Upper 95% Confidence Limit	7.77	8.67	-	-	-
Risk-adjusted Rate	3.0%	2.2%	-	-	-
Renal Failure					
Odds Ratio	0.74	0.83	-	-	-
Lower 95% Confidence Limit	0.25	0.28	-	-	-
Upper 95% Confidence Limit	2.16	2.49	-	-	-
O/E Ratio	0.00	0.00	-	-	-
Lower 95% Confidence Limit	0.00	0.00	-	-	-
Upper 95% Confidence Limit	2.74	3.47	-	-	-
Risk-adjusted Rate	0.0%	0.0%	-	-	-

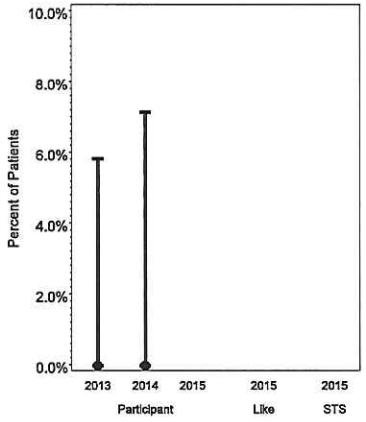
Deep Sternal Infx/Mediastinitis
Risk-adjusted rate + 95% CI



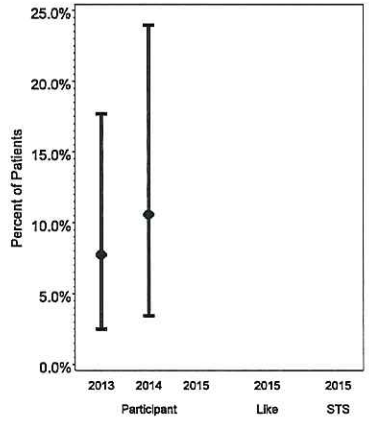
Permanent Stroke
Risk-adjusted rate + 95% CI



Renal Failure Complication
Risk-adjusted rate + 95% CI



Prolonged Ventilation
Risk-adjusted rate + 95% CI



Isolated CABG Procedures
Data Summary

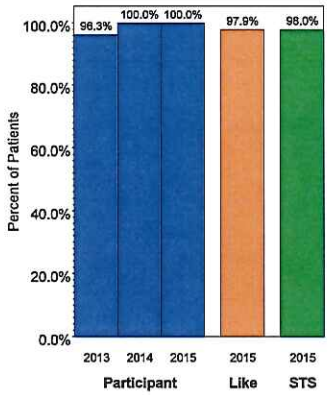
Participant 30397
STS Period Ending 03/31/2015

Duke Clinical Research Institute

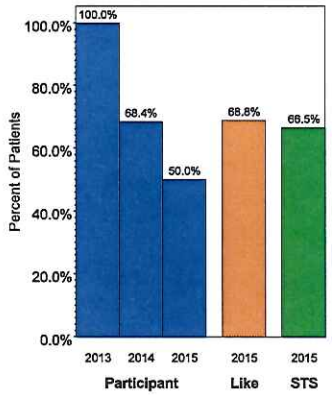
2015 is a partial year: Jan 2015 - Mar 2015

