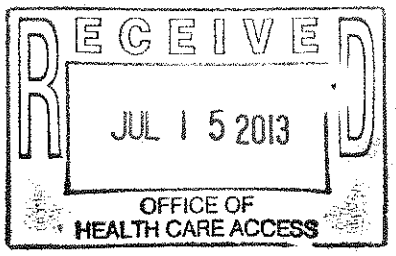
SHIPMAN & GOODWIN LLP®

COUNSELORS AT LAW

Joan W. Feldman
Phone: 860-251-5104
Fax: 860-251-5211
jfeldman@goodwin.com




July 15, 2013

Kimberly Martone
Director of Operations
Department of Public Health
Office of Health Care Access
410 Capitol Avenue, MS#13HCA
P.O. Box 340308
Hartford, CT 06134-0308

RE: Establishment of an Orthopedic Outpatient Surgery Facility
on the Hartford Hospital Campus "HHC Hartford Surgery Center, LLC"

Dear Ms. Martone:

On behalf of HHC Hartford Surgery Center, LLC, enclosed please find a Certificate of Need Application for the establishment of an Orthopedic Outpatient Surgery Facility on the Hartford Hospital Campus. As requested, I have included 1 original and 4 hard copies of the Certificate of Need Application in 3-ring binders along with a CD with the electronic version of the enclosed documents and materials. Also attached to this letter is a check in the amount of $500.00 for the filing fee.

Please do not hesitate to contact me at 860-251-5104 if you have any questions.

Sincerely,

Joan Feldman

Joan W. Feldman

Jwf/tja
Enclosures

# Application Checklist

**Instructions:**

1. **Please check each box below, as appropriate; and**
2. **The completed checklist *must* be submitted as the first page of the CON application.**

☒ **Attached is the CON application filing fee in the form of a certified, cashier or business check made out to the "Treasurer State of Connecticut" in the amount of $500.**

**For OHCA Use Only:**

**Docket No.:** 31851 **Check No.:** 479616
**OHCA Verified by:** KR **Date:** 7.16.13

☒ **Attached is evidence demonstrating that public notice has been published in a suitable newspaper that relates to the location of the proposal, 3 days in a row, at least 20 days prior to the submission of the CON application to OHCA. (*OHCA requests that the Applicant fax a courtesy copy to OHCA (860) 418-7053, at the time of the publication)Place notice after the checklist page***

☒ **Attached is a paginated hard copy of the CON application including a completed affidavit, signed and notarized by the appropriate individuals.**

☒ **Attached are completed Financial Attachments I and II.**

☒ **Submission includes one (1) original and four (4) hard copies with each set placed in 3-ring binders.**

**Note: A CON application may be filed with OHCA electronically through email, if the total number of pages submitted is 50 pages or less. In this case, the CON Application must be emailed to ohca@ct.gov.**

**Important: For CON applications(less than 50 pages) filed electronically through email, the signed affidavit and the check in the amount of $500 must be delivered to OHCA in hardcopy.**

☒ **The following have been submitted on a CD**

1. **A scanned copy of each submission in its entirety, including all attachments in Adobe (.pdf) format.**
2. **An electronic copy of the documents in MS Word and MS Excel as appropriate.**

RECEIVED

APR 22 2013

The Hartford Courant.

A TRIBUNE PUBLISHING COMPANY

# Affidavit of Publication

State of Connecticut

Wednesday, April 17, 2013

County of Hartford

**PUBLIC NOTICE**

**Statutory Reference:** Connecticut General Statutes §19a-638

**Applicant:** HHC Hartford Surgery Center, LLC

**Project Address:** Hartford Hospital
80 Seymour Street
Hartford, CT 06102-5037

**Proposal:** The Applicant is filing a Certificate of Need for the Purpose of Seeking Approval from the State of Connecticut Office of Health Care Access to establish an Orthopedic Ambulatory Surgical Facility

**Capital Expenditure:** $6,500,000

I, Rena Matus, do solemnly swear that I am Financial Operations Assistant of the Hartford Courant, printed and published daily, in the state of Connecticut and that from my own personal knowledge and reference to the files of said publication the advertisement of Public Notice was inserted in the regular edition.

| | | |
|---|---|---|
| On dates as follows: | 4/16/2013 | $93.04 |
| | 4/17/2013 | $93.04 |
| | 4/15/2013 | $103.04 |

In the amount of $289.12
MINTZ & HOKE/HARTFORD HEAL
254662
Full Run

Financial Operations Assistant
Rena Matus

Subscribed and sworn to before me on April 17, 2013

**Notary Public**

2542824

WILLIAM B. McDONALD
NOTARY PUBLIC, CONNECTICUT
MY COMMISSION EXPIRES FEB. 28, 2014

HARTFORD HOSPITAL
ATTN: ACCOUNTS PAYABLE
PO BOX 5037
HARTFORD, CT 06102-5037

51-57
119

Check Number
**479616**
Bank of America

THE FACE OF THIS DOCUMENT HAS A COLORED BACKGROUND ON WHITE PAPER

*Five hundred and 00/100 Dollars*

**Pay to the order of**

TREASURER STATE OF CONNECTICUT
OFFICE OF HEALTHCARE ACCESS
MS136 HCA
410 CAPITAL AVE
HARTFORD, CT 06134

| Date | Payment Amount |
|---|---|
| 07/09/2013 | *******$500.00 |

VOID AFTER 90 DAYS

THE BACK OF THIS DOCUMENT CONTAINS LAID LINES AND AN ARTIFICIAL WATERMARK. HOLD AT AN ANGLE TO VIEW.

[redacted]

TREASURER STATE OF CONNECTICUT
OFFICE OF HEALTHCARE ACCESS
MS136 HCA
410 CAPITAL AVE
HARTFORD, CT 06134

| Entity | Vendor ID / Location | Check Number |
|---|---|---|
| PNK | 04913 036 | 479616 |

HARTFORD HOSPITAL

| Invoice Number | Invoice Date | Gross Amount | Discount Amount | Withholding Amount | Net Amount |
|---|---|---|---|---|---|
| CONAPPLICATIONFEE | 07/03/2013 | 500.00 | | | 500.00 |
| GINA CHAMBERLAND PLANNING AND MARKETING | | | | | |
| TOTALS | | $500.00 | 0.00 | 0.00 | $500.00 |

0003

HH571485 1/03

# AFFIDAVIT

Applicant: HHC Hartford Surgery Center, LLC

Project Title: The Establishment of an Orthopedic Ambulatory Surgical Center on the Hartford Hospital campus.

I, Jeffrey Flaks, President and CEO of Hartford Hospital and a representative member of HHC Hartford Surgery Center, LLC being duly sworn, depose and state that the HHC Hartford Surgery Center, LLC information submitted in this Certificate of Need Application is accurate and correct to the best of my knowledge.

Signature _____ Date 7/11/13

Subscribed and sworn to before me on July 11, 2013

_____

Notary Public/Commissioner of Superior Court

KELLY ULLMAN
NOTARY PUBLIC OF CONNECTICUT
My Commission Expires 11/30/2014

My commission expires: _____

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

**Instructions**: Please complete all sections of the Certificate of Need ("CON") application. If any section or question is not relevant to your project, a response of "Not Applicable" may be deemed an acceptable answer. If there is more than one applicant, identify the name and all contact information for each applicant. OHCA will assign a Docket Number to the CON application once the application is received by OHCA.

| | |
|---|---|
| **Docket Number:** | |
| **Applicant:** | HHC Hartford Surgery Center, LLC |
| **Contact Person:** | Barbara A. Durdy |
| **Contact Person's Title:** | Director, Strategic Planning, Hartford HealthCare |
| **Contact Person's Address:** | 181 Patricia Genova Drive<br>Newington, CT 06111 |
| **Contact Person's Phone Number:** | 860-972-4231 |
| **Contact Person's Fax Number:** | 860-972-4650 |
| **Contact Person's Email Address:** | bdurdy@midstatemedical.org |
| **Project Town:** | Hartford |
| **Project Name:** | Proposal to Establish an Orthopedic Ambulatory Surgical Center on the Hartford Hospital Campus |
| **Statute Reference:** | Section 19a-638, C.G.S. |
| **Estimated Total Capital Expenditure:** | $6,500,000 |

1. **Project Description: Ambulatory Surgical Center**

   a. **Please provide a narrative detailing the proposal.**

   Hartford Hospital (the "Hospital") has a long history of providing a full range of orthopedic services to the region, including but not limited to orthopedic trauma surgery services, joint replacement surgery, bone reconstruction surgery, fracture care, sports and orthopedic rehabilitation services. Given a growing need and demand for high value cost-effective orthopedic services, the Hospital is committed to maintaining its status as a destination center for advanced orthopedic services and servicing such needs. Accordingly, the Hospital plans to develop a comprehensive musculoskeletal institute (the "Institute") that would have, as a critical and central component, an ambulatory surgery center on the Hospital's main campus in Hartford, Connecticut. The Institute (which represents a collaboration between the Hospital and its affiliated orthopedic surgeons) will: (i) provide specialized and sophisticated orthopedic services; (ii) adhere to evidence-based best practices; (iii) remain committed to technological advances, (iv) engage in clinical research; and (v) provide educational opportunities for medical students and residents.

   The ambulatory surgery center (the "ASC") will be owned and operated by a Connecticut limited liability company known as HHC Hartford Surgery Center, LLC (the "HHASC"). The Hospital will own a 51% controlling membership interest in HHASC with the remaining 49% membership interest being held by the affiliated orthopedic surgeons (the "Physicians") and Constitution Surgery Centers, LLC (the "CSC"). The Physicians who hold an ownership interest will be members of the Hospital's medical staff. See Exhibit 1 attached hereto for a copy of the draft Operating Agreement and Articles of Organization for HHASC.

   The Physicians will continue to perform inpatient and outpatient orthopedic surgery at the Hospital and other affiliated hospitals for those patients who prefer to have their surgery in a hospital setting or for patients with co-morbidities or other clinical conditions that make a hospital the more appropriate setting. The Physicians recognize the need to provide greater value at a lower cost and are eager to participate in the management of the Institute, and more particularly the ASC.

   The Hospital currently has 42 operating rooms located on its main campus, and of those operating rooms, 8 are dedicated to outpatient surgery. Notwithstanding the existence of the Hospital's multi-specialty operating rooms, the Applicant believes that there is a clear public need for the addition of the ASC on the Hospital's main campus for the following reasons:

   1. Consistent with national trends and because technological advances in orthopedic surgery permit more procedures to be performed on an ambulatory basis, the Hospital is shifting more and more of its orthopedic surgical cases to a more cost-

effective ambulatory surgical setting. Thus, continued growth in demand for ambulatory surgical capacity is expected[1];

2. The current capacity of the Hospital's operating rooms on the main campus is 80%. See OHCA Table 1a herein. The Hospital needs additional outpatient surgical capacity for the vast number of non-orthopedic surgical procedures performed in an outpatient surgical setting. ;

3. During fiscal year 2013, ten new surgeons will begin to provide surgical services at the Hospital. The projected additional volume has not been factored into the capacity percentages stated above, but it is expected to contribute approximately 1700 additional surgical cases per year.[2] In addition, the Hospital's staff development plan includes continued recruitment of additional surgical specialists;

4. Orthopedic Associates of Hartford, P.C., the principal physician group collaborating with the Hospital on the proposed ASC, owns a freestanding ambulatory orthopedic surgical center in Rocky Hill, Connecticut that is operating above maximum capacity (i.e. averaging 1,946 cases per year per operating room); and

5. Health care reform necessitates a re-alignment of the traditional interactions between hospitals and physicians through the creation of new models to accelerate change and bring higher quality at a lower cost to patients and payers alike. Specifically, as providers assume a greater degree of risk, the proposed health care delivery model will allow the Applicant to be more flexible in entering into cost-effective alternative payment arrangements. See Exhibit 3 attached hereto for a description of plans by CMS to create a value-based purchasing system for ASCs.

**b. Provide letters that have been received in support of the proposal.**

Please see Exhibit 4 attached hereto for copies of letters in support of this proposal.

**c. Report the number of proposed operating rooms, identifying the number to be equipped and utilized and the number to be built and shelled for future use.**

The proposed ASC will have three fully equipped operating rooms and two shelled operating rooms for future use. All three equipped operating rooms will be immediately utilized once the ASC is operational to accommodate the shift in volume from the Hospital and its affiliated physicians as discussed herein. As orthopedic volume growth continues and capacity in the three operating rooms is optimized, the shelled space will be developed to accommodate the expected demand.

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[1] According to the Advisory Board Company, significant growth in demand for inpatient and outpatient orthopedic surgical care is expected in the future. See Exhibit 2 attached hereto.

[2] The following surgeons have been recruited: (1) thoracic surgeon, (2) orthopedic/hand surgeons, (1) vascular surgeon, (1) spine surgeon, (1) trauma surgeon, (1) minimally invasive surgeon, (1) colorectal surgeon, (1) surgical oncologist, and (1) breast surgeon.

## 2. Clear Public Need

### a. Explain why there is a clear public need for the proposal. Provide evidence that demonstrates this need.

The clear public need for this proposal is supported by: (i) the opportunity to provide high-quality services in a more cost-effective setting; (ii) strong volume growth projections for orthopedic services (related in part to the aging population and the increased incidence of obesity); (iii) physician and patient preference; and (iv) limited operating room capacity.

i. The Provision of High Quality Services in a Lower Cost Environment.

The ASC will be considered a freestanding ambulatory surgical center for reimbursement purposes. As a result, the payment rates paid by payers and patients will be substantially lower than those paid for hospital-based ambulatory surgical services. See Exhibit 5 attached hereto. As Table 1 below illustrates, significant savings (i.e. on average of 35%) accrue to both the payer and the patient when the orthopedic surgical services are provided in a freestanding ambulatory surgery center setting.

**Table 1 - Comparison of Inpatient to Ambulatory Reimbursement Rates for Select Orthopedic Procedures**

| | | | Medicare Rates - Hartford County | | | | Savings | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2013 ASC | | 2013 HOPD - National | | CMS | | Patient | | System | |
| CPT Description | GSC Cases | Dist | CMS Pays | Patient Pays | CMS Pays | Patient Pays | $ | % | $ | % | $ | % |
| 64721 Carpal tunnel surgery | 346 | 19% | $ 699.33 | $ 174.83 | $ 1,075.77 | $ 268.95 | $ 376.44 | 35% | $ 94.12 | 35% | $ 470.56 | 35% |
| 29881 Knee arthroscopy/surgery | 271 | 15% | $ 1,098.16 | $ 274.54 | $ 1,689.29 | $ 422.33 | $ 591.13 | 35% | $147.79 | 35% | $ 738.92 | 35% |
| 29827 Arthroscop rotator cuff repr | 236 | 13% | $ 2,017.92 | $ 504.48 | $ 3,104.17 | $ 776.05 | $ 1,086.25 | 35% | $271.57 | 35% | $1,357.82 | 35% |
| 26055 Incise finger tendon sheath | 175 | 10% | $ 616.49 | $ 154.12 | $ 948.35 | $ 237.09 | $ 331.86 | 35% | $ 82.97 | 35% | $ 414.83 | 35% |
| 29848 Wrist endoscopy/surgery | 151 | 8% | $ 1,098.16 | $ 274.54 | $ 1,689.29 | $ 422.33 | $ 591.13 | 35% | $147.79 | 35% | $ 738.92 | 35% |
| 25447 Repair wrist joints | 98 | 5% | $ 1,491.52 | $ 372.88 | $ 2,294.40 | $ 573.61 | $ 802.88 | 35% | $200.73 | 35% | $1,003.61 | 35% |
| 29880 Knee arthroscopy/surgery | 92 | 5% | $ 1,098.16 | $ 274.54 | $ 1,689.29 | $ 422.33 | $ 591.13 | 35% | $147.79 | 35% | $ 738.92 | 35% |
| 20680 Removal of support implant | 91 | 5% | $ 863.85 | $ 215.96 | $ 1,328.86 | $ 332.22 | $ 465.01 | 35% | $116.26 | 35% | $ 581.27 | 35% |
| 62311 Inject spine l/s (cd) | 61 | 3% | $ 294.22 | $ 73.56 | $ 452.60 | $ 113.15 | $ 158.38 | 35% | $ 39.59 | 35% | $ 197.97 | 35% |
| 29888 Knee arthroscopy/surgery | 58 | 3% | $ 3,048.81 | $ 762.20 | $ 4,689.98 | $ 1,172.50 | $ 1,641.17 | 35% | $410.30 | 35% | $2,051.47 | 35% |
| 26160 Remove tendon sheath lesion | 42 | 2% | $ 616.49 | $ 154.12 | $ 948.35 | $ 237.09 | $ 331.86 | 35% | $ 82.97 | 35% | $ 414.83 | 35% |
| 64718 Revise ulnar nerve at elbow | 36 | 2% | $ 699.33 | $ 174.83 | $ 1,075.77 | $ 268.95 | $ 376.44 | 35% | $ 94.12 | 35% | $ 470.56 | 35% |
| 29806 Shoulder arthroscopy/surgery | 29 | 2% | $ 2,017.92 | $ 504.48 | $ 3,104.17 | $ 776.05 | $ 1,086.25 | 35% | $271.57 | 35% | $1,357.82 | 35% |
| 25111 Remove wrist tendon lesion | 21 | 1% | $ 808.85 | $ 202.21 | $ 1,244.24 | $ 311.07 | $ 435.39 | 35% | $108.86 | 35% | $ 544.25 | 35% |
| 29877 Knee arthroscopy/surgery | 19 | 1% | $ 1,098.16 | $ 274.54 | $ 1,689.29 | $ 422.33 | $ 591.13 | 35% | $147.79 | 35% | $ 738.92 | 35% |
| 29879 Knee arthroscopy/surgery | 9 | 1% | $ 1,098.16 | $ 274.54 | $ 1,689.29 | $ 422.33 | $ 591.13 | 35% | $147.79 | 35% | $ 738.92 | 35% |
| 29873 Knee arthroscopy/surgery | 7 | 0% | $ 1,098.16 | $ 274.54 | $ 1,689.29 | $ 422.33 | $ 591.13 | 35% | $147.79 | 35% | $ 738.92 | 35% |
| 29826 Shoulder arthroscopy/surgery | 6 | 0% | $ 1,098.16 | $ 274.54 | $ 1,689.29 | $ 422.33 | $ 591.13 | 35% | $147.79 | 35% | $ 738.92 | 35% |
| 64483 Inj foramen epidural l/s | 5 | 0% | $ 294.22 | $ 73.56 | $ 452.60 | $ 113.15 | $ 158.38 | 35% | $ 39.59 | 35% | $ 197.97 | 35% |

The Hospital is not alone in proactively reforming its care delivery system to capture these cost savings. According to the Ambulatory Surgery Center Association (the "ASCA"), the reduction in Medicare spending has been approximately $2.6 billion a year as a result of shifting surgical cases from a hospital-based setting to an ambulatory setting. "...[S]hifting just 50% of outpatient procedures from hospitals to ASCs would save Medicare an additional $2.6 billion dollars per year." Please see Exhibit 6 attached hereto.

ii. Projected Strong Volume Growth for Orthopedics.

Strong volume growth is projected for outpatient orthopedic surgery both on a national and a regional level. The Advisory Board Company projects inpatient orthopedic surgical growth at 6% and outpatient orthopedic surgical growth at 23% over the next ten years for the area to be serviced by the proposed ASC (the "Service Area"). See Exhibit 7 for the towns in the Service Area. The Advisory Board's projections also reflect the shifting of orthopedic surgical procedures from an inpatient setting to an outpatient setting. See Exhibit 2 attached hereto for a copy of the Orthopedic Growth Projections for the Service Area from the Advisory Board Company.

The two factors contributing the most to the overall projected growth in orthopedic surgery are an aging population and a rise in the incidence of obesity. See Exhibit 8 attached hereto. Obesity is believed to significantly contribute to osteoarthritis which often leads to joint problems that require joint surgery. See Exhibit 9 attached hereto. Specifically, osteoarthritis affects roughly 15% of adults over 25 and 34% of adults over age 65. According to a recent study by the Robert Wood Johnson Foundation, the percentage of adults in Connecticut who are considered obese was 24.4% in 2011 and it is projected to continue to increase significantly over the next ten years. See Exhibit 10 attached hereto for a copy of a Robert Wood Johnson Foundation study on obesity along with articles addressing the relationship between joint problems and obesity.

iii. Patient and Physician Preference.

Most patients prefer receiving their healthcare services in a facility with shorter wait times, favorable scheduling options, more focused customer service and less likelihood of cancellations due to emergencies. In addition, most patients would prefer to recover in their home rather than remain in the hospital as an inpatient. See Exhibits 6 and 11 attached hereto. Moreover, patient satisfaction surveys consistently demonstrate that patients are highly satisfied when receiving services in an ambulatory surgery center. According to a 2008 Press Ganey Pulse Report which surveyed 1,039,289 patients treated at an ambulatory surgical facility between January 1, 2007 and December 31, 2007, overall patient satisfaction score averaged at or above 92%. See Exhibit 12 attached hereto.

Physicians also prefer working in an environment that allows them to have greater input with respect to operations, equipment and scheduling. In the instant case, the Physicians have been the impetus for the development of the subject ASC. This desire is likely attributable to the fact that physicians in an ASC setting: (i) obtain more favorable scheduling because they are not competing for time with other surgeons from other specialties; (ii) can more easily assemble teams of specially-trained and highly skilled staff; (iii) can ensure that the appropriate and necessary equipment and supplies are being used for their patient (i.e. one size does not fit all in the operating room); and (iv) operate more efficiently with quicker turnover time between orthopedic surgical cases (i.e. less down time for the physician). See Exhibit 5 attached hereto. Simply stated, physicians tend to exercise more professional autonomy over their work environment in a freestanding ambulatory surgery center setting than they do in a hospital setting. See Exhibit 5 and Exhibit 11 attached hereto. "The entire system benefits from the repetition

and specialization: preoperative nursing care, interoperative medical care of an anesthesiologist, radiologist or surgeon, and postoperative care....and the patient benefits." See Exhibit 6 attached hereto.

iv. Limited Operating Room Capacity.

The Hospital does not believe that its existing operating room capacity will be able to adequately accommodate the projected orthopedic surgical growth, nor will the Hospital be able to accommodate the surgical growth attributable to the ten physicians newly recruited to the Hospital and the additional surgeons to be recruited in the future in accordance with its staff development plan. Orthopedic Associates' Rocky Hill ambulatory surgery center is currently operating at 182% of maximum capacity. This volume level is unsustainable and therefore, the ability to decant some of the volume to the proposed ASC is essential.

**b. Provide the calculations used to determine the proposed number of operating rooms (relate this to the projected volumes, including information such as the estimated number of procedures per room), and include any documentation to support these estimates.**

The proposed ASC will have three operating rooms and will be located in the same building that will house the Institute on the Hospital's main campus. See the Facilities Plan attached hereto as Exhibit 13. The number of operating rooms was determined based on the criteria established by OHCA in the State Facilities Plan as detailed below in Table 2 below.

**Table 2: Projected Number of Procedures and Operating Rooms**

**Projected Number of Procedures and Operating Rooms**

| | FY 2015 | FY 2016 | FY 2017 |
|---|---|---|---|
| Hand and Wrist | 825 | 890 | 958 |
| Foot and Ankle | 173 | 182 | 192 |
| Knee and Shoulder | 1,332 | 1,452 | 1,578 |
| General | 196 | 207 | 219 |
| | 2,526 | 2,731 | 2,947 |
| Minutes of Surgery/Cleanup | 227,340 | 245,790 | 265,230 |
| OR need calculated | 2.37 | 2.56 | 2.76 |
| Number of ORs required | 3 | 3 | 3 |

OHCA Facility Plan Guidelines
Capacity of the proposed facility will be based on
8 hours per day, 5 days per week, 50 weeks per year
for a total of 2,000 hours per year

Optimal utilization of an OR = 80%
Average time per case = 60 minutes
Cleanup time per case = 30 minutes

Optimal OR utilization = 96,000 minutes per OR

Based on the formula defined by OHCA in the Statewide Facilities Plan, three operating rooms will be needed to accommodate the projected case volume. Please note that with respect to the projected hand volume, this volume represents overage from the Glastonbury Surgery Center where most of the hand surgery is currently performed.[3]

The projected ASC volume for the proposed facility is detailed in Table 3 below.

**Table 3: Projected Volume for ASC**

**Projected Volume for Proposed ASC**

| | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Shift from West Hartford ASC | 109 | 109 | 109 |
| Shift from JB4 - Hartford Hospital | 1,069 | 1,069 | 1,069 |
| | 1,178 | 1,178 | 1,178 |
| Incremental Volume from Orthopedic Associates | 1,348 | 1,553 | 1,769 |
| Total Projected ASC Volume | 2,526 | 2,731 | 2,947 |

The incremental volume shifted from Orthopedic Associates to the ASC is based on the capacity needs of the practice and the need to decant volume from Rocky Hill and the Glastonbury Surgery Center. The shift in volume from the Hospital's JB4 and the West Hartford Surgery Center to the proposed ASC will allow the Hospital to accommodate the expected growth in outpatient surgical volume from all surgical specialties, including orthopedics.

**c. Provide the following regarding the proposal's location:**

**i. The rationale for choosing the proposed service location;**

Hartford Hospital's campus was chosen as the location for the proposed ASC because the ASC will be an integral and critical component of the Institute. The Hospital's main campus is the appropriate location for the Institute because it is proximate and integral to the entire Hospital setting, including but not limited to the Hospital's emergency department, inpatient facility and specialty consulting services. In summary, for the reasons described above, it is the most efficient and cost-effective location.

**ii. The service area towns and the basis for their selection;**

Please see Exhibit 7 for a listing of the towns and associated Zip codes for the Service Area. The Hospital believes that the Institute will develop a national reputation and attract patients from locations beyond the State of Connecticut.

[3] The Glastonbury Surgery Center is currently at 94% capacity.

**iii. The population to be served, including specific evidence such as incidence, prevalence, or other demographic data that demonstrates need;**

The proposed ASC will primarily serve residents of the Hospital's primary service area. As discussed above, the aging of Connecticut's population and the prevalence of obesity both contribute to the projected increase in demand for orthopedic surgical interventions. See Exhibit 5, 6, 8, 9 and 10 attached hereto (articles relating to obesity and growth projections.)

**iv. How and where the proposed patient population is currently being served;**

The patient population is currently being served at the Hospital's JB4 and West Hartford Surgery Centers, the Glastonbury Surgery Center and the Rocky Hill Surgical Center.

**v. Complete the following table concerning the existing providers in the towns listed above and also in nearby towns; and**

The following three tables set forth:

OHCA Table 1a: Utilization and Capacity of the Applicant;

OHCA Table 1b: Utilization and Capacity of the Applicant with Newly Recruited Physicians; and

OHCA Table 1c: Utilization and Capacity of All Existing Service Area Providers.

# OCHA Table 1a: Utilization and Capacity of Existing Providers

| Provider Name<br>Street Address<br>Town, Zip Code | Number of Operating Rooms | | | | Estimated Capacity for Proposal | | | | | | Current Utilization FY 2012 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Avail-able [1] | Utilized [2] | Not Utilized [3] | Equipped for Proposal [4] | 2012 % IP | Assumed Case Length | Minimum [5] per OR | Minimum [5] Total | Maximum [6] per OR | Maximum [6] Total | Total Cases | per OR | % of Max |
| Hartford Hospital, 80 Seymour Street, Hartford 06102 | 42 | 42 | 0 | 42 | 50% | 135.16 | 533 | 22,373 | 710 | 29,831 | 23,725 | 565 | 80% |
| West Hartford Surgery Center, 65 Memorial Road, West Hartford 06106 | 3 | 3 | 0 | 3 | 0% | 90.00 | 800 | 2,400 | 1,067 | 3,200 | 2,281 | 760 | 71% |
| Glastonbury Surgery Center, LLC, 195 Eastern Boulevard, Glastonbury 06033 | 3 | 3 | 0 | 3 | 0% | 90.00 | 800 | 2,400 | 1,067 | 3,200 | 3,011 | 1,004 | 94% |
| Orthopedic Associates Surgery Center, LLC, 1111 Cromwell Avenue, Rocky Hill 06067 | 4 | 4 | 0 | 4 | 0% | 90.00 | 800 | 3,200 | 1,067 | 4,267 | 7,784 | 1,946 | 182% |
| The Hospital of Central Connecticut, 100 Grand Street, New Britain 06050 | 23 | 23 | 0 | 13 | 33% | 119.53 | 602 | 7,830 | 803 | 10,441 | 9,962 | 766 | 95% |
| Bradley Memorial Campus of Hospital of Central Connecticut, 81 Meriden Ave, Southington 06489 | 4 | 2 | 1 | 3 | 17% | 105.52 | 682 | 2,047 | 910 | 2,729 | 1,647 | 549 | 60% |
| MidState Medical Center, 435 Lewis Avenue, Meriden 06451 | 9 | 9 | 0 | 9 | 24% | 111.57 | 645 | 5,808 | 860 | 7,744 | 8,162 | 907 | 105% |
| | | | | **Total** | | | | **49,259** | | **65,678** | **64,879** | | **99%** |

[1] Include used, equipped, and shell space. Data for facilities not associated with Applicants are based on Connecticut Department of Public Health, OHCA Inventory of Health Care Facilities, Services and Equipment for 2011

[2] Include those actually used to perform surgeries.

[3] Include those not used and those that are equipped or are only shell space.

[4] Excludes endoscopy rooms when known.

[5] Minimum number of surgeries to be performed in a single operating room for one year is 800 outpatient cases or 400 inpatient cases which represents 60% utilization of capacity, 20% below optimal. This is equivalent to 4 outpatient cases or 2 inpatient cases per day. The capacity of an operating room is based on eight (8) hours per day, five (5) days per week fifty (50) weeks per year for a total of 2,000 hours (120,000 minutes) per year consistent with the guidelines included in Section 2, Chapter 4 of the October 2012 OHCA Statewide Healthcare Facilities and Services Plan. Outpatient case lengths are assumed to be 60 minutes with a 30 minute room turnover time for an average of 90 minutes consistent with the guidelines included in Section 2, Chapter 4 of the October 2012 OHCA Statewide Healthcare Facilities and Services Plan. As some of the operating rooms covered in the application perform both inpatient and outpatient cases, a separate average case length for inpatient cases was defined as 180 minutes including room turnover time consistent with the standard used by the state of North Carolina for CON applications (see Chapter 6 of the 2013 State Medical Facilities Plan) as Connecticut does not appear to have a published inpatient average case length standard. The 2012 inpatient/outpatient case mix by facility were used for calculating a blended utilization rate of existing operating rooms. The 2012 percent inpatient case were: 50% for Hartford Hospital, 33% for HOCC New Britain, 17% for the Bradley Memorial Campus and 24% for MidState Medical Center. Glastonbury Surgery Center and Orthopedic Associates Surgery Center at Rocky Hill are outpatient only facilities.

[6] Maximum number of surgeries to be performed in a single operating room for one year is 1,067 outpatient cases or 533 inpatient cases based on 80% utilization of capacity consistent with the optimal utilization guidelines established by OHCA. The capacity of an operating room is based on eight (8) hours per day, five (5) days per week fifty (50) weeks per year for a total of 2,000 hours (120,000 minutes) per year consistent with the guidelines included in Section 2, Chapter 4 of the October 2012 OHCA Statewide Healthcare Facilities and Services Plan. Outpatient case lengths are assumed to be 60 minutes with a 30 minute room turnover time for an average of 90 minutes consistent with the guidelines included in Section 2, Chapter 4 of the October 2012 OHCA Statewide Healthcare Facilities and Services Plan. As some of the operating rooms covered in the application perform both inpatient and outpatient cases, a separate average case length for inpatient cases was defined as 180 minutes including room turnover time consistent with the standard used by the state of North Carolina for CON applications (see Chapter 6 of the 2013 State Medical Facilities Plan) as Connecticut does not appear to have a published inpatient average case length standard. The 2012 inpatient/outpatient case mix by facility were used for calculating a blended utilization rate of existing operating rooms. The 2012 percent inpatient case were: 50% for Hartford Hospital, 33% for HOCC New Britain, 17% for the Bradley Memorial Campus and 24% for MidState Medical Center. Glastonbury Surgery Center and Orthopedic Associates Surgery Center at Rocky Hill are outpatient only facilities.

# OHCA Table 1b: Projected Utilization and Capacity with Newly Recruited Physicians

| Provider Name<br>Street Address<br>Town, Zip Code | Number of Operating Rooms | | | | Estimated Capacity for Proposal | | | | | | Current Utilization FY 2012 + 1700 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Available [1] | Utilized [2] | Not Utilized [3] | Equipped for Proposal [4] | 2012 % IP | Assumed Case Length | Minimum [5] per OR | Minimum [5] Total | Maximum [6] per OR | Maximum [6] Total | Total Cases | per OR | % of Max |
| Hartford Hospital, 80 Seymour Street, Hartford 06102 | 42 | 42 | 0 | 42 | 50% | 135.16 | 533 | 22,373 | 710 | 29,831 | 25,425 | 605 | 85% |
| Hartford Hospital's Eye Surgery Center, 505 Willard Avenue, Newington 06111 | 4 | 4 | 0 | 4 | 0% | 90.00 | 800 | 3,200 | 1,067 | 4,267 | 8,307 | 2,077 | 195% |
| West Hartford Surgery Center, 65 Memorial Road, West Hartford 06106 | 3 | 3 | 0 | 3 | 0% | 90.00 | 800 | 2,400 | 1,067 | 3,200 | 2,281 | 760 | 71% |
| Glastonbury Surgery Center, LLC, 195 Eastern Boulevard, Glastonbury 06033 | 3 | 3 | 0 | 3 | 0% | 90.00 | 800 | 2,400 | 1,067 | 3,200 | 3,011 | 1,004 | 94% |
| Orthopedic Associates Surgery Center, LLC, 1111 Cromwell Avenue, Rocky Hill 06067 | 4 | 4 | 0 | 4 | 0% | 90.00 | 800 | 3,200 | 1,067 | 4,267 | 7,784 | 1,946 | 182% |
| The Hospital of Central Connecticut, 100 Grand Street, New Britain 06050 | 23 | 23 | 0 | 13 | 33% | 119.53 | 602 | 7,830 | 803 | 10,441 | 9,962 | 766 | 95% |
| Bradley Memorial Campus of Hospital of Central Connecticut, 81 Meriden Ave, Southington 06489 | 4 | 2 | 1 | 3 | 17% | 105.52 | 682 | 2,047 | 910 | 2,729 | 1,647 | 549 | 60% |
| MidState Medical Center, 435 Lewis Avenue, Meriden 06451 | 9 | 9 | 0 | 9 | 24% | 111.57 | 645 | 5,808 | 860 | 7,744 | 8,162 | 907 | 105% |
| | | | | **Total** | | | | **49,259** | | **65,678** | **66,579** | | **101%** |

[1] Include used, equipped, and shell space. Data for facilities not associated with Applicants are based on Connecticut Department of Public Health, OHCA Inventory of Health Care Facilities, Services and Equipment for 2011

[2] Include those actually used to perform surgeries.

[3] Include those not used and those that are equipped or are only shell space.

[4] Excludes endoscopy rooms when known.

[5] Minimum number of surgeries to be performed in a single operating room for one year is 800 outpatient cases or 400 inpatient cases which represents 60% utilization of capacity, 20% below optimal. This is equivalent to 4 outpatient cases or 2 inpatient cases per day. The capacity of an operating room is based on eight (8) hours per day, five (5) days per week fifty (50) weeks per year for a total of 2,000 hours (120,000 minutes) per year consistent with the guidelines included in Section 2, Chapter 4 of the October 2012 OHCA Statewide Healthcare Facilities and Services Plan. Outpatient case lengths are assumed to be 60 minutes with a 30 minute room turnover time for an average of 90 minutes consistent with the guidelines included in Section 2, Chapter 4 of the October 2012 OHCA Statewide Healthcare Facilities and Services Plan. As some of the operating rooms covered in the application perform both inpatient and outpatient cases, a separate average case length for inpatient cases was defined as 180 minutes including room turnover time consistent with the standard used by the state of North Carolina for CON applications (see Chapter 6 of the 2013 State Medical Facilities Plan) as Connecticut does not appear to have a published inpatient average case length standard. The 2012 inpatient/outpatient case mix by facility were used for calculating a blended utilization rate of existing operating rooms. The 2012 percent inpatient case were: 50% for Hartford Hospital, 33% for HOCC New Britain, 17% for the Bradley Memorial Campus and 24% for MidState Medical Center. Glastonbury Surgery Center and Orthopedic Associates Surgery Center at Rocky Hill are outpatient only facilities.

[6] Maximum number of surgeries to be performed in a single operating room for one year is 1,067 outpatient cases or 533 inpatient cases based on 80% utilization of capacity consistent with the optimal utilization guidelines established by OHCA. The capacity of an operating room is based on eight (8) hours per day, five (5) days per week fifty (50) weeks per year for a total of 2,000 hours (120,000 minutes) per year consistent with the guidelines included in Section 2, Chapter 4 of the October 2012 OHCA Statewide Healthcare Facilities and Services Plan. Outpatient case lengths are assumed to be 60 minutes with a 30 minute room turnover time for an average of 90 minutes consistent with the guidelines included in Section 2, Chapter 4 of the October 2012 OHCA Statewide Healthcare Facilities and Services Plan. As some of the operating rooms covered in the application perform both inpatient and outpatient cases, a separate average case length for inpatient cases was defined as 180 minutes including room turnover time consistent with the standard used by the state of North Carolina for CON applications (see Chapter 6 of the 2013 State Medical Facilities Plan) as Connecticut does not appear to have a published inpatient average case length standard. The 2012 inpatient/outpatient case mix by facility were used for calculating a blended utilization rate of existing operating rooms. The 2012 percent inpatient case were: 50% for Hartford Hospital, 33% for HOCC New Britain, 17% for the Bradley Memorial Campus and 24% for MidState Medical Center. Glastonbury Surgery Center and Orthopedic Associates Surgery Center at Rocky Hill are outpatient only facilities.

## OHCA Table 1c: Utilization and Capacity of All Service Area Existing Providers

| Provider Name<br>Street Address<br>Town, Zip Code | Number of Operating Rooms | | | | Estimated Capacity for Proposal | | | | | | Current Utilization FY 2012 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Avail-able [1] | Utilized [2] | Not Utilized [3] | Equipped for Proposal [4] | 2012 % IP | Assumed Case Length | Minimum [5] per OR | Minimum [5] Total | Maximum [6] per OR | Maximum [6] Total | Total Cases | per OR | % of Max |
| Hartford Hospital, 80 Seymour Street, Hartford 06102 | 42 | 42 | 0 | 42 | 50% | 135.16 | 533 | 22,373 | 710 | 29,831 | 23,725 | 565 | 80% |
| Connecticut Surgery Center, 81 Gillett Street, Hartford 06105 | 2 | 2 | 0 | 2 | Data not avialable | | | | | | | | |
| Hartford Surgical Center, 100 Retreat Avenue, Hartford 06106 | 2 | 2 | 0 | 2 | Data not avialable | | | | | | | | |
| Saint Francis Hospital and Medical Center, 114 Woodland Street, Hartford 06105 | 34 | 34 | 0 | 34 | Data not avialable | | | | | | | | |
| West Hartford Surgery Center, 65 Memorial Road, West Hartford 06106 | 3 | 3 | 0 | 3 | 0% | 90.00 | 800 | 2,400 | 1,067 | 3,200 | 2,281 | 760 | 71% |
| Glastonbury Surgery Center, LLC, 195 Eastern Boulevard, Glastonbury 06033 | 3 | 3 | 0 | 3 | 0% | 90.00 | 800 | 2,400 | 1,067 | 3,200 | 3,011 | 1,004 | 94% |
| Manchester Memorial Hospital, 71 Haynes Street, Manchester 06040 | 11 | 11 | 0 | 11 | Data not avialable | | | | | | | | |
| Orthopedic Associates Surgery Center, LLC, 1111 Cromwell Avenue, Rocky Hill 06067 | 4 | 4 | 0 | 4 | 0% | 90.00 | 800 | 3,200 | 1,067 | 4,267 | 7,784 | 1,946 | 182% |
| University of Connecticut Health Center - Farmington Surgery Center, 263 Farmington Avenue, Farmington 06030 | 4 | 4 | 0 | 4 | Data not avialable | | | | | | | | |
| Bristol Hospital, 41 Brewster Road, Bristol 06010 | 12 | 12 | 0 | 12 | Data not avialable | | | | | | | | |
| The Hospital of Central Connecticut, 100 Grand Street, New Britain 06050 | 23 | 23 | 0 | 13 | 33% | 119.53 | 602 | 7,830 | 803 | 10,441 | 9,962 | 766 | 95% |
| John Dempsey Hospital, 263 Farmington Avenue, Farmington 06030 | 8 | 8 | 0 | 8 | Data not avialable | | | | | | | | |
| Middlesex Center for Advanced Orthopedic Surgery, 510 Saybrook Road, Middletown 06457 | 3 | 3 | 0 | 3 | Data not avialable | | | | | | | | |
| Middlesex Hospital Middletown 06457 | 8 | 8 | 0 | 8 | Data not avialable | | | | | | | | |
| Middlesex Surgical Center, 530 Saybrook Road, Middletown 06457 | 3 | 3 | 0 | 3 | Data not avialable | | | | | | | | |
| Rockville General Hospital, 31 Union Street, Vernon 06066 | 4 | 4 | 0 | 4 | Data not avialable | | | | | | | | |
| Bradley Memorial Campus of Hospital of Central Connecticut, 81 Meriden Ave, Southington 06489 | 4 | 2 | 1 | 3 | 17% | 105.52 | 682 | 2,047 | 910 | 2,729 | 1,647 | 549 | 60% |
| MidState Medical Center, 435 Lewis Avenue, Meriden 06451 | 9 | 9 | 0 | 9 | 24% | 111.57 | 645 | 5,808 | 860 | 7,744 | 8,162 | 907 | 105% |
| | | | | **Total** | | | | **49,259** | | **65,678** | **64,879** | | **99%** |

[1] Include used, equipped, and shell space. Data for facilities not associated with Applicants are based on Connecticut Department of Public Health, OHCA Inventory of Health Care Facilities, Services and Equipment for 2011

[2] Include those actually used to perform surgeries.

[3] Include those not used and those that are equipped or are only shell space.

[4] Excludes endoscopy rooms when known.

[5] Minimum number of surgeries to be performed in a single operating room for one year is 800 outpatient cases or 400 inpatient cases which represents 60% utilization of capacity, 20% below optimal. This is equivalent to 4 outpatient cases or 2 inpatient cases per day. The capacity of an operating room is based on eight (8) hours per day, five (5) days per week fifty (50) weeks per year for a total of 2,000 hours (120,000 minutes) per year consistent with the guidelines included in Section 2, Chapter 4 of the October 2012 OHCA Statewide Healthcare Facilities and Services Plan. Outpatient case lengths are assumed to be 60 minutes with a 30 minute room turnover time for an average of 90 minutes consistent with the guidelines included in Section 2, Chapter 4 of the October 2012 OHCA Statewide Healthcare Facilities and Services Plan. As some of the operating rooms covered in the application perform both inpatient and outpatient cases, a separate average case length for inpatient cases was defined as 180 minutes including room turnover time consistent with the standard used by the state of North Carolina for CON applications (see Chapter 6 of the 2013 State Medical Facilities Plan) as Connecticut does not appear to have a published inpatient average case length standard. The 2012 inpatient/outpatient case mix by facility were used for calculating a blended utilization rate of existing operating rooms. The 2012 percent inpatient case were: 50% for Hartford Hospital, 33% for HOCC New Britain, 17% for the Bradley Memorial Campus and 24% for MidState Medical Center. Glastonbury Surgery Center and Orthopedic Associates Surgery Center at Rocky Hill are outpatient only facilities.