	Participant 30397			Like Group	STS
	2013	2014	2015	2015	2015
Prolonged Ventilation					
Odds Ratio	0.98	1.19	-	-	-
Lower 95% Confidence Limit	0.46	0.54	-	-	-
Upper 95% Confidence Limit	2.07	2.60	-	-	-
O/E Ratio	0.88	1.30	-	-	-
Lower 95% Confidence Limit	0.29	0.43	-	-	-
Upper 95% Confidence Limit	2.00	2.93	-	-	-
Risk-adjusted Rate	7.8%	10.6%	-	-	-
Discharge Location[1]					
Home	53.6%	72.3%	100.0%	76.4%	77.8%
Extended Care/TCU	46.4%	25.5%	0.0%	19.0%	17.5%
Other Acute Care Hospital	0.0%	2.1%	0.0%	0.8%	0.8%
Nursing Home	0.0%	0.0%	0.0%	2.9%	3.0%
Hospice	0.0%	0.0%	0.0%	0.2%	0.2%
Left AMA[2]	-	0.0%	0.0%	0.1%	0.1%
Other	0.0%	0.0%	0.0%	0.5%	0.3%
Missing	0.0%	0.0%	0.0%	0.2%	0.3%
Discharge Medications[1]					
Aspirin	92.9%	95.7%	100.0%	96.7%	96.6%
Among Eligible Cases	96.3%	100.0%	100.0%	97.9%	98.0%
Contraindicated / Not Indicated	3.6%	4.3%	0.0%	1.2%	1.4%
Missing	0.0%	0.0%	0.0%	0.3%	0.4%
ACE inhibitors	30.4%	27.7%	37.5%	42.9%	39.7%
Among Eligible Cases	100.0%	68.4%	50.0%	68.8%	66.5%
Contraindicated / Not Indicated	69.6%	59.6%	25.0%	37.7%	40.3%
Missing	0.0%	0.0%	0.0%	0.3%	0.4%
Beta Blockers	96.4%	95.7%	87.5%	94.3%	94.5%
Among Eligible Cases	98.2%	97.8%	100.0%	97.7%	98.0%
Contraindicated / Not Indicated	1.8%	2.1%	12.5%	3.5%	3.6%
Missing	0.0%	0.0%	0.0%	0.3%	0.4%
Any Lipid-Lowering Agents[3]	94.6%	96.0%	-	-	-
Among Eligible Cases	98.1%	100.0%	-	-	-
Contraindicated / Not Indicated	3.6%	4.0%	-	-	-
Missing	0.0%	0.0%	-	-	-

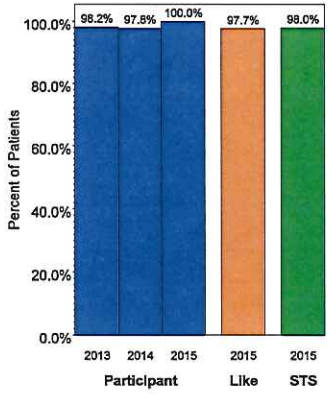
Discharge Aspirin



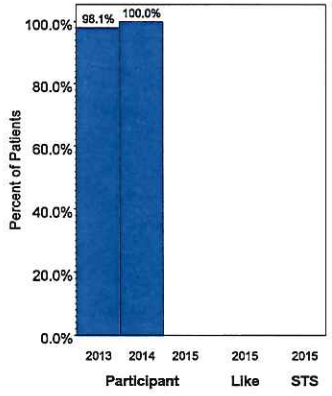
Discharge ACE Inhibitors



Discharge Beta Blocker



Discharge Lipid-Lowering Agent



[1]Excludes in-hospital mortalities
[2]Option added in v2.81
[3]Variable dropped in v2.81

CARMODY
TORRANCE | SANDAK | HENNESSEY LLP

David S. Hardy
Main: 203-777-5501
Direct: 203-784-3119
Fax: 203-784-3199
dhardy@carmodylaw.com

195 Church Street
P.O. Box 1950
New Haven, CT 06509-1950

July 20, 2016

VIA HAND DELIVERY

Kimberly R. Martone, Director of Operations
Department of Public Health - Office of Healthcare Access
410 Capitol Avenue
MS# 13HCA
Hartford, CT 06134



Re: The Waterbury Hospital
Saint Mary's Hospital, Inc.
John Dempsey Hospital
Certificate of Need Modification Request – Heart Center of Greater Waterbury Inc.

Dear Ms. Martone:

I enclose for filing a Certificate of Need Modification Request concerning OHCA Docket No. 08-31202-CON, *Establish Permanent Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and Saint Mary's Hospital.*

Please feel free to contact me with any questions. Thank you for your attention to this matter.