[6] Maximum number of surgeries to be performed in a single operating room for one year is 1,067 outpatient cases or 533 inpatient cases based on 80% utilization of capacity consistent with the optimal utilization guidelines established by OHCA. The capacity of an operating room is based on eight (8) hours per day, five (5) days per week fifty (50) weeks per year for a total of 2,000 hours (120,000 minutes) per year consistent with the guidelines included in Section 2, Chapter 4 of the October 2012 OHCA Statewide Healthcare Facilities and Services Plan. Outpatient case lengths are assumed to be 60 minutes with a 30 minute room turnover time for an average of 90 minutes consistent with the guidelines included in Section 2, Chapter 4 of the October 2012 OHCA Statewide Healthcare Facilities and Services Plan. As some of the operating rooms covered in the application perform both inpatient and outpatient cases, a separate average case length for inpatient cases was defined as 180 minutes including room turnover time consistent with the standard used by the state of North Carolina for CON applications (see Chapter 6 of the 2013 State Medical Facilities Plan) as Connecticut does not appear to have a published inpatient average case length standard. The 2012 inpatient/outpatient case mix by facility were used for calculating a blended utilization rate of existing operating rooms. The 2012 percent inpatient case were: 50% for Hartford Hospital, 33% for HOCC New Britain, 17% for the Bradley Memorial Campus and 24% for MidState Medical Center. Glastonbury Surgery Center and Orthopedic Associates Surgery Center at Rocky Hill are outpatient only facilities.

Based upon the foregoing, it is clear that there is need for additional ambulatory operating room capacity in the Service Area even without considering growth attributable to the Hospital's staff development plan.

### vi. The effect of the proposal on existing providers;

There will be little or no impact on existing providers in that most of the physicians that will be performing surgery at the proposed ASC are currently performing their ambulatory orthopedic surgery at the Rocky Hill, Glastonbury and the Hospital's

outpatient facilities. The projected volume for the proposed ASC represents a shifting of these existing volumes to the ASC.

**d. Explain why the proposal will not result in an unnecessary duplication of existing or approved health care services.**

This proposal is a critical component to the Institute and will be dedicated to providing technologically advanced orthopedic ambulatory surgery in accordance with evidence-based protocols which will lead to enhanced efficiencies and improved patient outcomes. The Hospital strongly believes that the Institute requires a freestanding orthopedic ASC wherein the Hospital and its Physicians can collaborate to improve quality and reduce costs. As noted above in 2.a.ii, strong growth is projected for outpatient orthopedics and surgical volumes in general. The Applicant believes that the projected volume growth for the Service Area will require the equivalent of approximately thirty (30) additional ambulatory operating rooms in the next ten years. Existing operating room capacity available to the Hospital is inadequate to meet the demands associated with anticipated surgical volume growth generated by the newly recruited surgeons.

**e. Attach a copy of any articles, studies, or reports that support the need to establish the proposed service, along with a brief explanation regarding the relevance of the selected articles.**

Please see Exhibits 2, 3, 5, 6 and 8 to 12 attached hereto for relevant literature in support of the proposed ASC.

**3. Projected Volume**

**a. Complete the following tables for the first three projected FYs of the proposal, for the outpatient surgical volume of each of the Applicants and physicians involved in the proposal. In OHCA Table 2a, report the units of service by service or procedure type, and in OHCA Table 2b, report the units of service by each existing and proposed operating room. Add lines as necessary.**

**OHCA Table 2a: Projected Outpatient Surgical Volume, by Procedure Type**

| | **Projected Volume (First 3 Full Operational FYs)*** | | |
|---|---|---|---|
| | **FY 2015** | **FY 2016** | **FY 2017** |
| Service or procedure type** | | | |
| Hand, Wrist, Elbow | **825** | **890** | **958** |
| Foot, Ankle | **173** | **182** | **192** |
| Knee, Shoulder | **1332** | **1452** | **1578** |
| General | **196** | **207** | **219** |
| **Total** | **2526** | **2731** | **2947** |

* If the first year of the proposal is only a partial year, provide the first partial year and then the first three full FYs. Add columns as necessary.
** Identify each service/procedure type and add lines as necessary.
*** Fill in years. In a footnote, identify the period covered by the Applicant's FY (e.g. July 1-June 30, calendar year, etc.).

The fiscal year for the proposed ASC will be October 1 through September 30.

**OHCA Table 2b: Projected Outpatient Surgical Volume, by Operating room**

| | Projected Volume (First 3 Full Operational FYs)* | | |
|---|---|---|---|
| | **FY 2014** | **FY 2015** | **FY 2016** |
| Operating room** | | | |
| OR 1 | **853** | **853** | **853** |
| OR 2 | **853** | **853** | **853** |
| OR 3 | **819** | **1024** | **1240** |
| **Total** | **2526** | **2731** | **2947** |

* If the first year of the proposal is only a partial year, provide the first partial year and then the first three full FYs. Add columns as necessary.
** Identify each operating room by location and any other identifier, and add lines as necessary.
*** Fill in years. In a footnote, identify the period covered by the Applicant's FY (e.g. July 1-June 30, calendar year, etc.).

**b. Provide a detailed description of all assumptions used in the derivation/calculation of the projected volumes.**

The projected volumes for the ASC are based on the following:

1) Actual outpatient orthopedic volume at the Hospital that would shift to the proposed ASC (with a conservative 2% annual growth factor applied); and

2) Projected volumes from Orthopedic Associates of Hartford physicians due to practice growth, newly recruited physicians as discussed above and decanting of volume from Rocky Hill and the Glastonbury Surgery Center. Three of the physicians newly recruited by the Hospital and discussed above will be joining Orthopedic Associates.

**4. Quality Measures**

**a. Submit a list of all key professional, administrative, clinical, and direct service personnel related to the proposal. Attach a copy of their Curriculum Vitae.**

Please see Exhibit 14 attached hereto for copies of Curriculum Vitae for key professional, administrative, clinical and direct service personnel related to this project.

**b. Explain how the proposal contributes to the quality of health care delivery in the region.**

This proposal will allow physicians and clinical staff to focus exclusively on the unique needs of ambulatory orthopedic surgical patients. The ASC will have meaningful performance benchmarks for the purpose of monitoring quality, patient satisfaction and

service. Overall, high value services at lower cost contributes to the quality of health care in the region.

**c. Identify the Standard of Practice Guidelines that will be utilized in relation to the proposal. Attach copies of relevant sections and briefly describe how the Applicant proposes to meet each of the guidelines.**

Please see Exhibit 15 attached hereto for relevant portions of the Standard of Practice Guidelines for Ambulatory Surgery Centers, Accreditation Association for Ambulatory Health Care Centers (the "AAAHC"). The ASC will operate in accordance with national standards required to achieve AAAHC accreditation.

**d. <u>For non-hospital Applicants only</u>, provide transfer agreements with hospitals closest to the proposed facility.**

Please see Exhibit 16 attached hereto for a copy of the draft transfer agreement between the ASC and the Hospital.

**5. Organizational and Financial Information**

**a. Identify the Applicant's ownership type(s) (e.g. Corporation, PC, LLC, etc.).**

The ASC is a Connecticut limited liability company, (LLC).

**b. Describe the proposed ownership structure for the outpatient surgical facility.**

Hartford Hospital 51% and the remaining 49% will be owned by the Physicians and CSC.

**c. Provide copies of Articles of Incorporation, Articles of Organization, or Partnership Agreements (all that are appropriate) related to the proposal.**

See Exhibit 1 attached hereto for the ASC Articles of Organization and the draft ASC Operating Agreement

**d. Does the Applicant have non-profit status?**
☐ Yes (Provide documentation) ☐ No

No.

**e. Provide copies of all signed written agreements or memorandum of understanding including all exhibits/attachment etc., between the Applicants related to the proposal.**

See Exhibit 1 attached hereto.

**f. Provide audited financial statements for the most recently completed fiscal year. If audited financial statements do not exist, in lieu of audited financial statements, provide other financial documentation (e.g. unaudited balance sheet, statement of operations, tax return, or other set of books.)**

Copies of the FY 2012 audited financial statements for Hartford Hospital are on file with OHCA.

**g. Submit a final version of all capital expenditures/costs as follows:**

**OHCA Table 3: Proposed Capital Expenditures/Costs**

| | |
|---|---|
| Medical Equipment Purchase | $1,800,000 |
| Imaging Equipment Purchase | |
| Non-Medical Equipment Purchase | |
| Land/Building Purchase * | |
| Construction/Renovation ** | $3,750,000 |
| Other Non-Construction (Specify) | $ 950,000 (i.e. contingent expenses) |
| **Total Capital Expenditure (TCE)** | **$6,500,000** |
| Medical Equipment Lease (Fair Market Value) *** | $ |
| Imaging Equipment Lease (Fair Market Value) *** | |
| Non-Medical Equipment Lease (Fair Market Value) *** | |
| Fair Market Value of Space *** | |
| **Total Capital Cost (TCC)** | **$** |
| **Total Project Cost (TCE + TCC)** | **$6,500,000** |
| Capitalized Financing Costs (Informational Purpose Only) | |
| Total Capital Expenditure with Cap. Fin. Costs | $6,500,000 |

* If the proposal involves a land/building purchase, attach a real estate property appraisal including the amount; the useful life of the building; and a schedule of depreciation.
** If the proposal involves construction/renovations, attach a description of the proposed building work, including the gross square feet; existing and proposed floor plans; commencement date for the construction/renovation; completion date of the construction/renovation; and commencement of operations date.
*** If the proposal involves a capital or operating equipment lease and/or purchase, attach a vendor quote or invoice; schedule of depreciation; useful life of the equipment; and anticipated residual value at the end of the lease or loan term.

The Applicant anticipates beginning construction upon receipt of OHCA's approval.

**h. List all funding or financing sources for the proposal and the dollar amount of each. Provide applicable details such as interest rate; term; monthly payment; pledges and funds received to date; letter of interest or approval from a lending institution.**

The operations of the ASC will be funded though capital contributions by the members, income from operations and lender financing at market rates.

**i. Provide a copy of the Applicant's charity care policy and sliding fee scale applicable to the proposal.**

The ASC will adopt the Hartford HealthCare charity care policy also referred to as its "Financial Assistance Policy" attached as Exhibit 17.

**j. Demonstrate how this proposal will affect the financial strength of the state's health care system.**

The ASC will operate as a freestanding ambulatory surgery center. As a freestanding ambulatory surgery center, the reimbursement paid by payers and patients will be substantially lower than that for hospital-based ambulatory surgical services (i.e. on average, 35% lower). Specifically, this proposal will allow for high quality orthopedic ambulatory surgical services to be available at a lower cost to the community. The ASC will also be an integral component of the Hospital's Institute offering a full continuum of coordinated orthopedic services. Having its physical presence on the Hospital campus will allow the proposed ASC to obtain additional efficiencies through shared service arrangements with the Hospital and thereby avoiding duplicative costs.

**6. Patient Population Mix: Current and Projected**

**a. Provide the current and projected patient population mix (based on the number of patients, not based on revenue) with the CON proposal for the proposed program.**

**OHCA Table 4: Patient Population Mix[4]**

| | Current** FY 2012 | Year 1 FY 2014 | Year 2 FY 2015 | Year 3 FY 2016 |
|---|---|---|---|---|
| Medicare* | 15.8% | 15.8% | 15.8% | 15.8% |
| Medicaid* | 5.6% | 5.6% | 5.6% | 5.6% |
| CHAMPUS & TriCare | | | | |
| **Total Government** | **21.4%** | **21.4%** | **21.4%** | **21.4%** |
| Commercial Insurers* | 63.1% | 63.1% | 63.1% | 63.1% |
| Uninsured | 1.6% | 1.6% | 1.6% | 1.6% |
| Workers Compensation | 13.9% | 13.9% | 13.9% | 13.9% |
| **Total Non-Government** | **78.6%** | **78.6%** | **78.6%** | **78.6%** |
| **Total Payer Mix** | **100%** | **100%** | **100%** | **100%** |

* Includes managed care activity;
** New programs may leave the "current" column blank;
*** Fill in years. Ensure the period covered by this table corresponds to the period covered in the projections provided.

**b. Provide the basis for/assumptions used to project the patient population mix.**

The projected patient population mix is based upon the current patient population mix for the Hospital and Orthopedic Associates of Hartford.

[4] Patient population mix reflects actual orthopedic ambulatory cases at the Hospital and Orthopedic Associates of Hartford.

7. **Financial Attachments I & II**

a. **Provide a summary of revenue, expense, and volume statistics, without the CON project, incremental to the CON project, and with the CON project. Complete Financial Attachment I. (Note that the actual results for the fiscal year reported in the first column must agree with the Applicant's audited financial statements.) The projections must include the first three full fiscal years of the project.**

See Exhibit 18 attached hereto for the Hospital's Financial Attachment A.

b. **Provide a three year projection of incremental revenue, expense, and volume statistics attributable to the proposal by payer. Complete Financial Attachment II. The projections must include the first three full fiscal years of the project.**

See Exhibit 19 attached hereto for HHASC's Financial Attachment B.

c. **Provide the assumptions utilized in developing both Financial Attachments I and II (e.g., full-time equivalents, volume statistics, other expenses, revenue and expense % increases, project commencement of operation date, etc.)**

- Case volume is derived from existing volume of all affiliated physicians who are expected to perform surgery at the proposed ASC.
- Volume growth is based on historical growth, physician practice patterns, and projections discussed herein.
- Net revenue per case is based on the Medicare and Medicaid fee schedules for ASCs.
- Required staffing and other operating expenses are based on CSC's experience in Connecticut.
- Depreciation expense is based on 5 year average useful life.
- Interest expense assumes capital is borrowed at 6.5% and amortized over 5 years.

d. **Provide documentation or the basis to support the proposed rates for each of the FYs as reported in Financial Attachment II. Provide a copy of the rate schedule for the proposed service(s).**

Medicare and Medicaid rates are based upon actual rates for ambulatory surgery centers in Connecticut.

**e. Identify the entity that will be billing for the proposed service(s).**

HHC Hartford Surgery Center, LLC.

**f. Provide the minimum number of units required to show an incremental gain from operations for each fiscal year.**

The Applicant projects that the volumes indicated in OHCA Tables 2a and 2b above will result in profitable operations because of lower cost structure.

**g. Explain any projected incremental losses from operations contained in the financial projections that result from the implementation and operation of the CON proposal.**

There are no projected losses in the financial projections.

**h. Describe how this proposal is cost effective.**

As noted in responses above, the ASC will operate as a freestanding ambulatory surgery center for reimbursement purposes. As a result, the payment rates paid by payers and patients will be substantially lower than they are for hospital-based ambulatory surgical services. This proposal will allow for high quality orthopedic ambulatory surgical services to be available at a lower cost to the community than if provided in a hospital setting. Finally, by being physically located on the Hospital campus, the proposed ASC will be able to enter into shared service arrangements that will allow for cost savings and avoid duplication of costs.

# TABLE OF CONTENTS

# EXHIBIT LIST
# HHC HARTFORD SURGERY CENTER, LLC

| Exhibit Number | Description |
|---|---|
| 1 | • Draft Operating Agreement for HHC Hartford Surgery Center, LLC<br>• Articles of Organization |
| 2 | • Advisory Board Orthopedic Growth Projections for Hartford County<br>• Advisory Board - Ambulatory Surgery Investment: 2013 Outlook, November 27, 2012 |
| 3 | • "Ambulatory Surgery Centers Quality and Access Act of 2013"<br>• Senate Bill 1137 of the Social Security Act |
| 4 | Letters of Support<br>• Senator John Fonfara<br>• Mayor Pedro E. Segarra |
| 5 | • *Ambulatory Surgery Centers, A Positive Trend In Health Care,* Ambulatory Surgery Center Association, October 08, 2011<br>• *Growth of Ambulatory Surgical Centers, Surgery Volume and Savings to Medicare*, Lane Koenig, PhD and Qian Gu, PhD, The American Journal of Gastroenterology, Vol. 108, January 2013 |
| 6 | *Can Ambulatory Care Fix Our Costly Healthy-Care System?,* Barbara Mannino, FOXBusiness, March 8, 2012, available at http://foxbusiness.com/personal-finance/2012/03/08/can-ambulatory-care-fix-our-costly-healthy-care-system/ |
| 7 | Service Area Towns |
| 8 | *The Role of Knee Alignment in Disease Progression and Functional Decline in Knee Osteoarthritis*, JAMA, July 11, 2001, Col 286, No. 2, Leena Sharma, MD; Jing Song, MS; David T. Felson, MD, MPH; September Cahue, BS; Eli Shamiyeh, MS; Dorothy D. Dunlop, PhD |
| 9 | *Obesity and Osteoarthritis; more complex than predicted!* NCBI, P. Pottie; N. Presle; B. Terlian; P. Netter; D. Mainard and F. Berenbaum, November, 2006 |
| 10 | • *Bending the Obesity Cost Curve in Connecticut,* Robert Wood Johnson Foundation, September 2012<br>• *F as in Fat: How Obesity Threatens America's Future, 2012,* |

| | |
|---|---|
| | Robert Wood Johnson Foundation, September 2012 |
| 11 | MEDPAC 2013 Report to Congress, Chapter 5 |
| 12 | Press Ganey 2008 Pulse Report |
| 13 | Facilities Plans |
| 14 | *Curriculum Vitae* of Key Personnel<br>• Jeffrey A. Flaks, President & CEO Hartford Hospital<br>• Gerald J. Boisvert, CPA, FHFMA, CFO, Hartford Hospital<br>• Kristian M. Mineau II, President & CEO Constitution Surgery Centers<br>• Courtland Gillett Lewis, MD, UCONN Health Center |
| 15 | *Standard of Practice Guidelines for Ambulatory Surgery Centers,* Accreditation Association for Ambulatory Health Care |
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DRAFT

# OPERATING AGREEMENT
# HHC HARTFORD SURGERY CENTER, LLC

## A CONNECTICUT LIMITED LIABILITY COMPANY DATED AS OF

_____

**Operating Agreement of _____ Surgery Center**

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**OPERATING AGREEMENT OF**
**_____SURGERY CENTER, LLC**

This Operating Agreement (this "Agreement") is entered into as of this ___ day of ____, 2013, by and among the signatories hereto.

**EXPLANATORY STATEMENT**

**WHEREAS,** the parties have agreed to organize and operate a limited liability company in accordance with the terms of, and subject to the conditions set forth in, this Agreement; and

**WHEREAS,** the parties wish to establish a facility for the provision of outpatient orthopedic surgery and related care services as contemplated by the vision of the Members, including, without limitation, creating a facility focused on providing services which are high quality, cost efficient, coordinated and collaborative, and patient centric, and as and to the extent compatible with and in furtherance of the charitable purposes of the Class B Member; and

**WHEREAS**, the parties have agreed to organize and operate a limited liability company pursuant to Internal Revenue Service Revenue Ruling 2004-51, 2004-22 I.R.S. 974, in such a manner as to neither (i) jeopardize the status of the Class B Member as an organization exempt from federal income taxation pursuant to Code Section 501(a) as an organization described in Code Section 501(c)(3), nor (ii) generate any "unrelated business taxable income" for the Class B Member as such term is used in Code Section 512(a).

**NOW, THEREFORE,** for good and valuable consideration, the sufficiency of which is hereby acknowledged, the parties, intending legally to be bound, agree as follows:

**ARTICLE I**
**ORGANIZATION OF THE COMPANY**

**1.01 Organization.**

On April 4, 2013, the Company was organized as a Connecticut limited liability company by the acceptance for filing of the Articles of Organization by the Connecticut Secretary of the State in accordance with and pursuant to the Act.

**1.02 Name of the Company.**

The name of the Company shall be "_____, LLC". The Company may do business under that name and under any other name or names that the Management Committee may select. If the Company does business under a name other than that set forth in its Articles of Organization, then the Company shall amend its Articles of Organization or file a trade name certificate as required by Applicable Law.

### 1.03 Principal Place of Business.

The principal place of business and the office of the Company initially shall be located at and the Company's business shall be conducted from _____, Connecticut. At such time as the Center is constructed and operations commence in Southington, Connecticut the Company shall move its principal place of business and office to that location. The Company may locate its place of business at any other place or places as the Management Committee may deem advisable.

### 1.04 Statutory Agent.

The name of the statutory agent of the Company for service of process on the Company in the State of Connecticut shall be Winship Service Corporation whose address is One Constitution Plaza, Hartford Connecticut, 06103-1919 . The Company may change its statutory agent if it is deemed advisable by the Management Committee. If the Company changes its statutory agent, the Company shall file the name and address of the new statutory agent with the Connecticut Secretary of State as required by the Act.

### 1.05 Term.

The existence of the Company shall be perpetual and shall continue unless and until the Company is dissolved, wound up and terminated in accordance with this Agreement.

### 1.06 Purposes.

The purposes to be promoted or carried out by the Company shall be to engage in the following:

(a) To operate a fully licensed, certified and accredited outpatient surgical center specializing primarily in musculoskeletal procedures, including, but not limited to, orthopedics, neurosurgery and pain management, applying best practice principles, envisioned by the Members, all in furtherance of the charitable purposes of the Class B Member by promoting health for a broad section of the community as further described in Section 1.07 and including, without limitation, a facility focused on providing services which are high quality, cost efficient, coordinated and collaborative, and patient centric; and

(b) The Members understand that the Company's and the Center's operations are subject to various state and federal laws regulating permissible relationships between the Members and entities such as the Company, including 42 U.S.C. § 1320a-7b(b) (the "Fraud and Abuse Statute"), and 42 U.S.C. § 1395nn (the "Stark Act"). It is the intent of the parties that the Company operate in a manner consistent with the foregoing statutes. The Members also acknowledge that the Stark Act, the regulations promulgated thereunder and similar Connecticut laws and regulations may restrict the Center (as presently formed) from providing "designated health services" (as defined by the Stark Act) or other services to patients referred by the Members or physician with a direct or indirect ownership or financial arrangement with the Company. The Center shall not provide "designated health services. If, in the future, any of the

services that the Center provides are deemed to be "designated health services," such services shall be provided by the Center only if such services may be provided in compliance with one or more exceptions to the ban on self-referrals set forth in the Stark Act, the regulations promulgated thereunder, or any successor statutes and/or regulations thereto. The Company shall adopt appropriate billing policies regarding "designated health services" and shall allow any Member to audit the Company's billing and collection activities to assure compliance with this Section 1.06(b).

(c) To engage in any other lawful act or activity for which limited liability companies may be formed under the Act consistent with the foregoing.

**1.07 Tax-Exempt Organization Limitations.**

Notwithstanding any other provision of this Agreement:

(a) So long as Hartford (or an entity owned by Hartford HealthCare Corporation) remains a Member of the Company, all acts, activities, and business carried on by the Company shall be consistent with, and in furtherance of, the charitable health care and community benefit missions and tax-exempt status under Section 501(c)(3) of the Code, of Hartford (the "Charitable Purposes"). The Members hereby agree and acknowledge that the foregoing duty of the Company to operate consistent with, and in furtherance of, the Charitable Purposes shall override any duty that the Company or its Member(s) may have to operate the Company for the financial benefit of any individual or for-profit Member. Accordingly, in the event of a conflict between the operation of the Company in accordance with the Charitable Purposes, on the one hand, and any duty to maximize the Company's profits, on the other hand, the Company, its Members and the Management Committee shall satisfy the Charitable Purposes without regard to the consequences for maximizing the Company's profitability.

(b) The Company shall not carry on propaganda, attempt to influence legislation, or participate or intervene in (including the publication or distribution of statements) any political campaign on behalf of (or in opposition to) a candidate for public office.

**1.08 Independent Medical Judgment**. No provision of this Agreement shall limit the independent medical judgment of any participating physician with Medical Staff privileges at the Center with regard to the providing of patient care.

## ARTICLE II
## MEMBERS AND MEMBER REPRESENTATIVES

**2.01 Members.**

The name, present mailing address, and Percentage Interest of each Member are set forth on Exhibit A, attached hereto, as such Exhibit A may be amended from time to time. There shall initially be three (3) authorized classes of Members of the Company: Class A Member, Class B Member and Class C Members. Except as otherwise specifically provided in this Agreement, all Members shall have (based on Percentage Interest held) the same economic rights. Except in the

case of an action taken by the Class B Member in accordance with Sections 4.06(b), 6.09(b) and 17.05(b) of this Agreement, the Members, acting as Members, shall have no right to act for or bind the Company. The initial Class A Member, Class B Member and Class C Members are identified in Exhibit A hereto. Additional Members may be admitted to the Company only upon the satisfaction of the provisions of Section 13.01 herein.

**2.02 Member Representations.**

(a) Each Member represents and warrants that neither it, he or she, nor any owners of the Member (i) has received loans for the purpose of investing in the Company from the Company, a Member or their Affiliates, or from any direct or indirect investor in the Company; (ii) has offered (and will not offer) terms for investment in the Member based upon previous, actual or expected referrals, services furnished or the amount of business otherwise generated from that owner to the Center; (iii) has or will make payment to an owner in return for the owner's investment in the Member that is not directly proportional to the owner's capital investment in the Member; and (iv) has or will make any other payments, direct or indirect, to an owner that are based, in any manner, upon the volume or value of referrals the owner has made or directed to the Center (or is expected to refer to the Center).

(b) No Person shall be eligible to become a physician owner, directly or indirectly, of the Class A Member (or remain an owner of a Class A Member) or a Class C Member (or remain an owner, directly or indirectly, of a Class C Member) (collectively, the "Physician Member") unless the following eligibility requirements are satisfied: (i) each Physician Member shall be a physician, licensed and registered, in good standing, to practice medicine in the State of Connecticut; (ii) each Physician Member has not been barred or suspended from participation in any governmental program, including, but not limited to, the Medicare and/or Medicaid programs; (iii) each Physician Member shall derive at least approximately one-third (1/3) of his or her medical practice income from all sources for the previous fiscal year or previous twelve (12)-month period from his or her own performance of procedures that are ambulatory surgical procedures (or procedures that are required to be provided in an inpatient or outpatient hospital operating room), and, those Physician Members who provide services in the Center shall directly perform not less than approximately one-third (1/3) of such procedures at the Center; (iv) each Physician Member shall fully inform each patient, prior to referring patients to the Center, of his or her investment interest in the Center; (v) each Physician Member shall treat patients receiving medical benefits or assistance under any federal health care program in a nondiscriminatory manner at the Center; (vi) if the Physician Member refers patients to the Center, such Physician Member shall maintain active privileges at the Center (and any physician subject to a Board of Managers action under the Medical Staff Bylaws that results in probation or suspended privileges may be deemed, at the Board of Managers sole discretion, ineligible to remain a Physician Member); and (vii) under Applicable Law, such Physician Member's ownership shall not disqualify (and, without further action, would not disqualify) the Company or the Center from engaging in operations as a Medicare-certified ambulatory surgery center for any reason, or from having such Physician Member perform cases at the Center. A physician who meets such requirements may be referred to herein as an "Eligible Physician Investor".

(c) Any entity which is an owner of the Class A Member or a Class C Member and has physician owners shall either be (i) a "group practice" as defined 42 CFR 1001.952(r)(5) or (ii) an entity established for the sole purposes of investing in the Class A Member or Class C Member and all physician owners shall be an Eligible Physician Investor as defined Section 2.02(b), above. Such Class A Member or Class C Member owners shall also comply with Section 2.02(a) above.

(d) The Class B Member further represents and warrants that it (i) will not require or encourage employed or affiliated physicians to refer patients to the Center or any Physician Member (or physician on staff at the Center); (ii) will not track referrals made by its employed or affiliated physicians to the Center, directly or indirectly, for inappropriate purposes including without limitation, determination of compensation; (iii) any compensation paid to employed or affiliated physicians will be at fair market value and will not take into account, in any manner, the volume or value of referrals to the Center or physicians on staff at the Center; (iv) will annually inform its employed and affiliated physicians of these requirements; (v) will treat patients receiving medical benefits or assistance under any federal health care program in a nondiscriminatory manner; and (vi) will not include any payment or cost associated with the Center on its cost report unless such costs are required to be included by a Federal health care program.

### 2.03 Member Representatives.

Each Member of the Company, which is not an individual, shall designate in writing one Member Representative who shall be entitled to exercise all of the rights of the Member, including voting rights, set forth in this Agreement. Such Member Representative shall have the authority to act on behalf of such Member until such time that the Management Committee receives written notice from the applicable Member of the replacement of such Member Representative. The initial Member Representative of each Member is set forth in Exhibit B hereto. A Member Representative may be removed or replaced at any time, with or without cause or notice, by the Member which designated such Member Representative.

## ARTICLE III
## CONTRIBUTIONS AND CAPITAL ACCOUNTS

### 3.01 Initial Capital Contributions.

The Members hereby agree to an initial capitalization plan for the Company pursuant to which the Company initially shall be capitalized with aggregate equity capital and debt of not more than $_____.00 during the period from the date of this Agreement through _____. The Class A Member, the Class B Member and the Class C Members shall make an initial Capital Contribution to the Company as set forth on Exhibit C payable in accordance with a schedule to be determined by the Management Committee; provided, that each interim payment of the initial capital contribution by the Members shall be divided amongst the Members in proportion to each Member's respective Percentage Interest. The Members hereby further agree to cause the Company to incur debt up to an aggregate maximum principal amount of $_____ (inclusive of the working capital line of credit referenced below). If

nonrecourse financing for the Company is unavailable or insufficient, it is hereby agreed and acknowledged that, upon the approval of the Management Committee, each Member (and its owners) shall be required to guarantee debt of the Company, solely on a pro-rata (based on Percentage Interest) and several basis. Each Member further agrees to execute and deliver such agreements and instruments as the Company may require with respect to such Member's guarantee. The foregoing initial capitalization plan is intended to fund the design, development, construction, furnishing, equipping and initial working capital for the Center, in a manner to timely pay all such costs and to permit the Center to commence commercial operation in _____, with an available working capital line of credit of at least $_____. Notwithstanding the foregoing, the Management Committee may amend the initial capitalization plan described in this Section 3.01 as to both the amount and timing of the payment of the initial Capital Contributions based upon the actual timing and costs associated with the development of the Center.

**3.02 Additional Capital Contributions.**

(a) If (i) the Management Committee at any time, or from time to time, determines by unanimous written consent or (ii) the Class B Member, pursuant to Section 6.09(b) of this Agreement, determines that the Company requires Capital in addition to the initial Capital Contributions provided for in Section 3.01, then the Management Committee, or the Class B Member, as applicable, shall give written notice to each Member of (i) the aggregate amount of additional Capital Contribution required, (ii) the reason the additional Capital Contribution is required, (iii) each Member's proportionate share of the aggregate additional Capital Contribution (determined in accordance with this Section), and (iv) the date each Member's additional Capital Contribution is due and payable, which date shall be no sooner than thirty (30) days after the notice has been given. A Member's proportionate share of the total additional Capital Contribution shall be equal to the product obtained by multiplying the Member's Percentage Interest and the aggregate additional Capital Contribution required. A Member's proportionate share shall be payable in cash, by certified check or by wire transfer.

(b) Except as provided in this Article III, no Member shall be required to contribute any additional capital to the Company, and no Member shall have any personal liability for any obligation of the Company.

**3.03 Capital Contribution Defaults.**

(a) If a Member (the "Defaulting Member") does not make a Capital Contribution required pursuant to Section 3.01 or Section 3.02(a) on or before the date such Capital Contribution is due, such failure shall be a material breach of this Agreement and if not cured within thirty (30) days after notice from the disinterested members of the Management Committee, the disinterested members of the Management Committee may remove the Defaulting Member in accordance with the terms of Section 14.02 as an Involuntary Withdrawal by the Defaulting Member. If the Management Committee does not assert its right to remove the Defaulting Member through an Involuntary Withdrawal as described above, (i) the Defaulting Member's Membership Interest shall be converted to an Economic Interest until such time (the "Cure Date") that the Defaulting Member has made the delinquent Capital Contribution, plus

interest, at a variable annual rate equal to the Prime Rate as in effect from time to time plus two percent (2%), from the date such Capital Contribution was due to the date of payment, (ii) the Defaulting Member shall automatically forfeit until the Cure Date its voting rights hereunder and its right to designate a Member Representative or any representative on the Management Committee, (iii) the Managers designated by the Defaulting Member to the Management Committee shall automatically be removed from the Management Committee, and (iv) the Company shall be entitled to set off against any Cash Flow or other amounts due to such Defaulting Member hereunder any amounts due to the Company attributable to such Capital Contribution and the interest thereon.

(b) As used in Section 3.03(a), "Prime Rate" means the Prime Rate as published from time to time in the "Money Rates" section of The Wall Street Journal or any successor publication, or in the event that such rate is no longer published in The Wall Street Journal or such successor journal, a comparable index or reference as may be selected by the Class A and B Members which are not at such time Defaulting Members.

**3.04 Interest on and Return of Capital Contributions.**

No Member shall be entitled to interest on such Member's Capital Contribution or to a return of such Member's Capital Contribution, unless otherwise provided herein.

**3.05 Form of Return of Capital Contributions.**

If a Member is entitled to receive a return of a Capital Contribution, the Member shall not have the right to receive anything but cash in return of the Member's Capital Contribution.

**3.06 Capital Accounts.**

A separate Capital Account shall be maintained for each Member and Economic Interest Owner.

**3.07 Loans to the Company.**

Any Member may at any time, with the consent of the Management Committee, make or cause a loan to be made to the Company in any amount and on those terms upon which (i) the Company and the Member agree and (ii) are in compliance with all Applicable Laws, including but not limited to, the Fraud and Abuse Statute and Stark Act.

## ARTICLE IV
## MEMBER MEETINGS

**4.01 Meetings.**

Meetings of the Members, for any valid purpose or purposes, may be called by the Management Committee or by any Member.

### 4.02 Place of Meetings.

The Members may designate any place, either within or outside the State of Connecticut, as the place of meeting for any meeting of the Members. If no designation is made, the place of meeting shall be the principal place of business of the Company. One or more Member may participate in a meeting of the Members by use of a conference telephone or similar communications equipment that allows all persons participating in the meeting to communicate with one another.

### 4.03 Notice of Meetings.

Except as provided in Section 4.01 written notice stating the place, day and hour of a meeting of the Members and the purpose or purposes for which the meeting is called shall be delivered not less than five (5) nor more than thirty (30) days before the date of the meeting either personally or by mail, by or at the direction of the Management Committee or Member calling the meeting, to each Member (and to each Member Representative designated in Section 2.02) entitled to vote at such meeting.

### 4.04 Meeting of All Members.

If all of the Members shall meet at any time and place either within or outside of the State of Connecticut, and consent to the holding of a meeting at such time and place, such meeting shall be valid without call or notice and at such meeting lawful action may be taken.

### 4.05 Record Date.

For the purpose of determining the Members entitled to notice of or to vote at any meeting of the Members or any adjournment thereof, the date on which notice of the meeting is mailed shall be the record date for such determination. When a determination of the Member entitled to vote at any meeting of the Members has been made as provided in this Section, such determination shall apply to any adjournment thereof.

### 4.06 Manner of Acting.

(a) The unanimous vote of the Class A and the Class B Member shall be required to take or approve any matter coming before the Members, unless the vote of a lesser or greater proportion or number is otherwise required by the Act, by the Articles of Organization, or by this Agreement. Except as otherwise required by the Act, by the Articles of Organization, or by this Agreement, the Class C Member shall not have any voting rights.

(b) Notwithstanding the foregoing or Section 5.05, the exclusive and unanimous vote of the Member Representative selected by the Class B Member shall be required to take or approve any Exempt Status Matter coming before the Members. In the exercise of its special powers hereunder, the Class B Member Member Representative shall act reasonably and on the written advice of counsel, and shall give not less than ten (10) days' prior notice to, and shall, during such ten (10) day period, seek the advice and input of, the other Members.

### 4.07 Proxies.

At all meetings of the Members, a Member may vote in person (or through its Member Representative) or by proxy executed in writing by the Member or Member Representative or by a duly authorized attorney-in-fact. Such proxy shall be filed with the Company before or at the time of the meeting. No proxy shall be valid after eleven months from the date of its execution, unless otherwise provided in the proxy.

### 4.08 Action by Members Without a Meeting.

Any action required by this Agreement or the Act to be taken at a meeting of the Members, or any other action that may be taken at a meeting of the Members, may be taken without a meeting and without a vote, if a consent in writing, setting forth the action so taken, shall be signed by at least the minimum number of Member and Member Representatives who could approve such action at a meeting of the Members.

### 4.09 Waiver of Notice.

When any notice is required to be given to any Member, a waiver thereof in writing signed by the person entitled to such notice, whether before, at, or after the time stated therein, shall be equivalent to the giving of such notice.

## ARTICLE V
## RIGHTS, DUTIES AND OBLIGATIONS OF MEMBERS

### 5.01 Limitation of Liability.

Each Member's liability shall be limited as set forth in this Agreement, the Act and other Applicable Law.

### 5.02 Liability for Company Debt.

A Member shall not be personally liable for the debts or losses of the Company except as otherwise required by Applicable Law.

### 5.03 Member Duties.

No Member shall be required to perform services for the Company solely by virtue of being a Member. Unless approved by the Management Committee, no Member shall perform services for the Company or be entitled to compensation for services performed for the Company.

### 5.04 Limitation on Authority of Members.

The Members shall have no right to take any part in, or interfere in any manner with, the conduct, control or management of the Company's business and shall have no right or authority to act for or bind the Company, said powers being vested solely and exclusively in the Management Committee. Except as otherwise expressly provided herein, the Members shall have only those rights granted exclusively to members pursuant to the Act or under this Agreement. Any Member who takes any action or binds the Company in violation of this Agreement shall be solely responsible for any loss and expense incurred by the Company as a result of the unauthorized action and shall indemnify and hold the Company harmless with respect to the loss or expense.

**5.05 Transactions with Members.**

Each Member understands and acknowledges that the conduct of the Company's business may involve business dealings and undertakings with Members and their Affiliates. Any business dealings and undertakings between the Company and a Member or one or more of its Affiliates shall be at arm's length, at fair market value and on commercially reasonable terms and approved solely by the disinterested Management Committee members. In addition, any decision to amend, renew or terminate (including, without limitation, asserting without cause termination rights or rights to terminate for breach) such business dealings and undertakings between the Company and a Member or one or more of its Affiliates shall reside solely with the disinterested Management Committee members except as otherwise set forth in Section 4.06(b) or 6.09(b).

**5.06 Restrictive Covenants.**

(a) **Non-Competition**. Each Member agrees that while it is a Member or Economic Interest Owner and for a period of two (2) years thereafter, it and its Competition Affiliates shall not directly or indirectly develop, manage, consult with (other than infrequent patient medical consultations), finance or invest in any ambulatory surgery center offering musculoskeletal surgical services similar to those provided by the Company (the "Competing Activity") in the Connecticut municipalities of Andover, Avon, Barkhamsted, Beacon Falls, Berlin, , Bloomfield, Bolton, Bozrah, Bristol, Burlington, Canterbury, Canton, Chaplin, Cheshire, Colchester, Columbia, Coventry, Cromwell, Durham, East Granby, East Hampton, East Hartford, East Windsor, Ellington, Enfield, Farmington, Franklin, Glastonbury, Granby, Griswold, Groton, Hartford, Harland, Harwinton, Hebron, Lebanon, Ledyard, Manchester, Mansfield, Marlborough, Meriden, Middlebury, Middlefield, Middletown, Montville, Naugatuck, New Britain, New Hartford, Newington, North Haven, Norwich, Plainfield, Plainville, Plymouth, Portland, Prospect, Rocky Hill, Scotland, Simsbury, South Windsor, Southington, Sprague, Suffield, Thomaston, Torrington, Vernon, Wallingford, Waterbury, Watertown, West Hartford, Wethersfield, Windham, Windsor, Windsor Locks, Wolcott, Woodbury (collectively, the "Territory"). This restrictive covenant does not prohibit referrals to, or the use of, any other ambulatory surgery center by Members, Economic Interest Owners or Competition Affiliates. Anything to the contrary notwithstanding, the following actions by the Class B Member shall not be in violation of this Section 5.06(a): (i) any surgical services provided by an entity wholly owned by Hartford HealthCare in a licensed hospital inpatient or outpatient department, (ii) any Hartford HealthCare surgical joint venture whose revenues from

orthopedic services are less than ten (10%) of total revenues in any given year, or (iii) any ambulatory surgery center acquired as part of a merger or acquisition of a hospital or health system by Hartford HealthCare.

(b) **Confidentiality.**

(i) Each Member hereby acknowledges that any disclosure of the Company's or another Member's Confidential Information, as defined below, even inadvertent disclosure, would cause irreparable and material damage to the Company or to the other Member. Each Member hereby agrees that it and each of its Competition Affiliates shall (A) maintain as confidential all of the Company's and the other Members' Confidential Information made known to it; (B) protect the confidentiality thereof in the same manner in which it protects the confidentiality of similar Confidential Information of its own, at all times exercising at least a reasonable degree of care in the protection of the Confidential Information; and (C) not disclose such Confidential Information to any third party without the express written consent of the owner of the Confidential Information. Each Member agrees to transfer to the Company and the other Members. as applicable, upon the termination of its Membership Interest, the Confidential Information made known to it as a result of it being a Member and in its possession upon the termination and to continue to maintain the confidentiality of the Confidential Information as provided herein. The obligations of each Member under this Section shall survive the termination of the Member's Membership Interest and the termination of this Agreement.

(ii) "Confidential Information" includes, but is not limited to, all: (A) financial information; (B) products, and services and product and service information, including but not limited to product and service costs, prices, profits and sales; (C) new business ideas; (D) business strategies; (E) product and service plans; (F) marketing plans and studies; (G) forecasts and models; (H) all intellectual property, including but not limited to property or information, (1) that is protected by copyright or is copyrightable, (2) that is protected by patent or that is patentable, or (3) that is valuable and not generally known in the trade, including trade secrets, financial data,. business plans, and data, and any developments relating to foregoing, whether or not patentable or copyrightable; (I) databases (and the documentation and information contained therein); (J) research projects and all information connected with research and development efforts; (K) records (including the records of the Company and the medical records of patients); (L) business relationships, methods and recommendations; (M) patient lists (including the identities of patients and prospective patients; (P) competitive analyses; (Q) all information relating to the operation of the Company's business; and (R) other confidential, proprietary or trade secret information that has not been made lawfully available to the general public.

(c) **Limitation of Covenants**. The restrictions in this Section 5.06:

(i) shall not prohibit any Member or its Competition Affiliates from taking any action on behalf of the Company;

(ii) shall not apply to the activities of a Member, a former Member or its Competition Affiliates if the Members unanimously consent to allow the Member or Former Member to undertake the prohibited activity after full disclosure of all the relevant facts;

(iii) shall not prohibit any Member and its Competition Affiliates from owning individually or collectively, directly or indirectly securities of any Person traded in a public market provided that the Member and its Competition Affiliates do not own more than two percent (2%) of any class of securities of such Person and have no relationship with such Person other than as a stockholder; and

(iv) shall not prohibit any Member or its Competition Affiliates from using for its own benefit or the benefit of others or to disclose or publish any information that (A) was rightfully in its possession prior to the date of this Agreement, (B) was rightfully obtained from others without violation of its obligations to the Company or the other Members, (C) was independently developed by the Member without the use of the Company's or the other Members' Confidential Information or (D) is or becomes within the public domain without breach of this Agreement.

(d) **Injunctive Relief**. Each Member acknowledges that any violation of any provision of Section 5.06 will cause irreparable harm to the Company and/or the other Member(s), that damages for such harm will be incapable of precise measurement and that, as a result, the Company and/or the other Member(s) will not have an adequate remedy at law to redress the harm caused by such violation. Therefore, in the event of such a violation, the parties agree that, in addition to other remedies, the aggrieved party or parties shall be entitled, without the necessity of either proof of actual damage or the posting of a bond, to injunctive relief, including but not limited to an immediate temporary injunction, temporary restraining order and/or preliminary or permanent injunction to restrain or enjoin any such violation, and to reimbursement of any reasonable attorneys' fees and expenses incurred to enforce the provisions of this Section 5.06. Nothing in this Agreement shall be construed to prohibit the Company and/or an aggrieved Member from pursuing any other remedy, the parties having agreed that all remedies are cumulative and that a Member is liable for any and all acts or omissions of such Member and/or any of its Competition Affiliates that violate any provision of this Section 5.06.

(e) **Acknowledgment**. Each Member hereby acknowledges the reasonableness of the restrictions contained in this Section 5.06 in view of the purposes of the Company and the relationship of the Members. Each Member acknowledges that the restrictions contained in this Section 5.06 represent mandatory conditions precedent to the execution of this Agreement, and that in the absence of such restrictions, neither Member would have consented to, or entered into, this Agreement.

## ARTICLE VI
## RIGHTS AND DUTIES OF MANAGEMENT COMMITTEE

### 6.01 Management Committee

(a) The management of the Company shall be vested in a Management Committee, which shall consist of six individuals (each individually referred to as a "Manager", and collectively as the "Managers"). The Class A Member shall be responsible for designating three of such six Managers (each of which shall be referred to individually as a "Class A Manager", and collectively as the "Class A Managers") to the Management Committee. The initial Managers designated by each Member are set forth on Exhibit B hereto. The Class B Member shall be responsible for designating three of such six Managers (each of which shall be referred to individually as an "HHC Manager", and collectively as the "HHC Managers") to the Management Committee. No Class C Member shall be appointed as a Manager, nor shall the Class C Members have the right to designate a Manager. The initial Managers designated by each Member are set forth on Exhibit B hereto.

(b) The annual meeting of the Management Committee shall be held on the _____ each year, or at such other time as is selected by the Management Committee. Regular meetings of the Management Committee may be held at such times and places as may be determined by the Management Committee, and once such determination has been made and notice given to each Manager, regular meetings may be held without any further notice. Special meetings of the Management Committee may be called by the Chairman, a Member, a Member Representative, or by two or more Managers upon at least forty-eight (48) hours' notice. Attendance at a meeting of the Management Committee, in person or as otherwise permitted under this Agreement or the Act, by a majority of the HHC Managers and a majority of the Class A Managers shall constitute a quorum.

(c) Action may be taken by the Management Committee without a meeting by consent, in writing, setting forth the action to be taken, signed by the number of Managers entitled to vote on such action as would be required to approve such action at a meeting at which all the Managers entitled to vote thereon were present. Such consent shall be filed with the records of the meetings of the Management Committee and shall be treated for all purposes as the act of the Management Committee.

(d) Managers may participate in a Management Committee meeting by means of conference telephone or similar communications equipment that enables all persons participating in the meeting to hear each other.

(e) The Management Committee may, from time to time, designate by resolution one or more subcommittees with such powers and authority as may be prescribed in such resolution. to serve at the request of the Management Committee. Each subcommittee. which shall be comprised of an equal number of the Class A Member and Class B Member representatives (and such non-voting Class C Members (or Class C Member representatives) as designated by the Management Committee), may determine the procedural rules for its meetings and conducting its business and shall act in accordance therewith. Adequate provision shall be

made for notice to subcommittee members of all meetings; a majority of the subcommittee members shall constitute a quorum; and all matters shall be determined by the vote of a majority of the subcommittee members present at a meeting at which a quorum is present.

**6.02 Powers of Management Committee.**

The Management Committee shall have full exclusive, and complete discretion, power, and authority (subject in all cases to Section 6.03, Section 6.04, Section 6.09. the other provisions of this Agreement and the requirements of Applicable Law), to manage, control. administer, and operate the business and affairs of the Company so as to further the purpose of the Company as set forth in Sections 1.06 and 1.07, and to make all decisions affecting such business and affairs (subject to Section 5.05 regarding transactions with a Member or an Affiliate of a Member), including without limitation, for Company purposes, the power to:

(a) acquire by purchase, lease, or otherwise any real property or any personal property, tangible or intangible;

(b) construct, operate, maintain, finance, and improve any real property or any personal property;

(c) sell, convey, assign, or lease any real property or any personal property;

(d) open and use bank accounts in the Company's name and to withdraw funds or issue checks, drafts or orders for the payment of money from such accounts;

(e) enter into agreements and contracts and to give receipts, releases and discharges;

(f) appoint, employ or otherwise contract with any Person to perform services for or on behalf of the Company, and to grant to any such Person such authority to act on behalf of the Company as the Management Committee may from time to time deem appropriate;

(g) purchase liability and other insurance to protect the Company's assets and business;

(h) execute any and all other instruments and documents that may be necessary or in the opinion of the Management Committee desirable to carry out the intent and purpose of this Agreement;

(i) make any and all expenditures that the Management Committee, in its sole discretion, deems necessary or appropriate in connection with the management of the affairs of the Company and the carrying out of its obligations and responsibilities under this Agreement, including, without limitation, all legal, accounting, and other related expenses incurred in connection with the organization, financing, and operation of the Company;

(j) invest and reinvest Company reserves in short-term instruments or money market funds;

(k) adopt and amend Medical Staff Bylaws and Medical Staff Rules and Regulations for the organization and operation of the Center (as provided further in Section 8.02 below);

(l) appoint and credential members of the Medical Staff and delineate their privileges at the Center, and otherwise discharge its responsibilities under the Medical Staff By-Laws and Medical Staff Rules and Regulations in effect from time to time;

(m) oversee quality assurance, quality improvement, and best practices medicine;

(n) arrange for managed care contracting;

(o) control the proper and efficient use of operating room time;

(p) oversee the review peers using the Company's Center pursuant to procedures adopted by the Management Committee from time to time;

(q) take and approve all actions and matters required of a governing authority of an ambulatory orthopedic surgical center under Applicable Law; and

(r) enter into any activity necessary to, in connection with, or incidental to, the accomplishment of the purposes of the Company.

**6.03 Management of Outpatient Surgery Center.**

The Management Committee shall arrange for the management and administration of the business affairs of the Company's Center. It shall do so either through the employment or engagement of individuals with the necessary credentials to do so, or through contract with a third party engaged in the business of outpatient surgical center management (subject to Section 5.05 if a Member or an Affiliate of a Member is engaged). The Members and the Management Committee hereby adopt and agree to comply with the Charity Care Policy. The Management Committee may amend the Charity Care Policy from time to time and shall enforce the Charity Care Policy in a manner to ensure the compliance of the Company and the Center with the Charity Care Policy and Applicable Law.

**6.04 Extraordinary Transactions.**

Notwithstanding anything herein to the contrary, excepting actions taken pursuant to Section 4.06(b) or Section 6.09(b), the Management Committee may not take action with regards to any of the following matters without the unanimous vote of the Class A and B Members (subject to Section 5.05 regarding transactions with a Member or an Affiliate of a Member):

(a) sell all or substantially all of the assets of the Company;

(b) merge or consolidate the Company with any other Person;

(c) acquire all or substantially all the assets of, or ownership interests in, another Person;

(d) borrow money or incur any debt for, or on behalf of, the Company in excess of $250,000, other than in the ordinary course of business;

(e) execute for or on behalf of the Company any mortgage or deed of trust or prepay, in whole or in part, refinance, amend, modify, or extend any mortgage or deeds of trust for or on behalf of the Company securing a debt in excess of $250,000;

(f) create a security interest in or cause a lien securing a debt in excess of $250,000 to be placed on any real property of the Company or, other than in the ordinary course of business, any personal property of the Company;

(g) acquire by purchase, lease or otherwise any real property;

(h) admit additional Members to the Company;

(i) enter into any management agreement relating to all or substantially all of the assets and/or operations of the Company or any other contract or series of related contracts that require aggregate expenditures by the Company or will result in aggregate gross payments to the Company, in excess of $100.000;

(j) hire or fire key personnel; and

(k) open additional offices.

**6.05 Term of Managers.**

Each Manager shall hold office until his or her death, resignation, incapacitation or removal as provided herein.

**6.06 Resignation of Manager**

Any Manager of the Company may resign at any time by giving written notice to the Company and to the Member who designated such Manager. The resignation of any Manager shall take effect upon receipt by the Member and the Company of the notice thereof or at such later date specified in such notice, and unless specified therein, the acceptance of such resignation shall not be necessary to make it effective.

**6.07 Removal of Manager.**

A Manager may be removed at any time, with or without cause or notice, by the Member that originally designated such Manager or as described in Section 3.03(a)(iii); provided, however, any Manager committing fraud against the Company, commission of a felony, or any other action in violation of his/her fiduciary duty to the Company shall be removed upon the request of a Member.

**6.08 Vacancies.**

Manager vacancies shall be filled by the Member who originally designated such Manager within ten (10) days after such vacancy arises.

**6.09 Manner of Acting.**

(a) **In General**. The affirmative vote of a majority of the HHC Managers and the affirmative vote of a majority of the Class A Managers shall be required to take or approve any action by the Management Committee.

(b) **Special Powers of HHC Managers**. Notwithstanding anything contained herein to the contrary, HHC Managers shall have the unilateral and exclusive right to (i) take or approve any action by the Management Committee with respect to any Exempt Status Matter, provided, however, that approval of such action may also be given by the Class B Member Member Representative pursuant to Section 4.06(b); or (ii) take or approve any and all actions on matters of financial policy, including, without limitation, approval of the Company's annual capital and operating budgets and any material modifications to such budgets, any borrowings or other financings, distribution policies and decisions, capital calls, cash management decisions, creation of financial reserves and investment policies. In the exercise of their special powers under clause (i) above, the HHC Managers shall act reasonably and on the written advice of counsel, and shall give not less than ten (10) days' prior written notice to, and shall, during such ten (10) day period, seek the advice and input of, the Class A Managers. Actions taken pursuant to this Section 6.09(b) shall not be subject to Section 5.05.

(c) **Compliance Plan and Conflict of Interest Policy**. The Management Committee shall adopt, and the Company shall operate consistently with, a compliance plan and a conflict of interest policy that is complimentary to the corporate compliance plan of the Class B Member in existence as of the Effective Date.

**6.10 Duties of Managers.**

Each Manager shall devote such time to the business and affairs of the Company as is necessary to carry out the duties set forth in this Agreement. The Management Committee shall manage the Company so as to further the purpose of the Company as set forth in Sections 1.06 and 1.07 including, without limitation, furthering the Class B Member's Charitable Purposes without regard to maximizing profitability.

### 6.11 Liability of Managers.

In no event will any Manager be personally liable to the Company, the Members or any other Manager for the debts, obligations, or liabilities of the Company whether arising in contract, tort or otherwise, in acting on behalf of the Company or in his or her capacity as a Manager, except as otherwise required by Applicable Law, provided that his or her actions or omissions did not constitute fraud, bad faith, gross negligence, or willful misconduct. No Manager shall be personally liable for failure to perform in accordance with, or to comply with the terms and conditions of, this Agreement or for any other reason unless such failure to conform or to comply or such other reason constitutes fraud, bad faith. gross negligence, or willful misconduct by such Manager.

### 6.12 Indemnity of Managers.

The Company shall indemnify and hold harmless each Manager against any and all liability, loss, expense, or damage incurred or sustained by reason of any act or omission in the conduct of the business of the Company, except if such Manager shall have been guilty of fraud, bad faith, gross negligence or willful misconduct. Such indemnification shall include the reasonable expenses (including reasonable attorneys' fees and costs) incurred by a Manager in connection with the defense of any action to which he or she may be made a party by reason of his or her interest in or activities on behalf of the Company. Any indemnity under this Section shall be provided out of and to the extent of Company assets only and no Member shall have any personal liability on account thereof.

### 6.13 Reliance upon Third Parties.

The Management Committee and each Manager shall be fully protected in relying in good faith upon information, opinions, reports, or statements furnished by any Person as to matters the Management Committee or Manager reasonably believes are within such other Person's professional or expert competence and who has been selected with reasonable care.

### 6.14 Compensation

The salary and/or other compensation of the Managers, if any, shall be fixed from time to time by the unanimous vote of the Class A and B Members.

## ARTICLE VII
## OFFICERS OF THE COMPANY

### 7.01 General.

The Management Committee annually at its annual meeting shall appoint a Medical Director and a Chairman, and may elect such other officers of the Company, which may include a President, a Vice President, a Treasurer, a Secretary and other officers and assistant officers, as the Management Committee may deem necessary or advisable for the efficient operation of the Company's affairs. Any two or more offices may be held by the same person. The Medical Director shall be nominated by Class A Member, subject to the approval of the Management Committee, and must at all times be on the active medical staff of the Class B Member. The Chairman shall be one of the six Managers and such position shall be held for alternating one-year terms by an HHC Manager and a Class A Manager, such that the Chairman shall be designated by the HHC Managers during the annual meeting of the Management Committee held during an even-numbered year, and shall be designated by the Class A Managers during the annual meeting of the Management Committee held during an odd-numbered year.

### 7.02 Authority and Duties.

Officers of the Company, if any, shall have such authority and perform such duties in the management of the Company as may be provided in this Agreement or, to the extent not so provided by resolution of the Management Committee.

### 7.03 Election and Term of Office.

Officers of the Company, if any, shall be elected annually by the Management Committee at the annual meeting of the Management Committee. Each officer shall hold office until his or her successor shall have been duly elected or until his or her prior death, resignation or removal.

### 7.04 Removal.

Any officer of the Company may be removed by the Management Committee whenever in its judgment the best interest of the Company would be served thereby; provided, however, (a) except as permitted under Section 6.09(b), the removal of a Chairman can only be by vote of the Managers who designated such Chairman; and (b) the removal of any officer shall be without prejudice to the contract rights, if any, of the person so removed. Election or appointment shall not of itself create contract rights.

### 7.05 Resignations.

Any officer of the Company may resign his or her office at any time by giving written notice thereof to the Chairman of the Company, if any, or to the Management Committee. Such resignation shall take effect at the time specified therein, or if no time is specified therein, at the time of the receipt thereof, and the acceptance thereof shall not be necessary to make it effective.

**7.06 Vacancies.**

A vacancy in any office shall be filled by the Management Committee for the unexpired portion of the term; provided, however, that any vacancy in the position of Chairman shall be filled by the Managers who designated the Chairman at the immediately preceding annual meeting of the Management Committee.

**7.07 Medical Director.**

The Medical Director shall be the chief operating officer of the Company's Center, with such powers and duties, including without limitation responsibility for the day-to-day operations of the Center, as may be contemplated by Applicable Law, or as may be established by the Management Committee. The Medical Director shall be responsible for the implementation of the Company's Charity Care Policy. The Medical Director shall be invited to attend all meetings of the Management Committee, except as otherwise directed by the Management Committee, provided, however that (a) the Medical Director's presence shall not be required to conduct a meeting of the Management Committee; and (b) the Medical Director shall recuse himself or herself from any deliberations or votes of the Management Committee concerning the evaluation and/or compensation of the Medical Director.

**7.08 Chairman.**

The Chairman shall preside at all meetings of the Management Committee and the Members, and shall have such powers and duties as may from time to time be delegated or assigned to the Chairman by the Management Committee. The Chairman shall be required to place on the agenda for a meeting of the Management Committee any agenda item proposed by a Manager at least two (2) business days before such meeting.

**7.09 President.**

The President, if any, shall be the chief executive officer of the Company. He or she shall see that all orders and resolutions of the Management Committee are carried into effect. In general, the President shall perform all duties incident to the office of President and such other duties as may from time to time be assigned to the President by the Management Committee.

**7.10 Vice President.**

The Vice President, if any, shall have such general responsibility as may be assigned to him or her from time to time by the Management Committee or the President. At the request of the President, or in case of the President's absence or inability to act, any Vice President designated by the Management Committee or by the President shall perform the duties of the President, and when so acting shall have all the powers of and be subject to all the restrictions upon the President.

**7.11 Treasurer.**

The Treasurer, if any, shall have charge and custody of and be responsible for all the funds and securities of the Company; he or she shall keep full and accurate accounts of assets, liabilities, receipts and disbursements and other transactions of the Company in books belonging to the Company; and he or she shall deposit all moneys and other valuable effects of the Company in the name of and to the credit of the Company in such banks or other depositories as may be designated by the Management Committee. The Treasurer shall disburse or oversee the disbursement of the funds of the Company as may be ordered by the Management Committee, taking proper vouchers for disbursements, and shall render to the President and to the Managers at the meetings of the Management Committee, or whenever they may require it, a statement of all his or her transactions as Treasurer and an account of the financial condition of the Company. In general, he or she shall perform all the duties incident to the office of Treasurer and such other duties as may from time to time be assigned to the Treasurer by the Management Committee or by the President.

### 7.12 Secretary.

The Secretary, if any, shall keep the minutes of the meetings of the Members and the Management Committee in one or more books provided for that purpose. In general. he or she shall perform all the duties incident to the office of Secretary and such other duties as may from time to time be assigned to the Secretary by the Management Committee or by the President.

### 7.13 Other Assistants and Acting Officers.

The Management Committee may from time to time appoint such other officers as the Management Committee may deem necessary or advisable, each of whom shall hold office for such period, have such authority and perform such duties as the Management Committee may from time to time determine.

## ARTICLE VIII
## MEDICAL STAFF

### 8.01 Medical Staff.

The Management Committee shall cause to be created and shall continue to provide for a medical staff organization known as the "Medical Staff of the _____ Center", which shall include all physicians, dentists and members of allied professions who are granted by the Management Committee the privilege of caring for or contributing to the care of patients at the Center (the "Medical Staff"). Membership on the Medical Staff shall be a prerequisite to the exercise of clinical privileges at the Center, except as otherwise may be provided in the Medical Staff Bylaws.

### 8.02 Medical Staff Bylaws.

The Management Committee shall adopt prior to the commencement of medical procedures at the Center, and may amend from time to time, the Medical Staff Bylaws and the Medical Staff Rules and Regulations to govern the organization, appointment and removal of the Medical Staff. The Medical Staff Bylaws shall provide that it shall be the responsibility of any member of the Medical Staff to assist the Company to comply with the Charity Care Policy as established pursuant to this Agreement, amended from time to time and enforced by the Management Committee.

### 8.03 Staff Status; Privileges; Corrective Action.

The Medical Staff Bylaws shall provide for the procedure to be followed in matters relating to Medical Staff membership status, clinical privileges, and corrective action. Final action on all such matters shall be taken by the Management Committee. The terms and conditions of membership status on the Medical Staff, and of the exercise of clinical privileges, shall be as specified in the Medical Staff Bylaws, the Medical Staff Rules and Regulations, or as more specifically defined in the notice of individual appointment to the Medical Staff.

### 8.04 Management Committee Exclusive Appointing Authority.

Anything to the contrary herein notwithstanding, the Management Committee shall have the exclusive authority and responsibility to make appointments or reappointments to the Medical Staff, after considering the recommendations and reports of the Medical Staff.

## ARTICLE IX
## ALLOCATION OF PROFIT AND LOSS AND DISTRIBUTIONS

### 9.01 Distributions.

(a) **General**. Except as otherwise provided in Sections 9.01(b) and 9.06(e), distributions of cash or other assets of the Company shall be made in accordance with Section 9.01(a)(i) and at such times and in such amounts as the Management Committee may determine. Distributions, other than tax distributions made in accordance with Section 9.01(b), Exempt Status Matter Distributions made in accordance with Sections 9.01(c) and 9.06(e), and liquidating distributions that shall be made in accordance with Section 15.03, shall be made to the Members and Economic Interest Owners in proportion to their Percentage Interests in the Company.

(i) **Free Cash Flow Distributions**. The Management Committee shall cause a calculation of Free Cash Flow to be made for each calendar quarter by the thirtieth (30) day after the end of each quarter. To the extent reasonably practicable in accordance with generally accepted commercial standards, the Management Committee shall cause a distribution of Free Cash Flow to be made to each Member, based on such calculation and on each Member's Percentage Interest, within thirty (30) days after the quarterly calculation of Free Cash Flow. The Management Committee may reserve as much of such quarterly distribution as may be

reasonably required for working capital; to pay taxes, insurance, debt service or other costs or expenses incident to the ownership or operation of the Company's business; for the replacement or restoration of Company assets; and for other contingencies or emergencies.

(b) **Tax Distributions**. With respect to each fiscal year of the Company, or part thereof, the Company shall distribute (the "Tax Distribution"), to the extent that it has cash or other liquid investments, to each Member and Economic Interest Owner (who is a Member or Economic Interest Owner as of the date of the distribution) an amount of cash equal to forty percent (40%) of the net amount of Profit and Loss allocated to such Member or Economic Interest Owner for such year under this Article IX, less any "Net Distributions" to such Member or Economic Interest Owner. In the event that the Company does not have cash or other liquid assets available to make such distribution the Company is authorized to borrow the necessary funds to make such distribution. The Tax Distribution required under this Section 9.01(b) shall be made on or before the April 1st following the close of each fiscal year of the Company. "Net Distributions" shall mean any distribution of cash or property to a Member or Economic Interest Owner with respect to its Membership Interest or Economic Interest (i) made during the first quarter of the subject fiscal year (but only if the Management Committee designates that such distribution is allocable to that fiscal year) or (ii) made during the twelve month period ending on April 1 after the close of the fiscal year (to the extent not designated for another fiscal year), but shall not include any payment for services, any guaranteed monthly payment, any reimbursement for expenses incurred by a Member on the Company's behalf, and any payment in redemption of a Member's or Economic Interest Owner's Membership Interest or Economic Interest. The Tax Distributions shall be made without regard to the taxable or tax-exempt status of the Member or Economic Interest Owner.

(c) **Authority to Withhold; Treatment of Withheld Tax**. Notwithstanding any other provision of this Agreement, each Member and Economic Interest Owner hereby authorizes the Company to withhold and to pay over or otherwise, to pay any withholding or other taxes payable by the Company (pursuant to the Code or any provision of United States federal, state or local or foreign law) with respect to such Member or Economic Interest Owner or as a result of such Member's or Economic Interest Owner's participation in the Company; and if and to the extent that the Company shall be required to withhold or pay any such withholding or other taxes, such Member or Economic Interest Owner shall be deemed for all purposes of this Agreement to have received a payment from the Company as of the time such withholding or other tax is required to be paid, which payment shall be deemed to be a distribution with respect to such Member's or Economic Interest Owner's Interest in the Company. To the extent that the aggregate amount of such payments to a Member or Economic Interest Owner for any fiscal year exceeds the amount of distributions that such Member or Economic Interest Owner would have received for such fiscal year, the Company shall notify such Member or Economic Interest Owner as to the amount of such excess and such Member or Economic Interest Owner shall make a prompt payment to the Company of such amount by wire transfer. The Company shall promptly notify each Member or Economic Interest Owner of any withholding or other taxes payable by the Company with respect to such Member or Economic Interest Owner and, upon the request of such Member or Economic Interest Owner, shall use reasonable efforts to assist such Member or Economic Interest Owner to secure any available tax refunds, credits or exemptions (including exemptions from withholding) with respect to such withholding taxes.

**9.02 Allocation of Profit and Loss.**

After giving effect to the special allocations set forth in Section 9.03, for any taxable year of the Company, Profit or Loss shall be allocated to the Members and the Economic Interest Owners in proportion to their Percentage Interests, subject to any special allocation required by Section 9.06.

**9.03 Regulatory Allocations.**

(a) **Qualified Income Offset**. No Member or Economic Interest Owner shall be allocated Loss or deductions if the allocation causes the Member or the Economic Interest Owner to have an Adjusted Capital Account Deficit, after the allocation of all Profit and gains. If a Member or an Economic Interest Owner receives (i) an allocation of Loss or deduction (or item thereof) or (ii) any distribution, that causes the Member or the Economic Interest Owner to have an Adjusted Capital Account Deficit at the end of any taxable year, then all items of income and gain of the Company (consisting of a *pro rata* portion of each item of Company income, including gross income and gain) for that taxable year shall be allocated to that Member or Economic Interest Owner, before any other allocation is made of Company items for that taxable year, in the amount and in proportions required to eliminate the excess as quickly as possible. This Section 9.03(a) is intended to comply with, and shall be interpreted consistently with the "qualified income offset" provisions of the Regulations promulgated under Code Section 704(b). Any special allocations of items of Profit or Loss pursuant to this Section 9.03(a) shall be taken into account in computing subsequent allocations of Profit and Loss pursuant to this Agreement, so that the net amount of any items so allocated and the Profit, Loss, and other items allocated to each Member and Economic Interest Owner shall, to the extent possible, be equal to the net amount that would have been allocated to each such Member or Economic Interest Owner pursuant to this Agreement if such special allocation had not occurred.

(b) **Minimum Gain Chargeback**. Except as set forth in Regulation Sections 1.704-2(f)(2), (3) and (4), if during any taxable year, there is a net decrease in Minimum Gain, each Member and Economic Interest Owner, prior to any other allocation pursuant to this Article IX, shall be specially allocated items of gross income and gain for such taxable year (and if necessary, subsequent taxable years) in an amount equal to that Member's or Economic Interest Owner's share of the net decrease of Minimum Gain, computed in accordance with Regulation Section 1.704-2(g). Allocations of gross income and gain pursuant to this Section shall be made first from gain recognized from the disposition of Company assets subject to nonrecourse liabilities (within the meaning of the Regulations promulgated under Code Section 752), to the extent of the Minimum Gain attributable to those assets, and thereafter, from a *pro rata* portion of the Company's other items of income and gain for the taxable year. It is the intent of the parties hereto that any allocation pursuant to this Section 9.03(b) shall constitute a "'minimum gain chargeback" under Regulation Section 1.704-2(f).

(c) **Member Nonrecourse Debt Minimum Gain**. Except as set forth in Regulation Section 1.704-2(i)(4), if during any taxable year, there is a net decrease in Member Nonrecourse Debt Minimum Gain, each Member and Economic Interest Owner, prior to any

other allocation pursuant to this Article IX, shall be specially allocated items of gross income and gain for such taxable year (and if necessary, subsequent taxable years) in an amount equal to that Member's or Economic Interest Owner's share of the net decrease of Member Nonrecourse Debt Minimum Gain. computed in accordance with Regulation Section 1.704-2(i)(5). Allocations of gross income and gain pursuant to this Section shall be made first from gain recognized from the disposition of Company assets subject to nonrecourse liabilities (within the meaning of Regulation Section 1.704-2(b)(4)), to the extent of the Member Nonrecourse Debt Minimum Gain attributable to those assets, and thereafter, from a *pro rata* portion of the Company's other items of income and gain for the taxable year. It is the intent of the parties hereto that any allocation pursuant to this Section 9.03(c) shall constitute a "chargeback of partner nonrecourse debt minimum gain" under Regulation Section 1.704-2(i)(4).

(d) **Code Section 754 Adjustments**. To the extent an adjustment to the tax basis of any Company asset pursuant to Code Section 734(b) or Code Section 743(b) is required, pursuant to Regulation Section 1.704-1(b)(2)(iv)(m), to be taken into account in determining Capital Accounts, the amount of the adjustment to the Capital Accounts shall be treated as an item of gain (if the adjustment increases the basis of the asset) or loss (if the adjustment decreases basis), and the gain or loss shall be specially allocated to the Members and the Economic Interest Owners in a manner consistent with the manner in which their Capital Accounts are required to be adjusted pursuant to that Section of the Regulations.

(e) **Nonrecourse Deductions**. Nonrecourse Deductions for a taxable year or other period shall be specially allocated among the Members and the Economic Interest Owners in proportion to their Percentage Interests.

(f) **Member Nonrecourse Deductions**. Any Member Nonrecourse Deduction for any taxable year or other period shall be specially allocated to the Member or the Economic Interest Owner who bears the risk of loss with respect to the loan to which the Member Nonrecourse Deduction is attributable in accordance with Regulation Section 1.704-2(i).

(g) **Fractions Rule Adjustment**. Notwithstanding anything to the contrary in this Agreement, the Company shall (i) make allocations of Profit (or any item thereof) to the Class B Member only to the extent that the Class B Member has actually received a distribution under Section 9.01 attributable to such Profit, and (ii) make such special, curative, and/or offsetting allocations of Profit or Net Loss (or any item thereof) to the extent necessary to cause the allocations of Company income, gain, loss, and deduction to meet the requirements of Code Section 514(c)(9)(E) and the Treasury Regulations thereunder; provided, however, in the event any such allocation made under this subsection (g) would reduce the amounts distributable to any Member under this Agreement, the parties shall in good faith negotiate an amendment to the allocation provisions of this Agreement such that no such reduction occurs (unless the Class B Member waives such right with respect to a reduction in any amount distributable to it).

(h) **UBTI Limitation**. Notwithstanding anything to the contrary in this Agreement, the Company shall make such special, curative, and/or offsetting allocations of Profit or Loss (or any item thereof) to the extent necessary and to the extent supported by advice of tax counsel, to cause any amounts otherwise allocable to the Class B Member that would

constitute unrelated business taxable income to instead be allocated to the other Members; provided, however, in the event any such allocation made under this subsection (h) would reduce the amounts distributable to any Member under this Agreement, the parties shall in good faith negotiate an amendment to the allocation provisions of this Agreement such that no such reduction occurs (unless the Class B Member waives such right with respect to a reduction in any amount distributable to it).

**9.04 Contributed Property and Book-ups.**

In accordance with Code Section 704(c) and the Regulations thereunder, as well as Regulation Section 1.704-1(b)(2)(iv)(d)(3), income, gain, loss, and deduction with respect to any property contributed (or deemed contributed) to the Company shall, solely for tax purposes, be allocated among the Members and the Economic Interest Owners so as to take account of any variation between the adjusted basis of the property to the Company for federal income tax purposes and its fair market value at the date of contribution (or deemed contribution). If the adjusted book value of any Company asset is adjusted as provided herein, subsequent allocations of income, gain, loss, and deduction with respect to the asset shall take account of any variation between the adjusted basis of the asset for federal income tax purposes and its adjusted book value in the manner required under Code Section 704(c) and the Regulations thereunder. Any elections or decisions relating to such allocations shall be made by the Management Committee in a manner that reasonably reflects the intent of this Agreement. Allocations pursuant to this Section 9.04 are solely for tax purposes and shall not affect any Member's or any Economic Interest Owner's Capital Account.

**9.05 General.**

(a) **Distributions of Property**. If any assets of the Company are distributed in kind to any Member or Economic Interest Owner, those assets shall be valued on the basis of their Agreed Value, and any Member or any Economic Interest Owner entitled to any interest in those assets shall receive that interest as a tenant-in-common with all other Members and Economic Interest Owners so entitled. The Profit or Loss for each distributed asset shall be determined as if the asset had been sold at its Agreed Value, and the Profit or Loss shall be allocated as provided in Section 9.02 and shall be properly credited or charged to the Capital Accounts of the Members and the Economic Interest Owners prior to the distribution of the assets.

(b) **Members of Record for Allocations**. All Profit and Loss shall be allocated to the Persons shown on the records of the Company to have been Members or Economic Interest Owners during the year, as of the last day of the taxable year for which the allocation is to be made. Notwithstanding the foregoing, unless the Company elects to separate its taxable year into segments, if there is a Transfer or an Involuntary or Voluntary Withdrawal during the taxable year, the Profit and Loss shall be allocated between the original Member or Economic Interest Owner and his or her successor or, in the case of a Transfer to the Company or a Voluntary Withdrawal, among the remaining Members and Economic Interest Owners, on the basis of the number of days each was a Member or an Economic Interest Owner during the taxable year. However, the Company's taxable year shall be segregated into two or more

segments in order to account for Profit, Loss, or proceeds attributable to any extraordinary non-recurring items of the Company.

(c) **Members of Record for Distributions**. All *pro rata* distributions shall be made to the Persons shown on the records of the Company to be Members or Economic Interest Owners as of the day of the distribution.

(d) **Guaranteed Payments**. To the extent any compensation for goods or services, that is paid to a Member or an Economic Interest Owner by the Company, is determined by the Internal Revenue Service not to be a guaranteed payment under Code Section 707(c) or is not paid to the Member or the Economic Interest Owner other than in the Person's capacity as a Member or an Economic Interest Owner within the meaning of Code Section 707(a), the Member or the Economic Interest Owner shall be specially allocated gross income of the Company in an amount equal to the amount of that compensation, and the Member or the Economic Interest Owner's Capital Account shall be adjusted to reflect the payment of that compensation.

(e) **Amendment of Regulatory Allocations**. The Management Committee is hereby authorized, upon the advice of the Company's tax counsel, to amend this Article IX to comply with the Code and the Regulations promulgated under Code Section 704(b). However, no amendment shall materially affect distributions to a Member or an Economic Interest Owner without the Member's or Economic Interest Owner's prior written consent.

**9.06 Exempt Status Matter Special Allocations and Distributions.**

(a) In the event with respect to any taxable year of the Company, an Exempt Status Matter Action is taken, then, upon seven (7) days prior written notice by the Class A Member, the Class B Member shall meet with the Class A Member within thirty (30) days after the close of such taxable year to determine whether such Exempt Status Matter Action(s) have had a negative impact on the Profit of the Company for such taxable year, and/or are likely to have a negative impact on the Profit of the Company in subsequent taxable years, that would have otherwise have been realized had such Exempt Status Matter Action(s) not been taken. The failure of Class A Member to give notice of such a meeting within thirty (30) days of the end of a taxable year shall constitute an irrevocable waiver of the rights of Class A Member to claim an Exempt Status Matter Special Allocation pursuant to this Section 9.06 for such taxable year, except with respect to an Exempt Status Matter Action taken in a prior taxable year with respect to which the Class B Member and the Class A Member, or the Company's independent auditors, determined in accordance with this Section 9.06, was likely to have a negative impact on the Profit of the Company in succeeding taxable years (a "Qualifying Prior Year Exempt Status Matter Action").

(b) In the event that the Class B Member and the Class A Member determine, after the meeting referred to in Section 9.06(a), that any Exempt Status Matter Action(s) taken during the taxable year, or Qualifying Prior Year Exempt Status Matter Action, did not have an adverse effect on the Profit of the Company for such taxable year, then there shall be no Exempt Status Matter Special Allocation to Class A or C Members for such taxable

year. In the event that the Class B Member and the Class A Member determine that there has been an adverse impact on the Profit of the Company for said taxable year (or in the event that the parties are unable to reach agreement as to whether there was an adverse impact on such Profit), the Managers of the Company shall instruct the Company's independent auditors to review the specifics of the Exempt Status Matter Action(s) that occurred during such taxable year, and any Qualifying Prior Year Exempt Status Matter Action, and to render a report, within thirty days after being retained, which will outline in reasonably sufficient detail, the economic impact, or lack thereof, that the Exempt Status Matter Action(s), and any Qualifying Prior Year Exempt Status Matter Action, had on the Company's Profit for such taxable year and/or will likely have on the Company's Profit in succeeding years ("Special Report"). The Special Report will be finalized in all events prior to filing the tax return for the fiscal year in question.

For purposes of determining whether and to what extent there has been or will be an impact on the Company's Profit, and of preparing said report; (i) the value of additional free or partial pay care required as part of an Exempt Status Matter Action shall be determined on a fee equivalent basis using Medicare rates; (ii) the cost of additional free health educational programs and seminars required as part of an Exempt Status Matter Action shall include only those additional out-of-pocket costs and expenses attributable to the publicity for or operation of such programs and seminars, and shall not include an allocation of the Center's overhead or personnel costs; (iii) opportunity costs (including lost profits) of non-clinical activities approved by the Management Committee but which have been limited or eliminated as a result of an Exempt Status Matter Action; and (iv) opportunity costs (other than as provided in clause (i) or (iii) above) and consequential and other special damages shall not be included. Each Member shall have ten (10) days after receipt of the auditors' report, to object in writing to such report. Such objection shall state in reasonable detail the basis for the Member's objection to the auditors' report. A failure to object within such ten (10) days will render the auditors' conclusions final and non-appealable for purposes of the special allocation set forth in this Section 9.06. If a Member objects to such report within said ten-day period, the Company's independent auditors shall have one week to rule on such objection and issue their final report, which report shall be conclusive and binding on the parties.

(c) Notwithstanding the provisions of Sections 9.01 and 9.02, for each taxable year of the Company in which the Members determine, or it is otherwise determined pursuant the provisions of Section 9.06(b), that an Exempt Status Matter Action has had a negative impact on the Profit of the Company, the Class A and C Members shall each receive, after giving effect to the special allocations set forth in Section 9.03, a special allocation of Profit as described in Section 9.06(d) equal to the Exempt Status Matter Special Allocation Amount (as defined below), and a corresponding amount of cash as described in Section 9.06(e) equal to the Exempt Status Matter Distribution (as defined below).

(d) The Exempt Status Matter Special Allocation Amount for the Class A and C Members shall be, for each taxable year, the product of (i) Class A or C Member's respective Percentage Interest for such taxable year, multiplied by (ii) the difference, if positive, of (A) the allocable Profit of the Company for such taxable year determined by the Company's independent auditors as though the Exempt Status Matter Action(s) were never taken (the "Estimated Allocable Net Profit") minus (B) the actual allocable Profit of the Company for such

taxable year. If Class A or C Member's Exempt Status Matter Special Allocation Amount that has accrued for any taxable year of the Company exceeds the Company's total Profit for such taxable year, the difference between such Exempt Status Matter Special Allocation Amount and the Company's total Profit for such taxable year (the "Profit Shortfall") shall be carried forward to successive taxable years and shall be allocated to Class A and C Members pursuant to the formula set forth in the first sentence of this Section 9.06(d) until such time that the Profit Shortfall is reduced to zero (*i.e.,* until the Class A and C Members have received a special allocation of Profit that cumulatively totals the aggregate of the Exempt Matter Special Allocation Amounts accrued to Class A and C Members for all taxable years of the Company).

(e) The Company shall make a distribution to the Class A and C Members (each an "Exempt Status Matter Distribution") equal to each Member's Exempt Status Matter Special Allocation Amount, as further set forth in Section 9.06(d). The Company shall make the Exempt Status Matter Distribution to the Class A and C Members, if applicable, within ninety (90) days of the issuance of the final auditors' report described in Section 9.06(b), except to the extent that the Company has insufficient cash to make such Exempt Status Matter Distributions (each a "Cash Shortfall"). If the Company experiences a Cash Shortfall and a Class A or C Member's Exempt Status Matter Special Allocation Amount exceeds the Exempt Status Matter Distribution attributable to such Exempt Status Matter Special Allocation for any taxable year (a "Member Distribution Shortfall"), the Company shall carry-forward the Member Distribution Shortfall to the successive taxable year (or taxable years, if necessary) and make a distribution to Class A and C Members of its Member Distribution Shortfall at such time or times that the Company no longer has a Cash Shortfall.

## ARTICLE X
## BOOKS, RECORDS, ACCOUNTING AND TAX ELECTIONS

**10.01 Bank Accounts.**

All funds of the Company shall be deposited in a bank account or accounts maintained in the Company's name. The Management Committee shall determine the institution or institutions at which the accounts will be opened and maintained, the types of accounts, and the Persons who will have authority with respect to the accounts and the funds therein.

**10.02 Books and Records.**

(a) The Management Committee shall keep or cause to be kept complete and accurate books and records of the Company and supporting documentation of the transactions with respect to the conduct of the Company's business. At a minimum, the Company shall keep the following records:

(i) A current list of

(1) the full name and last known address of each Member and Economic Interest Owner, Member Representative and Manager;

(2) the amount of cash each Member and Economic Interest Owner has contributed;

(3) a description and statement of the Agreed Value of the other property each Member and Economic Interest Owner has contributed or has agreed to contribute in the future; and

(4) the date on which each became a Member and Economic Interest Owner.

(ii) A copy of the Articles of Organization of the Company and all amendments thereto, together with executed copies of any powers of attorney pursuant to which any amendment has been executed;

(iii) Copies of the Company's federal, state, and local income tax returns and reports (including information returns), if any, for the three most recent years;

(iv) Copies of the Company's currently effective Operating Agreement;

(v) Copies of the Company's financial statements for the three most recent years;

(vi) Minutes of every meeting of the Members;

(vii) Any written consents obtained from the Members for actions taken by the Members without a meeting;

(viii) A copy of the Company's Charity Care Policy; and

(ix) Copies of the quarterly reports of charity care provided by the Company and the charitable initiatives implemented or to be implemented by the Company (subject to any reasonable record retention policy adopted by the Management Committee).

(b) The books and records shall be maintained in accordance with sound accounting practices and shall be available at the Company's principal office for examination by any Member, or any former Member (but only those books and records pertaining to the period in which he or she was a Member), or the Member's duly authorized representative at any and all reasonable times during normal business hours.

(c) Each Member shall reimburse the Company for all costs and expenses incurred by the Company in connection with the Member's inspection or copying of the Company's books and records.

(d) At the request of any Member, and at the requesting Member's expense, the Management Committee shall cause an audit of the Company's books and records to be prepared by independent accountants for the period requested by that Member.

**10.03 Annual Accounting Period.**

The annual accounting period and the fiscal year of the Company shall be its taxable year. The Company's taxable year shall be the annual period ending on December 31.

**10.04 Accounting.**

The Company shall be an accrual basis taxpayer.

**10.05 Returns and Other Elections.**

The Management Committee shall: (a) cause the preparation and timely filing of all tax returns required to be filed by the Company pursuant to the Code and all other tax returns deemed necessary and required in each jurisdiction in which the Company does business; (b) shall send a copy of Schedule K-1 or any successor or replacement form thereof to each Member and Economic Interest Owner as soon as the same is filed; and (c) shall cause the Company to file any other documents from time to time as may be required by any state or any subdivision thereof. All tax elections may be made by the Management Committee in its sole discretion, provided that the Management Committee shall make any tax election authorized by a unanimous vote of all the Members. However, the Management Committee may not make an election for the Company (i) to be excluded from the provisions of Subchapter K of the Code or (ii) to be treated as a corporation for federal income tax purposes, without the unanimous written consent of the Members. The determination by the Management Committee with respect to the treatment of any item or its allocation for Federal, state or local tax purposes shall be binding so long as such determination will not be inconsistent with any provision of this Agreement.

**10.06 Tax Matters Partner**

Hartford shall be and is designated the Tax Matters Partner (as defined in Code Section 6231) and is authorized and required (a) to represent the Company (at the Company's expense) in connection with all examinations of the Company's affairs by tax authorities, including, without limitation, administrative and judicial proceedings; (b) to expend Company funds for professional services and costs associated therewith; and (c) to keep all Members informed of all notices from government taxing authorities that may come to the attention of the Tax Matters Partner; provided, however, that: (i) upon written request by the Class A Member, the Class A Member and/or its representative may attend any particular examination or administrative or judicial proceeding; and (ii) the Class B Member shall not settle any tax examination or administrative or judicial proceeding without the prior written consent of Class A Member if such settlement will be likely to have an adverse economic impact on Class A Member. The Members agree to cooperate with each other and to do or refrain from doing any and all things reasonably required to conduct such proceedings. The Company shall indemnify and save harmless the Tax Matters Partner from and against any loss, damage, liability or expense

incurred or sustained by it by reason of any act performed by it, or any failure by it to act, as the Tax Matters Partner, provided that any such act or failure to act shall not result from its willful misconduct, gross negligence or fraud.