Very truly yours,

David S. Hardy

DSH/cf
Enc.

cc: Robert Anthony, Esq., Counsel for Saint Mary's Hospital, Inc.
Anne Diamond, CEO, John Dempsey Hospital
Michele Volpe, Esq., Counsel for Prospect Medical Holdings, Inc.

{N5252244}

State of Connecticut
Office of Health Care Access
Form for Modification of a Previously Authorized Certificate of Need

All persons who are requesting a modification to a previously authorized Certificate of Need must complete this form. Completed forms should be submitted to the Director of the Office of Health Care Access, 410 Capitol Avenue, MS#13HCA, P.O. Box 340308, Hartford, Connecticut 06134-0308.

SECTION I. PETITIONER INFORMATION

If more than 2 Petitioners, please attach a separate sheet of paper and provide additional information in the format below:

	Petitioner	Petitioner
Full legal name	The Waterbury Hospital	Saint Mary's Hospital, Inc.
Doing Business As	Heart Center of Greater Waterbury	Heart Center of Greater Waterbury
Name of Parent Corporation	Greater Waterbury Health Network, Inc.	Saint Mary's Health System, Inc.
Mailing Address, if Post Office Box, include a street mailing address for Certified Mail	64 Robbins Street Waterbury, CT 06708	56 Franklin Street Waterbury, CT 06706
Petitioner type (e.g., P for profit and NP for Not for Profit)	NP	NP
Name of Contact person, including title	Darlene Stromstad, FACHE, President and Chief Executive Officer	Chad Wable, FACHE, President and Chief Executive Officer
Contact person's street mailing address	64 Robbins Street Waterbury, CT 06708	56 Franklin Street Waterbury, CT 06706
Contact person's phone, fax and e-mail address	(p) 203-573-7101 (f) 203-573-6161 dstromstad@wtbyhosp.org	(p) 203-709-3368 (f) 203-709-3066 CWable@stmh.org

	Petitioner	Petitioner
Full legal name	John Dempsey Hospital	
Doing Business As	John Dempsey Hospital	
Name of Parent Corporation	University of Connecticut Health Center	
Mailing Address, if Post Office Box, include a street mailing address for Certified Mail	263 Farmington Ave. MC 3801 Farmington, CT 06030	
Petitioner type (e.g., P for profit and NP for Not for Profit)	NP	
Name of Contact person, including title	Anne Diamond, Chief Executive Officer	
Contact person's street mailing address	263 Farmington Ave. MC 3801 Farmington, CT 06030	
Contact person's phone, fax and e-mail address	(p) 860-679-2213 (f) 860-679-4525 diamond@uchc.edu	

SECTION II. GENERAL PROPOSAL INFORMATION

a. Title of Previously Authorized Project and Associated Docket Number(s):

OHCA Docket No. 08-31202-CON: Establish Permanent Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and Saint Mary's Hospital

b. Location of proposal (Town including street address):

The Waterbury Hospital, 64 Robbins Street, Waterbury, CT
Saint Mary's Hospital, 56 Franklin Street, Waterbury, CT

c. Type of Modification Request:

☐ Change in the Scope of the Authorized Certificate of Need Project

☐ Extension of CON Expiration Date

☒ Change in a CON Order Condition *(other than to extend expiration date)*

☐ Other – Describe: _____

SECTION III. IF REQUESTING A CHANGE IN THE SCOPE OF AUTHORIZED PROJECT:

a. Provide a one page description of the requested change in the scope of a previously authorized Certificate of Need project and provide a detailed rationale for such change:

SECTION IV. IF REQUESTING AN EXTENSION OF THE CON EXPIRATION DATE:

a. Certificate of Need expiration date per CON Final Decision: _____

b. Requested revised CON expiration date: _____

c. Rationale for increased time to fully complete and implement the authorized project:

_____

_____

_____

_____

_____

SECTION V. IF REQUESTING A CHANGE IN A CON FINAL DECISION CONDITION *(other than extension of the CON expiration date)*

a. Identify the CON Condition that you are requesting to be revised or vacated.