**10.07 Title to Company Property.**

Except as provided in this Section, all real and personal property acquired by the Company shall be acquired and held by the Company in its name. The Management Committee may direct that legal title to all or any portion of the Company's property be acquired or held in a name other than the Company's name. Without limiting the foregoing, the Management Committee may cause title to be acquired and held in the names of trustees, nominees, or straw parties for the Company. It is expressly understood and agreed that the manner of holding title to the Company's property (or any part thereof) is solely for the convenience of the Company and all property shall be treated as Company property.

## ARTICLE XI
## ASSIGNMENTS

**11.01 Transfers.**

Except as otherwise provided in this Agreement, no Member may Transfer all, or any portion of, or any interest or rights in, its Membership Interest or Economic Interest, and no Economic Interest Owner may Transfer all, or any portion of, or any interest or rights in, its Economic Interest, including the assignment of the right to receive distributions. An Involuntary Withdrawal shall be governed by Article XIV of this Agreement.

**11.02 Transfers to Affiliates.**

Notwithstanding Section 11.01, a Member may transfer, without recourse, all of its Membership Interest to an Affiliate of the transferor provided such Affiliate otherwise can comply with the terms of this Agreement. If the Member transfers its Membership Interest hereunder, the transferee shall be admitted as an additional or substitute Member upon such Affiliate's written acceptance and adoption of all of the terms and provisions of this Agreement.

**11.03 Transfers to Third Parties.**

(a) Notwithstanding Section 11.01, after the expiration of three (3) years from the date that medical procedures are first performed at the Center, a Member or Economic Interest Owner (the "Transferor") may Transfer to a transferee (the "Transferee") all (but not less than all) of its Membership Interest or Economic Interest (the "Transferred Interest") in the Company upon receiving from the Transferor a bona fide, written, all-cash offer, if the following conditions are, or have been, satisfied:

(i) The Transferee delivers to the Company a written instrument, in a form reasonably satisfactory to Company's counsel, agreeing to be bound by the terms of this Agreement;

(ii) The Transfer will not result in the termination of the Company pursuant to Code Section 708;

(iii) The Transfer will not require registration of the Transferred Interest under any federal or state securities laws;

(iv) The Transferor or the Transferee delivers the following information to the Company: (A) the Transferee's taxpayer identification number and (B) the Transferee's initial tax basis in the Transferred Interest; and

(v) The Transferor complies with the provisions set forth in Section 11.04 (relating to the Right of First Offer) and in Section 11.05 (relating to Tag- Along Rights).

(b) If a Member transfers only its Economic Interest hereunder, the Transferee shall succeed to the Transferor's rights in the Transferred Interest, including the right to receive distributions,. except that the Transferee shall not become a Member, and shall not be entitled to vote on any matter coming before the Members, unless the Members unanimously approve the admission of the Transferee as a substitute Member.

**11.04 Right of First Offer.**

Except with respect to any Transfer completed in accordance with Section 11.02, if Transferor desires to Transfer all (and not less than all) of the Transferor's Membership Interest or economic Interest (the "Interest to be Transferred"), the Transferor shall notify the Company and each Member of that desire (the "Transfer Notice"). The Transfer Notice shall describe the Interest to be Transferred, the proposed Transferee, the cash to be paid for the Interest to be Transferred, and all other material terms of the Transfer. The Company and the non-transferring Members shall have the option (the "Purchase Option") to purchase the Interest to be Transferred for the Purchase Price and on the Payment Terms as set forth herein. Upon the delivery of the first Transfer Notice, the Transferor shall be and remain obligated to sell the Interest to be Transferred under this Section 11.04 until the end of the Member Transfer Period as described herein.

(a) **Purchaser.** The Interest to be Transferred shall be purchased by the Company, if the Members, other than the Transferor, unanimously consent to the purchase of the Interest to be Transferred by the Company. Otherwise, the Members, other than the Transferor, shall have the right to purchase the Interest to be Transferred. In the event that more than one Member elects to purchase the Interest to be Transferred, each Member shall have the right to purchase the Interest to be Transferred in the same proportion as that Member's Percentage Interest bears to the total Percentage Interest of all Members who have elected to purchase the Interest to be Transferred; provided, however. that if any Member declines to purchase a portion of the Interest to be Transferred, the remaining Members may purchase such portion.

(b) **Manner of Election.** The Company may elect to exercise the Purchase Option at any time prior to the thirtieth (30th) calendar day following its receipt of the Transfer

Notice (the "Company Transfer Period"), by giving written notice of its election to the Transferor. If the Company does not elect to exercise the Purchase Option within the Company Transfer Period, the Transferor shall provide written notice to each non-transferring Member of such failure. The non-transferring Members shall then have the right to elect to exercise the Purchase Option by giving written notice of such election to the Transferor, at any time prior to the thirtieth (30th) calendar day following the day the last notice of the Company's failure to exercise the Purchase Option was given to a non-transferring Member hereunder (the "Member Transfer Period"). The Company or the Members may elect to purchase all but not less than all of the Interest to be Transferred.

(c) **Transfer Closing Date.** If the Company or a Member elects to exercise the Purchase Option, the Company's or the Member's notice of its election shall fix a closing date (the "Transfer Closing Date") for the purchase, which shall not be earlier than five (5) calendar days, nor more than thirty (30) calendar days, after the expiration of the Company Transfer Period or the Member Transfer Period, as the case may be. The Transferor shall be obligated to transfer on the Transfer Closing Date the Interest to be Transferred by the Company or the Member.

(d) **Purchase Price.** The Company and the Members shall have the right to purchase the Interest to be Transferred at the price set forth in the Transfer Notice.

(e) **Payment Terms.** In the event that the Company or a Member (the "Purchaser") exercises its right to purchase the Interest to be Transferred, the Purchaser may elect to pay the purchase price on the Transfer Closing Date (i) in cash; (ii) in five equal annual installments, with the first to be paid on the Transfer Closing Date, together with interest calculated at a minimum rate per annum at which no interest will be imputed for federal income tax purposes; or (iii) on any other terms mutually agreed to by the Transferor and the Purchaser.

(f) **Closing.** On the Transfer Closing Date, the Transferor shall convey and assign to the Purchaser, by assignment with warranty of title, free and clear of all liens, claims, and encumbrances arising through the assignor, the Interest to be Transferred (or if there is more than one Purchaser, the portion purchased by that Purchaser) and shall execute and deliver to the Purchaser all documents that are reasonably required by the Purchaser to give effect to the sale and acquisition of the Interest to be Transferred, provided that the Transferor may retain a security interest in the Interest to be Transferred if the Purchaser elects to pay the Purchase Price as set forth in Section 11.04(e)(ii) above. The Transferor and the Purchaser shall take such other actions and execute such other documents as may be necessary or appropriate to give effect to any transaction contemplated by this Section.

(g) **No Election.** If the Company or the Members fail to exercise the Purchase Option, the Transferor shall be permitted to transfer the Interest to be Transferred to the proposed Transferee at the price and on the other terms set forth in the Transfer Notice for a period of ninety (90) days (the "Free Transfer Period") after the expiration of the Member Transfer Period. If the Transferor does not Transfer the Interest to be Transferred within the Free Transfer Period, the Transferor's right to Transfer the Interest to be Transferred pursuant to this Section shall cease and terminate. Any Transfer of the Interest to be Transferred made after the last day of the

Free Transfer Period without strict compliance with the terms, provisions, and conditions of this Section 11.04 and the other terms, provisions, and conditions of this Agreement, shall be null, void, and of no force or effect.

**11.05 Tag-Along Rights.**

(a) Except with respect to any Transfer completed in accordance with Section 11.02 or Section 11.04, each Member agrees that it shall not Transfer its Membership Interest or Economic Interest (the "Interest to be Transferred") unless the terms and conditions of such Transfer shall include an offer by the proposed transferee (the "Third Party") to purchase the Membership Interest or Economic Interest, as applicable, of the other Member ("Tag-Along Member"), at such Tag-Along Member's option and at the same price and on the same terms and conditions as apply to the selling Member (for purposes of this Section 11.05, the "Selling Member").

(b) The Selling Member shall notify the Company and the Tag-Along Member of any proposed Transfer to which the provisions of this Section 11.05 apply. Each such notice shall set forth: (i) the name of the Third Party; (ii) the address of the Third Party; (iii) the proposed amount and form of consideration and terms and conditions of payment offered by the Third Party, and any other material terms pertaining to the Transfer (the "Third Party Terms"); and (iv) that the Third Party has been informed of the "Tag-Along Rights" provided for in this Section 11.05 and has agreed to purchase the Tag-Along Member's Membership Interest or Economic Interest in accordance with the terms hereof.

(c) The Tag-Along Rights set forth above in this Section 11.05 may be exercised by the Tag-Along Member by delivery of a written notice to the Company and the Selling Member (the "Tag-Along Notice") within ten (10) business days following receipt of the notice specified in the preceding paragraph. The Tag-Along Notice shall state that the Tag-Along Member wishes to be included in the Transfer to the Third Party.

(d) Upon the giving of a Tag-Along Notice, the Tag-Along Member shall be entitled and obligated to sell its Membership Interest or Economic Interest, as applicable, to the Third Party on the Third Party Terms. After expiration of the ten (10) business day period referred to in Section 11.05(c) above, if the provisions of this Section have been complied with in all material respects, the Selling Member shall have the right for a one hundred twenty (120) day period (the "Tag-Along Free Period") to Transfer its Interest to be Transferred to the Third Party on the Third Party Terms (or on other terms no more favorable to the Selling Member) without further notice to the Tag-Along Member who have not given a Tag-Along Notice, but after such Tag-Along Free Period no such Transfer may be made without again giving notice to all Tag-Along Members of the proposed Transfer and complying with the requirements of this Section 11.05. Any Transfer of the Interest to be Transferred made after the last day of the Tag-Along Free Period without strict compliance with the terms, provisions, and conditions of this Section 11.05 and the other terms, provisions, and conditions of this Agreement, shall be null, void, and of no force or effect.

(e) At the closing of the Transfer to any Third Party (of which the Selling Member shall give the Tag-Along Member who has elected to exercise the Tag-Along Right provided by this Section 11.05 at least ten (10) Business Days' prior written notice), the Third Party shall remit to each Member the consideration for the total sales price of the Membership Interest or Economic Interest of such Member sold pursuant thereto, upon compliance by such Member with any conditions to closing generally applicable to the Selling Member and the Tag-Along Member selling its Membership Interest or Economic Interest in the transaction.

**11.06 Reasonableness of Restrictions.**

Each Member hereby acknowledges the reasonableness of the restrictions contained in this Article in view of the purposes of the Company, the tax-exempt status of the Class B Member and the relationship of the Members. The Transfer of any Membership Interest or Economic Interest in violation of the restrictions contained in this Article shall be deemed invalid, null and void, and of no force or effect. Any Person to whom a Membership Interest or Economic Interest, or any portion thereof, is attempted to be transferred in violation of this Article shall not be entitled to vote on matters coming before the Members, participate in the management of the Company, act as an agent of the Company, receive distributions from the Company or have any other rights in or with respect to the Membership Interest or Economic Interest, or portion thereof.

## ARTICLE XII
## PUT/CALL OPTIONS

**12.01 General.**

Within ninety (90) days of the occurrence of a Put Event or a Call Event, the Class A Member (for a Put Event) or the Class B Member (for a Call Event) may trigger their respective rights for the Class B Member to acquire all, but not less than all, of the Class A Member's Membership Interest by giving the Put/Call Notice (as defined below). Upon receipt of the Put/Call Notice, the Class A Member shall be obligated to sell its Membership Interest to the Class B Member for the Put/Call Value (as determined pursuant to Section 12.04 below). Notwithstanding the foregoing, other than with respect to a Change in Control, the Class B Member's right to buy the Class A Member's Membership Interest as set forth in this Article XII shall not be exercisable until (i) one year after the commencement of medical procedures at the Center and (ii) ninety (90) days after the either the Class A or B Member has provided their Put/Call Notice to the other Member, during which time the Class A and B Members shall make a reasonable best effort to come to an amicable settlement of their differences or the amicable sale of either or both parties' Membership Interest.

**12.02 Put/Call Notice.**

The Put/Call Notice shall (a) be in writing signed by either the Class A or B Member, as applicable; (b) include the closing date (the "Closing Date") for such purchase, which Closing Date shall be no fewer than ninety (90) calendar days after the date of the other Member's receipt of the Put/Call Notice; (c) include the Deposit required pursuant to Section 12.05 below if a Call

Event; (d) include the terms and conditions of the offer in accordance with this Article (other than the purchase price, which shall be the Put/Call Value determined pursuant to Section 12.04 below); and (e) include adjustments to be made to the purchase price on the Closing Date, if any.

**12.03 Payment Terms.**

The Class B Member may elect to pay the Put/Call Value on the Closing Date (i) in cash; (ii) in twenty equal quarterly installments, with the first to be paid on the Closing Date, together with interest at a fixed annual rate equal to the Prime Rate in effect as of the Put/Call Notice plus one percent (1%); or (iii) on any other terms mutually agreed to by the Class A and B Members.

**12.04 Put/Call Value.**

The term Put/Call Value means the appraised fair market value of the Class A Member's Membership Interest in the Company as hereinafter provided. The Class A and B Members shall each appoint, by written notice to the other within thirty (30) days after the Put/Call Notice, an appraiser to determine the fair market value of the Class A Member's Membership Interest (without any discount for lack of voting rights, marketability or control) being sold as of the last day of the month immediately preceding the month in which the Put/Call Notice was delivered. If the two appraisers agree upon the value of the Class A Member's Membership Interest, they shall jointly render a single written report stating that value. If the two appraisers cannot agree upon the value of the Class A Member's Membership Interest, they shall each render a separate written report and shall appoint a third appraiser within thirty (30) days of their appointment. The third appraiser shall determine the value of the Class A Member's Membership Interest being sold and shall render a written report of his or her opinion thereon. The value contained in the aforesaid joint written report or written report of the third appraiser, as the case may be, shall be the Put/Call Value. However, if the value of the Class A Member's Membership Interest contained in the appraisal report of the third appraiser is more than the higher of the first two appraisals, the higher of the first two appraisals shall be the Put/Call Value and if the value of the Class Member's Membership Interest contained in the appraisal report of the third appraiser is less than the lower of the first two appraisals, the lower of the first two appraisals shall be the Put/Call Value. If either party fails to timely appoint an appraiser or either appraiser fails to timely render a report, the value contained in the timely-rendered report of the timely-appointed appraiser shall be the Put/Call Value and there shall be no need to appoint a third appraiser. Each party shall pay the fees and costs of the appraiser appointed by that party, and the fees and other costs of the third appraiser shall be shared equally by both parties.

Notwithstanding any provision in this Article XII to the contrary, in the event of a Call Event, the Class B Member may, within ten (10) days of the final determination of the Put/Call Value pursuant to this Section 12.04, elect to rescind its offer to purchase the Membership Interest of the Class A Member without liability to the other (except the payment of its portion of the costs of a third appraiser, if any, as provided in Section 12.04) and any deposit paid by the Class B Member pursuant to Section 12.05 shall be returned to the Class B Member.

**12.05 Deposit.**

In the event a Call Event, the Put/Call Notice shall be accompanied by a deposit in the amount of one hundred thousand dollars ($100,000) (the "Deposit"), in the form of a certified or cashier's check made payable to a nationally recognized title insurance company, as escrow agent (the "Escrow Agent"). Concurrently with depositing a check or making the wire transfer, the Class B Member shall provide to the Escrow Agent a duly-completed IRS Form W-9 with the Class B Member's respective employer identification number for the Escrow Agent's use in depositing the check or federal funds in an interest-bearing account. The costs for the services of the Escrow Agent shall be paid at Closing, one-half by each of the Class A and B Members.

**12.06 Escrow Agreement.**

By execution of this Agreement, the Class A and B Members agree that the Escrow Agent shall hold the Deposit and any and all interest accrued thereon (collectively, also the "Deposit") in escrow and shall dispose of the Deposit only in accordance with the following provisions:

(a) The Escrow Agent shall deliver the Deposit, or such portion thereof as is required to be delivered hereunder, to the Class A Member or to the Class B Member, as the case may be, as follows:

(i) to the Class A Member, or otherwise at the direction of the Class A Member, upon completion of the Closing Date, in which case the Deposit shall be applied toward the Put/Call Value; or

(ii) to the Class A Member, after receipt of the Class A Member's demand in which the Class A Member certifies that the Class B Member has defaulted under this Article, and the Class A Member is thereby entitled to receive the Deposit; but the Escrow Agent shall not honor the Class A Member's demand until more than ten (10) days after the Escrow Agent has transmitted a copy of the Class A Member's demand to the Class B Member, nor thereafter if the Escrow Agent receives a Notice of Objection (hereinafter defined) from the Class B Member within such ten (10) day period; or

(iii) to the Class B Member, after receipt of the Class B Member's demand in which the Class B Member certifies that the Class A Member has defaulted under this Article, and the Class B Member is thereby entitled to receive the Deposit; but the Escrow Agent shall not honor the Class B Member's demand until more than ten (10) days after the Escrow Agent has transmitted a copy of the Class B Member" demand to the Class A Member, nor thereafter if Escrow Agent receives a Notice of Objection (hereinafter defined) from the Class A Member within such ten (10) day period; or

(iv) to any party, at the direction of both the Class A and B Members.

Upon delivery of the Deposit in accordance with the terms and conditions herein, the Escrow Agent shall be relieved of all liability hereunder and with respect to the Deposit. The

Escrow Agent shall deliver the Deposit, at the election of the party or parties entitled to receive the same, by (i) a good, unendorsed certified check or checks of the Escrow Agent payable to the order of such party or parties, (ii) an endorsed official bank or cashier's check or checks payable to the order of such party or parties, or (iii) a bank wire transfer or transfers of immediately available funds to an account designated by such party or parties.

(b) Upon receipt of a written demand under Subsection 12.06(a)(ii) or under Section 12.06(a)(iii) above, the Escrow Agent shall promptly transmit a copy of such demand to the other Member. Within ten (10) days after the date of transmitting the same, but not thereafter, the other Member may object to the delivery of the Deposit to the Member requesting the Deposit by transmitting a notice of objection (a "Notice of Objection"') to the Escrow Agent. After receiving a Notice of Objection, the Escrow Agent shall promptly transmit a copy of such Notice of Objection to the Member requesting the Deposit; and thereafter, the Escrow Agent shall continue to hold the Deposit until the Escrow Agent receives a written agreement of the Class A and B Members directing the disbursement of the Deposit, in which event the Escrow Agent shall disburse the applicable Deposit in accordance with such agreement. In the event of any litigation between the Class A and B Members relating to the Deposit, the Escrow Agent will deposit the Deposit with the clerk of the court in which such litigation is pending. In the event the Deposit is deposited in court by the Escrow Agent pursuant to the foregoing sentence, the Escrow Agent shall be entitled to rely upon the judgment of such court.

(c) The Escrow Agent may rely on the foregoing provisions in lieu of an escrow agreement with the Members. Notwithstanding the foregoing, in the event that the Escrow Agent requests a commercially reasonable written agreement embodying the foregoing provisions, the Class A and B Members shall promptly execute such an agreement. If either the Class A or Class B Members shall fail to execute such agreement within five (5) days after transmittal thereof, or if the agreement materially differs from the terms hereof, upon such determination of either the Class A or B Members, then either the Class A or B Member may direct the Escrow Agent to transfer the check to another Escrow Agent who will not require a separate written escrow agreement.

(d) When the Deposit check is deposited with the Escrow Agent, the Escrow Agent shall be instructed in writing that the Escrow Agent's acceptance of the check as a Deposit will constitute acceptance by the Escrow Agent of the terms and conditions set forth herein, and the Escrow Agent shall be provided with a copy of this Article with such Deposit.

**12.07 Closing Date.**

(a) The sale and acquisition of the Class A Member's Membership Interest (the "Closing") shall occur on the Closing Date through the offices of the Escrow Agent, in escrow. At such Closing, the Class A Member shall convey and assign to the Class B Member by assignment with warranty of title, free and clear of all liens, claims, and encumbrances arising through the assignor, the Class A Member's Membership Interest and shall execute and deliver to the Class B Member all documents that are reasonably required to give effect to the sale and acquisition of the Class A Member's Membership Interest. The Class A Member's obligation to transfer its Membership Interest shall be conditioned upon the Class B Member's payment of the

Put/Call Value. The Class A and B Members shall take such other actions and execute such other documents as may be necessary or appropriate to give effect to any transaction contemplated by this Article.

(b) All loans made or deemed made by or to the Class A Member shall be repaid in full (including all accrued but unpaid interest thereon) at the Closing. No transaction pursuant to this Section shall relieve the Class A Member from any duty or obligation owed to the Company or to the other Members to the extent such obligation accrued and is properly attributable to the period prior to the Closing Date, nor shall it constitute a waiver or release of claims with respect thereto. The Class B Member shall defend, indemnify and hold harmless the Class A Member from all obligations and liabilities arising from the Class A Member's Membership Interest accruing and properly attributable to the period beginning on the Closing Date, and the Class A Member shall defend, indemnify and hold harmless the Class B Member from all obligations and liabilities arising from the Class A Member's Membership Interest accruing and properly attributable to the period prior to the Closing Date. The foregoing sentence shall survive the Closing and shall not require further documentation to take effect, but, if requested by either the Class A or B Member, both the Class A and B Members will execute a reasonable confirming document that is consistent with the foregoing provisions.

(c) If at the Closing Date, the Class A Member or its Affiliates or related entities, shall have any guarantees, collateral or covenants lodged with third parties to secure any indebtedness, liability or obligation of the Company, including any liability under nonrecourse caveats, or shall have outstanding any commitment to give such guarantees, collateral or covenants ("Personal Liability"), the Class B Member shall deliver or cause to be delivered to the Class A Member, no later than the Closing Date, a cancellation of such Personal Liability. As an alternative to the foregoing, the Class A Member, at its election, may accept the Class B Member's indemnity for all manner of loss, claims and damages that could arise as a result of any Personal Liability, so long as (i) such indemnity is supported by an irrevocable clean letter of credit in an amount equal to the maximum potential Personal Liability (as reasonably determined by the Class A Member) and (ii) such letter of credit is payable at sight, renewable annually, issued by a nationally recognized United States banking institution and is otherwise reasonably acceptable to the Class A Member. The foregoing letter of credit shall remain in full force and effect until the Personal Liability is released.

(d) In the event that the Class A Member shall be prohibited under the terms of any debt or other obligation of the Company from selling its Membership Interest to the Class B Member without the consent of or payment to a third party, or otherwise is prohibited from consummating this transaction without the consent of or payment to a third party to whom a debt or other obligation of the Company is owed, then in such event, such debt or other obligation of the Company giving rise to such prohibition, as the case may be, shall be fully discharged by the Class B Member on the Closing Date and any prepayment fee, premium or cost shall be paid by the Class B Member, unless the appropriate mortgagee or other creditor or obligee shall permit such transfer to be made, in which case the Class B Member shall pay all costs and fees related to obtaining such consent to the transfer.

**12.08 Default.**

(a) In the event of a default by the Class A or B Member under this Article (the "Defaulting Member"), the Class A or B Member that is ready, willing and able to close the transaction (the "Non-defaulting Member") shall have the right to purchase the Defaulting Member's Interest at a price equal to 75% of the purchase price that would have been payable on the Closing Date.

(b) Because a Membership Interest in the Company is a unique asset, the Non-defaulting Member shall have all remedies available at law and equity with respect to any failure by a Defaulting Member to perform, including, without limitation the right to specific performance and to recover attorneys' fees and litigation costs. In lieu of the foregoing and all other remedies, at the election of the Non-defaulting Member, if the Defaulting Member fails to close on the purchase of the membership Interest in accordance with the terms of this Article, the non-defaulting Member shall retain the Deposit, as complete and liquidated damages and not as a penalty.

**12.09 Tag-Along Rights.**

(a) In the event of a Put Event or a Call Event, the Class C Members shall each have the right to request that its Membership Interest be purchased by the Class B Member under the same terms and conditions as the Class A Member's Membership Interest is purchased under this Article ("Class C Member Tag-Along Rights").

(b) The Class B Member shall notify the Class C Members of any proposed purchase of the Class A Member's Membership Interest pursuant to this Article.

(c) The Tag-Along Rights set forth above in this Section 12.09 may be exercised by each Class C Member by delivery of a written notice to the Class B Member (the "Tag-Along Notice") within ten (10) business days following receipt of the notice specified in the preceding paragraph. The Tag-Along Notice shall state that the Class C Member wishes to have its Membership Interest purchased by the Class B Member in accordance with the terms of this Article.

(d) Upon the giving of a Tag-Along Notice, the Class C Members shall be entitled and obligated to sell its Membership Interest or Economic Interest, as applicable, to the Class B Member as of the Closing (as defined in Section 12.07) at the Put/Call Value (as determined pursuant to Section 12.04 – the Class C Members shall have no right to appoint an appraiser to establish the Put/Call Value which Put/Call Value shall be determined solely by the Class A and B Member in accordance with Section 12.04). In addition, the Class B Member and the Class C Members selling their Membership Interests pursuant to this Section 12.09 shall both comply Sections 12.07(b), (c) and (d) as to those Class C Members selling their Membership Interests.

(e) At the Closing, the Class B Member shall remit to each Class C Member who exercised Class Member Tag-Along Rights the consideration for the total sales price of the Membership Interest or Economic Interest of such Class C Member

## ARTICLE XIII
## ADDITIONAL MEMBERS

### 13.01 Additional Members.

The Class A and B Members, acting unanimously, shall have the right to admit additional Members upon such terms and conditions, at such time or times, and for such contributions as shall be determined by such Members, and in connection with any such admission, the Management Committee shall have the right to amend Exhibit A to reflect the name, address, contribution, taxpayer identification number and Percentage Interest of the admitted Member. The admission of any Person as a substitute or additional Member shall be conditioned upon such Person's written acceptance and adoption of all the terms and provisions of this Agreement.

Provided, however, the HHC Managers after consultation with the Class A Managers at a regularly scheduled Management Committee meeting may unilaterally approve a new Class C Member who is either (a) both (i) board certified or board eligible in either orthopedics or neurosurgery and (ii) is an Eligible Physician Investor as defined in Section 2.02(b) ("New Class C Investors"); or (b) an entity owned entirely by New Class C Investors that complies with Section 2.02(c) of this Agreement.

Within a reasonable time period following the addition of a new Member(s) (including a New Class C Investor), the Class B Member shall make such capital contributions as necessary, to maintain its Percentage Interest at fifty one (51%) percent. The Members otherwise specifically waive any preemptive rights.

### 13.02 Additional Owners of the Class A and C Members.

Prior to adding a new owner to a Class A or C Member, directly or indirectly, the Class A or C Member (as applicable) shall provide at least thirty (30) days' prior written notice to the Class B Member with a description of the of proposed new owner in the Class A or C Member and the Class B Member must approve the addition of such new owner to the Class A or C Member; provided, however, such approval will not be unreasonably withheld, conditioned or delayed. Provided, further, that the approval requirements of this Section 13.02 shall not apply to any new owner (direct or indirect) of the Class A or C Member who is also providing substantially all of his/her/its professional services through a practice entity with current owners in the Class A or C Member (e.g., an associate of a PC with owners who are owners in the Class A or C Member would not require approval by the Class B Member to become an owner in the Class A or C Member, or, if a PC is merged into a PLLC that currently has owners in the Class A or C Member, the members of PC could become owners in the Class A or C Member without approval by the Class B Member); however, the Class A or C Member will still provide notice to the Class B Member of the addition of all new owners in the Class A or C Member even if such new owner does not require Class B Member approval.

## ARTICLE XIV
## WITHDRAWALS OF MEMBERS

### 14.01 Voluntary Withdrawal.

No Member or Economic Interest Owner shall have the right or power to Voluntarily Withdraw from the Company, except as otherwise provided by this Agreement. Except in connection with an Involuntary Withdrawal, a Class C Member may not withdraw or resign from the Company at any time prior to either the fifth (5th) anniversary of such Class C Member becoming a Class C Member of the Company or the fifth (5th) anniversary of the date on which the Center begins operation, whichever is later. If a Class C Member withdraws or resigns as a Member in violation of this Section 14.01, such Class C Member hereby agrees that such withdrawal or resignation will constitute a breach of this Agreement and an Involuntary Withdrawal. The Company may offset any damages due to such a breach against any amounts otherwise distributable to such Class C Member in addition to any remedies otherwise available to the Company. No assessment of damages shall account for or be based on the volume or value of business generated by such Class C Member.

### 14.02 Involuntary Withdrawal.

Immediately upon the occurrence of an Involuntary Withdrawal, the successor of the withdrawn Member or Economic Interest Owner shall thereupon become an Economic Interest Owner but shall not become a Member without the unanimous vote of the remaining Members. The successor Economic Interest Owner shall have all the rights of an Economic Interest Owner, subject to the provisions of this Agreement, including the obligation to sell its Economic Interest under Section 14.03. However, neither the withdrawn Member or Economic Interest Owner nor the successor Economic Interest Owner shall be entitled to receive, in liquidation of the withdrawn Member's Membership Interest or Economic Interest Owner's Economic Interest, the fair market value of the withdrawn Member's Membership Interest or Economic Interest Owner's Economic Interest as of the date the Member or Economic Interest Owner Involuntarily Withdrew from the Company, except as otherwise provided by this Agreement.

### 14.03 Right to Buy Interest.

Upon the Involuntary Withdrawal of a Member or an Economic Interest Owner, the Company and the Members (the "Purchasing Members"), other than the Withdrawn Member (as defined below), shall have the right to purchase all, but not less than all, of a Withdrawn Member's Economic Interest, who shall be obligated to sell, upon the receipt of an Election Notice and for the Purchase Price and on the Payment Terms as set forth herein.

(a) **Withdrawn Member** means a Member or an Economic Interest Owner who has suffered an Involuntary Withdrawal and its successors or assigns.

(b) **Transfer Period**. Upon the occurrence of the Involuntary Withdrawal, the Withdrawn Member shall be and remain obligated to sell its Economic Interest for a period (the "Transfer Period") ending at 11:59 p.m. local time at the Company's principal office on the

sixtieth (60th) day following the day the Members, other than the Withdrawn Member, receive actual written notice of the Involuntary Withdrawal.

(c) **Purchaser.** In accordance with this Section 14.03, the Company shall purchase the Withdrawn Member's Economic Interest if the Management Committee consents to the purchase of the Economic Interest by the Company. Otherwise, the Purchasing Members shall have the right to purchase the Withdrawn Member's Economic Interest. In the event that more than one Member elects to purchase the Withdrawn Member's Economic Interest, each Member shall have the right to purchase the Withdrawn Member's Economic Interest in the same proportion as that Member's Percentage Interest bears to the total Percentage Interest of all Members who have elected to purchase the Withdrawn Member's Economic Interest.

(d) **Manner of Election**. At any time during the Transfer Period, the Company or a Member may elect to purchase the Withdrawn Member's Economic Interest by giving written notice of its election to the Withdrawn Member (the "Election Notice"). If such election is not made within the Transfer Period, any right to purchase the Withdrawn Member's Economic Interest shall be waived except as otherwise provided in this Agreement.

(e) **Transfer Closing Date.** If the Company or a Member elects to purchase the Withdrawn Member's Economic Interest, the Company's or the Member's notice shall fix a closing date (the "Transfer Closing Date") for the purchase, which shall not be earlier than five (5) days after the expiration of the Transfer Period, nor more than sixty (60) days after the expiration of the Transfer Period.

(f) **Purchase Price.** The Purchase Price for the Withdrawn Member's Economic Interest shall be the Appraised Value of the Withdrawn Member's Economic Interest, as determined under Section 14.04.

(g) **Payments Terms.** In the event that a Member or the Company (the '"Purchaser") exercises its right to purchase the Withdrawn Member's Economic Interest, the Purchaser may elect to pay the purchase price on the Transfer Closing Date (i) in cash, (ii) in five equal annual installments, with the first installment to be paid on the Transfer Closing Date, together with interest calculated at a minimum rate per annum at which no interest will be imputed for federal income tax purposes, or (iii) on any other terms mutually agreed to by the Withdrawn Member and the Purchaser.

(h) **Closing.** The sale and acquisition of the Withdrawn Member's Economic Interest (the "Closing") shall occur on the Transfer Closing Date. At such Closing, the Withdrawn Member shall convey and assign to the Purchaser by assignment with warranty of title, free and clear of all liens, claims, and encumbrances arising through the assignor, the Economic Interest of the Withdrawn Member and shall execute and deliver to the Purchaser all documents that are reasonably required to give effect to the sale and acquisition of such Economic Interest, provided that the Withdrawn Member may retain a security interest in the Economic Interest if the Purchaser elects to pay the Purchase Price in five equal annual installments as set forth in Section 14.03(g)(ii). The Withdrawn Member and the Purchaser shall

take such other actions and execute such other documents as may be necessary or appropriate to give effect to any transaction contemplated by this Section.

**14.04 Appraised Value.**

The term "Appraised Value" means the appraised fair market value of an Economic Interest in the Company as hereinafter provided. The Company and the Withdrawn Member, under Section 14.03, shall each appoint, by written notice to the other within ten days of the date of the Election Notice, an appraiser to determine the fair market value of the Economic Interest (without any discount for lack of voting rights, marketability or control) being sold as of the date of the Involuntary Withdrawal. If the two appraisers agree upon the value of the Economic Interest, they shall jointly render a single written report stating that value. If the two appraisers cannot agree upon the value of the Economic Interest, they shall each render a separate written report and shall appoint a third appraiser within thirty (30) days of their appointment. The third appraiser shall determine the value of the Economic Interest being sold and shall render a written report of his or her opinion thereon. The value contained in the aforesaid joint written report or written report of the third appraiser, as the case may be, shall be the Appraised Value. However, if the value of the Economic Interest contained in the appraisal report of the third appraiser is more than the higher of the first two appraisals, the higher of the first two appraisals shall be the Appraised Value and if the value of the Economic Interest contained in the appraisal report of the third appraiser is less than the lower of the first two appraisals, the lower of the first two appraisals shall be the Appraised Value. If either party fails to timely appoint an appraiser, or either appraiser fails to timely render a report, the value contained in the timely-rendered report of the timely-appointed appraiser shall be the Appraised Value and there shall be no need to appoint a third appraiser. Each party shall pay the fees and costs of the appraiser appointed by that party, and the fees and other costs of the third appraiser shall be shared equally by both parties.

## ARTICLE XV
## DISSOLUTION AND TERMINATION

**15.01 Dissolution.**

The Company shall be dissolved and subsequently terminated upon:

(a) the unanimous vote or written consent of the Class A and B Members to dissolve the Company, or as set forth in Section 14.04; or

(b) the Company has been sanctioned or excluded from participation in any federal health care program.

**15.02 Winding Up and Liquidation.**

When the Company is dissolved, the business and property of the Company shall be wound up and liquidated by the Management Committee or a liquidator designated by the Members (the "Liquidating Trustee"). The Management Committee or the Liquidating Trustee

shall use his or her or its best efforts to reduce to cash and cash equivalent items, such assets of the Company as the Management Committee or the Liquidating Trustee shall deem it advisable to sell, with consideration to obtaining fair value for such assets, and any tax or other legal considerations.

**15.03 Distributions.**

On winding up of the Company, the assets of the Company shall be distributed, first to creditors of the Company, including Members and Economic Interest Owners who are creditors, in satisfaction of the liabilities of the Company, and then to the Members and Economic Interest Owners in accordance with the balances in their respective Capital Accounts, after taking into account all contributions, distributions, and allocations for all periods.

**15.04 Negative Capital Accounts.**

Except as otherwise provided in this Agreement, no Member or Economic Interest Owner shall be obligated to restore a Negative Capital Account to the Company, and such deficit shall not be considered a debt owed to the Company or any other person for any purpose whatsoever.

## ARTICLE XVI
## DEFINITIONS

The following capitalized terms shall have the meanings specified in this Article XVI. Other terms are defined in the text of this Agreement, and throughout this Agreement, those terms shall have the meanings respectively ascribed to them.

**Act.**

"Act" shall mean the Connecticut Limited Liability Company Act, as amended from time to time.

**Adjusted Capital Account Deficit.**

"Adjusted Capital Account Deficit" means, with respect to any Member or Economic Interest Owner, the deficit balance, if any, in the Member's or Economic Interest Owner's Capital Account as of the end of the relevant taxable year, after giving effect to the following adjustments:

(i) the Member's or Economic Interest Owner's Capital Account shall be increased by the amount that the Member or the Economic Interest Owner is obligated to restore, or is deemed obligated to restore pursuant to Regulation Section 1.704-1(b)(2)(ii)(c) and the penultimate sentences of Regulation Sections 1.704-2(g)(1) and 1.704-2(i)(5); and

(ii) the Member's or Economic Interest Owner's Capital Account shall be decreased by the items described in Regulation Sections 1.704-1(b)(2)(ii)(d)(4), (5), and (6). The foregoing definition of Adjusted Capital Account Deficit is intended to comply with the

provisions of Section 1.704-1(b)(2)(ii)(d) of the Regulations and shall be interpreted consistently therewith.

**Affiliate.**

'"Affiliate" shall mean, with respect to a Member, any other Person that directly, or indirectly through one or more intermediaries, controls, is controlled by, or is under common control with, the Member. For purposes of Article XI only, "Affiliate", in the case of Class A or C Member, shall additionally mean any other Person that directly, or indirectly through one or more intermediaries, is controlled by fully licensed orthopedic surgeons on the active medical staff of the Class B Member. ("Control," for purposes of this definition, shall mean having the ability to elect a minimum of 75% of the governing body of such Person). Finally, "Affiliate", in the case of Class A Member, shall additionally include Constitution Surgery Center, LLC and any other Person that directly, or indirectly through one or more intermediaries, controls, is controlled by, or is under common control with, Constitution Surgery Centers, LLC.

**Agreed Value.**

"Agreed Value" shall mean the fair market value of an asset as of the date of valuation, which shall be determined by the unanimous agreement of the Class A and B Members or, if they cannot so agree, by an independent appraiser selected by the Management Committee.

**Applicable Law.**

"Applicable Law" shall mean each and every applicable federal, state or local law, statute, charter, ordinance, rule, regulation, order, license certification and accreditation standard of any governmental, regulatory or administrative agency or authority or court or other tribunal, including but not limited to the Connecticut Public Health Code and any decision issued by the Connecticut Office of Health Care Access with regard to the application for a certificate of need to be filed with respect to the Center.

**Arbitrable Issue.**

"Arbitrable Issue" shall mean any one or more of the following: (i) an alleged breach of this Agreement; (ii) a dispute regarding the interpretation or implementation of this Agreement, including without limitation the Company's Charity Care Policy; or (iii) whether an Exempt Status Matter Action has a Material Adverse Effect.

**Articles of Organization.**

"Articles of Organization" shall mean the Articles of Organization of the Company as filed with the Connecticut Secretary of the State, as amended from time to time.

**Call Event.**

"Call Event" shall mean any of the following: (a) the Class B Members have determined that that the continued existence and/or operation of the Company could jeopardize the status of either Class B Member as a tax-exempt organization under Code Section 501(a) as an organization described in Code section 501(c)(3); (b) the Class B Members learn or receive written notification that the Class A Member has experienced a Change in Control; or (c) there exists a bona fide dispute between the Members regarding one or more of the matters below, that has not been resolved after a good faith attempt by the Members to resolve such dispute pursuant to the dispute resolution procedures described in Section 17.15(a) of this Agreement:

(i) a proposed capital expenditure, or series of capital expenditures over a continuous three-year period in the aggregate, of $1,000,000 or more (not including the capital expenditures to be financed pursuant to the plan of capitalization outlined in Section 3.01 hereof);

(ii) the proposed merger or consolidation of the Company with or into another Person;

(iii) the proposed sale of all or substantially all of the assets of the Company;

(iv) the proposed borrowing of money, or incurring a debt, for or on behalf of the Company in excess of $750,000 (not including the debt commitment described in the plan of capitalization outlined in Section 3.01 hereof); or

(v) the proposed dissolution of the Company.

**Capital Account.**

"Capital Account" shall mean the account maintained by the Company for each Member and Economic Interest Owner in accordance with the following provisions:

(i) a Member's or Economic Interest Owner's Capital Account shall be credited with the Member's or Economic Interest Owner's Capital Contributions, the amount of any Company liabilities assumed by the Member or the Economic Interest Owner (or that are secured by Company property distributed to the Member or the Economic Interest Owner), the Member's or Economic Interest Owner's distributive share of Profit, and any item in the nature of income or gain specially allocated to such Member or Economic Interest Owner pursuant to the provisions of Article IX (other than Section 9.04); and

(ii) a Member's or Economic Interest Owner's Capital Account shall be debited with the amount of money and the fair market value of any Company property distributed to the Member or the Economic Interest Owner, the amount of any liabilities of the Member or the Economic Interest Owner assumed by the Company (or that are secured by property contributed by the Member or the Economic Interest Owner to the Company), the Member's or Economic Interest Owner's distributive share of Loss, and any item in the nature of

expenses or loss specially allocated to the Member or the Economic Interest Owner pursuant to the provisions of Article IX (other than Section 9.04).

If any Economic Interest is transferred pursuant to the terms of this Agreement, the transferee shall succeed to the Capital Account of the transferor to the extent the Capital Account is attributable to the transferred Economic Interest. If the book value of Company property is adjusted pursuant to Section 9.03(d), the Capital Account of each Member and Economic Interest Owner shall be adjusted to reflect the aggregate adjustment in the same manner as if the Company had recognized gain or loss equal to the amount of such aggregate adjustment.

In connection with a Capital Contribution of money or other property (other than a *de minimis* amount) by a new or existing Member or Economic Interest Owner as consideration for an Economic Interest or Membership Interest, or in connection with the liquidation of the Company or a distribution of money or other property (other than a *de minimis* amount) by the Company to a retiring Member or Economic Interest Owner (as consideration for an Economic Interest or Membership Interest), the Capital Accounts of the Members shall be adjusted to reflect a revaluation of Company property (including intangible assets) to its Agreed Value in accordance with Regulation Section 1.704-l(b)(2)(iv)(f). Any differences in the adjusted tax basis of Company property and the Agreed Value hereunder shall be accounted for under the principles set forth in Section 9.04.

It is intended that the Capital Accounts of all Members and Economic Interest Owners shall be maintained in compliance with the provisions of Regulation Section 1.704-1(b), and all provisions of this Agreement relating to the maintenance of Capital Accounts shall be interpreted and applied in a manner consistent with that Regulation.

**Capital Contribution.**

"Capital Contribution" shall mean any contribution to the capital of the Company in cash or property by a Member or Economic Interest Owner whenever made.

**Center.**

"Center" shall mean the outpatient orthopedic surgical center to be operated by the Company in Southington, Connecticut.

**Change in Control.**

"Change in Control" means:

(a) With respect to a Class A or C Member, less than fifty-one percent (51%) of the ownership interests in Class A or C Member are owned by fully-licensed surgeons specializing in either orthopedics or neurosurgery who are then on the active medical staff of the Class B Member; and

(b) With respect to the Class B Member, within one year after a merger or other reorganization involving Persons other than Affiliates of the Class B Member, more than fifty percent (50%) of the Persons electing the Board of Directors of Class B Member are different than the Persons electing the Board of Directors of Class B Member immediately prior to such reorganization.

**Charity Care Policy.**

"Charity Care Policy" shall mean the charity care policy attached as Exhibit D to this Agreement, as amended from time to time by the Management Committee or as provided in this Agreement.

**Claim.**

"Claim" shall mean any action, suit, audit, proceeding, hearing, investigation, litigation, charge, complaint, claim, assessment or demand.

**Class A Managers.**

"Class A Managers" shall mean the individual Managers designated by the Class A Member pursuant to Section 6.01(a) hereof.

**Class A Member.**

"Class A Member" shall mean _____ or any Affiliate of _____ to which _____ has assigned its Membership Interest pursuant to Section 11.02 hereof.

**Class B Member.**

"Class B Member" shall mean Hartford Hospital or any Affiliate of Hartford Hospital to which the Class B Member has assigned the Class B Member's Membership Interest pursuant to Section 11.02 hereof.

**Class C Member.**

"Class C Member" shall mean either (a) physicians who meet the requirements set forth in Section 2.02(b) hereof or (b) an entity owned entirely by physicians who meet the requirements set forth in Section 2.02(c) hereof.

**Code.**

"Code" shall mean the Internal Revenue Code of 1986, as amended, or the corresponding provisions of subsequent and superseding federal revenue laws.

**Company.**

"Company" shall mean _____ Surgery Center, LLC.

**Competition Affiliate.**

"Competition Affiliate" shall mean, with respect to a Member or Economic Interest Owner, any other Person that directly, or indirectly through one or more intermediaries, controls, is controlled by, or is under common control with such Member or Economic Interest Owner. "Competition Affiliate" shall additionally mean, with respect to Class A Member, THC and any Person who is the direct or indirect owner of a beneficial interest in, or a direct or indirect stockholder of, Class A Member or THC.

**Costs.**

"Costs" shall mean any and all liabilities, losses, damages, Claims, sanctions, exclusions, taxes, interest, penalties, fines, costs and expenses (including without limitation, reasonable expenses of investigation and court costs, reasonable attorneys' fees and disbursements and the reasonable fees and disbursements of other professionals).

**Economic Interest.**

"Economic Interest" shall mean a Member's or Economic Interest Owner's share of the Profit and Loss of and the right to receive distributions from the Company pursuant to this Agreement and the Act, but shall not include any right to participate in the management or affairs of the Company, including the right to vote on, consent to, or otherwise participate in any decision of the Members.

**Economic Interest Owner.**

"Economic Interest Owner" shall mean the owner of an Economic Interest who is not a Member.

**Exempt Status Matter.**

"Exempt Status Matter" is any matter that the Class B Member, acting through its Member Representative, or the HHC Managers, in its sole, but reasonable, discretion believes involves one or more of the following areas:

(i) the amendment of the Charity Care Policy, which policy has been adopted by the Company in furtherance of the Class B Member's charitable purposes including, but not limited to, promoting health for a broad section of the community;

(ii) the initiation and implementation of charitable initiatives in furtherance of the Class B Member's charitable purposes (in addition to that provided for in the Charity Care Policy) including, but not limited to, promoting health for a broad section of the community;

(iii) ensuring that the Company's policies and/or operations neither jeopardize the tax-exempt status of the Class B Member nor generate any "unrelated business taxable income" for the Class B Member as such term is used in Code section 512(a);

(iv) ensuring that the Company satisfies its obligation to further the charitable purpose of promoting health for a broad section of the community;

(v) ensuring that any Person contracted with, employed or retained to manage any part of the activities or operations of the Company is legally obligated, in performing its duties to the Company, to further the Class B Member's charitable purposes, including but not limited to, requiring the preparation and submission to the Management Committee of quarterly reports on the charity care provided, and charitable care initiatives implemented or to be implemented, by the Company;

(vi) the termination of any management agreement or other arrangement entered into with any Person to manage any part of the activities or operations of the Company if the HHC Managers determine, in their sole, but reasonable, discretion, that such Person is not acting to further (or is acting contrary to) the Class B Member's charitable purposes; and

(vii) the removal of any officer of the Company if the HHC Managers determine, in their sole, but reasonable, discretion that such officer is not acting to further (or is acting contrary to) the Class B Member's charitable purposes, but such removal be without prejudice to the contract rights, if any, of the person so removed.

**Exempt Status Matter Action.**

"Exempt Status Matter Action" shall mean that the Class B Member, or its Member Representative or the HHC Managers, have exercised its or their rights under Section 4.06(b), Section 6.09(b) or Section 17.05(b) unilaterally to cause the Company to take action, without the consent of the Class A Member or the Class A Managers; provided however, that an Exempt Status Matter Action shall not include any action to enforce Applicable Law, this Agreement or the Company's Charity Care Policy.

**Exempt Status Matter Allocation.**

'"Exempt Status Matter Allocation" shall mean a special allocation of Profit as required and calculated pursuant to Section 9.06 hereof.

**Free Cash Flow.**

"Free Cash Flow" shall mean:

(a) the Profit or Loss for each year;

(b) plus non-cash charges and expenses deducted in determining Profit or Loss;

(c) plus the excess proceeds of any refinancing of Company debt and any other cash receipts which were not included in the computation of Profit or Loss;

(d) plus the portion of any proceeds from the sale or other disposition of Company property not included in Profit or Loss;

(e) minus the sum of

(i) principal payments against Company debt;

(ii) non-cash items of income included in the computation of Profit or Loss; and

(iii) any other cash expenditures of Company's earnings which were not deducted in the computation of Profit or Loss, including, but not limited to the replacement or restoration of Company assets and provisions for adequate reserves for reasonably anticipated cash expenses and contingencies as determined by the Management Committee.

**Hartford**

"Hartford" shall mean Hartford Hospital, a Connecticut nonstock corporation.

**HHC Managers.**

"HHC Managers" shall mean the individual Managers designated by the Class B Member pursuant to Section 6.01(a) hereof.

**Involuntary Withdrawal.** "Involuntary Withdrawal" means:

(a) With respect to any Member or Economic Interest Owner, the bankruptcy or dissolution of the Member or Economic Interest Owner or any other event of disassociation as provided in Section 34-180(4)-(10) of the Act;

(b) The conviction of any felony by a Member;

(c) Any material breach of this Agreement by a Member which is not cured within thirty (30) days of notice of such breach from a non-breaching Member;

(d) The exclusion, suspension or debarment from participation in any governmental program, including, but not limited to, the Medicare or Medicaid programs, of a Member or any Affiliate of a Member;

(e) With respect to the Class A Member, (i) the Class A Member has fewer than ____ (__) physician/members licensed to render, and actively rendering, professional orthopedic surgical services in Connecticut, or (ii) the Class A Member and/or any one of its Competition Affiliates breaches any of the representations, warranties or covenants contained in Section 5.06(b) hereof and the Class B Member gives notice of such breach to the Class A Member; or

(f) With respect to a Class C Member: (i) the failure of a Class C Member to meet or continue to meet any of the requirements set forth in Section 2.02 hereof; (ii) revocation or suspension of a license to practice medicine or any other license required by any health care licensing authority in the State of Connecticut; (iii) retirement; (iv) the failure to maintain active, unrestricted staff privileges at the Center; (v) death or disability at any time; (vi) adjudication of incompetence at any time; or (vii) completely and fully terminating the practice of medicine within a fifty (50) mile radius of the Center.

**Majority in Interest.**

"Majority in Interest" means the Members holding a majority of the Percentage Interests then held by the Members.

**Manager.**

"Manager" shall mean the Person or Persons designated to manage the business and affairs of the Company pursuant to Article VI hereof.

**Management Committee.**

"Management Committee" shall mean the Managers designated to manage the business and affairs of the Company pursuant to Article VI hereof.

**Material Adverse Effect.**

"Material Adverse Effect" shall mean, when referring to the impact of an Exempt Status Matter Action, an Exempt Status Matter Action that materially and adversely affects the business or prospects of the Company, or the Class A and C Members' investment in the Company, and that would not be substantially redressed if the Class A or C Member timely and properly exercises, and/or the Class A or C Member had timely and properly exercised, its right to an Exempt Status Matter Special Allocation pursuant to Section 9.06 hereof.

**Medical Staff.**

"Medical Staff" shall have the meaning set forth in Section 8.01 hereof.

**Member.**

"Member" shall mean each of the parties who executes a counterpart of this Agreement as a Member and each of the parties who may hereafter become a Member in accordance with the terms hereof If a Person is a Member immediately prior to the purchase or other acquisition by such Person of a Membership Interest or an Economic Interest, such Person shall have all the rights of a Member with respect to such purchased or otherwise acquired Membership Interest or Economic Interest, as the case may be. A Member shall cease to be a Member upon the sale or other transfer of his or her entire Economic Interest in the Company and shall not be deemed a Member with respect to any Percentage Interest in which he or she has sold or otherwise transferred his or her entire Economic Interest.

**Member Nonrecourse Debt Minimum Gain.**

"Member Nonrecourse Debt Minimum Gain" has the meaning set forth in Regulation Section 1.704-2(i)(3). Member Nonrecourse Debt Minimum Gain shall be computed separately for each Member and Economic Interest Owner in a manner consistent with the Regulations under Code Section 704(b).

**Member Nonrecourse Deductions.**

"Member Nonrecourse Deductions" means any Company deductions that would be Nonrecourse Deductions, if they were not attributable to a loan made or guaranteed by a Member or Economic Interest Owner within the meaning of Regulation Section 1.704-2(b)(4).

**Member Representatives.**

"Member Representatives" shall mean those individuals designated by the Members pursuant to Article II hereof.

**Membership Interest.**

"Membership Interest" shall mean a Member's entire interest in the Company including such Member's Economic Interest and the right to participate in the management of the business and affairs of the Company, including the right to vote on, consent to, or otherwise participate in any decision or action of or by the Members granted pursuant to this Agreement and the Act.

**Minimum Gain.**

"Minimum Gain" has the meaning set forth in Regulation Sections 1.704-2(b)(2) and 1.704-2(d). Minimum Gain shall be computed separately for each Member and Economic Interest Owner in a manner consistent with the Regulations under Code Section 704(b).

**Negative Capital Account.**

"Negative Capital Account" means a Capital Account with a balance of less than zero.

**Nonrecourse Deductions.**

"Nonrecourse Deductions" has the meaning set forth in Regulation Section 1.704-2(b)(l).

The amount of Nonrecourse Deductions for a taxable year of the Company equals the net increase, if any, in the amount of Minimum Gain during that taxable year, determined according to the provisions of Regulation Section 1.704-2(c).

**Nonrecourse Liability.**

"Nonrecourse Liability" means any liability of the Company with respect to which no Member or Economic Interest Owner has personal liability determined in accordance with Section 1.752-1(a)(2) of the Regulations.

**Percentage Interest.**

"Percentage Interest" shall mean, as to a Member, the percentage set forth after the Member's name on Exhibit A, as amended from time to time, and as to an Economic Interest Owner who is not a Member, the Percentage Interest of the Member whose Economic Interest has been acquired by such Economic Interest Owner, to the extent the Economic Interest Owner has succeeded to that Member's Economic Interest.

**Person.**

"Person" shall mean any individual, general partnership, limited partnership, limited liability company, corporation, joint venture, trust, business trust, cooperative, association, foreign trust or foreign business organization and the heirs, executors, administrators, legal representatives, successors, and assigns of such "Person" where the context so permits.

**Profit and Loss.**

"Profit" and "Loss" shall mean, for each taxable year of the Company (or other period for which Profit or Loss must be computed) the Company's taxable income or loss determined in accordance with Code Section 703(a), with the following adjustments:

(i) all items of income, gain, loss, deduction, or credit required to be stated separately pursuant to Code Section 703(a)(1) shall be included in computing taxable income or loss;

(ii) any tax-exempt income of the Company, not otherwise taken into account in computing taxable income or loss, shall be included in computing Profit or Loss;

(iii) any expenditures of the Company described in Code Section 705(a)(2)(B) (or treated as such pursuant to Regulation Section 1.704-1(b)(2)(iv)(i)) and not otherwise taken into account in computing taxable income or loss, shall be subtracted from Profit or Loss;

(iv) gain or loss resulting from any taxable disposition of Company property shall be computed by reference to the adjusted book value of the property disposed of, notwithstanding the fact that the adjusted book value differs from the adjusted basis of the property for federal income tax purposes; and

(v) in lieu of the depreciation, amortization, or cost recovery deductions allowable in computing taxable income or Loss, there shall be taken into account the depreciation computed based upon the adjusted book value of the asset.

**Regulations.**

"Regulations" shall mean the income tax regulations promulgated under the Code by the United States Department of the Treasury, including proposed, temporary and final regulations.

**Put Event.**

"Put Event" shall mean any of the following: (a) (i) it has been determined that an Exempt Status Matter Action has had and/or shall have a Material Adverse Effect either by mutual written agreement of the Members, or by a written finding made reasonably and in good faith by the Class A Member, based upon the written advice of the Class A Member's professional advisors (and after having sought the advice and input of the Class B Members Member Representatives); and (ii) within forty-five (45) days of such mutual written agreement, or receipt of such written finding from the Class A Member, the Class B Members have not either (A) revoked such Exempt Status Matter Action or (B) assigned their Membership Interests to one or more for-profit Affiliates of a Class B Member, revoked such Exempt Status Matter Action, and agreed in writing to amend this Agreement to delete Sections 4.06(b), 6.09(b) and 17.05(b) hereof; (b) the Class A Member learns or receives written notification that the Class B Members have, collectively, experienced a Change in Control; or (c) there exists a bona fide dispute between the Members regarding one or more of the matters below, that has not been resolved after a good faith attempt by the Members to resolve such dispute pursuant to the dispute resolution procedures described in Section 17.15(a) of this Agreement:

(i) a proposed capital expenditure, or series of capital expenditures over a continuous three-year period in the aggregate, of $1,000,000 or more (not including the capital expenditures to be financed pursuant to the plan of capitalization outlined in Section 3.01 hereof);

(ii) the proposed merger or consolidation of the Company with or into another Person;

(iii) the proposed sale of all or substantially all of the assets of the Company;

(iv) the proposed borrowing of money, or incurring a debt, for or on behalf of the Company in excess of $750,000 (not including the debt commitment described in the plan of capitalization outlined in Section 3.01 hereof); or

(v) the proposed dissolution of the Company.

**THC.**

"THC" shall mean Hartford Orthopedic, Plastic & Hand Surgeons, Inc., a Connecticut professional corporation, with an address at 85 Seymour Street, Suite 816, Hartford, Connecticut 06106.

**Transfer.**

"Transfer" means, when used as a noun, any sale, hypothecation, pledge, assignment, attachment, gift, bequest, exchange, conveyance, encumbrance or any other form of disposition, whether voluntary or involuntary, by direct or indirect means, or by merger, consolidation or otherwise, and, when used as a verb, means, to sell, hypothecate, pledge, assign, gift, bequeath, exchange, convey, encumber or otherwise dispose of, whether voluntary or involuntary, by direct or indirect means, or by merger, consolidation or otherwise; provided, however, that "Transfer" shall not include a Transfer by the Class B Member or Class A Member to an Affiliate of the transferor.

**Voluntary Withdrawal.**

"Voluntary Withdrawal" means the disassociation of a Member or an Economic Interest Owner from the Company by means other than by a Transfer or an Involuntary Withdrawal.

## ARTICLE XVII
## MISCELLANEOUS PROVISIONS

**17.01 Power of Attorney.**

(a) Each Member constitutes and appoints each Manager as the Member's true and lawful attorney-in-fact ("Attorney-In-Fact"), and in the Member's name, place and stead, to make, execute, sign, acknowledge, and file or cause to be made, executed, signed, acknowledged and filed:

(i) all documents (including amendments to the Articles of Organization) that the Attorney-In-Fact deems appropriate to reflect any amendment, change, or modification of this Agreement;

(ii) any and all other certificates or other instruments required to be filed by the Company under the laws of the State of Connecticut or of any other state or jurisdiction, including, without limitation, any certificate or other instruments necessary in order for the Company to continue to qualify as a limited liability company under the laws of the State of Connecticut;

(iii) one or more applications to use an assumed name; and

(iv) all documents that may be required to dissolve and terminate the Company and to cancel its Articles of Organization.

(b) The foregoing power of attorney is irrevocable and is coupled with an interest, and to the extent permitted by Applicable Law, shall survive the death, disability or dissolution of a Member. It also shall survive the transfer of a Membership Interest or an Economic Interest, except that if the transferee is approved for admission as a Member, this power of attorney shall survive the delivery of the assignment for the sole purpose of enabling the Attorney-in-Fact to execute, acknowledge, and file any documents needed to effectuate the substitution. Each Member shall be bound by any representations made by the Attorney-in-Fact acting in good faith pursuant to this power of attorney, and each Member hereby waives any and all defenses that may be available to contest, negate, or disaffirm the action of the Attorney-in-Fact taken in good faith under this power of attorney.

**17.02 Notices.**

Any notice, demand, consent, approval, communication or other document required or permitted to be given hereunder shall be in writing and delivered personally or sent by registered or certified mail, postage prepaid, or a nationally recognized overnight delivery service (receipt requested), to the Member's or the Company's address, as appropriate, which is set forth in this Agreement, or to such other address for the party as shall be specified by notice. Any notice that is delivered personally in the manner provided herein shall be deemed to have been duly given to the party to whom it is directed upon actual receipt by such party. Any notice that is addressed and mailed or delivered overnight in the manner herein provided shall be duly given when received by the addressee.

**17.03 Application of Connecticut Law.**

This Agreement and its interpretation shall be governed exclusively by its terms and by the laws of the State of Connecticut (without regard to principles of conflicts of law), and specifically the Act.

**17.04 Jurisdiction and Venue.**

Any suit involving any dispute or matter arising under this Agreement may only be brought in the United States District Court for the District of Connecticut or any Connecticut State Court having jurisdiction over the subject matter of the dispute or matter. All Members and Economic Interest Owners hereby consent to the exercise of personal jurisdiction by any such court with respect to any such proceeding.

**17.05 Amendments.**

(a) This Agreement and the Articles of Organization may be amended upon a unanimous vote of the Class A and B Members or by a written consent signed by all of the Class A and B Members.

(b) This Agreement and the Articles of Organization may be amended upon unanimous vote of the HHC Managers, provided that the HHC Managers have reasonably determined, based on the written advice of counsel, that such amendment or amendments are necessary to prevent the Class B Member from losing its status as a tax-exempt organization under Code Section 501(a) as an organization described in Code Section 501(c)(3).

**17.06 Execution of Additional Instruments.**

Each Member hereby agrees to execute such other and further statements of interest and holdings, designations and other instruments necessary to comply with any Applicable Laws, rules or regulations.

**17.07 Construction.**

When required by the context, the singular number whenever used in this Agreement shall include the plural and vice-versa, and the masculine gender whenever used in this Agreement shall include the feminine and neuter genders and vice-versa.

**17.08 Headings.**

The headings in this Agreement are inserted for convenience only and are in no way intended to describe, interpret, define, or limit the scope, extent or intent of this Agreement or any provision hereof.

**17.09 Waivers.**

The failure of any party to seek redress for default of or to insist upon the strict performance of any covenant or condition of this Agreement shall not prevent a subsequent act, that would have originally constituted a default, from having the effect of an original default.

**17.10 Rights and Remedies Cumulative.**

The rights and remedies provided by this Agreement are cumulative and the use of any one right or remedy by any party shall not preclude or waive the right to use any other remedy. The rights and remedies provided by this Agreement are given in addition to any other legal rights the parties may have.

**17.11 Severability.**

If any provision of this Agreement or the application thereof to any person or circumstance shall be invalid, illegal or unenforceable to any extent, the remainder of this Agreement and the application thereof shall not be affected and shall be enforceable to the fullest extent permitted by law.

### 17.12 Specific Performance.

The parties recognize that irreparable injury will result from a breach of any provision of this Agreement and that money damages will be inadequate to fully remedy the injury. Accordingly, in the event of a breach or threatened breach of one or more of the provisions of this Agreement, any party who may be injured (in addition to any other remedies that may be available to that party) shall be entitled to one or more preliminary or permanent orders (i) restraining and enjoining any act that would constitute a breach or (ii) compelling the performance of any obligation that, if not performed, would constitute a breach.

### 17.13 Successors and Assigns.

The covenants, terms, provisions and agreements herein contained shall be binding upon and inure to the benefit of the parties hereto and to the extent permitted by this Agreement, their respective successors and assigns.

### 17.14 Creditors.

None of the provisions of this Agreement shall be for the benefit of or enforceable by any creditors of the Company.

### 17.15 Dispute Resolution.

(a) Except for actions taken pursuant to Section 4.06(b) or 6.09(a), all disputes, claims, controversies and differences arising out of or relating to this Agreement, or the termination, invalidity or breach hereof, including without limitation any deadlock in a vote of the Members or in a vote of the Managers on the Management Committee, any party may refer the matter by written notice to, and for resolution by, the chief executive officers of the Class A Member and the Class B Member and, only in the event of a dispute unrelated to any deadlock in a vote of the Members or in a vote of the Managers on the Management Committee, one representative designated collectively by the Class C Members. Such individuals shall meet at the principal office of the Company, or at such other location as they may agree, within fourteen (14) days of the notice from the party to negotiate in good faith a resolution of the matter. If within twenty-one (21) days of the written notice from the party the matter still has not been resolved, and such matter involves an Arbitrable Issue, the party may submit the dispute to arbitration pursuant to Section 17.15(b) of this Agreement.

(b)

(i) If an Arbitrable Issue has not been resolved pursuant to the procedures provided for in Section 17.15(a), a party may, by written notice to the other Members, submit the Arbitrable Issue to be determined by arbitration in the City of Hartford, Connecticut, in accordance with the Commercial Arbitration Rules of the American Arbitration Association (except as otherwise specified in this Section 17.15). The dispute shall be determined by one (1) arbitrator acceptable to both parties who shall be selected within fourteen (14) days of receipt of notice of intention to arbitrate by the party receiving that notice. If the receiving party fails to respond to said notice in writing within said fourteen (14) days, then the party providing said notice shall select the arbitrator and the arbitrator selected by the party providing said notice shall be deemed to have been selected by the receiving party. If, by the end of said fourteen (14) day period the parties have not agreed upon one (1) arbitrator as acceptable, then the dispute shall be determined by a panel of three (3) arbitrators selected as follows: Within an additional seven (7) days, each party will appoint one (1) arbitrator. These two (2) arbitrators will then, within an additional seven (7) days, name a third arbitrator. If the two (2) arbitrators are unable to agree upon the choice of a third arbitrator within seven (7) days, either party may request the person or entity administering the arbitration, or, if none, the American Arbitration Association or any other arbitration administering person or entity, to appoint the necessary arbitrator pursuant to the Commercial Arbitration Rules.

(ii) As soon as the arbitrator has been chosen or if three are utilized, the panel has been convened, a hearing date shall be set within thirty (30) days thereafter. Such hearing date shall be subject to the mutual agreement of the parties and the arbitrator(s), but if such agreement cannot be reached, the arbitrator(s) shall have authority to establish such times for hearings as he, she or they deem appropriate. Written submissions shall be presented and exchanged by both parties fifteen (15) days before the hearing date, including reports prepared by any expert upon whom either party intends to rely. At such time the parties shall also exchange copies of all documentary evidence upon which they will rely at the arbitration hearing and a list of the witnesses whom they intend to call to testify at the hearing. Each party shall also make its respective experts available for deposition by the other party prior to the hearing date. The arbitrator(s) shall make his or her award as promptly as practicable after conclusion of the hearing. Arbitrators shall be compensated for their services at the standard hourly rate charged in their private professional activities.

(iii) The parties acknowledge that the United States District Court for the District of Connecticut has jurisdiction over the parties for the purpose of enforcing this Section 17.15. Connecticut rules of civil procedure and evidence shall apply with respect to any arbitration hereunder, including all rules pertaining to discovery and inspection. The award may be made solely on the default of a party. The arbitrator(s) shall follow substantive rules of law. The arbitrator(s) shall make the award in strict conformity with this Agreement and shall have no power to depart from or change any of the provisions hereof. If three arbitrators are used, a decision of any two of them shall be binding. At the request of either party at the start of the arbitration, the award of the arbitrator(s) shall be accompanied by findings of fact and a written statement of reasons for the decision. The arbitrator(s) shall have the discretion to award the costs of arbitration, arbitrators' fees and the respective attorneys' fees of each party between the

parties as they see fit. All parties agree to be bound by the results of this arbitration; judgment upon the award so rendered may be entered and enforced in any court of competent jurisdiction, including the power to require specific performance. To the extent reasonably practicable, both parties agree to continue performing their respective obligations under this Agreement while the dispute is being resolved. All matters relating to any arbitration hereunder shall be maintained in confidence.

(iv) Nothing contained in this Section 17.15 shall prohibit either party from seeking equitable relief without first resorting to arbitration under such circumstances as that party's interests hereunder and in its property will be otherwise compromised.

**17.16 Indemnification.**

(a) Each Member and Economic Interest Owner (each, an "Indemnitor") shall indemnify, hold harmless and defend the Company and each other Member, Economic Interest Owner and their respective directors, officers, employees, representatives and agents (each an "Indemnitee" and collectively, the "lndemnitees"") from and against any Costs incurred by the lndemnitees that arise from or are related to: (i) a violation of the anti-kickback provisions of Applicable Law by the Indemnitor or any of its directors, officers. owners, employees, representatives or agents relating to the Company and/or the Center, and such violation of Applicable Law is not cured by the Indemnitor at its sole cost and expense within sixty (60) days of the notice provided for in the first sentence of Section 17. 16(b); and/or (ii) the enforcement of this indemnity.

(b) To the greatest extent not inconsistent with the laws of Connecticut, the Company shall indemnify any Member made a party to any proceeding because such individual is a Member, against all liability incurred by the Member provided that: (a) the Member acted in good faith; (b) the Member reasonably believed its conduct was not contrary to the Company's best interest; and (c) the Member's conduct was not willful misconduct or knowingly unlawful. A determination of indemnification shall be made by the Board of Managers and indemnification shall include the payment of all damages and reasonable attorney fees incurred in the action. Any Member entitled to indemnification under this Section 17.16(a) shall be referred to as an "Indemnitee" and the Company shall be an "Indemnitor".

(c) If there occurs an event which a party asserts is an indemnifiable event pursuant to this Section 17.16, the parties seeking indemnification shall promptly notify the other parties obligated to provide indemnification (collectively, the "Indemnifying Party"). If such event involves (i) any Claim or (ii) the commencement of any action, suit or proceeding by a third person, the party seeking indemnification will give such Indemnifying Party prompt written notice of such Claim or the commencement of such action, suit or proceeding, provided, however, that the failure to provide prompt notice as provided herein will relieve the Indemnifying Party of its obligations hereunder only to the extent that such failure prejudices the Indemnifying Party hereunder. In case any such action, suit or proceeding shall be brought against any party seeking indemnification and it shall notify the Indemnifying Party of the commencement thereof, the Indemnifying Party shall be entitled to participate therein and, to the extent that it desires to do so, to assume the defense thereof, with counsel reasonably satisfactory

to such party seeking indemnification and, after notice from the Indemnifying Party to such party seeking indemnification of such election so to assume the defense thereof, the Indemnifying Party shall not be liable to the party seeking indemnification hereunder for any attorneys' fees or any other expenses, in each case subsequently incurred by such party, in connection with the defense of such action, suit or proceeding. The party seeking indemnification agrees to cooperate fully with the Indemnifying Party and its counsel in the defense against any such action, suit or proceeding. In any event, the party seeking indemnification shall have the right to participate at its own expense in the defense of such action, suit or proceeding. In no event shall an Indemnifying Party be liable for any settlement or compromise effected without its prior consent. If, however, the party seeking indemnification refuses its consent to a bona fide offer of settlement which the Indemnifying Party wishes to accept (which must include the unconditional release of the parties seeking indemnification from all liability with respect to the Claim at issue), the party seeking indemnification may continue to pursue such matter, free of any participation by the Indemnifying Party, at the sole expense of the party seeking indemnification. In such event, the obligation of the Indemnifying Party to the party seeking indemnification shall be equal to the lesser of (i) the amount of the offer or settlement which the party seeking indemnification refused to accept plus the costs and expenses of such party prior to the date the Indemnifying Party notifies the party seeking indemnification of the offer of settlement and (ii) the actual out-of-pocket amount the party seeking indemnification is obligated to pay as a result of such party's continuing to pursue such matter.

(d) The amount which an Indemnifying Party is required to pay to, for or on behalf of any other party (hereinafter referred to as an "Indemnitee") pursuant to this Section 17.16 shall be adjusted (including, without limitation, retroactively) by any insurance proceeds actually recovered by or on behalf of such Indemnities in reduction of the related indemnifiable loss (the "Indemnifiable Loss"). Amounts required to be paid, as so reduced, are hereafter sometimes called an "Indemnity Payment." If an Indemnitee shall have received or shall have had paid on its behalf an Indemnity Payment in respect of an Indemnifiable Loss and shall subsequently receive insurance proceeds in respect of such Indemnifiable Loss, then the Indemnitee shall pay to the Indemnifying Party the amount of such insurance proceeds or, if less, the amount of the Indemnity Payment.

**17.17 Counterparts.**

This Agreement may be executed in counterparts, each of which shall be deemed an original but all of which shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties hereto have caused their signatures, or the signatures of their duly authorized representatives, to be set forth below on the day and year first above written.

[INSERT SIGNATURE BLOCK BY MEMBERS AND COMPANY]

**EXHIBIT A**
**MEMBERS AND PERCENTAGE INTEREST**

## EXHIBIT B

## MEMBER REPRESENTATIVES AND MANAGEMENT COMMITTEE MEMBERS

**MEMBER REPRESENTATIVES**

**MANAGEMENT COMMITTEE MEMBERS**

**EXHIBIT C**
**INITIAL CAPITAL CONTRIBUTION**

## EXHIBIT D
## CHARITY CARE POLICY

This policy, as amended from time to time, shall apply to the Company's _____ Surgery Center, LLC (the "Center") and shall be enforced by the Management Committee.

1. **Promotion of Health in the Community**. The Center shall be responsible for the holding annually of free health educational programs and seminars as determined by the Management Committee, and will otherwise promote the health of the community served by the Center.

2. **Medicare and Medicaid Patients**. The Center shall accept patients covered by Medicare and Medicaid.

3. **Charity Care**. In accordance with a policy adopted by both the HHC Managers (by majority vote) and the Class A Managers on the Company's Management Committee, the Center shall provide free or reduced charge health care services to the poor or indigent, based on ability to pay. Charity care for this purpose shall not include contractual allowances. Ability to pay shall be determined on the basis of the patient's income relative to the federal poverty level, his or her net assets, and any other hardship factors.

4. **Debt Collection**. While the Center may institute collection proceedings against those who appear able to pay, it shall not be the primary moving party to foreclose a security interest in a patient's primary residence in collection of the debt.

5. **Administration**. The Center shall assure that there are adequate notices on premises about the availability of charity care. Billing and admissions staff shall be trained in the application process and in the overall Charity Care Policy.

6. **Reports**. The Medical Director shall cause a report detailing compliance with this Charity Care Policy to be prepared and submitted for the review of the Management Committee of the Company each calendar quarter during the term of this Operating Agreement. The Management Committee shall cause the Medical Director to take prompt action to require compliance with this Charity Care Policy should the aforementioned reports evidence noncompliance, in whole or in part, with this policy.

SECRETARY OF THE STATE
30 TRINITY STREET
P.O. BOX 150470
HARTFORD, CT 06115-0470

APRIL 4,2013

PATRICIA B. CHOUINARD
SHIPMAN & GOODWIN
ONE CONSTITUTION PLAZA
HARTFORD, CT 06103-1919

RE: Acceptance of Business Filing

This letter is to confirm the acceptance of the following business filing:

Business Name:
HHC HARTFORD SURGERY CENTER, LLC

Work Order Number: 2013096457-002
Business Filing Number: 0004833386
Type of Request: ARTICLES OF ORGANIZATION
File Date/Time: APR 03 2013 01:00 PM
Effective Date/Time:
Work Order Payment Received: 340.00
Payment Received: 170.00
Credit on Account: 652.39
Customer Id: 000000419
Business Id: 1101640

FRANK GOULD
Commercial Recording Division
860-509-6003
WWW.CONCORD.SOTS.CT.GOV

BUSINESS FILING REPORT

WORK ORDER NUMBER:2013096457-002
BUSINESS FILING NUMBER: 0004833386

BUSINESS NAME:

HHC HARTFORD SURGERY CENTER, LLC

BUSINESS LOCATION:

80 SEYMOUR ST.
HARTFORD,CT 06102

MEMBER INFORMATION FOR ONE MEMBER:

NAME:HARTFORD HOSPITAL
TITLE:MEMBER

** END OF REPORT **

# ARTICLES OF ORGANIZATION
# of
# HHC HARTFORD SURGERY CENTER, LLC

The undersigned hereby forms a limited liability company under the Connecticut Limited Liability Company Act, and states as follows.

**FIRST:** The name of the limited liability company is **HHC Hartford Surgery Center, LLC** (the "Company").

**SECOND:** The purposes to be promoted or carried out by the Company shall be to engage in any lawful act or activity for which limited liability companies may be formed under the Connecticut Limited Liability Company Act, as amended from time to time.

**THIRD:** The principal office of the Company shall be at 80 Seymour Street, Hartford, Connecticut 06102.

**FOURTH:** The Statutory Agent for Service for the Company shall be Winship Service Corporation, with an address in c/o Shipman & Goodwin LLP, One Constitution Plaza, Hartford, Connecticut 06103-1919.

**FIFTH:** The Company shall be managed by a Manager or Managers.

**SIXTH:** The name and business address of a Member of the Company is:

| Name | Business Address |
|---|---|
| Hartford Hospital | 80 Seymour Street<br>P.O. Box 5037<br>Hartford, CT 06102-5037 |

I declare, under penalties of false statement, that the statements made in these Articles of Organization are true.

Dated: April 3, 2013

Organizer of the Limited Liability Company:

Vincenzo Carannante, Organizer

Acceptance of Designation as Statutory Agent for Service

The foregoing designation as Statutory Agent for Service is hereby accepted:

WINSHIP SERVICE CORPORATION

By: _____
Patricia B. Chouinard, Its Secretary

2744942v1

**Advisory Board**
**Orthopedic Service Line Forecast**
**Hartford Hospital Primary Servic Area**

**Summary of Hartford PSA Orthopedic OR Case Volumes**

| Hartford PSA | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
|---|---|---|---|---|---|
| Outpatient[1] | 18,539 | 20,079 | 22,794 | **8%** | **23%** |
| Inpatient[2] | 8,952 | 9,058 | 9,511 | **1%** | **6%** |
| **Total** | **27,491** | **29,137** | **32,305** | **6%** | **18%** |

1. Outpatient data from the Advisory Board Outpatient Market Estimator for the Hartford PSA. Orthopedic procedure descriptions were reviewed by four consultants to identify those procedures that are generally performed in an operating room. All other procedures were excluded.

2. Inpatient data from the Advisory Board Inpatient Market Estimator for the Hartford PSA. Data represent the number of projected admissions for the orthopedic service line. The analysis assumes 1 operating room case per surgical admission which may understate volumes slightly.

**Summary of Hartford PSA Total OR Case Volumes**

| Hartford PSA | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
|---|---|---|---|---|---|
| Outpatient[1] | 130,226 | 141,224 | 159,736 | **8%** | **23%** |
| Inpatient[2] | 32,723 | 32,465 | 32,934 | **-1%** | **1%** |
| **Total** | **162,949** | **173,689** | **192,670** | **7%** | **18%** |

1. Outpatient data from the Advisory Board Outpatient Market Estimator for the Hartford PSA. Procedure descriptions were reviewed by four consultants to identify those procedures that are generally performed in an operating room. All other procedures were excluded.

2. Inpatient data from the Advisory Board Inpatient Market Estimator for the Hartford PSA. Data represent the number of projected admissions for surgical service lines. The analysis assumes 1 operating room case per surgical admission which may understate volumes slightly.

The Advisory Board Company | Health Care Advisory Board
Outpatient Market Estimator

**Brief Description**

Welcome to the Innovations Center Outpatient Market Estimator. Developed by the Advisory Board's Data & Analytics Group, this model generates current and forecasted outpatient volume estimates for any geography within the United States. Users can select any set of counties or zip codes and view market estimates for service lines, sub-service lines or individual services/procedures. The tool has been further enhanced to allow users to view estimates and forecasts for all patients within their market or to focus the results on local pediatric or adult populations. For more information, please contact the Data and Analytics Group at Analytics@advisory.com

**select which level you would like to view your customized service or**

Service Line | Sub Service Line | Procedure Group | rms and Conditio

**Session Name**

HartfordZipCodesV2

**Session Description**

**LOCALES SELECTED**

06099|Connecticut|
06074|Connecticut|
06114|Connecticut|
06067|Connecticut|
06068|Connecticut|
06081|Connecticut|
06019|Connecticut|
06450|Connecticut|
06029|Connecticut|
06096|Connecticut|
06117|Connecticut|
06037|Connecticut|
06052|Connecticut|
06107|Connecticut|
06042|Connecticut|
06082|Connecticut|
06095|Connecticut|
06095|Connecticut|
06082|Connecticut|
06106|Connecticut|
06109|Connecticut|
06066|Connecticut|
06111|Connecticut|
06099|Connecticut|
06085|Connecticut|
06453|Connecticut|
06088|Connecticut|
06089|Connecticut|
06059|Connecticut|
06457|Connecticut|
06112|Connecticut|
06040|Connecticut|
06090|Connecticut|
06479|Connecticut|
06084|Connecticut|
06049|Connecticut|
06119|Connecticut|
06092|Connecticut|
06018|Connecticut|
06103|Connecticut|
06105|Connecticut|
06079|Connecticut|
06026|Connecticut|
06118|Connecticut|
06016|Connecticut|
06062|Connecticut|
06029|Connecticut|
06078|Connecticut|
06416|Connecticut|
06078|Connecticut|
06108|Connecticut|
06451|Connecticut|
06051|Connecticut|
06120|Connecticut|
06488|Connecticut|
06022|Connecticut|
06092|Connecticut|
06118|Connecticut|
06489|Connecticut|