(i) We request that OHCA vacate Condition 2(b) of the Order. Condition 2 provides the following:

> *"The scope of this CON authorization is being approved as was specifically presented in the Applicants' proposal, which consists of two full-service inpatient cardiac programs, one at [Saint Mary's Hospital] and one at [The Waterbury Hospital], but both served by the same clinical team. The Applicants agree that this CON authorization will become invalid and therefore null and void, if either of the following occurs in the future:*
>
> *(a) Any change to the structure of the single clinical team model serving both [Saint Mary's Hospital] and [The Waterbury Hospital] (not including individual personnel changes), as highlighted in Finding of Facts numbers 17, 29, 30 7 31; or*
> *(b) Any changes in the ownership or control of one or both of the legal entities, [Saint Mary's Hospital] and [The Waterbury Hospital]."*

(ii) We request that OHCA permit The Waterbury Hospital and Saint Mary's Hospital to dissolve the entity known as "Heart Center of Greater Waterbury, Inc.," which is referred to in Conditions 4, 5, 6 and 8 of the Order, as well as throughout OHCA's Heart Center CON final decision. Following this change, the residents of the existing The Waterbury Hospital and Saint Mary's Hospital service area towns, Beacon Falls, Bethlehem, Cheshire, Middlebury, Naugatuck, Prospect, Southbury, Thomaston, Waterbury, Watertown, Wolcott and Woodbury, will continue to be served as they are today by each of the hospitals.

b. Provide the rationale for such requested change:

(i) Condition 2(b) provides that the Heart Center's CON authorization will become invalid and therefore null and void if, "[a]ny changes in the ownership or control of one or both of the legal entities, [Saint Mary's Hospital or The Waterbury Hospital]" occur. Because both The Waterbury Hospital and Saint Mary's Hospital are planning to enter into transactions that will change their ownership and control, we request that OHCA vacate Condition 2(b) to allow the CON authorization to remain valid even if changes to the ownership or control of one or both of the legal entities occur. The Waterbury Hospital and its sole member, Greater Waterbury Health Network, Inc., have entered into a Letter of Intent to sell substantially all of its assets to Prospect Medical Holdings, Inc. ("Prospect"), and Saint Mary's Hospital and its sole member, Saint Mary's Health System, Inc., have entered in a Transfer Agreement to join Trinity Health.

The Waterbury Hospital and Saint Mary's Hospital would each like the ability to change their ownership and control without rendering the Heart Center's CON authorization invalid, as each hospital considers its cardiac program assets vital elements of its operations and each would need to contribute its cardiac program assets as part of its respective transactions. The Waterbury Hospital

would contribute its cardiac program assets to Prospect and Saint Mary's Hospital would do the same in its transaction. If The Waterbury Hospital and Saint Mary's Hospital cannot contribute their cardiac programs as part of their respective transactions, which are intended to strengthen their financial circumstances and ensure the residents of the greater Waterbury area have access to superior health care, without forfeiting OHCA's CON authorization, then their respective transactions will be significantly hindered.

(iii) We request that OHCA permit The Waterbury Hospital and Saint Mary's Hospital to dissolve the corporation known as "Heart Center of Greater Waterbury, Inc." which is referred to in Conditions 4, 5, 6 and 8 of the Order, as well as throughout OHCA's CON final decision, because the Heart Center entity has served its purpose and is no longer necessary. The Waterbury Hospital and Saint Mary's Hospital are committed to preserving their collaborative cardiac programs, and continuing to make positive contributions to the greater Waterbury community through those collaborative programs, but are now capable of doing so without the Heart Center entity.