**DEMOGRAPHICS SELECTED**

0 - 4 years old
5 - 9 years old
10 - 14 years old
15 - 19 years old
20 - 24 years old
25 - 29 years old
30 - 34 years old
35 - 39 years old
40 - 44 years old
45 - 49 years old
50 - 54 years old
55 - 59 years old
60 - 64 years old
65 - 69 years old
70 - 74 years old
75 - 79 years old
80 - 84 years old
85- years old
Female
Male

| Service Line | Sub Service Line | OPG Description | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth | 2012 HOPD Volume | 2017 HOPD Volume | 2022 HOPD Volume | 5YR Growth | 10YR Growth | Procedure Location | OR Case Volumes 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cardiology | Cardiac Cath | Concomitant Diagnostic Coronary and Peripheral Catheterization | 139 | 134 | 135 | -3% | -3% | 115 | 108 | 108 | -5% | -6% | Cath Lab | | | | | |
| Cardiology | Cardiac Cath | Diagnostic Cardiac Catheterization | 3,774 | 3,243 | 2,693 | -14% | -29% | 3,048 | 2,531 | 2,051 | -17% | -33% | Cath Lab | | | | | |
| Cardiology | Cardiac Cath | Heart Biopsy | 77 | 80 | 83 | 4% | 7% | 77 | 80 | 83 | 4% | 7% | Cath Lab | | | | | |
| Cardiology | Cardiac Cath | Intracoronary Brachytherapy | 4 | 0 | 0 | -100% | -100% | 4 | 0 | 0 | -100% | -100% | Cath Lab | | | | | |
| Cardiology | Cardiac Cath | Intravascular Coronary Ultrasound | 48 | 68 | 85 | 42% | 77% | 48 | 68 | 84 | 41% | 74% | Cath Lab | | | | | |
| Cardiology | Cardiac Cath | Other Diagnostic Cardiac Catheterization | 79 | 86 | 99 | 9% | 26% | 39 | 43 | 50 | 9% | 26% | Cath Lab | | | | | |
| Cardiology | Cardiac Cath | Other Transcatheter Cardiac Procedure | 27 | 29 | 33 | 8% | 23% | 0 | 0 | 0 | 8% | 23% | Cath Lab | | | | | |
| Cardiology | Cardiac Cath | Percutaneous Transluminal Balloon Valvuloplasty (Aortic Valve) | 1 | 2 | 3 | 39% | 99% | 1 | 2 | 3 | 39% | 99% | Cath Lab | | | | | |
| Cardiology | Cardiac Cath | Percutaneous Transluminal Balloon Valvuloplasty (Mitral Valve) | 0 | 0 | 1 | 44% | 105% | 0 | 0 | 1 | 44% | 105% | Cath Lab | | | | | |
| Cardiology | Cardiac Cath | Percutaneous Transluminal Balloon Valvuloplasty (Pulmonary Valve) | 3 | 4 | 5 | 33% | 79% | 3 | 4 | 5 | 33% | 79% | Cath Lab | | | | | |
| Cardiology | Cardiac Cath | Percutaneous Transluminal Coronary Artery Angioplasty | 128 | 126 | 131 | -1% | 2% | 126 | 121 | 122 | -4% | -3% | Cath Lab | | | | | |
| Cardiology | Cardiac Cath | Percutaneous Transluminal Coronary Artery Atherectomy | 8 | 8 | 8 | 0% | 2% | 8 | 8 | 8 | 0% | 0% | Cath Lab | | | | | |
| Cardiology | Cardiac Cath | Percutaneous Transluminal Coronary Artery Stent Placement | 799 | 789 | 798 | -1% | 0% | 787 | 758 | 744 | -4% | -5% | Cath Lab | | | | | |
| Cardiology | Cardiac Cath | Percutaneous Transluminal Coronary Thrombectomy | 4 | 4 | 4 | 6% | 7% | 4 | 4 | 4 | 4% | 3% | Cath Lab | | | | | |
| Cardiology | Cardiac Cath | Pericardial Procedures | 7 | 7 | 7 | -5% | -2% | 7 | 7 | 7 | -5% | -2% | Cath Lab | | | | | |
| Cardiology | Cardiac Cath | Transcatheter Coronary Thrombolysis | 7 | 6 | 4 | -25% | -42% | 7 | 6 | 4 | -25% | -42% | Cath Lab | | | | | |
| Cardiology | Electrophysiology | Cardiac Event Recorder Implant | 23 | 30 | 39 | 27% | 65% | 23 | 28 | 36 | 24% | 61% | Cath Lab | | | | | |
| Cardiology | Electrophysiology | Cardiac Event Recorder Removal | 16 | 20 | 26 | 26% | 66% | 15 | 18 | 24 | 24% | 62% | Cath Lab | | | | | |
| Cardiology | Electrophysiology | Electronic Evaluation Of Cardiac Event Recorder | 185 | 289 | 453 | 56% | 144% | 25 | 38 | 59 | 50% | 135% | Cath Lab | | | | | |
| Cardiology | Electrophysiology | Electronic Evaluation Of ICD | 5,683 | 6,721 | 7,881 | 18% | 39% | 1,037 | 1,144 | 1,269 | 10% | 22% | Cath Lab | | | | | |
| Cardiology | Electrophysiology | Electronic Evaluation Of Pacemaker | 11,931 | 13,402 | 14,165 | 12% | 19% | 2,177 | 2,282 | 2,280 | 5% | 5% | Cath Lab | | | | | |
| Cardiology | Electrophysiology | Electrophysiology Study | 53 | 58 | 66 | 11% | 25% | 52 | 57 | 63 | 10% | 22% | Cath Lab | | | | | |
| Cardiology | Electrophysiology | Heart Electrode Procedure | 31 | 34 | 39 | 10% | 27% | 30 | 33 | 38 | 9% | 25% | Cath Lab | | | | | |
| Cardiology | Electrophysiology | ICD Implant | 381 | 418 | 467 | 10% | 23% | 372 | 397 | 431 | 7% | 16% | Cath Lab | | | | | |
| Cardiology | Electrophysiology | ICD Removal | 4 | 5 | 6 | 16% | 33% | 4 | 5 | 6 | 16% | 33% | Cath Lab | | | | | |
| Cardiology | Electrophysiology | Intracardiac Catheter Ablation | 230 | 272 | 309 | 18% | 35% | 225 | 266 | 302 | 18% | 35% | Cath Lab | | | | | |
| Cardiology | Electrophysiology | Intracardiac Echocardiography | 9 | 21 | 36 | 147% | 321% | 8 | 20 | 33 | 140% | 297% | Cath Lab | | | | | |
| Cardiology | Electrophysiology | Intracardiac Pacing | 7 | 7 | 9 | 13% | 37% | 6 | 7 | 8 | 13% | 36% | Cath Lab | | | | | |
| Cardiology | Electrophysiology | Other Electrophysiology Procedure | 99 | 113 | 127 | 15% | 28% | 15 | 17 | 19 | 15% | 28% | | | | | | |
| Cardiology | Electrophysiology | Pacemaker Implant | 539 | 542 | 573 | 0% | 6% | 512 | 499 | 517 | -3% | 1% | Cath Lab | | | | | |
| Cardiology | Electrophysiology | Pacemaker Removal | 10 | 13 | 17 | 28% | 70% | 10 | 12 | 16 | 27% | 70% | Cath Lab | | | | | |
| Cardiology | Electrophysiology | Tilt Table Test | 181 | 186 | 193 | 3% | 7% | 129 | 120 | 112 | -7% | -13% | | | | | | |
| Cardiology | Medical Cardiology | Ambulatory Blood Pressure Monitoring | 269 | 279 | 291 | 4% | 8% | 14 | 14 | 15 | -1% | 3% | | | | | | |
| Cardiology | Medical Cardiology | Audioelectric Cardiography | 2 | 3 | 5 | 92% | 224% | 0 | 1 | 1 | 92% | 224% | | | | | | |
| Cardiology | Medical Cardiology | Cardiac Rehabilitation | 12,474 | 13,130 | 13,654 | 5% | 9% | 6,237 | 6,565 | 6,827 | 5% | 9% | | | | | | |
| Cardiology | Medical Cardiology | Cardiopulmonary Resuscitation | 234 | 250 | 275 | 7% | 18% | 227 | 240 | 262 | 6% | 16% | | | | | | |
| Cardiology | Medical Cardiology | Cardiovascular Stress Test | 22,893 | 23,958 | 24,843 | 5% | 9% | 5,551 | 5,517 | 5,489 | -1% | -1% | | | | | | |
| Cardiology | Medical Cardiology | Cardioversion | 399 | 464 | 535 | 16% | 34% | 375 | 432 | 493 | 15% | 31% | Cath Lab | | | | | |
| Cardiology | Medical Cardiology | Electrocardiogram | 165,506 | 177,860 | 197,317 | 7% | 19% | 56,693 | 60,473 | 67,088 | 7% | 18% | | | | | | |
| Cardiology | Medical Cardiology | Electrocardiogram Monitoring | 6,889 | 7,158 | 7,343 | 4% | 7% | 1,653 | 1,718 | 1,762 | 4% | 7% | | | | | | |
| Cardiology | Medical Cardiology | External Circulatory Assist | 1,794 | 1,931 | 2,057 | 8% | 15% | 36 | 39 | 41 | 8% | 15% | | | | | | |
| Cardiology | Medical Cardiology | Other Medical Cardiology Diagnostic | 2,051 | 1,478 | 1,140 | -28% | -44% | 41 | 30 | 23 | -28% | -44% | | | | | | |
| Cardiology | Medical Cardiology | Other Medical Cardiology Procedure | 249 | 275 | 304 | 10% | 22% | 25 | 27 | 30 | 10% | 22% | | | | | | |
| Cardiology | Medical Cardiology | Other Non-Invasive Cardiac Study | 1 | 1 | 1 | 8% | 21% | 0 | 0 | 0 | 8% | 21% | | | | | | |
| Cardiology | Medical Cardiology | Transesophageal Echocardiography | 543 | 606 | 683 | 12% | 26% | 503 | 551 | 609 | 10% | 21% | | | | | | |
| Cardiology | Medical Cardiology | Transthoracic Echocardiography | 51,113 | 54,628 | 58,645 | 7% | 15% | 11,883 | 12,034 | 12,370 | 1% | 4% | | | | | | |
| Cosmetic Procedure | Breast Procedures | Breast Augmentation With Implant | 1,281 | 1,497 | 1,739 | 17% | 36% | 163 | 150 | 131 | -8% | -19% | OR | 1281 | 1497 | 1739 | 0.17 | 0.36 |
| Cosmetic Procedure | Breast Procedures | Breast Augmentation Without Implant | 32 | 35 | 36 | 8% | 13% | 4 | 3 | 3 | -15% | -33% | OR | 32 | 35 | 36 | 0.08 | 0.13 |
| Cosmetic Procedure | Breast Procedures | Breast Implant Preparation | 12 | 15 | 19 | 23% | 51% | 0 | 0 | 0 | 0% | 0% | OR | 12 | 15 | 19 | 0.23 | 0.51 |
| Cosmetic Procedure | Breast Procedures | Breast Implant Removal | 90 | 91 | 90 | 1% | 0% | 55 | 55 | 54 | -1% | -2% | OR | 90 | 91 | 90 | 0.01 | 0 |
| Cosmetic Procedure | Breast Procedures | Breast Lift (Mastopexy) | 528 | 786 | 1,145 | 49% | 117% | 324 | 471 | 687 | 46% | 112% | OR | 528 | 786 | 1145 | 0.49 | 1.17 |
| Cosmetic Procedure | Breast Procedures | Breast Reduction | 501 | 497 | 491 | -1% | -2% | 304 | 298 | 295 | -2% | -3% | OR | 501 | 497 | 491 | -0.01 | -0.02 |
| Cosmetic Procedure | Facial Procedures | Blepharoplasty - Lower Eyelid | 31 | 35 | 39 | 12% | 23% | 1 | 1 | 2 | 6% | 16% | OR | 31 | 35 | 39 | 0.12 | 0.23 |
| Cosmetic Procedure | Facial Procedures | Blepharoplasty - Upper Eyelid | 856 | 988 | 1,129 | 15% | 32% | 36 | 40 | 45 | 9% | 24% | OR | 856 | 988 | 1129 | 0.15 | 0.32 |
| Cosmetic Procedure | Facial Procedures | Facial Bone Augmentation | 59 | 62 | 64 | 5% | 9% | 2 | 2 | 3 | -1% | 2% | OR | 59 | 62 | 64 | 0.05 | 0.09 |
| Cosmetic Procedure | Facial Procedures | Facial Bone Reduction | 14 | 15 | 16 | 6% | 11% | 1 | 1 | 1 | -2% | 3% | OR | 14 | 15 | 16 | 0.06 | 0.11 |
| Cosmetic Procedure | Facial Procedures | Forehead Reduction | 152 | 156 | 166 | 3% | 9% | 6 | 6 | 7 | -4% | 2% | OR | 152 | 156 | 166 | 0.03 | 0.09 |
| Cosmetic Procedure | Facial Procedures | Rhinoplasty | 488 | 504 | 515 | 3% | 5% | 21 | 20 | 21 | -3% | -1% | OR | 488 | 504 | 515 | 0.03 | 0.05 |
| Cosmetic Procedure | Facial Procedures | Rhytidectomy | 421 | 467 | 496 | 11% | 18% | 18 | 19 | 20 | 4% | 11% | OR | 421 | 467 | 496 | 0.11 | 0.18 |
| Cosmetic Procedure | Fat Removal | Lipectomy | 917 | 962 | 1,016 | 5% | 11% | 247 | 231 | 217 | -6% | -12% | OR | 917 | 962 | 1016 | 0.05 | 0.11 |
| Cosmetic Procedure | Fat Removal | Liposuction | 256 | 266 | 277 | 4% | 8% | 69 | 64 | 59 | -8% | -14% | OR | 256 | 266 | 277 | 0.04 | 0.08 |
| Cosmetic Procedure | Nonsurgical Procedures | Chemical Peel | 3,770 | 4,114 | 4,476 | 9% | 19% | 0 | 0 | 0 | 0% | 0% | | | | | | |
| Cosmetic Procedure | Nonsurgical Procedures | Dermabrasion | 267 | 298 | 333 | 12% | 25% | 34 | 30 | 25 | -12% | -26% | | | | | | |
| Cosmetic Procedure | Nonsurgical Procedures | Electrolysis/Laser Hair Removal | 4,160 | 4,186 | 4,251 | 1% | 2% | 83 | 84 | 85 | 1% | 2% | | | | | | |
| Cosmetic Procedure | Nonsurgical Procedures | Injection - Filling Material (ex. Collagen) | 6,401 | 7,766 | 9,378 | 21% | 47% | 0 | 0 | 0 | 0% | 0% | | | | | | |
| Cosmetic Procedure | Nonsurgical Procedures | Salabrasion (Tattoo Removal) | 357 | 422 | 481 | 18% | 35% | 0 | 0 | 0 | 0% | 0% | | | | | | |
| Cosmetic Procedure | Other Cosmetic Procedures | Hair Transplantation/Analysis | 73 | 80 | 87 | 9% | 20% | 7 | 8 | 9 | 9% | 20% | | | | | | |
| Cosmetic Procedure | Other Cosmetic Procedures | Muscle/Skin Flap | 59 | 72 | 88 | 22% | 49% | 27 | 33 | 40 | 22% | 49% | OR | 59 | 72 | 88 | 0.22 | 0.49 |
| Cosmetic Procedure | Other Cosmetic Procedures | Skin Flap | 81 | 97 | 118 | 21% | 46% | 37 | 45 | 54 | 21% | 46% | OR | 81 | 97 | 118 | 0.21 | 0.46 |
| Cosmetic Procedure | Other Cosmetic Procedures | Tissue Expander Procedures - Skin | 31 | 35 | 41 | 16% | 33% | 18 | 21 | 24 | 16% | 33% | | | | | | |
| Dermatology | Acne & Warts | Acne Surgery | 4,110 | 3,765 | 3,418 | -8% | -17% | 41 | 38 | 34 | -8% | -17% | | | | | | |
| Dermatology | Acne & Warts | Chemical Exfoliation - Acne | 139 | 134 | 129 | -4% | -7% | 0 | 0 | 0 | 0% | 0% | | | | | | |
| Dermatology | Acne & Warts | Cryotherapy - Acne | 466 | 434 | 402 | -7% | -14% | 5 | 4 | 4 | -7% | -14% | | | | | | |
| Dermatology | Acne & Warts | Wart Destruction | 3,870 | 3,800 | 3,744 | -2% | -3% | 77 | 76 | 75 | -2% | -3% | | | | | | |
| Dermatology | Eczema & Psoriasis | Actinotherapy (UV Therapy) - Eczema/Psoriasis | 776 | 705 | 641 | -9% | -17% | 23 | 21 | 19 | -9% | -17% | | | | | | |
| Dermatology | Eczema & Psoriasis | Debridement - Eczema/Psoriasis | 1,203 | 1,185 | 1,170 | -1% | -3% | 36 | 36 | 35 | -1% | -3% | | | | | | |
| Dermatology | Eczema & Psoriasis | Laser Treatment - Eczema/Psoriasis | 103 | 155 | 214 | 50% | 107% | 4 | 6 | 9 | 50% | 107% | | | | | | |
| Dermatology | Eczema & Psoriasis | Photochemotherapy - Eczema/Psoriasis | 4,515 | 4,171 | 3,801 | -8% | -16% | 90 | 83 | 76 | -8% | -16% | | | | | | |
| Dermatology | Other Dermatology Procedures | Foreign Body Removal - Skin | 1,226 | 1,233 | 1,264 | 1% | 3% | 306 | 308 | 316 | 1% | 3% | | | | | | |

| Service Line | Sub Service Line | OPG Description | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth | 2012 HOPD Volume | 2017 HOPD Volume | 2022 HOPD Volume | 5YR Growth | 10YR Growth | Procedure Location | OR Case Volumes 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dermatology | Other Dermatology Procedures | Other Procedures - Skin | 143 | 144 | 147 | 0% | 3% | 14 | 14 | 15 | 0% | 3% | | | | | | |
| Dermatology | Other Dermatology Procedures | Tattooing for Coloration Defect | 47 | 46 | 45 | -2% | -3% | 6 | 5 | 5 | -2% | -3% | | | | | | |
| Dermatology | Other Skin Lesions | Benign Lesion Destruction - Skin | 59,902 | 65,106 | 72,794 | 9% | 22% | 1,198 | 1,302 | 1,456 | 9% | 22% | | | | | | |
| Dermatology | Other Skin Lesions | Benign Lesion Excision - Skin | 13,733 | 14,574 | 15,858 | 6% | 15% | 1,236 | 1,312 | 1,427 | 6% | 15% | | | | | | |
| Dermatology | Other Skin Lesions | Benign Lesion Incision/Drainage - Skin | 10,107 | 10,375 | 10,961 | 3% | 8% | 1,011 | 1,038 | 1,096 | 3% | 8% | | | | | | |
| Dermatology | Other Skin Lesions | Intralesional Injection - Skin | 4,429 | 4,418 | 4,508 | 0% | 2% | 89 | 88 | 90 | 0% | 2% | | | | | | |
| Dermatology | Other Skin Lesions | Lesion Shaving - Skin | 6,405 | 6,542 | 6,862 | 2% | 7% | 64 | 65 | 69 | 2% | 7% | | | | | | |
| Dermatology | Other Skin Lesions | Skin Tag Removal | 2,555 | 2,564 | 2,617 | 0% | 2% | 51 | 51 | 52 | 0% | 2% | | | | | | |
| Dermatology | Skin Cancer | Biopsy - Lip | 186 | 212 | 249 | 14% | 34% | 4 | 4 | 5 | 14% | 34% | | | | | | |
| Dermatology | Skin Cancer | Biopsy - Skin | 24,459 | 27,949 | 32,983 | 14% | 35% | 489 | 559 | 660 | 14% | 35% | | | | | | |
| Dermatology | Skin Cancer | Malignant Lesion Destruction - Skin | 5,658 | 7,256 | 9,707 | 28% | 72% | 170 | 218 | 291 | 28% | 72% | | | | | | |
| Dermatology | Skin Cancer | Malignant Lesion Excision - Skin | 6,120 | 7,142 | 8,652 | 17% | 41% | 857 | 1,000 | 1,211 | 17% | 41% | | | | | | |
| Dermatology | Skin Cancer | Mohs Surgery | 3,459 | 5,128 | 7,833 | 48% | 126% | 104 | 154 | 235 | 48% | 126% | | | | | | |
| Dermatology | Skin Cancer | Photodynamic Therapy (PDT) | 25 | 26 | 29 | 7% | 19% | 2 | 2 | 2 | 7% | 19% | | | | | | |
| Dermatology | Skin Cancer | Whole Body Photography | 1 | 1 | 2 | 19% | 47% | 0 | 0 | 0 | 20% | 48% | | | | | | |
| Dermatology | Skin Grafts and Transfers | Allograft - Skin | 33 | 40 | 50 | 21% | 49% | 19 | 23 | 28 | 21% | 49% | | | | | | |
| Dermatology | Skin Grafts and Transfers | Bilaminate Skin Graft | 189 | 229 | 282 | 21% | 50% | 117 | 142 | 175 | 21% | 50% | OR | 189 | 229 | 282 | 0.21 | 0.5 |
| Dermatology | Skin Grafts and Transfers | Composite Graft | 7 | 8 | 10 | 20% | 51% | 4 | 5 | 7 | 20% | 51% | OR | 7 | 8 | 10 | 0.2 | 0.51 |
| Dermatology | Skin Grafts and Transfers | Derma-Fat-Fascia Graft | 6 | 7 | 8 | 17% | 39% | 4 | 4 | 5 | 17% | 39% | OR | 6 | 7 | 8 | 0.17 | 0.39 |
| Dermatology | Skin Grafts and Transfers | Full Thickness Skin Graft | 196 | 238 | 300 | 22% | 53% | 65 | 79 | 99 | 22% | 53% | OR | 196 | 238 | 300 | 0.22 | 0.53 |
| Dermatology | Skin Grafts and Transfers | Other Grafts | 1 | 1 | 2 | 20% | 51% | 1 | 1 | 1 | 20% | 51% | | | | | | |
| Dermatology | Skin Grafts and Transfers | Pinch Graft | 8 | 10 | 13 | 21% | 52% | 4 | 4 | 5 | 21% | 52% | | | | | | |
| Dermatology | Skin Grafts and Transfers | Skin Graft Preparation | 46 | 56 | 69 | 22% | 50% | 17 | 20 | 25 | 22% | 50% | OR | 46 | 56 | 69 | 0.22 | 0.5 |
| Dermatology | Skin Grafts and Transfers | Split Graft | 112 | 136 | 171 | 22% | 52% | 77 | 94 | 118 | 22% | 52% | OR | 112 | 136 | 171 | 0.22 | 0.52 |
| Dermatology | Skin Grafts and Transfers | Tissue Transfer | 1,500 | 1,811 | 2,257 | 21% | 50% | 420 | 507 | 632 | 21% | 50% | OR | 1500 | 1811 | 2257 | 0.21 | 0.5 |
| Dermatology | Skin Grafts and Transfers | Xenograft - Skin | 136 | 166 | 206 | 22% | 51% | 53 | 65 | 80 | 22% | 51% | | | | | | |
| Endocrinology | Diabetes Management | Diabetes Management Training | 1,925 | 2,389 | 3,035 | 24% | 58% | 750 | 814 | 900 | 9% | 20% | | | | | | |
| Endocrinology | Diabetes Management | Glucose Monitoring | 52 | 63 | 79 | 22% | 52% | 3 | 4 | 5 | 22% | 52% | | | | | | |
| ENT | Endocrine (Thyroid/Parathyroid/Thymus) Procedures | Biopsy - Percutaneous - Thyroid | 325 | 330 | 345 | 2% | 6% | 147 | 132 | 123 | -10% | -16% | OR | 325 | 330 | 345 | 0.02 | 0.06 |
| ENT | Endocrine (Thyroid/Parathyroid/Thymus) Procedures | Lesion Aspiration/Injection - Thyroid | 102 | 105 | 112 | 4% | 10% | 12 | 8 | 6 | -31% | -54% | OR | 102 | 105 | 112 | 0.04 | 0.1 |
| ENT | Endocrine (Thyroid/Parathyroid/Thymus) Procedures | Lesion Excision - Thyroid | 25 | 26 | 27 | 2% | 8% | 19 | 18 | 18 | -6% | -7% | OR | 25 | 26 | 27 | 0.02 | 0.08 |
| ENT | Endocrine (Thyroid/Parathyroid/Thymus) Procedures | Other Procedures - Endocrine System | 2 | 2 | 2 | 2% | 6% | 1 | 1 | 1 | -4% | -7% | OR | 2 | 2 | 2 | 0.02 | 0.06 |
| ENT | Endocrine (Thyroid/Parathyroid/Thymus) Procedures | Parathyroid Autotransplantation | 10 | 15 | 23 | 52% | 137% | 9 | 14 | 21 | 46% | 121% | OR | 10 | 15 | 23 | 0.52 | 1.37 |
| ENT | Endocrine (Thyroid/Parathyroid/Thymus) Procedures | Removal/Exploration - Parathyroid | 100 | 159 | 257 | 59% | 157% | 96 | 147 | 230 | 53% | 140% | OR | 100 | 159 | 257 | 0.59 | 1.57 |
| ENT | Endocrine (Thyroid/Parathyroid/Thymus) Procedures | Thyroidectomy | 265 | 408 | 645 | 54% | 143% | 253 | 376 | 576 | 48% | 127% | OR | 265 | 408 | 645 | 0.54 | 1.43 |
| ENT | Endoscopic Nasal/Sinus Procedures | Endoscopic Sinus Surgery - Diagnostic | 188 | 199 | 215 | 5% | 15% | 125 | 125 | 130 | 0% | 4% | OR | 188 | 199 | 215 | 0.05 | 0.15 |
| ENT | Endoscopic Nasal/Sinus Procedures | Endoscopic Sinus Surgery - Procedural | 2,627 | 2,743 | 2,947 | 4% | 12% | 1,740 | 1,730 | 1,776 | -1% | 2% | OR | 2627 | 2743 | 2947 | 0.04 | 0.12 |
| ENT | Endoscopic Nasal/Sinus Procedures | Nasal Endoscopy - Diagnostic | 4,037 | 4,292 | 4,701 | 6% | 16% | 605 | 644 | 705 | 6% | 16% | OR | 4037 | 4292 | 4701 | 0.06 | 0.16 |
| ENT | Endoscopic Nasal/Sinus Procedures | Nasal/Sinus Endoscopy - Other Procedures | 192 | 207 | 231 | 8% | 20% | 77 | 83 | 93 | 8% | 20% | OR | 192 | 207 | 231 | 0.08 | 0.2 |
| ENT | External Ear Procedures | Biopsy - External Ear | 139 | 162 | 196 | 17% | 41% | 6 | 6 | 8 | 17% | 41% | OR | 139 | 162 | 196 | 0.17 | 0.41 |
| ENT | External Ear Procedures | Debridement - Mastoid Cavity | 443 | 463 | 502 | 4% | 13% | 18 | 19 | 20 | 4% | 13% | OR | 443 | 463 | 502 | 0.04 | 0.13 |
| ENT | External Ear Procedures | Ear Removal/Reattachment | 31 | 33 | 36 | 4% | 13% | 27 | 28 | 30 | 4% | 13% | OR | 31 | 33 | 36 | 0.04 | 0.13 |
| ENT | External Ear Procedures | Ear Wax Removal | 13,087 | 14,262 | 16,123 | 9% | 23% | 393 | 428 | 484 | 9% | 23% | OR/DO | | | | | |
| ENT | External Ear Procedures | Foreign Body Removal - Auditory Canal | 515 | 521 | 550 | 1% | 7% | 87 | 73 | 63 | -16% | -28% | OR | 515 | 521 | 550 | 0.01 | 0.07 |
| ENT | External Ear Procedures | Lesion Drainage/Excision - External Ear | 108 | 109 | 114 | 1% | 5% | 21 | 18 | 15 | -15% | -26% | OR | 108 | 109 | 114 | 0.01 | 0.05 |
| ENT | External Ear Procedures | Other Procedures - External Ear | 30 | 30 | 31 | -1% | 4% | 5 | 4 | 3 | -20% | -34% | OR | 30 | 30 | 31 | -0.01 | 0.04 |
| ENT | External Ear Procedures | Reconstruction - Auditory Canal | 19 | 19 | 20 | 2% | 8% | 14 | 13 | 13 | -4% | -6% | OR | 19 | 19 | 20 | 0.02 | 0.08 |
| ENT | Hearing/Speech Aid Services | Cochlear Implant Analysis/Programming | 77 | 92 | 112 | 19% | 45% | 9 | 10 | 12 | 19% | 45% | DO | | | | | |
| ENT | Hearing/Speech Aid Services | Hearing/Speech Aid Selection/Evaluation | 289 | 300 | 314 | 4% | 9% | 12 | 12 | 13 | 4% | 9% | DO | | | | | |
| ENT | Hearing/Speech Aid Services | Hearing/Speech Therapy - Post-Cochlear Implant | 124 | 131 | 146 | 6% | 18% | 12 | 13 | 15 | 6% | 18% | OR | 124 | 131 | 146 | 0.06 | 0.18 |
| ENT | Hearing/Speech Aid Services | Implantation - Cochlear Implant | 22 | 27 | 33 | 20% | 50% | 18 | 19 | 20 | 7% | 17% | OR | 22 | 27 | 33 | 0.2 | 0.5 |
| ENT | Hearing/Speech Aid Services | Implantation/Removal - Other Hearing/Speech Aid | 9 | 11 | 12 | 13% | 30% | 6 | 7 | 7 | 5% | 12% | OR | 9 | 11 | 12 | 0.13 | 0.3 |
| ENT | Hearing/Speech Aid Services | Other Hearing/Speech Aid Services | 1,114 | 1,170 | 1,258 | 5% | 13% | 22 | 23 | 25 | 5% | 13% | DO | | | | | |
| ENT | Hearing/Speech Examinations/Therapy | Hearing Examinations | 32,019 | 34,163 | 37,959 | 7% | 19% | 640 | 683 | 759 | 7% | 19% | DO | | | | | |
| ENT | Hearing/Speech Examinations/Therapy | Hearing/Speech Therapy | 11,526 | 12,768 | 14,840 | 11% | 29% | 1,575 | 1,271 | 1,021 | -19% | -35% | DO | | | | | |
| ENT | Hearing/Speech Examinations/Therapy | Speech Examinations | 740 | 786 | 870 | 6% | 18% | 117 | 86 | 63 | -27% | -47% | DO | | | | | |
| ENT | Larynx Procedures | Laryngectomy | 4 | 5 | 6 | 17% | 41% | 4 | 5 | 5 | 15% | 35% | OR | 4 | 5 | 6 | 0.17 | 0.41 |
| ENT | Larynx Procedures | Laryngoplasty | 12 | 12 | 14 | 6% | 16% | 10 | 11 | 12 | 3% | 11% | OR | 12 | 12 | 14 | 0.06 | 0.16 |
| ENT | Larynx Procedures | Laryngoscopy - Aspiration | 13 | 14 | 15 | 5% | 14% | 4 | 3 | 3 | -7% | -10% | OR | 13 | 14 | 15 | 0.05 | 0.14 |
| ENT | Larynx Procedures | Laryngoscopy - Biopsy | 125 | 132 | 142 | 5% | 13% | 86 | 86 | 88 | 0% | 3% | OR | 125 | 132 | 142 | 0.05 | 0.13 |
| ENT | Larynx Procedures | Laryngoscopy - Diagnostic | 6,440 | 7,008 | 7,844 | 9% | 22% | 386 | 420 | 471 | 9% | 22% | OR | 6440 | 7008 | 7844 | 0.09 | 0.22 |
| ENT | Larynx Procedures | Laryngoscopy - Other Procedures | 13 | 14 | 14 | 4% | 10% | 8 | 7 | 7 | -4% | -7% | OR | 13 | 14 | 14 | 0.04 | 0.1 |
| ENT | Larynx Procedures | Laryngoscopy - Stroboscopy | 371 | 417 | 482 | 12% | 30% | 55 | 50 | 46 | -10% | -17% | OR/DO | | | | | |
| ENT | Larynx Procedures | Laryngoscopy - Tumor Removal | 181 | 187 | 197 | 3% | 9% | 128 | 123 | 121 | -4% | -6% | OR | 181 | 187 | 197 | 0.03 | 0.09 |
| ENT | Larynx Procedures | Laryngoscopy - Vocal Cord Injection | 48 | 52 | 57 | 8% | 19% | 14 | 12 | 11 | -10% | -19% | OR | 48 | 52 | 57 | 0.08 | 0.19 |
| ENT | Larynx Procedures | Lesion Excision - Larynx | 2 | 2 | 2 | 1% | 3% | 1 | 1 | 1 | -5% | -10% | OR | 2 | 2 | 2 | 0.01 | 0.03 |
| ENT | Larynx Procedures | Other Procedures - Larynx | 9 | 10 | 10 | 5% | 15% | 4 | 4 | 4 | -2% | 0% | OR | 9 | 10 | 10 | 0.05 | 0.15 |
| ENT | Middle/Inner Ear Procedures | Eustachian Tube Procedure - Middle Ear | 42 | 39 | 38 | -6% | -8% | 1 | 1 | 1 | -6% | -8% | OR | 42 | 39 | 38 | -0.06 | -0.08 |
| ENT | Middle/Inner Ear Procedures | Exploratory Surgery - Middle Ear | 16 | 14 | 14 | -9% | -15% | 7 | 6 | 5 | -19% | -32% | OR | 16 | 14 | 14 | -0.09 | -0.15 |
| ENT | Middle/Inner Ear Procedures | Labyrinthectomy | 1 | 1 | 1 | -3% | -3% | 0 | 0 | 0 | -16% | -27% | OR | 1 | 1 | 1 | -0.03 | -0.03 |
| ENT | Middle/Inner Ear Procedures | Labyrinthotomy | 32 | 30 | 29 | -7% | -11% | 3 | 3 | 3 | -7% | -11% | OR | 32 | 30 | 29 | -0.07 | -0.11 |
| ENT | Middle/Inner Ear Procedures | Lesion Excision - Middle Ear | 14 | 13 | 12 | -9% | -14% | 7 | 6 | 5 | -18% | -31% | OR | 14 | 13 | 12 | -0.09 | -0.14 |
| ENT | Middle/Inner Ear Procedures | Mastoidectomy | 27 | 28 | 31 | 6% | 18% | 18 | 18 | 18 | -1% | 1% | OR | 27 | 28 | 31 | 0.06 | 0.18 |
| ENT | Middle/Inner Ear Procedures | Myringoplasty | 74 | 77 | 85 | 5% | 16% | 36 | 34 | 34 | -6% | -6% | OR | 74 | 77 | 85 | 0.05 | 0.16 |
| ENT | Middle/Inner Ear Procedures | Myringotomy | 173 | 156 | 144 | -10% | -16% | 87 | 69 | 56 | -21% | -35% | OR | 173 | 156 | 144 | -0.1 | -0.16 |
| ENT | Middle/Inner Ear Procedures | Other Procedures - Inner Ear | 9 | 9 | 10 | 2% | 7% | 3 | 3 | 3 | -6% | -9% | OR | 9 | 9 | 10 | 0.02 | 0.07 |
| ENT | Middle/Inner Ear Procedures | Other Procedures - Middle Ear | 10 | 9 | 9 | -8% | -13% | 3 | 3 | 2 | -16% | -27% | OR | 10 | 9 | 9 | -0.08 | -0.13 |
| ENT | Middle/Inner Ear Procedures | Stapes Procedures | 54 | 54 | 56 | 0% | 3% | 38 | 35 | 34 | -7% | -11% | OR | 54 | 54 | 56 | 0 | 0.03 |
| ENT | Middle/Inner Ear Procedures | Tympanic Membrane Repair | 116 | 118 | 125 | 1% | 8% | 33 | 30 | 28 | -9% | -14% | OR | 116 | 118 | 125 | 0.01 | 0.08 |

| Service Line | Sub Service Line | OPG Description | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth | 2012 HOPD Volume | 2017 HOPD Volume | 2022 HOPD Volume | 5YR Growth | 10YR Growth | OR Case Volumes: Procedure Location | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ENT | Middle/Inner Ear Procedures | Tympanoplasty | 163 | 142 | 129 | -13% | -21% | 82 | 63 | 50 | -23% | -39% | OR | 163 | 142 | 129 | -0.13 | -0.21 |
| ENT | Middle/Inner Ear Procedures | Tympanoplasty With Mastoidectomy | 67 | 59 | 54 | -12% | -20% | 47 | 39 | 33 | -18% | -31% | OR | 67 | 59 | 54 | -0.12 | -0.2 |
| ENT | Middle/Inner Ear Procedures | Tympanostomy | 1,849 | 1,660 | 1,538 | -10% | -17% | 928 | 732 | 597 | -21% | -36% | OR | 1849 | 1660 | 1538 | -0.1 | -0.17 |
| ENT | Middle/Inner Ear Procedures | Ventilating Tube Removal - Eardrum | 67 | 59 | 54 | -12% | -19% | 23 | 18 | 15 | -19% | -32% | OR | 67 | 59 | 54 | -0.12 | -0.19 |
| ENT | Nasal Procedures (Non-Endoscopy) | Biopsy - Nose | 29 | 31 | 34 | 8% | 18% | 1 | 1 | 1 | 8% | 18% | OR | 29 | 31 | 34 | 0.08 | 0.18 |
| ENT | Nasal Procedures (Non-Endoscopy) | Dislocation Treatment - Nose | 18 | 18 | 19 | 2% | 6% | 0 | 0 | 0 | 2% | 6% | OR | 18 | 18 | 19 | 0.02 | 0.06 |
| ENT | Nasal Procedures (Non-Endoscopy) | Foreign Body Removal - Nose | 163 | 166 | 176 | 2% | 8% | 47 | 42 | 38 | -11% | -19% | OR | 163 | 166 | 176 | 0.02 | 0.08 |
| ENT | Nasal Procedures (Non-Endoscopy) | Fracture Treatment - Nose | 230 | 227 | 230 | -1% | 0% | 150 | 147 | 149 | -1% | 0% | OR | 230 | 227 | 230 | -0.01 | 0 |
| ENT | Nasal Procedures (Non-Endoscopy) | Hemorrhage Control - Nose | 1,669 | 1,744 | 1,886 | 4% | 13% | 617 | 577 | 556 | -7% | -10% | OR | 1669 | 1744 | 1886 | 0.04 | 0.13 |
| ENT | Nasal Procedures (Non-Endoscopy) | Lesion Drainage - Nose | 14 | 14 | 14 | 1% | 4% | 2 | 2 | 1 | -23% | -40% | OR | 14 | 14 | 14 | 0.01 | 0.04 |
| ENT | Nasal Procedures (Non-Endoscopy) | Lesion/Polyp Excision/Destruction - Nose | 79 | 73 | 69 | -8% | -13% | 30 | 28 | 26 | -8% | -13% | OR | 79 | 73 | 69 | -0.08 | -0.13 |
| ENT | Nasal Procedures (Non-Endoscopy) | Mucosa Cauterization/Ablation | 70 | 65 | 62 | -7% | -12% | 8 | 8 | 7 | -7% | -12% | OR | 70 | 65 | 62 | -0.07 | -0.12 |
| ENT | Nasal Procedures (Non-Endoscopy) | Other Procedures - Nose | 47 | 42 | 39 | -10% | -16% | 20 | 18 | 16 | -10% | -16% | OR | 47 | 42 | 39 | -0.1 | -0.16 |
| ENT | Nasal Procedures (Non-Endoscopy) | Reconstruction - Rhinoplasty | 5 | 6 | 6 | 3% | 10% | 3 | 3 | 3 | 0% | 7% | OR | 5 | 6 | 6 | 0.03 | 0.1 |
| ENT | Nasal Procedures (Non-Endoscopy) | Rhinectomy | 2 | 2 | 3 | 6% | 15% | 2 | 2 | 2 | 6% | 15% | OR | 2 | 2 | 3 | 0.06 | 0.15 |
| ENT | Nasal Procedures (Non-Endoscopy) | Septoplasty | 271 | 268 | 272 | -1% | 1% | 176 | 174 | 177 | -1% | 1% | OR | 271 | 268 | 272 | -0.01 | 0.01 |
| ENT | Nasal Procedures (Non-Endoscopy) | Turbinate Excision/Resection | 410 | 368 | 338 | -10% | -18% | 207 | 173 | 150 | -16% | -28% | OR | 410 | 368 | 338 | -0.1 | -0.18 |
| ENT | Nasal Procedures (Non-Endoscopy) | Turbinate Injection | 91 | 83 | 77 | -9% | -15% | 1 | 1 | 1 | -9% | -15% | DO | | | | | |
| ENT | Oral Function Therapy | Oral Function Therapy | 696 | 849 | 1,089 | 22% | 56% | 47 | 22 | 8 | -53% | -82% | DO | | | | | |
| ENT | Oral/Maxillofacial Procedures | Arthroscopy - Jaw | 9 | 9 | 9 | -3% | -3% | 5 | 4 | 4 | -12% | -20% | OR | 9 | 9 | 9 | -0.03 | -0.03 |
| ENT | Oral/Maxillofacial Procedures | Biopsy - Mouth | 182 | 188 | 198 | 4% | 9% | 11 | 11 | 12 | 4% | 9% | OR | 182 | 188 | 198 | 0.04 | 0.09 |
| ENT | Oral/Maxillofacial Procedures | Biopsy - Tongue | 95 | 98 | 103 | 3% | 8% | 6 | 6 | 6 | 3% | 8% | OR | 95 | 98 | 103 | 0.03 | 0.08 |
| ENT | Oral/Maxillofacial Procedures | Bone Removal - Maxillofacial | 48 | 49 | 51 | 3% | 8% | 36 | 37 | 39 | 3% | 8% | OR | 48 | 49 | 51 | 0.03 | 0.08 |
| ENT | Oral/Maxillofacial Procedures | Cleft Lip/Nose Repair | 11 | 11 | 11 | -1% | 2% | 8 | 8 | 8 | -1% | 2% | OR | 11 | 11 | 11 | -0.01 | 0.02 |
| ENT | Oral/Maxillofacial Procedures | Dislocation Treatment - Jaw | 38 | 38 | 39 | -1% | 1% | 13 | 11 | 10 | -12% | -21% | OR | 38 | 38 | 39 | -0.01 | 0.01 |
| ENT | Oral/Maxillofacial Procedures | Epiglottidectomy | 1 | 1 | 1 | 28% | 65% | 0 | 1 | 1 | 22% | 48% | OR | 1 | 1 | 1 | 0.28 | 0.65 |
| ENT | Oral/Maxillofacial Procedures | Fistula Repair - Jaw | 16 | 16 | 16 | 1% | 4% | 3 | 2 | 2 | -22% | -40% | OR | 16 | 16 | 16 | 0.01 | 0.04 |
| ENT | Oral/Maxillofacial Procedures | Foreign Body Removal - Mouth | 4 | 5 | 5 | 1% | 5% | 1 | 1 | 1 | -13% | -23% | OR | 4 | 5 | 5 | 0.01 | 0.05 |
| ENT | Oral/Maxillofacial Procedures | Fracture Treatment - Oral/Facial Bone | 57 | 57 | 58 | 0% | 1% | 23 | 21 | 19 | -10% | -17% | OR | 57 | 57 | 58 | 0 | 0.01 |
| ENT | Oral/Maxillofacial Procedures | Frenectomy | 41 | 37 | 34 | -11% | -17% | 7 | 4 | 3 | -33% | -54% | OR | 41 | 37 | 34 | -0.11 | -0.17 |
| ENT | Oral/Maxillofacial Procedures | Frenoplasty | 26 | 26 | 27 | 0% | 3% | 13 | 12 | 11 | -10% | -17% | OR | 26 | 26 | 27 | 0 | 0.03 |
| ENT | Oral/Maxillofacial Procedures | Frenotomy | 40 | 49 | 61 | 22% | 53% | 11 | 12 | 13 | 5% | 12% | OR | 40 | 49 | 61 | 0.22 | 0.53 |
| ENT | Oral/Maxillofacial Procedures | Glossectomy | 17 | 17 | 18 | 4% | 11% | 14 | 14 | 14 | -2% | -2% | OR | 17 | 17 | 18 | 0.04 | 0.11 |
| ENT | Oral/Maxillofacial Procedures | Gum Procedures | 424 | 424 | 433 | 0% | 2% | 71 | 51 | 35 | -29% | -51% | OR | 424 | 424 | 433 | 0 | 0.02 |
| ENT | Oral/Maxillofacial Procedures | Laceration Repair - Mouth/Tongue | 29 | 29 | 30 | 1% | 4% | 20 | 18 | 17 | -7% | -11% | OR | 29 | 29 | 30 | 0.01 | 0.04 |
| ENT | Oral/Maxillofacial Procedures | Lesion Excision/Destruction - Mouth/Tongue | 504 | 515 | 535 | 2% | 6% | 71 | 72 | 75 | 2% | 6% | OR | 504 | 515 | 535 | 0.02 | 0.06 |
| ENT | Oral/Maxillofacial Procedures | Lesion Incision/Drainage - Mouth/Tongue | 43 | 43 | 44 | 1% | 4% | 5 | 5 | 5 | 1% | 4% | OR | 43 | 43 | 44 | 0.01 | 0.04 |
| ENT | Oral/Maxillofacial Procedures | Lip Excision | 42 | 43 | 46 | 4% | 11% | 12 | 10 | 9 | -14% | -26% | OR | 42 | 43 | 46 | 0.04 | 0.11 |
| ENT | Oral/Maxillofacial Procedures | Lip Repair | 30 | 30 | 31 | 2% | 6% | 19 | 18 | 17 | -6% | -10% | OR | 30 | 30 | 31 | 0.02 | 0.06 |
| ENT | Oral/Maxillofacial Procedures | Other Oral/Maxillofacial Procedures | 119 | 118 | 119 | -1% | 0% | 20 | 15 | 12 | -24% | -42% | OR | 119 | 118 | 119 | -0.01 | 0 |
| ENT | Oral/Maxillofacial Procedures | Palatopharynoplasty (Uvulopalatopharyngoplasty - Uvulopharyngoplasty) | 168 | 215 | 281 | 28% | 67% | 102 | 119 | 140 | 16% | 36% | OR | 168 | 215 | 281 | 0.28 | 0.67 |
| ENT | Oral/Maxillofacial Procedures | Palatoplasty | 12 | 14 | 16 | 15% | 37% | 7 | 8 | 8 | 4% | 12% | OR | 12 | 14 | 16 | 0.15 | 0.37 |
| ENT | Oral/Maxillofacial Procedures | Prosthetic Preparation - Maxillofacial | 120 | 120 | 123 | 0% | 2% | 11 | 11 | 11 | 0% | 2% | OR | 120 | 120 | 123 | 0 | 0.02 |
| ENT | Oral/Maxillofacial Procedures | Reconstruction - Chin | 2 | 2 | 2 | -2% | -2% | 2 | 2 | 2 | -2% | -2% | OR | 2 | 2 | 2 | -0.02 | -0.02 |
| ENT | Oral/Maxillofacial Procedures | Reconstruction - Facial | 72 | 73 | 75 | 2% | 4% | 54 | 55 | 56 | 2% | 4% | OR | 72 | 73 | 75 | 0.02 | 0.04 |
| ENT | Oral/Maxillofacial Procedures | Reconstruction - Jaw | 100 | 100 | 101 | 0% | 1% | 75 | 75 | 76 | 0% | 1% | OR | 100 | 100 | 101 | 0 | 0.01 |
| ENT | Oral/Maxillofacial Procedures | Tongue Reduction - Radiofrequency | 7 | 12 | 20 | 73% | 180% | 4 | 7 | 10 | 59% | 136% | OR | 7 | 12 | 20 | 0.73 | 1.8 |
| ENT | Oral/Maxillofacial Procedures | Tumor Removal - Bone - Face | 135 | 136 | 140 | 1% | 4% | 101 | 102 | 105 | 1% | 4% | OR | 135 | 136 | 140 | 0.01 | 0.04 |
| ENT | Oral/Maxillofacial Procedures | Tumor Removal - Soft Tissue - Face | 39 | 44 | 53 | 14% | 36% | 25 | 26 | 29 | 6% | 16% | OR | 39 | 44 | 53 | 0.14 | 0.36 |
| ENT | Oral/Maxillofacial Procedures | Uvulectomy | 22 | 23 | 24 | 4% | 11% | 13 | 13 | 12 | -6% | -10% | OR | 22 | 23 | 24 | 0.04 | 0.11 |
| ENT | Oral/Maxillofacial Procedures | Vestibuloplasty | 6 | 7 | 7 | 5% | 11% | 4 | 4 | 4 | -5% | -10% | OR | 6 | 7 | 7 | 0.05 | 0.11 |
| ENT | Other ENT Diagnostic Testing | Facial Nerve Function | 8 | 9 | 12 | 22% | 53% | 1 | 1 | 1 | 22% | 53% | DO | | | | | |
| ENT | Other ENT Diagnostic Testing | Laryngeal Function | 34 | 41 | 53 | 23% | 57% | 5 | 6 | 7 | 23% | 57% | DO | | | | | |
| ENT | Other ENT Diagnostic Testing | Nasal Function | 73 | 81 | 93 | 11% | 27% | 1 | 1 | 1 | 11% | 28% | DO | | | | | |
| ENT | Other ENT Diagnostic Testing | Nasopharyngoscopy | 450 | 413 | 393 | -8% | -13% | 31 | 29 | 28 | -8% | -13% | DO | | | | | |
| ENT | Other ENT Diagnostic Testing | Other ENT Diagnostic Testing | 85 | 91 | 101 | 7% | 19% | 14 | 11 | 9 | -19% | -34% | DO | | | | | |
| ENT | Other ENT Diagnostic Testing | Posturography | 142 | 158 | 182 | 11% | 28% | 17 | 19 | 22 | 11% | 28% | DO | | | | | |
| ENT | Other ENT Diagnostic Testing | Swallowing Function/Laryngeal Sensory Testing | 136 | 185 | 261 | 36% | 92% | 58 | 72 | 93 | 24% | 58% | DO | | | | | |
| ENT | Other ENT Diagnostic Testing | Swallowing Function/Laryngeal Sensory Testing - Endoscopic | 12 | 17 | 25 | 40% | 107% | 2 | 2 | 2 | 1% | 3% | DO | | | | | |
| ENT | Other ENT Procedures | Lesion Excision - Trachea | 1 | 1 | 1 | 1% | 3% | 0 | 0 | 0 | -5% | -10% | OR | 1 | 1 | 1 | 0.01 | 0.03 |
| ENT | Other ENT Procedures | Other Procedures - Trachea | 15 | 16 | 17 | 5% | 10% | 10 | 9 | 9 | -3% | -6% | OR | 15 | 16 | 17 | 0.05 | 0.1 |
| ENT | Other ENT Procedures | Repair/Revision - Neck | 2 | 2 | 2 | 4% | 8% | 1 | 1 | 1 | -4% | -7% | OR | 2 | 2 | 2 | 0.04 | 0.08 |
| ENT | Other ENT Procedures | Revision/Repair - Trachea | 11 | 11 | 12 | 5% | 9% | 7 | 7 | 7 | -3% | -6% | OR | 11 | 11 | 12 | 0.05 | 0.09 |
| ENT | Pharynx Procedures | Biopsy - Pharynx | 57 | 59 | 62 | 4% | 9% | 17 | 15 | 13 | -10% | -19% | OR | 57 | 59 | 62 | 0.04 | 0.09 |
| ENT | Pharynx Procedures | Foreign Body Removal - Pharynx | 13 | 13 | 14 | 1% | 6% | 5 | 5 | 4 | -9% | -14% | OR | 13 | 13 | 14 | 0.01 | 0.06 |
| ENT | Pharynx Procedures | Hemorrhage Control - Pharynx | 38 | 38 | 39 | -1% | 2% | 18 | 17 | 16 | -9% | -14% | OR | 38 | 38 | 39 | -0.01 | 0.02 |
| ENT | Pharynx Procedures | Lesion Drainage - Pharynx | 2 | 2 | 2 | 5% | 15% | 0 | 0 | 0 | -12% | -20% | OR | 2 | 2 | 2 | 0.05 | 0.15 |
| ENT | Pharynx Procedures | Lesion Excision/Destruction - Pharynx | 13 | 13 | 14 | 2% | 7% | 5 | 5 | 4 | -8% | -14% | OR | 13 | 13 | 14 | 0.02 | 0.07 |
| ENT | Pharynx Procedures | Other Procedures - Pharynx | 1 | 2 | 2 | 7% | 18% | 1 | 1 | 1 | 0% | 3% | OR | 1 | 2 | 2 | 0.07 | 0.18 |
| ENT | Pharynx Procedures | Pharyngoplasty | 3 | 3 | 3 | 2% | 6% | 2 | 2 | 1 | -8% | -14% | OR | 3 | 3 | 3 | 0.02 | 0.06 |
| ENT | Salivary Gland/Duct Procedures | Biopsy - Salivary Gland | 38 | 40 | 43 | 5% | 12% | 6 | 5 | 4 | -21% | -38% | OR | 38 | 40 | 43 | 0.05 | 0.12 |
| ENT | Salivary Gland/Duct Procedures | Cyst Procedures - Salivary Gland | 9 | 9 | 9 | -1% | 1% | 3 | 2 | 2 | -14% | -24% | OR | 9 | 9 | 9 | -0.01 | 0.01 |
| ENT | Salivary Gland/Duct Procedures | Dilation - Salivary Duct | 20 | 20 | 22 | 3% | 10% | 1 | 1 | 1 | 3% | 10% | OR | 20 | 20 | 22 | 0.03 | 0.1 |
| ENT | Salivary Gland/Duct Procedures | Incision - Salivary Gland | 29 | 29 | 31 | 2% | 8% | 4 | 3 | 2 | -29% | -50% | OR | 29 | 29 | 31 | 0.02 | 0.08 |
| ENT | Salivary Gland/Duct Procedures | Lesion Drainage - Salivary Gland | 5 | 5 | 5 | 1% | 7% | 0 | 0 | 0 | -8% | -3% | OR | 5 | 5 | 5 | 0.01 | 0.07 |
| ENT | Salivary Gland/Duct Procedures | Other Procedures - Salivary Gland/Duct | 4 | 4 | 4 | 2% | 8% | 2 | 2 | 2 | -7% | -10% | OR | 4 | 4 | 4 | 0.02 | 0.08 |
| ENT | Salivary Gland/Duct Procedures | Parotid Diversion | 1 | 1 | 1 | 5% | 14% | 1 | 1 | 1 | -2% | 0% | OR | 1 | 1 | 1 | 0.05 | 0.14 |
| ENT | Salivary Gland/Duct Procedures | Parotidectomy - Complete | 29 | 38 | 51 | 33% | 79% | 21 | 26 | 33 | 24% | 56% | OR | 29 | 38 | 51 | 0.33 | 0.79 |
| ENT | Salivary Gland/Duct Procedures | Parotidectomy - Partial | 46 | 46 | 47 | 0% | 1% | 38 | 36 | 34 | -6% | -10% | OR | 46 | 46 | 47 | 0 | 0.01 |