In Agreed Settlement, Docket No. 03-30167-CON, OHCA authorized John Dempsey Hospital, The Waterbury Hospital, and Saint Mary's Hospital to establish "Waterbury Area Heart Center, Inc.," which later changed its name to "Heart Center of Greater Waterbury, Inc." to serve as a management services organization in support of the cardiac programs of both The Waterbury Hospital and Saint Mary's Hospital. (see Agreed Settlement, Docket No. 03-30167-CON, Findings of Facts Section 8, pg. 4). The management services organization was to be responsible for "program coordination, quality/training coordination, marketing coordination, and community wellness outreach." Id.

The Heart Center entity, which originally provided those services in order to get the hospitals' cardiac programs started and working efficiently, is no longer necessary. The cardiac programs of both The Waterbury Hospital and Saint Mary's Hospital have proven themselves capable of running collaboratively, efficiently and effectively without support from the Heart Center. This is evidenced by the fact that the cardiac programs are currently operating well despite negligible support from the Heart Center, which has a single employee. That employee focuses exclusively on community wellness outreach, and does not support program coordination, quality/training coordination, or marketing coordination at all. The two Hospitals, not the Heart Center, provide those vital coordination services to the cardiac programs, which have performed over 1,845 open heart surgical procedures and over 6,753 angioplasties since 2009 without experiencing coordination problems.

The Waterbury Hospital and Saint Mary's Hospital are fully capable of performing program coordination, quality/training coordination, marketing coordination, and community wellness outreach, both in concert and independently, without assistance from the Heart Center entity. The Waterbury Hospital will, following the dissolution of the Heart Center, employ the Heart Center's one remaining employee to continue to perform community wellness outreach and heart health education. Dissolving the Heart Center entity will reduce the administrative burden on The Waterbury Hospital and Saint Mary's Hospital, as well as their accounting and legal fees, as they will only be responsible for their own operations, rather than for the Heart Center as well.

SECTION VI. OTHER

a. Submit a completed CON Modification Affidavit.

Please see the attached Affidavits.

b. Identify any other pertinent changes to the findings of facts upon which the original CON authorization was based as a result of this requested modification.

(i) No findings of facts apply to the ownership and control of The Waterbury Hospital or Saint Mary's Hospital, so no changes to the findings of facts are necessary in conjunction with our request that OHCA vacate Condition 2(b).

(ii) In conjunction with our request that OHCA permit The Waterbury Hospital and Saint Mary's Hospital to dissolve the Heart Center of Greater Waterbury, Inc. entity, all references to "Heart Center of Greater Waterbury, Inc." in Conditions 4, 5, 6 and 8 and all references to the Heart Center team in findings of facts Sections 29, 30 and 3 must be removed, because while the single clinical team will exist post-dissolution, it will no longer use the Heart Center name.

c. Identify what has been accomplished to date in terms of full project implementation.

Since obtaining permanent status in 2009, the Heart Center at The Waterbury Hospital and Saint Mary's Hospital (the "Program") has provided necessary lifesaving services to the greater Waterbury community through its two campuses, one program model, and has performed over 1,845 open heart surgical procedures and over 6,753 angioplasties. The Waterbury Hospital and Saint Mary's Hospital have provided those lifesaving services in a collaborative manner, and look forward to continuing to provide those services in a collaborative manner in the future.

The Program serves Waterbury and the surrounding municipalities through its community education programs. Each year, the Program offers over 200 free programs related to cardiac health and wellness, heart disease prevention, and reduction of risk factors. The Program was instrumental in Waterbury earning recognition as a HEARTSafe Community from the Connecticut Department of Public Health in collaboration with the American Heart Association.

The Program continues to meet all of its OHCA reporting requirements, including the submission of data to the American College of Cardiologists National Cardiac Data Registry (ACC-NCDR) and to the Society of Thoracic Surgeons (STS) Adult Cardiac Surgery Database. Interdisciplinary members of the cardiac team from The Waterbury Hospital and Saint Mary's Hospital continue to meet regularly with cardiologists and cardiac surgeons to review individual cases as well as aggregate date. The cardiac teams share best practices, discuss clinical operations and review any shared areas of improvement. Quarterly data review suggests that The Waterbury Hospital and Saint Mary's Hospital continue to demonstrate exceptional "Door to Balloon Time." Both hospitals exceed the benchmark by providing emergency angioplasty within 90 minutes of arrival time to the Emergency Department. Additionally for open heart surgery procedures both hospitals continue to compare favorably to the STS database quality measures. See data previously submitted to OHCA.

CON MODIFICATION AFFIDAVIT

Applicant: The Waterbury Hospital

Project Title: OHCA Docket No. 08-31202: Establish Permanent Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and Saint Mary's Hospital, Inc.

I, Darlene Stromstad, President and Chief Executive Officer of The Waterbury Hospital being duly sworn, depose and state that the information provided in this CON Modification form is true and accurate to the best of my knowledge.

Signature

7/14/16
Date

Subscribed and sworn to before me on 7/14/16

Notary Public/Commissioner of Superior Court

My commission expires: 7-31-16

CON MODIFICATION AFFIDAVIT

Applicant: Saint Mary's Hospital, Inc.

Project Title: OHCA Docket No. 08-31202: Establish Permanent Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and Saint Mary's Hospital, Inc.

I, Chad Wable, President and Chief Executive Officer of Saint Mary's Hospital, Inc. being duly sworn, depose and state that the information provided in this CON Modification form is true and accurate to the best of my knowledge.

Signature 7/13/16
Date

Subscribed and sworn to before me on 7/13/16

Victoria Cipriano
Notary Public/~~Commissioner of Superior Court~~

VICTORIA CIPRIANO
NOTARY PUBLIC
MY COMMISSION EXPIRES FEB. 28, 2017

My commission expires:

CON MODIFICATION AFFIDAVIT

Applicant: John Dempsey Hospital

Project Title: OHCA Docket No. 08-31202: Establish Permanent Primary and Elective Angioplasty and Open Heart Surgery Programs at The Waterbury Hospital and Saint Mary's Hospital, Inc.

I, Anne Diamond, Chief Executive Officer of John Dempsey Hospital being duly sworn, depose and state that the information provided in this CON Modification form is true and accurate to the best of my knowledge.

Anne Diamond

Signature

7/15/2016

Date

Subscribed and sworn to before me on July 15 2016

Notary Public/Commissioner of Superior Court

My commission expires: 1/31/19

State of Connecticut
Department of Public Health
Office of Health Care Access

Final Decision

Modification of a Previously Authorized Certificate of Need

Applicant:

The Waterbury Hospital
64 Robbins Street, Waterbury CT 06708

Saint Mary's Hospital, Inc.
56 Franklin Street, Waterbury, CT 06706

John Dempsey Hospital
263 Farmington Avenue, MC 3801
Farmington, CT 06030

Docket Number: **16-31202-MDF**

Project Description: **Modification of Previous Certificates of Need Authorization Nos. 08-31202-CON**

Procedural History: On April 20, 2004, the Office of Health Care Access ("OHCA") granted a Certificate of Need ("CON") to The Waterbury Hospital ("TWH") and St Mary's Hospital Corporation d/b/a Waterbury Area Heart Center, Inc. ("SMH") and University of Connecticut Health Center/John Dempsey Hospital ("JDH"), by way of an Agreed Settlement issued under Docket Number 03-30167-CON, to establish primary and elective angioplasty and open heart surgery programs at SMH and TWH.

On January 21, 2009, OHCA granted a CON to TWH, SMH and JDH, by way of an Agreed Settlement issued under Docket Number 08-31202-CON, to establish *permanent* primary and elective angioplasty and open heart surgery programs at SMH and TWH, with no associated capital expenditure. (Emphasis Added.)