| Service Line | Sub Service Line | OPG Description | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth | 2012 HOPD Volume | 2017 HOPD Volume | 2022 HOPD Volume | 5YR Growth | 10YR Growth | OR Case Volumes: Procedure Location | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ENT | Salivary Gland/Duct Procedures | Salivary Gland Excision | 43 | 45 | 48 | 3% | 10% | 33 | 32 | 32 | -3% | -3% | OR | 43 | 45 | 48 | 0.03 | 0.1 |
| ENT | Sinus Procedures (Non-Endoscopy) | Ethmoidectomy | 19 | 15 | 13 | -17% | -29% | 10 | 8 | 6 | -25% | -41% | OR | 19 | 15 | 13 | -0.17 | -0.29 |
| ENT | Sinus Procedures (Non-Endoscopy) | Other Procedures - Sinus | 6 | 5 | 4 | -19% | -33% | 2 | 1 | 1 | -35% | -57% | OR | 6 | 5 | 4 | -0.19 | -0.33 |
| ENT | Sinus Procedures (Non-Endoscopy) | Sinus Lavage | 76 | 61 | 51 | -19% | -32% | 2 | 2 | 2 | -19% | -32% | OR | 76 | 61 | 51 | -0.19 | -0.32 |
| ENT | Sinus Procedures (Non-Endoscopy) | Sinusotomy | 17 | 14 | 12 | -19% | -32% | 6 | 4 | 3 | -30% | -49% | OR | 17 | 14 | 12 | -0.19 | -0.32 |
| ENT | Sinus Procedures (Non-Endoscopy) | Therapeutic Sinus Injection | 8 | 7 | 6 | -18% | -32% | 1 | 1 | 0 | -46% | -71% | OR | 8 | 7 | 6 | -0.18 | -0.32 |
| ENT | Tonsils/Adenoids Procedures | Adenoidectomy | 597 | 625 | 685 | 5% | 15% | 418 | 407 | 415 | -3% | -1% | OR | 597 | 625 | 685 | 0.05 | 0.15 |
| ENT | Tonsils/Adenoids Procedures | Lesion Drainage - Tonsils/Adenoids | 69 | 68 | 68 | -1% | -1% | 48 | 47 | 48 | -1% | -1% | OR | 69 | 68 | 68 | -0.01 | -0.01 |
| ENT | Tonsils/Adenoids Procedures | Lesion Excision/Destruction - Tonsils/Adenoids | 5 | 5 | 5 | -2% | -1% | 3 | 3 | 3 | -2% | -1% | OR | 5 | 5 | 5 | -0.02 | -0.01 |
| ENT | Tonsils/Adenoids Procedures | Other Procedures - Tonsils/Adenoids | 5 | 5 | 5 | 0% | 3% | 3 | 3 | 3 | 0% | 3% | OR | 5 | 5 | 5 | 0 | 0.03 |
| ENT | Tonsils/Adenoids Procedures | Tonsillectomy | 657 | 670 | 701 | 2% | 7% | 460 | 436 | 424 | -5% | -8% | OR | 657 | 670 | 701 | 0.02 | 0.07 |
| ENT | Tonsils/Adenoids Procedures | Tonsillectomy/Adenoidectomy | 1,478 | 1,516 | 1,640 | 3% | 11% | 1,034 | 987 | 993 | -5% | -4% | OR | 1478 | 1516 | 1640 | 0.03 | 0.11 |
| Evaluation and Mar | Evaluation and Management | Care During Transport | 1 | 1 | 1 | 4% | 15% | 0 | 0 | 0 | 0% | 0% | | | | | | |
| Evaluation and Mar | Evaluation and Management | Confirmatory Consultations | 1,691 | 1,724 | 1,806 | 2% | 7% | 203 | 207 | 217 | 2% | 7% | | | | | | |
| Evaluation and Mar | Evaluation and Management | Coordinated Care | 522 | 666 | 863 | 28% | 65% | 0 | 0 | 0 | 0% | 0% | | | | | | |
| Evaluation and Mar | Evaluation and Management | Emergency Department Services | 197,474 | 202,499 | 212,120 | 3% | 7% | 195,499 | 200,474 | 209,999 | 3% | 7% | | | | | | |
| Evaluation and Mar | Evaluation and Management | Health/Behavior Assessment | 145 | 180 | 227 | 24% | 56% | 23 | 29 | 36 | 24% | 56% | | | | | | |
| Evaluation and Mar | Evaluation and Management | Health/Behavior Intervention | 313 | 385 | 488 | 23% | 56% | 41 | 50 | 63 | 23% | 56% | | | | | | |
| Evaluation and Mar | Evaluation and Management | Home Services | 929 | 1,060 | 1,248 | 14% | 34% | 0 | 0 | 0 | 0% | 0% | | | | | | |
| Evaluation and Mar | Evaluation and Management | Home Services - Non-Physician | 142 | 169 | 202 | 19% | 43% | 0 | 0 | 0 | 0% | 0% | | | | | | |
| Evaluation and Mar | Evaluation and Management | Hospital Observation | 5,938 | 6,790 | 8,022 | 14% | 35% | 5,819 | 6,655 | 7,861 | 14% | 35% | | | | | | |
| Evaluation and Mar | Evaluation and Management | Medical Nutrition Assessment | 6 | 8 | 10 | 26% | 69% | 1 | 2 | 2 | 26% | 69% | | | | | | |
| Evaluation and Mar | Evaluation and Management | Medical Nutrition Assessment/Intervention | 2,527 | 3,104 | 3,826 | 23% | 51% | 505 | 621 | 765 | 23% | 51% | | | | | | |
| Evaluation and Mar | Evaluation and Management | Nursing Facility/Rest Home Services | 355 | 374 | 408 | 5% | 15% | 0 | 0 | 0 | 0% | 0% | | | | | | |
| Evaluation and Mar | Evaluation and Management | Office Consultation | 137,505 | 140,878 | 147,895 | 2% | 8% | 9,625 | 9,861 | 10,353 | 2% | 8% | | | | | | |
| Evaluation and Mar | Evaluation and Management | Office/Outpatient Evaluation | 2,481,662 | 2,533,987 | 2,657,648 | 2% | 7% | 99,266 | 101,359 | 106,306 | 2% | 7% | | | | | | |
| Evaluation and Mar | Evaluation and Management | Other Evaluation and Management | 728 | 773 | 858 | 6% | 18% | 15 | 15 | 17 | 6% | 18% | | | | | | |
| Evaluation and Mar | Evaluation and Management | Other Physician Services | 28,715 | 28,975 | 29,986 | 1% | 4% | 3,733 | 3,767 | 3,898 | 1% | 4% | | | | | | |
| Evaluation and Mar | Evaluation and Management | Preventive Medicine Services | 144,069 | 141,991 | 143,508 | -1% | 0% | 5,763 | 5,680 | 5,740 | -1% | 0% | | | | | | |
| Evaluation and Mar | Evaluation and Management | Prolonged Services | 265 | 270 | 283 | 2% | 7% | 32 | 32 | 34 | 2% | 7% | | | | | | |
| Evaluation and Mar | Evaluation and Management | Smoking Cessation | 2 | 2 | 3 | 19% | 47% | 0 | 0 | 0 | 19% | 47% | | | | | | |
| Gastroenterology | Anoscopy | Anoscopy - Diagnostic | 1,692 | 1,718 | 1,801 | 2% | 6% | 169 | 172 | 180 | 2% | 6% | | | | | | |
| Gastroenterology | Anoscopy | Anoscopy - Procedural | 61 | 62 | 66 | 2% | 9% | 6 | 6 | 7 | 2% | 9% | | | | | | |
| Gastroenterology | Capsule Endoscopy | Capsule Endoscopy | 210 | 253 | 320 | 21% | 53% | 139 | 152 | 178 | 9% | 28% | | | | | | |
| Gastroenterology | Colonoscopy | Colonoscopy - Diagnostic/Screening | 21,011 | 23,642 | 26,731 | 13% | 27% | 9,867 | 10,182 | 10,773 | 3% | 9% | | | | | | |
| Gastroenterology | Colonoscopy | Colonoscopy - Procedural | 20,630 | 23,348 | 26,560 | 13% | 29% | 10,460 | 10,761 | 11,270 | 3% | 8% | | | | | | |
| Gastroenterology | Endoscopic Retrograde Cholangiopancreatography (ERCP) | ERCP - Diagnostic | 148 | 158 | 173 | 7% | 17% | 140 | 150 | 165 | 7% | 17% | | | | | | |
| Gastroenterology | Endoscopic Retrograde Cholangiopancreatography (ERCP) | ERCP - Procedural | 366 | 406 | 467 | 11% | 28% | 348 | 386 | 444 | 11% | 28% | | | | | | |
| Gastroenterology | Enteroscopy | Enteroscopy - Diagnostic | 149 | 152 | 159 | 2% | 6% | 68 | 64 | 62 | -5% | -8% | OR | 149 | 152 | 159 | 0.02 | 0.06 |
| Gastroenterology | Enteroscopy | Enteroscopy - Procedural | 260 | 296 | 347 | 14% | 33% | 169 | 187 | 212 | 10% | 26% | OR | 260 | 296 | 347 | 0.14 | 0.33 |
| Gastroenterology | Esophagogastroduodenoscopy (EGD) | EGD - Diagnostic | 2,502 | 2,604 | 2,803 | 4% | 12% | 1,331 | 1,227 | 1,170 | -8% | -12% | | | | | | |
| Gastroenterology | Esophagogastroduodenoscopy (EGD) | EGD - Procedural | 12,993 | 14,568 | 16,688 | 12% | 28% | 6,911 | 6,863 | 6,968 | -1% | 1% | | | | | | |
| Gastroenterology | Esophagoscopy | Esophagoscopy - Diagnostic | 55 | 58 | 63 | 5% | 13% | 29 | 27 | 26 | -7% | -11% | | | | | | |
| Gastroenterology | Esophagoscopy | Esophagoscopy - Procedural | 183 | 208 | 242 | 14% | 32% | 97 | 98 | 101 | 1% | 4% | | | | | | |
| Gastroenterology | GERD Testing | Acid Reflux Test/PH Probe | 329 | 359 | 384 | 9% | 17% | 214 | 219 | 221 | 2% | 3% | | | | | | |
| Gastroenterology | GERD Testing | Manometry/Function Study - Esophagus/Stomach | 285 | 311 | 334 | 9% | 17% | 167 | 177 | 187 | 6% | 12% | | | | | | |
| Gastroenterology | Other GI Diagnostic Testing | Fecal Occult Blood Test | 10,472 | 11,732 | 13,643 | 12% | 30% | 105 | 117 | 136 | 12% | 30% | | | | | | |
| Gastroenterology | Other GI Diagnostic Testing | Intubation/Collection - Esophagus | 259 | 270 | 281 | 4% | 9% | 199 | 208 | 216 | 4% | 9% | | | | | | |
| Gastroenterology | Other GI Diagnostic Testing | Manometry - Anus | 159 | 218 | 304 | 37% | 91% | 42 | 54 | 76 | 30% | 82% | | | | | | |
| Gastroenterology | Other GI Diagnostic Testing | Other Endoscopic Ultrasound | 30 | 38 | 50 | 28% | 68% | 22 | 27 | 33 | 20% | 47% | | | | | | |
| Gastroenterology | Other GI Diagnostic Testing | Other GI Diagnostic Testing | 250 | 282 | 331 | 13% | 32% | 47 | 51 | 60 | 7% | 26% | | | | | | |
| Gastroenterology | Other GI Procedures | Abscess Drainage - Abdomen - Percutaneous | 43 | 48 | 56 | 13% | 32% | 34 | 36 | 40 | 6% | 16% | | | | | | |
| Gastroenterology | Other GI Procedures | Dilation - Esophagus | 989 | 1,041 | 1,128 | 5% | 14% | 467 | 438 | 424 | -6% | -9% | | | | | | |
| Gastroenterology | Other GI Procedures | Gastric Intubation/Irrigation | 69 | 69 | 71 | 0% | 3% | 68 | 67 | 70 | 0% | 3% | | | | | | |
| Gastroenterology | Other GI Procedures | Other GI Procedures | 2 | 2 | 2 | 1% | 1% | 0 | 0 | 0 | 1% | 1% | | | | | | |
| Gastroenterology | Other GI Procedures | Other Tube Placememt | 24 | 27 | 31 | 11% | 30% | 20 | 22 | 25 | 11% | 30% | | | | | | |
| Gastroenterology | Other GI Procedures | Puncture/Drainage - Abdomen | 518 | 583 | 671 | 13% | 29% | 410 | 438 | 473 | 7% | 15% | | | | | | |
| Gastroenterology | Percutaneous Liver Biopsy | Percutaneous Liver Biopsy | 765 | 852 | 977 | 11% | 28% | 643 | 707 | 802 | 10% | 25% | | | | | | |
| Gastroenterology | Proctosigmoidoscopy | Proctosigmoidoscopy - Diagnostic | 309 | 204 | 149 | -34% | -52% | 46 | 31 | 22 | -34% | -52% | | | | | | |
| Gastroenterology | Proctosigmoidoscopy | Proctosigmoidoscopy - Procedural | 27 | 21 | 18 | -21% | -33% | 12 | 10 | 8 | -21% | -33% | | | | | | |
| Gastroenterology | Sigmoidoscopy | Sigmoidoscopy - Diagnostic/Screening | 1,428 | 932 | 663 | -35% | -54% | 214 | 140 | 99 | -35% | -54% | | | | | | |
| Gastroenterology | Sigmoidoscopy | Sigmoidoscopy - Procedural | 420 | 327 | 271 | -22% | -35% | 189 | 147 | 122 | -22% | -35% | | | | | | |
| General Surgery | Abdomen | Biopsy - Abdomen - Laparoscopic | 46 | 46 | 48 | 1% | 4% | 41 | 41 | 43 | 1% | 4% | OR | 46 | 46 | 48 | 0.01 | 0.04 |
| General Surgery | Abdomen | Biopsy - Abdomen - Percutaneous | 89 | 95 | 105 | 7% | 19% | 79 | 85 | 94 | 7% | 19% | OR | 89 | 95 | 105 | 0.07 | 0.19 |
| General Surgery | Abdomen | Catheter Implantation/Removal - Abdomen | 102 | 108 | 117 | 6% | 14% | 90 | 95 | 103 | 6% | 14% | OR | 102 | 108 | 117 | 0.06 | 0.14 |
| General Surgery | Abdomen | Exploratory Laparoscopy - Abdomen | 383 | 338 | 309 | -12% | -19% | 314 | 277 | 253 | -12% | -19% | OR | 383 | 338 | 309 | -0.12 | -0.19 |
| General Surgery | Abdomen | Exploratory Laparotomy - Abdomen | 20 | 20 | 20 | -3% | -2% | 18 | 18 | 18 | -3% | -2% | OR | 20 | 20 | 20 | -0.03 | -0.02 |
| General Surgery | Abdomen | Lesion Drainage/Aspiration - Abdomen | 2 | 2 | 2 | -10% | -16% | 2 | 2 | 2 | -10% | -16% | OR | 2 | 2 | 2 | -0.1 | -0.16 |
| General Surgery | Abdomen | Lesion Drainage/Aspiration - Abdomen - Laparoscopic | 74 | 82 | 93 | 10% | 24% | 60 | 66 | 74 | 10% | 24% | OR | 74 | 82 | 93 | 0.1 | 0.24 |
| General Surgery | Abdomen | Other Laparoscopic Procedures - Abdomen | 19 | 22 | 25 | 15% | 33% | 15 | 17 | 20 | 15% | 33% | OR | 19 | 22 | 25 | 0.15 | 0.33 |
| General Surgery | Abdomen | Other Procedures - Abdomen | 48 | 46 | 45 | -6% | -8% | 41 | 39 | 38 | -6% | -8% | OR | 48 | 46 | 45 | -0.06 | -0.08 |
| General Surgery | Abdomen | Tumor Excision - Abdomen | 46 | 46 | 48 | 1% | 5% | 35 | 35 | 37 | 1% | 5% | OR | 46 | 46 | 48 | 0.01 | 0.05 |
| General Surgery | Adhesions | Enterolysis - Laparoscopic | 79 | 95 | 117 | 21% | 49% | 69 | 82 | 99 | 18% | 42% | OR | 79 | 95 | 117 | 0.21 | 0.49 |
| General Surgery | Appendix | Appendectomy - Laparoscopic | 252 | 293 | 366 | 16% | 45% | 239 | 275 | 341 | 15% | 42% | OR | 252 | 293 | 366 | 0.16 | 0.45 |
| General Surgery | Appendix | Appendectomy - Open | 24 | 17 | 13 | -28% | -48% | 23 | 16 | 12 | -29% | -49% | OR | 24 | 17 | 13 | -0.28 | -0.48 |
| General Surgery | Appendix | Other Procedures - Appendix | 1 | 1 | 1 | 6% | 12% | 1 | 1 | 1 | 5% | 10% | OR | 1 | 1 | 1 | 0.06 | 0.12 |
| General Surgery | Bariatric | Gastric Restrictive Procedure - Laparoscopic (Lap Band) | 128 | 130 | 149 | 2% | 17% | 114 | 108 | 113 | -5% | -1% | OR | 128 | 130 | 149 | 0.02 | 0.17 |
| General Surgery | Bone Marrow/Stem Cell Procedures | Aspiration - Bone Marrow | 178 | 198 | 229 | 11% | 29% | 83 | 89 | 99 | 7% | 18% | OR | 178 | 198 | 229 | 0.11 | 0.29 |
| General Surgery | Bone Marrow/Stem Cell Procedures | Biopsy - Bone Marrow | 1,278 | 1,498 | 1,815 | 17% | 42% | 409 | 479 | 581 | 17% | 42% | OR | 1278 | 1498 | 1815 | 0.17 | 0.42 |

| Service Line | Sub Service Line | OPG Description | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth | 2012 HOPD Volume | 2017 HOPD Volume | 2022 HOPD Volume | 5YR Growth | 10YR Growth | OR Case Volumes: Procedure Location | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| General Surgery | Bone Marrow/Stem Cell Procedures | Bone Marrow/Stem Cell Harvesting | 67 | 70 | 74 | 5% | 11% | 53 | 56 | 58 | 5% | 11% | OR | 67 | 70 | 74 | 0.05 | 0.11 |
| General Surgery | Bone Marrow/Stem Cell Procedures | Bone Marrow/Stem Cell Transplatation | 5 | 5 | 6 | 10% | 20% | 3 | 4 | 4 | 10% | 20% | OR | 5 | 5 | 6 | 0.1 | 0.2 |
| General Surgery | Bone Marrow/Stem Cell Procedures | Donor Search Management | 2 | 2 | 2 | 3% | 7% | 1 | 1 | 1 | 3% | 7% | | | | | | |
| General Surgery | Bone Marrow/Stem Cell Procedures | Transplant Preparation | 2 | 2 | 2 | 11% | 17% | 1 | 1 | 1 | 11% | 17% | | | | | | |
| General Surgery | Breast | Biopsy - Breast - Open | 110 | 97 | 87 | -12% | -21% | 64 | 52 | 44 | -18% | -32% | OR | 110 | 97 | 87 | -0.12 | -0.21 |
| General Surgery | Breast | Biopsy - Breast - Percutaneous | 2,597 | 2,803 | 3,062 | 8% | 18% | 1,376 | 1,403 | 1,448 | 2% | 5% | | | | | | |
| General Surgery | Breast | Brachytherapy Catheter Implantation - Breast | 75 | 122 | 212 | 63% | 182% | 65 | 103 | 174 | 59% | 169% | OR | 75 | 122 | 212 | 0.63 | 1.82 |
| General Surgery | Breast | Breast Reconstruction/Revision | 209 | 209 | 210 | 0% | 1% | 136 | 126 | 117 | -7% | -14% | OR | 209 | 209 | 210 | 0 | 0.01 |
| General Surgery | Breast | Breast Reconstruction/Revision with Implant | 77 | 77 | 78 | 1% | 2% | 54 | 50 | 47 | -6% | -12% | OR | 77 | 77 | 78 | 0.01 | 0.02 |
| General Surgery | Breast | Cyst/Abscess Drainage - Breast | 1,194 | 1,101 | 1,034 | -8% | -13% | 358 | 309 | 271 | -14% | -24% | OR | 1194 | 1101 | 1034 | -0.08 | -0.13 |
| General Surgery | Breast | Lesion Removal - Breast | 1,841 | 1,619 | 1,456 | -12% | -21% | 1,399 | 1,183 | 1,023 | -15% | -27% | OR | 1841 | 1619 | 1456 | -0.12 | -0.21 |
| General Surgery | Breast | Lumpectomy | 520 | 516 | 507 | -1% | -3% | 427 | 403 | 377 | -6% | -12% | OR | 520 | 516 | 507 | -0.01 | -0.03 |
| General Surgery | Breast | Mastectomy | 214 | 231 | 254 | 8% | 19% | 180 | 185 | 194 | 3% | 8% | OR | 214 | 231 | 254 | 0.08 | 0.19 |
| General Surgery | Breast | Nipple Exploration | 34 | 35 | 36 | 2% | 5% | 28 | 28 | 29 | 2% | 5% | OR | 34 | 35 | 36 | 0.02 | 0.05 |
| General Surgery | Breast | Other Procedures - Breast | 18 | 19 | 19 | 1% | 5% | 11 | 11 | 11 | 1% | 5% | OR | 18 | 19 | 19 | 0.01 | 0.05 |
| General Surgery | Breast | Tumor Destruction (Thermotherapy) - Breast | 8 | 70 | 659 | 729% | 7719% | 7 | 49 | 378 | 586% | 5190% | OR | 8 | 70 | 659 | 7.29 | 77.19 |
| General Surgery | Colorectal/Lower GI | Abscess Drainage - Anus/Rectum | 197 | 198 | 203 | 0% | 3% | 87 | 87 | 89 | 0% | 3% | OR | 197 | 198 | 203 | 0 | 0.03 |
| General Surgery | Colorectal/Lower GI | Anal Fissure Procedures | 102 | 102 | 105 | 1% | 3% | 55 | 55 | 57 | 1% | 3% | OR | 102 | 102 | 105 | 0.01 | 0.03 |
| General Surgery | Colorectal/Lower GI | Anal Sphincter Incision | 63 | 63 | 65 | 0% | 3% | 49 | 49 | 51 | 0% | 3% | OR | 63 | 63 | 65 | 0 | 0.03 |
| General Surgery | Colorectal/Lower GI | Biopsy - Bowel | 3 | 3 | 3 | 6% | 15% | 2 | 2 | 3 | 6% | 15% | OR | 3 | 3 | 3 | 0.06 | 0.15 |
| General Surgery | Colorectal/Lower GI | Biopsy - Rectum | 23 | 24 | 26 | 3% | 10% | 14 | 15 | 16 | 3% | 10% | OR | 23 | 24 | 26 | 0.03 | 0.1 |
| General Surgery | Colorectal/Lower GI | Fecal Incontinence/Rectal Prolapse Procedures | 105 | 189 | 322 | 81% | 208% | 79 | 138 | 227 | 74% | 185% | OR | 105 | 189 | 322 | 0.81 | 2.08 |
| General Surgery | Colorectal/Lower GI | Fistula Repair - Anus | 165 | 166 | 170 | 0% | 3% | 124 | 124 | 128 | 0% | 3% | OR | 165 | 166 | 170 | 0 | 0.03 |
| General Surgery | Colorectal/Lower GI | Hemorrhoid Destruction | 546 | 695 | 881 | 27% | 61% | 16 | 21 | 26 | 27% | 61% | OR | 546 | 695 | 881 | 0.27 | 0.61 |
| General Surgery | Colorectal/Lower GI | Hemorrhoid Injection | 103 | 107 | 114 | 4% | 11% | 1 | 1 | 1 | 4% | 11% | OR | 103 | 107 | 114 | 0.04 | 0.11 |
| General Surgery | Colorectal/Lower GI | Hemorrhoid Ligation | 37 | 40 | 44 | 8% | 20% | 6 | 6 | 6 | -4% | -6% | OR | 37 | 40 | 44 | 0.08 | 0.2 |
| General Surgery | Colorectal/Lower GI | Hemorrhoidectomy | 1,093 | 1,080 | 1,094 | -1% | 0% | 295 | 271 | 254 | -8% | -14% | OR | 1093 | 1080 | 1094 | -0.01 | 0 |
| General Surgery | Colorectal/Lower GI | Lesion Destruction - Anus | 194 | 193 | 197 | -1% | 1% | 45 | 41 | 38 | -9% | -15% | OR | 194 | 193 | 197 | -0.01 | 0.01 |
| General Surgery | Colorectal/Lower GI | Other Procedures - Anus/Rectum | 132 | 134 | 140 | 2% | 7% | 73 | 74 | 77 | 2% | 6% | OR | 132 | 134 | 140 | 0.02 | 0.07 |
| General Surgery | Colorectal/Lower GI | Other Procedures - Bowel | 91 | 101 | 115 | 11% | 27% | 84 | 93 | 106 | 11% | 27% | OR | 91 | 101 | 115 | 0.11 | 0.27 |
| General Surgery | Colorectal/Lower GI | Rectal Stricture Procedures | 11 | 11 | 12 | 4% | 12% | 7 | 8 | 8 | 4% | 12% | OR | 11 | 11 | 12 | 0.04 | 0.12 |
| General Surgery | Colorectal/Lower GI | Transabdominal Colonoscopy | 20 | 21 | 22 | 4% | 9% | 15 | 15 | 16 | 4% | 9% | OR | 20 | 21 | 22 | 0.04 | 0.09 |
| General Surgery | Colorectal/Lower GI | Tumor Destruction/Excision - Anus/Rectum | 54 | 57 | 62 | 6% | 15% | 45 | 48 | 52 | 6% | 15% | OR | 54 | 57 | 62 | 0.06 | 0.15 |
| General Surgery | Gallbladder | Cholecystectomy - Laparoscopic | 2,511 | 2,774 | 3,127 | 10% | 25% | 2,235 | 2,361 | 2,544 | 6% | 14% | OR | 2511 | 2774 | 3127 | 0.1 | 0.25 |
| General Surgery | Gallbladder | Other Procedures - Gallbladder | 2 | 2 | 2 | 7% | 20% | 2 | 2 | 2 | 7% | 20% | OR | 2 | 2 | 2 | 0.07 | 0.2 |
| General Surgery | Hepatobiliary/Pancreatic | Abscess Drainage - Liver | 2 | 2 | 2 | 7% | 19% | 1 | 1 | 2 | 7% | 19% | OR | 2 | 2 | 2 | 0.07 | 0.19 |
| General Surgery | Hepatobiliary/Pancreatic | Bile Stone Removal - Percutaneous | 1 | 1 | 1 | 8% | 21% | 1 | 1 | 1 | 8% | 21% | OR | 1 | 1 | 1 | 0.08 | 0.21 |
| General Surgery | Hepatobiliary/Pancreatic | Biopsy - Liver - Wedge | 11 | 11 | 12 | 4% | 13% | 10 | 11 | 11 | 4% | 13% | OR | 11 | 11 | 12 | 0.04 | 0.13 |
| General Surgery | Hepatobiliary/Pancreatic | Biopsy - Pancreas - Percutaneous | 21 | 22 | 25 | 8% | 20% | 19 | 21 | 23 | 8% | 20% | OR | 21 | 22 | 25 | 0.08 | 0.2 |
| General Surgery | Hepatobiliary/Pancreatic | Catheter Implantation/Removal - Bile Duct | 54 | 61 | 70 | 12% | 30% | 53 | 59 | 68 | 12% | 30% | OR | 54 | 61 | 70 | 0.12 | 0.3 |
| General Surgery | Hepatobiliary/Pancreatic | Cryosurgical Tumor Ablation - Liver - Laparoscopic | 7 | 12 | 21 | 74% | 195% | 7 | 12 | 21 | 74% | 195% | OR | 7 | 12 | 21 | 0.74 | 1.95 |
| General Surgery | Hepatobiliary/Pancreatic | Laparoscopic Cholangiography | 1 | 1 | 1 | 4% | 9% | 1 | 1 | 1 | 3% | 6% | OR | 1 | 1 | 1 | 0.04 | 0.09 |
| General Surgery | Hepatobiliary/Pancreatic | Lesion Drainage - Liver - Percutaneous | 5 | 5 | 5 | 7% | 21% | 4 | 5 | 5 | 7% | 21% | OR | 5 | 5 | 5 | 0.07 | 0.21 |
| General Surgery | Hepatobiliary/Pancreatic | Other Laparoscopic Procedures - Liver | 2 | 3 | 3 | 6% | 16% | 2 | 2 | 3 | 6% | 16% | OR | 2 | 3 | 3 | 0.06 | 0.16 |
| General Surgery | Hepatobiliary/Pancreatic | Other Procedures - Biliary Tract | 2 | 2 | 2 | 6% | 18% | 2 | 2 | 2 | 6% | 18% | OR | 2 | 2 | 2 | 0.06 | 0.18 |
| General Surgery | Hepatobiliary/Pancreatic | Other Procedures - Liver | 1 | 1 | 1 | 3% | 13% | 1 | 1 | 1 | 2% | 13% | OR | 1 | 1 | 1 | 0.03 | 0.13 |
| General Surgery | Hepatobiliary/Pancreatic | Other Procedures - Pancreas | 4 | 4 | 4 | 5% | 13% | 3 | 4 | 4 | 5% | 13% | OR | 4 | 4 | 4 | 0.05 | 0.13 |
| General Surgery | Hepatobiliary/Pancreatic | Radiofrequency Tumor Ablation - Liver - Percutaneous | 24 | 40 | 64 | 67% | 167% | 22 | 37 | 58 | 67% | 167% | OR | 24 | 40 | 64 | 0.67 | 1.67 |
| General Surgery | Hepatobiliary/Pancreatic | Stent Placement - Bile Duct | 14 | 21 | 33 | 51% | 136% | 14 | 21 | 33 | 51% | 136% | OR | 14 | 21 | 33 | 0.51 | 1.36 |
| General Surgery | Hernia | Epigastric Hernia Repair | 50 | 50 | 52 | 1% | 5% | 41 | 40 | 40 | -3% | -2% | OR | 50 | 50 | 52 | 0.01 | 0.05 |
| General Surgery | Hernia | Femoral Hernia Repair | 42 | 44 | 47 | 4% | 12% | 35 | 35 | 36 | 0% | 4% | OR | 42 | 44 | 47 | 0.04 | 0.12 |
| General Surgery | Hernia | Inguinal Hernia Repair | 1,743 | 1,793 | 1,863 | 3% | 7% | 1,272 | 1,186 | 1,114 | -7% | -12% | OR | 1743 | 1793 | 1863 | 0.03 | 0.07 |
| General Surgery | Hernia | Inguinal Hernia Repair - Laparoscopic | 350 | 404 | 491 | 16% | 40% | 262 | 276 | 304 | 5% | 16% | OR | 350 | 404 | 491 | 0.16 | 0.4 |
| General Surgery | Hernia | Lumbar Hernia Repair | 4 | 5 | 5 | 3% | 8% | 4 | 4 | 5 | 3% | 8% | OR | 4 | 5 | 5 | 0.03 | 0.08 |
| General Surgery | Hernia | Other Laparoscopic Hernia Repair | 373 | 629 | 961 | 68% | 157% | 298 | 441 | 589 | 48% | 98% | OR | 373 | 629 | 961 | 0.68 | 1.57 |
| General Surgery | Hernia | Spigelian Hernia Repair | 9 | 9 | 10 | 6% | 16% | 8 | 8 | 8 | 2% | 8% | OR | 9 | 9 | 10 | 0.06 | 0.16 |
| General Surgery | Hernia | Umbilical Hernia Repair | 505 | 464 | 436 | -8% | -14% | 404 | 358 | 324 | -11% | -20% | OR | 505 | 464 | 436 | -0.08 | -0.14 |
| General Surgery | Hernia | Ventral Hernia Repair | 368 | 351 | 344 | -5% | -6% | 316 | 291 | 276 | -8% | -13% | OR | 368 | 351 | 344 | -0.05 | -0.06 |
| General Surgery | Lymphatic | Biopsy/Excision - Lymph Node - Laparoscopic | 4 | 4 | 5 | 17% | 42% | 3 | 4 | 4 | 17% | 42% | OR | 4 | 4 | 5 | 0.17 | 0.42 |
| General Surgery | Lymphatic | Biopsy/Excision - Lymph Node - Open | 412 | 426 | 453 | 3% | 10% | 329 | 340 | 363 | 3% | 10% | OR | 412 | 426 | 453 | 0.03 | 0.1 |
| General Surgery | Lymphatic | Biopsy/Excision - Lymph Node - Percutaneous | 78 | 81 | 87 | 4% | 11% | 27 | 29 | 30 | 4% | 11% | OR | 78 | 81 | 87 | 0.04 | 0.11 |
| General Surgery | Lymphatic | Lesion Drainage - Lymph Node | 18 | 20 | 22 | 8% | 18% | 5 | 5 | 6 | 8% | 18% | OR | 18 | 20 | 22 | 0.08 | 0.18 |
| General Surgery | Lymphatic | Lesion Removal - Lymphatic | 4 | 4 | 4 | 1% | 7% | 3 | 3 | 4 | 1% | 7% | OR | 4 | 4 | 4 | 0.01 | 0.07 |
| General Surgery | Lymphatic | Other Laparoscopic Procedures - Lymphatic | 1 | 1 | 1 | 1% | 4% | 1 | 1 | 1 | 1% | 4% | OR | 1 | 1 | 1 | 0.01 | 0.04 |
| General Surgery | Lymphatic | Other Procedures - Lymphatic | 13 | 13 | 14 | 4% | 10% | 9 | 10 | 10 | 4% | 11% | OR | 13 | 13 | 14 | 0.04 | 0.1 |
| General Surgery | Lymphatic | Radical Lymph Node Resection | 104 | 106 | 111 | 2% | 6% | 92 | 93 | 98 | 2% | 6% | OR | 104 | 106 | 111 | 0.02 | 0.06 |
| General Surgery | Other General Surgery | Adrenalectomy | 0 | 0 | 1 | 11% | 27% | 0 | 0 | 1 | 11% | 27% | OR | 0 | 0 | 1 | 0.11 | 0.27 |
| General Surgery | Other General Surgery | Adrenalectomy - Laparoscopic | 2 | 3 | 5 | 69% | 209% | 2 | 3 | 5 | 69% | 209% | OR | 2 | 3 | 5 | 0.69 | 2.09 |
| General Surgery | Other General Surgery | Lesion Excision - Skin | 1,117 | 1,138 | 1,186 | 2% | 6% | 369 | 375 | 391 | 2% | 6% | OR | 1117 | 1138 | 1186 | 0.02 | 0.06 |
| General Surgery | Other General Surgery | Pilonidal Cyst Removal | 170 | 167 | 167 | -1% | -1% | 115 | 109 | 104 | -6% | -10% | OR | 170 | 167 | 167 | -0.01 | -0.01 |
| General Surgery | Other General Surgery | Pressure Ulcer Excision | 18 | 18 | 20 | 5% | 13% | 11 | 12 | 13 | 5% | 13% | OR | 18 | 18 | 20 | 0.05 | 0.13 |
| General Surgery | Other General Surgery | Sweat Gland Lesion Removal | 62 | 61 | 62 | -1% | 0% | 37 | 37 | 37 | -1% | 0% | OR | 62 | 61 | 62 | -0.01 | 0 |
| General Surgery | Soft Tissue | Biopsy - Soft Tissue | 163 | 168 | 177 | 3% | 8% | 62 | 64 | 67 | 3% | 8% | OR | 163 | 168 | 177 | 0.03 | 0.08 |
| General Surgery | Soft Tissue | Lesion Drainage - Soft Tissue | 22 | 23 | 24 | 5% | 13% | 10 | 10 | 11 | 5% | 13% | OR | 22 | 23 | 24 | 0.05 | 0.13 |
| General Surgery | Soft Tissue | Other Soft Tissue Procedures | 68 | 70 | 75 | 4% | 11% | 11 | 11 | 12 | 4% | 11% | OR | 68 | 70 | 75 | 0.04 | 0.11 |
| General Surgery | Soft Tissue | Radical Tumor Resection - Soft Tissue | 52 | 51 | 52 | -1% | 0% | 35 | 35 | 35 | -1% | 0% | OR | 52 | 51 | 52 | -0.01 | 0 |
| General Surgery | Soft Tissue | Tumor Excision - Soft Tissue | 839 | 938 | 1,074 | 12% | 28% | 495 | 553 | 634 | 12% | 28% | OR | 839 | 938 | 1074 | 0.12 | 0.28 |
| General Surgery | Spleen | Splenectomy - Laparoscopic | 4 | 5 | 7 | 28% | 69% | 4 | 5 | 6 | 28% | 69% | OR | 4 | 5 | 7 | 0.28 | 0.69 |
| General Surgery | Trachea | Tracheotomy/Tracheostomy Procedures | 58 | 63 | 68 | 7% | 17% | 56 | 60 | 65 | 7% | 17% | OR | 58 | 63 | 68 | 0.07 | 0.17 |