On July 20, 2016, OHCA received a Request for Modification from the Applicants seeking to vacate and modify certain facts and conditions arising from both CONS. Deputy Commissioner Addo has reviewed the entire record in this matter.

Findings of Fact

1. On April 20, 2004, OHCA granted a CON to TWH, SMH and JDH (herein referred to as "Applicants") to establish *initial* primary and elective angioplasty and open heart surgery programs at SMH and TWH. (Emphasis Added.) The Applicants agreed to establish the Waterbury Heart Center, Inc. ("WAHC") to manage and coordinate both programs.

2. WAHC subsequently changed its name to the Heart Center of Greater Waterbury ("HCGW"). The HCGW provided initial support to the Applicants to ensure that both programs worked collaboratively, efficiently and effectively.

3. On January 21, 2009, OHCA issued a second CON to the Applicants under Docket No. 08-31202-CON. That CON permitted the Applicants to establish *permanent* primary and elective angioplasty and open heart surgery programs at SMH and TWH. (Emphasis Added.)

4. Pursuant to Condition 2(b) of the January 21, 2009 CON Agreed Settlement Order, changes in ownership and control of either, or both, SMH and TWH will nullify and void CON authorization.

5. TWH has entered into a Letter of Intent to sell substantially all of its assets to Prospect Medical Holdings, Inc.

6. SMH has entered into a Transfer Agreement to join Trinity Health.

7. The Applicants' programs currently operate with negligible support from HCGW. HCGW employs one employee who performs community wellness outreach and does not engage in program coordination, quality/training coordination or marketing coordination.

8. The Applicants seek to vacate Condition 2(b) of the Agreed Settlement Order in 08-31202-CON which voids and nullifies CON authorization if changes in ownership or control of SMH and TWH occur.

9. The Applicants further request that OHCA permit TWH and SMH to dissolve the entity known as the "Heart Center of Greater Waterbury, Inc." Upon dissolution of HCGW, TWH will employ HCGW's sole employee to perform community outreach.

10. The Applicants further request that all references to HCGW be removed from findings of fact Section No. 17, 29, 30 and 31 of the CON issued under Docket Number 08-31202-CON.

Discussion

Connecticut General Statutes § 4-181a (b) provides in relevant part: "On a showing of changed conditions, the agency may reverse or modify the final decision, at any time, at the request of any person or on the agency's own motion." The Applicants have established a change in conditions resulting from the impending transfers of ownership of TWH and SMH and the ability for both cardiac programs to operate with only negligible support from HCGW. Furthermore, based upon the Applicants' representation that TWH will continue to employ HCGW's one remaining employee, community wellness outreach and heart health education will continue.

Order

Based upon the foregoing, the request to vacate Condition 2(b) of the CON issued under Docket Number 08-31202-CON is hereby **APPROVED**. All other conditions remain in full force and effect.

The request to modify the Findings of Fact included in the CON issued under Docket Number 08-31202-CON to remove references to HCGW and to dissolve HCGW is hereby **APPROVED.**

TWH shall continue to employ an individual to perform community wellness outreach and heart health education.

9/2/2016
Date

Yvonne Addo
Yvonne Addo, MBA
Deputy Commissioner

Olejarz, Barbara

From: Microsoft Outlook
To: Anne Diamond (Dempsey) (diamond@uchc.edu); Darlene Stromstad; cwable@stmh.org
Sent: Friday, September 02, 2016 1:26 PM
Subject: Relayed: Request for modification

Delivery to these recipients or groups is complete, but no delivery notification was sent by the destination server:

Anne Diamond (Dempsey) (diamond@uchc.edu) (diamond@uchc.edu)

Darlene Stromstad (dstromstad@wtbyhosp.org)

cwable@stmh.org (cwable@stmh.org)

Subject: Request for modification