| Service Line | Sub Service Line | OPG Description | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth | 2012 HOPD Volume | 2017 HOPD Volume | 2022 HOPD Volume | 5YR Growth | 10YR Growth | OR Case Volumes | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | Procedure Location | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
| General Surgery | Trachea | Tracheotomy/Tracheostomy Procedures - Emergency | 329 | 353 | 385 | 7% | 17% | 316 | 339 | 370 | 7% | 17% | OR | 329 | 353 | 385 | 0.07 | 0.17 |
| General Surgery | Upper GI | Biopsy - Stomach | 5 | 5 | 5 | 3% | 8% | 4 | 4 | 4 | 3% | 8% | OR | 5 | 5 | 5 | 0.03 | 0.08 |
| General Surgery | Upper GI | Endoscopic GERD Procedures | 2 | 6 | 19 | 164% | 747% | 1 | 3 | 7 | 101% | 380% | OR | 2 | 6 | 19 | 1.64 | 7.47 |
| General Surgery | Upper GI | Feeding Tube Insertion/Removal | 466 | 494 | 548 | 6% | 18% | 368 | 390 | 433 | 6% | 18% | OR | 466 | 494 | 548 | 0.06 | 0.18 |
| General Surgery | Upper GI | Laparoscopic Fundoplication (Lap Nissen) | 81 | 81 | 81 | 1% | 0% | 71 | 68 | 65 | -4% | -8% | OR | 81 | 81 | 81 | 0.01 | 0 |
| General Surgery | Upper GI | Other Laparoscopic Procedures - Esophagus | 39 | 46 | 57 | 18% | 46% | 31 | 37 | 45 | 18% | 46% | OR | 39 | 46 | 57 | 0.18 | 0.46 |
| General Surgery | Upper GI | Other Laparoscopic Procedures - Stomach | 25 | 30 | 37 | 21% | 52% | 23 | 27 | 34 | 21% | 52% | OR | 25 | 30 | 37 | 0.21 | 0.52 |
| General Surgery | Upper GI | Other Procedures - Esophagus | 20 | 23 | 26 | 12% | 30% | 17 | 20 | 23 | 13% | 32% | OR | 20 | 23 | 26 | 0.12 | 0.3 |
| General Surgery | Upper GI | Other Procedures - Stomach | 37 | 41 | 47 | 11% | 28% | 33 | 36 | 42 | 11% | 28% | OR | 37 | 41 | 47 | 0.11 | 0.28 |
| General Surgery | Upper GI | Vagus Nerve Transection - Laparoscopic | 1 | 1 | 1 | -4% | -2% | 1 | 1 | 1 | -4% | -2% | OR | 1 | 1 | 1 | -0.04 | -0.02 |
| Gynecology | Artificial Insemination/In Vitro Fertilization | Artificial Insemination - Intra-Cervical | 17 | 16 | 16 | -4% | -4% | 3 | 2 | 2 | -23% | -39% | | | | | | |
| Gynecology | Artificial Insemination/In Vitro Fertilization | Artificial Insemination - Intra-Uterine | 1,286 | 1,482 | 1,721 | 15% | 34% | 116 | 119 | 123 | 3% | 6% | | | | | | |
| Gynecology | Artificial Insemination/In Vitro Fertilization | Artificial Insemination - Sperm Washing | 47 | 46 | 47 | -2% | -2% | 5 | 5 | 5 | -2% | -2% | | | | | | |
| Gynecology | Artificial Insemination/In Vitro Fertilization | In Vitro Fertilization - Egg Retrieval | 466 | 537 | 623 | 15% | 34% | 72 | 64 | 59 | -10% | -17% | | | | | | |
| Gynecology | Artificial Insemination/In Vitro Fertilization | In Vitro Fertilization - Embryo Transfer | 452 | 520 | 603 | 15% | 34% | 69 | 62 | 57 | -10% | -17% | | | | | | |
| Gynecology | Biopsy - Gynecology | Biopsy - Cervix | 486 | 430 | 390 | -11% | -20% | 24 | 22 | 20 | -11% | -20% | | | | | | |
| Gynecology | Biopsy - Gynecology | Biopsy - Cervix - Colposcopy | 3,066 | 2,706 | 2,450 | -12% | -20% | 153 | 135 | 123 | -12% | -20% | | | | | | |
| Gynecology | Biopsy - Gynecology | Biopsy - Cervix - Colposcopy (Leep) | 206 | 182 | 165 | -12% | -20% | 57 | 49 | 44 | -14% | -22% | | | | | | |
| Gynecology | Biopsy - Gynecology | Biopsy - Endometrium | 3,478 | 3,144 | 2,914 | -10% | -16% | 174 | 157 | 146 | -10% | -16% | | | | | | |
| Gynecology | Biopsy - Gynecology | Biopsy - Ovary | 1 | 1 | 1 | -8% | -11% | 1 | 1 | 1 | -8% | -11% | | | | | | |
| Gynecology | Biopsy - Gynecology | Biopsy - Uterus - Hysteroscopy | 1,608 | 1,611 | 1,658 | 0% | 3% | 973 | 919 | 900 | -5% | -7% | | | | | | |
| Gynecology | Biopsy - Gynecology | Biopsy - Vagina | 132 | 125 | 122 | -5% | -7% | 21 | 20 | 20 | -5% | -7% | | | | | | |
| Gynecology | Biopsy - Gynecology | Biopsy - Vagina - Colposcopy | 63 | 59 | 56 | -7% | -11% | 3 | 3 | 3 | -7% | -11% | | | | | | |
| Gynecology | Biopsy - Gynecology | Biopsy - Vulva | 494 | 465 | 450 | -6% | -9% | 40 | 37 | 36 | -6% | -9% | | | | | | |
| Gynecology | Biopsy - Gynecology | Biopsy - Vulva - Colposcopy | 22 | 21 | 21 | -6% | -8% | 1 | 1 | 1 | -6% | -8% | | | | | | |
| Gynecology | General Gynecology Procedures | Adhesiolysis - Ovary/Fallopian Tube | 9 | 9 | 9 | 0% | 5% | 7 | 7 | 7 | -5% | -7% | OR | 9 | 9 | 9 | 0 | 0.05 |
| Gynecology | General Gynecology Procedures | Adhesiolysis - Ovary/Fallopian Tube - Laparoscopic | 255 | 248 | 250 | -3% | -2% | 193 | 176 | 166 | -9% | -14% | OR | 255 | 248 | 250 | -0.03 | -0.02 |
| Gynecology | General Gynecology Procedures | Brachytherapy Placement - Vagina/Uterus | 8 | 10 | 12 | 23% | 52% | 6 | 7 | 8 | 15% | 32% | OR | 8 | 10 | 12 | 0.23 | 0.52 |
| Gynecology | General Gynecology Procedures | Cervical Cauterization (Cryocautery) | 533 | 495 | 470 | -7% | -12% | 27 | 25 | 23 | -7% | -12% | OR | 533 | 495 | 470 | -0.07 | -0.12 |
| Gynecology | General Gynecology Procedures | Cervical Cauterization (Electro/Thermal) | 61 | 57 | 54 | -7% | -11% | 3 | 3 | 3 | -7% | -11% | OR | 61 | 57 | 54 | -0.07 | -0.11 |
| Gynecology | General Gynecology Procedures | Cervical Cauterization (Laser) | 51 | 47 | 45 | -7% | -12% | 29 | 24 | 21 | -15% | -26% | OR | 51 | 47 | 45 | -0.07 | -0.12 |
| Gynecology | General Gynecology Procedures | Cervical Conization (Cold Knife/Laser) | 171 | 160 | 153 | -7% | -10% | 119 | 104 | 93 | -13% | -22% | OR | 171 | 160 | 153 | -0.07 | -0.1 |
| Gynecology | General Gynecology Procedures | Cervical Conization (Leep) | 420 | 412 | 413 | -2% | -2% | 135 | 116 | 101 | -14% | -25% | OR | 420 | 412 | 413 | -0.02 | -0.02 |
| Gynecology | General Gynecology Procedures | Cervical Conization (Leep) - Colposcopy | 52 | 47 | 44 | -9% | -15% | 14 | 12 | 11 | -12% | -18% | OR | 52 | 47 | 44 | -0.09 | -0.15 |
| Gynecology | General Gynecology Procedures | Cervical Currettage | 258 | 237 | 222 | -8% | -14% | 17 | 16 | 15 | -8% | -14% | OR | 258 | 237 | 222 | -0.08 | -0.14 |
| Gynecology | General Gynecology Procedures | Cervical Currettage - Colposcopy | 127 | 116 | 108 | -9% | -15% | 6 | 6 | 5 | -9% | -15% | OR | 127 | 116 | 108 | -0.09 | -0.15 |
| Gynecology | General Gynecology Procedures | Cervical Dilation | 186 | 182 | 184 | -2% | -1% | 29 | 28 | 28 | -2% | -1% | OR | 186 | 182 | 184 | -0.02 | -0.01 |
| Gynecology | General Gynecology Procedures | Cervical Stump Excision | 3 | 3 | 3 | 0% | 5% | 3 | 3 | 3 | 0% | 5% | OR | 3 | 3 | 3 | 0 | 0.05 |
| Gynecology | General Gynecology Procedures | Cervicectomy | 1 | 1 | 1 | 4% | 12% | 1 | 1 | 1 | 4% | 12% | OR | 1 | 1 | 1 | 0.04 | 0.12 |
| Gynecology | General Gynecology Procedures | Diagnostic Colposcopy | 911 | 837 | 784 | -8% | -14% | 46 | 42 | 39 | -8% | -14% | | | | | | |
| Gynecology | General Gynecology Procedures | Diagnostic Hysteroscopy | 184 | 179 | 180 | -3% | -2% | 83 | 72 | 64 | -13% | -23% | OR | 184 | 179 | 180 | -0.03 | -0.02 |
| Gynecology | General Gynecology Procedures | Dilation & Currettage (D&C) - Non-Obstetrical | 551 | 498 | 459 | -10% | -17% | 339 | 289 | 254 | -15% | -25% | OR | 551 | 498 | 459 | -0.1 | -0.17 |
| Gynecology | General Gynecology Procedures | Endometrial Ablation - Hysteroscopy | 384 | 378 | 387 | -2% | 1% | 224 | 197 | 181 | -12% | -19% | OR | 384 | 378 | 387 | -0.02 | 0.01 |
| Gynecology | General Gynecology Procedures | Endometrial Ablation (Cryoablation) | 1 | 1 | 1 | -3% | -3% | 1 | 1 | 1 | -11% | -17% | OR | 1 | 1 | 1 | -0.03 | -0.03 |
| Gynecology | General Gynecology Procedures | Endometrial Ablation (Thermal) | 112 | 168 | 260 | 50% | 132% | 53 | 62 | 75 | 17% | 40% | OR | 112 | 168 | 260 | 0.5 | 1.32 |
| Gynecology | General Gynecology Procedures | Hymen Incision/Removal | 21 | 21 | 21 | -2% | -3% | 16 | 16 | 16 | -2% | -3% | OR | 21 | 21 | 21 | -0.02 | -0.03 |
| Gynecology | General Gynecology Procedures | Lesion Destruction - Vagina | 147 | 145 | 145 | -2% | -1% | 39 | 39 | 39 | -2% | -1% | OR | 147 | 145 | 145 | -0.02 | -0.01 |
| Gynecology | General Gynecology Procedures | Lesion Destruction - Vulva | 494 | 486 | 486 | -2% | -1% | 71 | 70 | 70 | -2% | -1% | OR | 494 | 486 | 486 | -0.02 | -0.01 |
| Gynecology | General Gynecology Procedures | Lesion Drainage - Ovary | 23 | 22 | 22 | -3% | -1% | 12 | 12 | 12 | -3% | -1% | OR | 23 | 22 | 22 | -0.03 | -0.01 |
| Gynecology | General Gynecology Procedures | Lesion Drainage - Percutaneous | 2 | 2 | 2 | 7% | 15% | 1 | 1 | 2 | 6% | 15% | OR | 2 | 2 | 2 | 0.07 | 0.15 |
| Gynecology | General Gynecology Procedures | Lesion Drainage - Vagina | 9 | 9 | 10 | -1% | 1% | 2 | 2 | 2 | -1% | 1% | OR | 9 | 9 | 10 | -0.01 | 0.01 |
| Gynecology | General Gynecology Procedures | Lesion Drainage - Vulva | 234 | 230 | 232 | -2% | -1% | 43 | 42 | 43 | -2% | -1% | OR | 234 | 230 | 232 | -0.02 | -0.01 |
| Gynecology | General Gynecology Procedures | Lesion Removal - Ovary | 15 | 15 | 15 | -2% | 0% | 13 | 13 | 13 | -2% | 0% | OR | 15 | 15 | 15 | -0.02 | 0 |
| Gynecology | General Gynecology Procedures | Lesion Removal - Ovary - Laparoscopic | 513 | 499 | 501 | -3% | -2% | 403 | 392 | 394 | -3% | -2% | OR | 513 | 499 | 501 | -0.03 | -0.02 |
| Gynecology | General Gynecology Procedures | Lesion Removal - Vagina | 38 | 38 | 39 | 0% | 3% | 20 | 20 | 21 | 0% | 3% | OR | 38 | 38 | 39 | 0 | 0.03 |
| Gynecology | General Gynecology Procedures | Lesion Removal - Vulva | 22 | 21 | 22 | -2% | -1% | 14 | 14 | 14 | -2% | -1% | OR | 22 | 21 | 22 | -0.02 | -0.01 |
| Gynecology | General Gynecology Procedures | Other Adhesiolysis | 16 | 16 | 17 | 2% | 7% | 8 | 9 | 9 | 2% | 7% | OR | 16 | 16 | 17 | 0.02 | 0.07 |
| Gynecology | General Gynecology Procedures | Other Hysteroscopic Procedures | 25 | 27 | 30 | 7% | 19% | 18 | 19 | 22 | 7% | 19% | OR | 25 | 27 | 30 | 0.07 | 0.19 |
| Gynecology | General Gynecology Procedures | Other Laparoscopic Procedures - Gynecology | 11 | 12 | 14 | 9% | 22% | 9 | 9 | 10 | 5% | 14% | OR | 11 | 12 | 14 | 0.09 | 0.22 |
| Gynecology | General Gynecology Procedures | Other Procedures - Gynecology | 130 | 136 | 146 | 4% | 12% | 48 | 48 | 48 | -2% | 0% | OR | 130 | 136 | 146 | 0.04 | 0.12 |
| Gynecology | General Gynecology Procedures | Repair/Revision - Vagina | 97 | 111 | 132 | 15% | 37% | 80 | 89 | 102 | 11% | 28% | OR | 97 | 111 | 132 | 0.15 | 0.37 |
| Gynecology | General Gynecology Procedures | Speculoscopy | 10 | 11 | 12 | 11% | 25% | 0 | 0 | 0 | 11% | 26% | | | | | | |
| Gynecology | General Gynecology Procedures | Uterine Adhesiolysis - Hysteroscopy | 19 | 18 | 18 | -3% | -2% | 12 | 11 | 11 | -9% | -13% | OR | 19 | 18 | 18 | -0.03 | -0.02 |
| Gynecology | General Gynecology Procedures | Uterine Suspension | 6 | 6 | 6 | -1% | 2% | 6 | 5 | 5 | -4% | -6% | OR | 6 | 6 | 6 | -0.01 | 0.02 |
| Gynecology | General Gynecology Procedures | Vaginal Infection Treatment | 156 | 177 | 212 | 14% | 36% | 3 | 4 | 4 | 14% | 36% | | | | | | |
| Gynecology | General Gynecology Procedures | Vaginectomy | 8 | 8 | 9 | 4% | 11% | 6 | 6 | 6 | -3% | -3% | OR | 8 | 8 | 9 | 0.04 | 0.11 |
| Gynecology | General Gynecology Procedures | Vulvectomy | 37 | 38 | 39 | 1% | 4% | 28 | 26 | 25 | -6% | -9% | OR | 37 | 38 | 39 | 0.01 | 0.04 |
| Gynecology | Gynecological Exams | Exam For Suspected Abuse | 9 | 8 | 9 | -2% | 2% | 2 | 2 | 2 | -2% | 2% | | | | | | |
| Gynecology | Gynecological Exams | Pap Smear | 8,906 | 8,629 | 8,582 | -3% | -4% | 193 | 187 | 186 | -3% | -4% | | | | | | |
| Gynecology | Gynecological Exams | Pelvic Examination with Anesthesia | 31 | 32 | 33 | 2% | 7% | 13 | 13 | 14 | 2% | 7% | | | | | | |
| Gynecology | Gynecological Exams | Post-Coital Exam | 4 | 4 | 4 | -1% | 1% | 0 | 0 | 0 | 0% | 0% | | | | | | |
| Gynecology | Gynecological Exams | Women's Cancer Screening | 6,500 | 6,840 | 7,433 | 5% | 14% | 242 | 254 | 277 | 5% | 14% | | | | | | |
| Gynecology | Hysterectomy | Laparoscopic Assisted Vaginal Hysterectomy (LAVH) | 191 | 299 | 342 | 56% | 79% | 175 | 272 | 312 | 56% | 78% | OR | 191 | 299 | 342 | 0.56 | 0.79 |
| Gynecology | Hysterectomy | Laparoscopic Supracervical Hysterectomy (LSH) | 87 | 135 | 155 | 56% | 79% | 79 | 123 | 141 | 56% | 78% | OR | 87 | 135 | 155 | 0.56 | 0.79 |
| Gynecology | Hysterectomy | Total Laparoscopic Hysterectomy | 3 | 4 | 5 | 56% | 79% | 3 | 4 | 5 | 56% | 78% | OR | 3 | 4 | 5 | 0.56 | 0.79 |
| Gynecology | Hysterectomy | Vaginal Hysterectomy | 4 | 6 | 7 | 56% | 79% | 4 | 6 | 7 | 56% | 78% | OR | 4 | 6 | 7 | 0.56 | 0.79 |
| Gynecology | Uterine Fibroid Procedures | Uterine Fibroid Ablation - Ultrasound | 14 | 38 | 54 | 176% | 300% | 11 | 29 | 40 | 164% | 269% | OR | 14 | 38 | 54 | 1.76 | 3 |
| Gynecology | Uterine Fibroid Procedures | Uterine Fibroid Embolization (UAE) | 187 | 348 | 368 | 86% | 96% | 151 | 268 | 273 | 78% | 81% | OR | 187 | 348 | 368 | 0.86 | 0.96 |
| Gynecology | Uterine Fibroid Procedures | Uterine Fibroid Removal - Abdominal Approach | 8 | 7 | 4 | -12% | -55% | 6 | 5 | 3 | -14% | -58% | OR | 8 | 7 | 4 | -0.12 | -0.55 |

| Service Line | Sub Service Line | OPG Description | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth | 2012 HOPD Volume | 2017 HOPD Volume | 2022 HOPD Volume | 5YR Growth | 10YR Growth | OR Case Volumes | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | Procedure Location | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
| Gynecology | Uterine Fibroid Procedures | Uterine Fibroid Removal - Hysteroscopy | 107 | 115 | 70 | 8% | -35% | 68 | 67 | 38 | -1% | -45% | OR | 107 | 115 | 70 | 0.08 | -0.35 |
| Gynecology | Uterine Fibroid Procedures | Uterine Fibroid Removal - Laparoscopic | 24 | 24 | 13 | -3% | -46% | 21 | 20 | 11 | -5% | -49% | OR | 24 | 24 | 13 | -0.03 | -0.46 |
| Gynecology | Uterine Fibroid Procedures | Uterine Fibroid Removal - Vaginal Approach | 11 | 11 | 6 | -2% | -45% | 8 | 8 | 4 | -5% | -50% | OR | 11 | 11 | 6 | -0.02 | -0.45 |
| Gynecology | Women's Reproductive Health Procedures | Cervical Cerclage | 64 | 65 | 70 | 2% | 9% | 51 | 49 | 49 | -4% | -4% | OR | 64 | 65 | 70 | 0.02 | 0.09 |
| Gynecology | Women's Reproductive Health Procedures | Contraceptive Capsule Implantation/Removal | 22 | 19 | 17 | -12% | -20% | 3 | 3 | 3 | -12% | -20% | | | | | | |
| Gynecology | Women's Reproductive Health Procedures | Diaphragm Fitting | 92 | 76 | 65 | -18% | -29% | 6 | 5 | 4 | -18% | -29% | | | | | | |
| Gynecology | Women's Reproductive Health Procedures | Fallopian Tube Assessment (Chromotubation) | 7 | 6 | 6 | -3% | -2% | 2 | 2 | 2 | -3% | -2% | OR | 7 | 6 | 6 | -0.03 | -0.02 |
| Gynecology | Women's Reproductive Health Procedures | Fallopian Tube Ligation/Occlusion | 39 | 36 | 34 | -8% | -11% | 23 | 21 | 19 | -12% | -18% | OR | 39 | 36 | 34 | -0.08 | -0.11 |
| Gynecology | Women's Reproductive Health Procedures | Fallopian Tube Ligation/Occlusion - Hysteroscopy | 14 | 19 | 28 | 36% | 96% | 9 | 11 | 16 | 30% | 81% | OR | 14 | 19 | 28 | 0.36 | 0.96 |
| Gynecology | Women's Reproductive Health Procedures | Fallopian Tube Ligation/Occlusion - Laparoscopic | 588 | 541 | 520 | -8% | -12% | 357 | 314 | 292 | -12% | -18% | OR | 588 | 541 | 520 | -0.08 | -0.12 |
| Gynecology | Women's Reproductive Health Procedures | Fallopian Tube Repair | 18 | 18 | 18 | -3% | -2% | 16 | 15 | 15 | -6% | -7% | OR | 18 | 18 | 18 | -0.03 | -0.02 |
| Gynecology | Women's Reproductive Health Procedures | Fallopian Tube Repair - Laparoscopic | 3 | 3 | 4 | 3% | 10% | 3 | 3 | 3 | 0% | 5% | OR | 3 | 3 | 4 | 0.03 | 0.1 |
| Gynecology | Women's Reproductive Health Procedures | Fern Test | 3 | 4 | 4 | 6% | 15% | 0 | 1 | 1 | 6% | 15% | | | | | | |
| Gynecology | Women's Reproductive Health Procedures | Hormone Pellet Implantation (HRT) | 259 | 245 | 233 | -5% | -10% | 3 | 2 | 2 | -6% | -10% | | | | | | |
| Gynecology | Women's Reproductive Health Procedures | IUD Implantation/Removal | 728 | 742 | 789 | 2% | 8% | 73 | 74 | 79 | 2% | 8% | | | | | | |
| Gynecology | Women's Reproductive Health Procedures | Oophorectomy | 11 | 12 | 13 | 5% | 15% | 10 | 10 | 11 | 5% | 15% | OR | 11 | 12 | 13 | 0.05 | 0.15 |
| Gynecology | Women's Reproductive Health Procedures | Salpingectomy | 5 | 5 | 5 | -1% | 1% | 4 | 4 | 4 | -6% | -8% | OR | 5 | 5 | 5 | -0.01 | 0.01 |
| Gynecology | Women's Reproductive Health Procedures | Salpingo-Oophorectomy | 21 | 20 | 20 | -4% | -5% | 18 | 16 | 15 | -9% | -14% | OR | 21 | 20 | 20 | -0.04 | -0.05 |
| Gynecology | Women's Reproductive Health Procedures | Salpingo-Oophorectomy - Laparoscopic | 350 | 392 | 449 | 12% | 28% | 293 | 314 | 343 | 7% | 17% | OR | 350 | 392 | 449 | 0.12 | 0.28 |
| Lab | Anatomic Pathology | Anatomic Pathology | 2 | 2 | 2 | -1% | 1% | 1 | 1 | 1 | -4% | -2% | | | | | | |
| Lab | Chemistry | Chemistry | 212,203 | 220,269 | 236,676 | 4% | 12% | 14,854 | 15,419 | 16,567 | 4% | 12% | | | | | | |
| Lab | Consultation | Consultation | 238 | 247 | 259 | 4% | 9% | 141 | 146 | 153 | 4% | 9% | | | | | | |
| Lab | Cytogenetic Studies | Cytogenetic Studies | 1,304 | 1,588 | 1,934 | 22% | 48% | 221 | 223 | 222 | 1% | 0% | | | | | | |
| Lab | Cytopathology | Cytopathology | 111,261 | 110,703 | 111,037 | -1% | 0% | 13,052 | 12,177 | 12,214 | -7% | -6% | | | | | | |
| Lab | Drug Testing | Drug Testing | 1,499 | 1,460 | 1,459 | -3% | -3% | 131 | 117 | 117 | -11% | -11% | | | | | | |
| Lab | Evocative/Suppression Testing | Evocative/Suppression Testing | 13 | 13 | 13 | 0% | 0% | 1 | 1 | 1 | -7% | -7% | | | | | | |
| Lab | Hematology/Coagulation | Hematology/Coagulation | 141,262 | 156,400 | 179,377 | 11% | 27% | 7,063 | 7,820 | 8,969 | 11% | 27% | | | | | | |
| Lab | Immunology | Immunology | 41,212 | 42,064 | 44,547 | 2% | 8% | 3,709 | 3,786 | 4,009 | 2% | 8% | | | | | | |
| Lab | Microbiology | Microbiology | 126,892 | 137,738 | 156,116 | 9% | 23% | 10,141 | 9,667 | 9,575 | -5% | -6% | | | | | | |
| Lab | Organ/Disease Panel | Organ/Disease Panel | 337,647 | 358,412 | 384,733 | 6% | 14% | 27,012 | 28,673 | 30,779 | 6% | 14% | | | | | | |
| Lab | Other Lab | Other Lab | 2,689 | 2,812 | 2,988 | 5% | 11% | 108 | 112 | 120 | 5% | 11% | | | | | | |
| Lab | PSA Test | PSA Test | 3,558 | 4,424 | 5,467 | 24% | 54% | 107 | 133 | 164 | 24% | 54% | | | | | | |
| Lab | Reproductive Medicine Procedures | Reproductive Medicine Procedures | 2,032 | 2,280 | 2,612 | 12% | 29% | 346 | 388 | 444 | 12% | 29% | | | | | | |
| Lab | Surgical Pathology | Surgical Pathology | 91,807 | 96,594 | 105,219 | 5% | 15% | 28,234 | 28,978 | 31,566 | 3% | 12% | | | | | | |
| Lab | Therapeutic Drug Assays | Therapeutic Drug Assays | 7,160 | 7,388 | 7,663 | 3% | 7% | 430 | 443 | 460 | 3% | 7% | | | | | | |
| Lab | Tissue Typing | Tissue Typing | 160 | 160 | 157 | 0% | -2% | 38 | 38 | 38 | 0% | -2% | | | | | | |
| Lab | Transcutaneous Procedures | Transcutaneous Procedures | 5 | 5 | 6 | 12% | 25% | 1 | 1 | 1 | 12% | 25% | | | | | | |
| Lab | Transfusion Medicine | Transfusion Medicine | 919 | 930 | 972 | 1% | 6% | 285 | 288 | 301 | 1% | 6% | | | | | | |
| Lab | Urinalysis | Urinalysis | 36,903 | 38,254 | 41,340 | 4% | 12% | 1,107 | 1,148 | 1,240 | 4% | 12% | | | | | | |
| Miscellaneous Serv | Allergy | Allergen Immunotherapy | 140,648 | 139,404 | 142,994 | -1% | 2% | 2,813 | 2,788 | 2,860 | -1% | 2% | | | | | | |
| Miscellaneous Serv | Allergy | Allergy Testing | 6,164 | 6,145 | 6,371 | 0% | 3% | 123 | 123 | 127 | 0% | 3% | | | | | | |
| Miscellaneous Serv | Fine Needle Aspiration | Fine Needle Aspiration | 653 | 535 | 450 | -18% | -31% | 150 | 123 | 103 | -18% | -31% | | | | | | |
| Miscellaneous Serv | Fine Needle Aspiration | Fine Needle Aspiration - Image Guided | 756 | 1,026 | 1,406 | 36% | 86% | 380 | 483 | 623 | 27% | 64% | | | | | | |
| Miscellaneous Serv | Immunization | Immunization Administration | 195,473 | 227,883 | 269,721 | 17% | 38% | 1,955 | 2,279 | 2,697 | 17% | 38% | | | | | | |
| Miscellaneous Serv | Infusion/Transfusion | Blood Transfusion | 310 | 320 | 330 | 3% | 6% | 137 | 141 | 145 | 3% | 6% | | | | | | |
| Miscellaneous Serv | Infusion/Transfusion | Other Infusion/Transfusion Services | 22 | 22 | 22 | 0% | 0% | 17 | 17 | 17 | 0% | 0% | | | | | | |
| Miscellaneous Serv | Infusion/Transfusion | Therapeutic Infusion/Injection | 103,476 | 121,316 | 143,471 | 17% | 39% | 6,209 | 7,279 | 8,608 | 17% | 39% | | | | | | |
| Miscellaneous Serv | Miscellaneous Services | Blood Letting (Phlebotomy) | 1,357 | 1,462 | 1,611 | 8% | 19% | 163 | 175 | 193 | 8% | 19% | | | | | | |
| Miscellaneous Serv | Miscellaneous Services | Other Miscellaneous Services | 2,620 | 2,608 | 2,646 | 0% | 1% | 838 | 835 | 847 | 0% | 1% | | | | | | |
| Miscellaneous Serv | Therapeutic Apheresis | Therapeutic Apheresis | 339 | 571 | 928 | 68% | 173% | 248 | 417 | 677 | 68% | 173% | | | | | | |
| Miscellaneous Serv | Venipuncture | Venipuncture | 81,928 | 86,005 | 91,988 | 5% | 12% | 13,928 | 14,621 | 15,638 | 5% | 12% | | | | | | |
| Nephrology | End Stage Renal Disease (ESRD) | ESRD Services | 20,512 | 22,580 | 24,552 | 10% | 20% | 3,888 | 3,620 | 3,300 | -7% | -15% | | | | | | |
| Nephrology | End Stage Renal Disease (ESRD) | Hemodialysis | 1,826 | 1,970 | 2,107 | 8% | 15% | 546 | 494 | 437 | -10% | -20% | | | | | | |
| Nephrology | End Stage Renal Disease (ESRD) | Other Dialysis Procedures | 1,028 | 1,087 | 1,121 | 6% | 9% | 380 | 370 | 351 | -3% | -8% | | | | | | |
| Neurology | Functional Neurology Procedures | Chemodenervation - Face | 839 | 1,327 | 2,156 | 58% | 157% | 75 | 93 | 116 | 24% | 54% | | | | | | |
| Neurology | Functional Neurology Procedures | Chemodenervation - Neck | 553 | 853 | 1,339 | 54% | 142% | 88 | 120 | 164 | 35% | 86% | | | | | | |
| Neurology | Functional Neurology Procedures | Chemodenervation - Trunk/Extremity | 469 | 714 | 1,125 | 52% | 140% | 98 | 136 | 194 | 38% | 97% | | | | | | |
| Neurology | Neuro-Electrodiagnostics | Electrocorticogram (ECOG) | 2 | 3 | 5 | 71% | 186% | 1 | 1 | 2 | 71% | 185% | | | | | | |
| Neurology | Neuro-Electrodiagnostics | Electroencephalogram (EEG) | 4,490 | 4,997 | 5,797 | 11% | 29% | 2,020 | 2,102 | 2,278 | 4% | 13% | | | | | | |
| Neurology | Neuro-Electrodiagnostics | Electromyography (EMG) | 9,962 | 11,198 | 12,880 | 12% | 29% | 1,693 | 1,904 | 2,190 | 12% | 29% | | | | | | |
| Neurology | Neuro-Electrodiagnostics | Magnetoencephalography (MEG) | 3 | 4 | 7 | 57% | 159% | 1 | 2 | 3 | 57% | 159% | | | | | | |
| Neurology | Neuro-Electrodiagnostics | Pharmacological/Physical Activation During EEG | 7 | 7 | 8 | 7% | 19% | 0 | 0 | 0 | 7% | 19% | | | | | | |
| Neurology | Other Neurological Diagnostic Testing | Autonomic Nervous System Testing | 420 | 600 | 887 | 43% | 111% | 21 | 30 | 44 | 43% | 111% | | | | | | |
| Neurology | Other Neurological Diagnostic Testing | Caloric Vestibular Test | 744 | 855 | 1,020 | 15% | 37% | 74 | 85 | 102 | 15% | 37% | | | | | | |
| Neurology | Other Neurological Diagnostic Testing | Central Nervous System Testing | 128 | 138 | 155 | 8% | 21% | 9 | 10 | 11 | 8% | 21% | | | | | | |
| Neurology | Other Neurological Diagnostic Testing | Cerebral Seizure Testing | 278 | 292 | 319 | 5% | 15% | 109 | 114 | 125 | 5% | 15% | | | | | | |
| Neurology | Other Neurological Diagnostic Testing | Developmental Testing | 1,375 | 1,749 | 2,326 | 27% | 69% | 55 | 70 | 93 | 27% | 69% | | | | | | |
| Neurology | Other Neurological Diagnostic Testing | H-Reflex Testing | 484 | 574 | 702 | 19% | 45% | 34 | 40 | 49 | 19% | 45% | | | | | | |
| Neurology | Other Neurological Diagnostic Testing | Muscle/Range of Motion Testing | 2,207 | 2,235 | 2,324 | 1% | 5% | 110 | 112 | 116 | 1% | 5% | | | | | | |
| Neurology | Other Neurological Diagnostic Testing | Nerve Conduction Testing | 2,810 | 3,200 | 3,771 | 14% | 34% | 309 | 352 | 415 | 14% | 34% | | | | | | |
| Neurology | Other Neurological Diagnostic Testing | Neurobehaviorial Status Exam | 624 | 764 | 997 | 22% | 60% | 37 | 46 | 60 | 22% | 60% | | | | | | |
| Neurology | Other Neurological Diagnostic Testing | Neuromuscular Junction Test | 70 | 73 | 78 | 5% | 12% | 6 | 6 | 6 | 5% | 12% | | | | | | |
| Neurology | Other Neurological Diagnostic Testing | Neuropsychological Testing | 1,090 | 1,395 | 1,877 | 28% | 72% | 174 | 223 | 300 | 28% | 72% | | | | | | |
| Neurology | Other Neurological Diagnostic Testing | Nystagmus Study | 247 | 285 | 342 | 16% | 39% | 25 | 29 | 34 | 16% | 39% | | | | | | |
| Neurology | Other Neurological Diagnostic Testing | Oscillating Tracking Test | 30 | 35 | 44 | 18% | 46% | 1 | 1 | 2 | 18% | 46% | | | | | | |
| Neurology | Other Neurological Diagnostic Testing | Other Neurological Diagnostic Testing | 163 | 166 | 174 | 1% | 7% | 16 | 17 | 17 | 1% | 7% | | | | | | |
| Neurology | Other Neurological Diagnostic Testing | Psychological Testing | 2,052 | 2,538 | 3,298 | 24% | 61% | 82 | 102 | 132 | 24% | 61% | | | | | | |
| Neurology | Other Neurological Diagnostic Testing | Sinusoidal Rotational Test | 32 | 38 | 47 | 19% | 49% | 3 | 4 | 5 | 19% | 49% | | | | | | |
| Neurology | Other Neurological Diagnostic Testing | Somatosensory Testing | 815 | 929 | 1,103 | 14% | 35% | 57 | 65 | 77 | 14% | 35% | | | | | | |

| | | | | | | | | | | | | | OR Case Volumes | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Service Line | Sub Service Line | OPG Description | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth | 2012 HOPD Volume | 2017 HOPD Volume | 2022 HOPD Volume | 5YR Growth | 10YR Growth | Procedure Location | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
| Neurology | Sleep Studies | Polysomnography Testing | 9,944 | 11,352 | 12,963 | 14% | 30% | 4,165 | 3,402 | 2,851 | -18% | -32% | | | | | | |
| Neurology | Sleep Studies | Sleep Latency Test | 377 | 433 | 508 | 15% | 35% | 173 | 147 | 131 | -15% | -24% | | | | | | |
| Neurology | Sleep Studies | Sleep Study | 240 | 332 | 459 | 39% | 92% | 100 | 99 | 101 | -1% | 1% | | | | | | |
| Neurosurgery | Cranial/Peripheral Nerve Disorders | Neuroplasty - Arm/Leg | 35 | 36 | 38 | 3% | 9% | 20 | 19 | 18 | -7% | -9% | OR | 35 | 36 | 38 | 0.03 | 0.09 |
| Neurosurgery | Cranial/Peripheral Nerve Disorders | Neuroplasty - Cranial Nerve Transposition | 2 | 2 | 2 | 3% | 11% | 1 | 1 | 1 | -6% | -8% | OR | 2 | 2 | 2 | 0.03 | 0.11 |
| Neurosurgery | Cranial/Peripheral Nerve Disorders | Neuroplasty - Hand/Foot | 25 | 25 | 26 | 1% | 4% | 15 | 13 | 13 | -8% | -13% | OR | 25 | 25 | 26 | 0.01 | 0.04 |
| Neurosurgery | Cranial/Peripheral Nerve Disorders | Neuroplasty - Ulnar Nerve Transposition - Elbow | 101 | 103 | 106 | 2% | 6% | 59 | 54 | 52 | -7% | -12% | OR | 101 | 103 | 106 | 0.02 | 0.06 |
| Neurosurgery | Cranial/Peripheral Nerve Disorders | Neuroplasty - Ulnar Nerve Transposition - Wrist | 7 | 7 | 8 | 3% | 9% | 4 | 4 | 4 | -6% | -9% | OR | 7 | 7 | 8 | 0.03 | 0.09 |
| Neurosurgery | Functional Neurosurgery Procedures | Neurostimulation - Cortical/Subcortical Mapping | 5 | 9 | 15 | 72% | 176% | 0 | 0 | 1 | 51% | 141% | | | | | | |
| Neurosurgery | Functional Neurosurgery Procedures | Neurostimulation - Electrical Lead Implantation - Open | 46 | 45 | 41 | -2% | -11% | 44 | 42 | 38 | -3% | -13% | OR | 46 | 45 | 41 | -0.02 | -0.11 |
| Neurosurgery | Functional Neurosurgery Procedures | Neurostimulation - Electrical Lead Implantation - Percutaneous | 93 | 90 | 82 | -3% | -12% | 15 | 14 | 13 | -3% | -12% | | | | | | |
| Neurosurgery | Functional Neurosurgery Procedures | Neurostimulation - Electrical Lead Removal/Revision | 21 | 34 | 52 | 64% | 151% | 19 | 31 | 48 | 62% | 146% | OR | 21 | 34 | 52 | 0.64 | 1.51 |
| Neurosurgery | Functional Neurosurgery Procedures | Neurostimulation - Focal Magnetic Pulse Delivery | 0 | 1 | 1 | 77% | 197% | 0 | 1 | 1 | 68% | 167% | | | | | | |
| Neurosurgery | Functional Neurosurgery Procedures | Neurostimulation - Neurophysiologist Monitoring (MER) | 419 | 709 | 1,123 | 69% | 168% | 24 | 35 | 56 | 49% | 135% | | | | | | |
| Neurosurgery | Functional Neurosurgery Procedures | Neurostimulation - Pulse Generator Implantation/Removal | 67 | 114 | 182 | 71% | 173% | 63 | 106 | 167 | 69% | 168% | OR | 67 | 114 | 182 | 0.71 | 1.73 |
| Neurosurgery | Functional Neurosurgery Procedures | Neurostimulator Programming | 377 | 364 | 328 | -3% | -13% | 21 | 18 | 16 | -15% | -24% | | | | | | |
| Neurosurgery | Functional Neurosurgery Procedures | Surface Neurostimulator Application | 829 | 868 | 860 | 5% | 4% | 25 | 26 | 26 | 5% | 4% | | | | | | |
| Neurosurgery | Neuro-Vascular Procedures | Occlusion/Embolization - Transcatheter | 1 | 1 | 1 | 18% | 44% | 1 | 1 | 1 | 18% | 44% | OR | 1 | 1 | 1 | 0.18 | 0.44 |
| Neurosurgery | Other Nervous System Procedures | Biopsy - Nerve | 15 | 16 | 17 | 6% | 14% | 10 | 10 | 10 | -1% | 0% | OR | 15 | 16 | 17 | 0.06 | 0.14 |
| Neurosurgery | Other Nervous System Procedures | Excision - Neurofibroma/Neurolemmoma | 11 | 12 | 13 | 6% | 16% | 7 | 7 | 7 | -2% | -1% | OR | 11 | 12 | 13 | 0.06 | 0.16 |
| Neurosurgery | Other Nervous System Procedures | Excision - Neuroma | 26 | 28 | 30 | 7% | 16% | 17 | 17 | 17 | -1% | 0% | OR | 26 | 28 | 30 | 0.07 | 0.16 |
| Neurosurgery | Other Nervous System Procedures | Implantation - Nerve End | 6 | 6 | 7 | 9% | 20% | 3 | 3 | 3 | 2% | 4% | OR | 6 | 6 | 7 | 0.09 | 0.2 |
| Neurosurgery | Other Nervous System Procedures | Nerve Decompression | 114 | 114 | 116 | 0% | 1% | 9 | 9 | 9 | 0% | 1% | OR | 114 | 114 | 116 | 0 | 0.01 |
| Neurosurgery | Other Nervous System Procedures | Nerve Graft | 3 | 3 | 4 | 7% | 18% | 2 | 2 | 3 | 7% | 18% | OR | 3 | 3 | 4 | 0.07 | 0.18 |
| Neurosurgery | Other Nervous System Procedures | Neuroplasty - Other | 5 | 5 | 6 | 9% | 20% | 2 | 3 | 3 | 9% | 20% | OR | 5 | 5 | 6 | 0.09 | 0.2 |
| Neurosurgery | Other Nervous System Procedures | Other Nervous System Procedures | 116 | 122 | 131 | 5% | 13% | 32 | 34 | 37 | 5% | 13% | OR | 116 | 122 | 131 | 0.05 | 0.13 |
| Neurosurgery | Other Nervous System Procedures | Suture - Hand/Foot Nerve | 24 | 25 | 27 | 5% | 13% | 13 | 14 | 15 | 5% | 13% | OR | 24 | 25 | 27 | 0.05 | 0.13 |
| Neurosurgery | Other Nervous System Procedures | Suture - Major Peripheral Nerve | 2 | 3 | 3 | 5% | 14% | 2 | 2 | 2 | 5% | 14% | OR | 2 | 3 | 3 | 0.05 | 0.14 |
| Neurosurgery | Other Nervous System Procedures | Suture - Other Nerve | 1 | 1 | 1 | 7% | 17% | 0 | 0 | 0 | 7% | 17% | OR | 1 | 1 | 1 | 0.07 | 0.17 |
| Neurosurgery | Other Nervous System Procedures | Sympathectomy - Digital Arteries | 1 | 1 | 1 | 2% | 9% | 1 | 1 | 1 | -4% | -3% | OR | 1 | 1 | 1 | 0.02 | 0.09 |
| Neurosurgery | Other Nervous System Procedures | Sympathectomy - Spine | 4 | 3 | 3 | -9% | -15% | 3 | 2 | 2 | -14% | -24% | OR | 4 | 3 | 3 | -0.09 | -0.15 |
| Neurosurgery | Other Nervous System Procedures | Transection/Avulsion - Facial Nerve | 1 | 1 | 2 | 13% | 32% | 0 | 0 | 0 | 12% | 32% | OR | 1 | 1 | 2 | 0.13 | 0.32 |
| Neurosurgery | Other Nervous System Procedures | Transection/Avulsion - Greater Occipital Nerve | 1 | 1 | 1 | 4% | 10% | 0 | 0 | 0 | -5% | -7% | OR | 1 | 1 | 1 | 0.04 | 0.1 |
| Neurosurgery | Other Nervous System Procedures | Transection/Avulsion - Orbital Nerve | 1 | 1 | 1 | 5% | 16% | 1 | 1 | 1 | -1% | 3% | OR | 1 | 1 | 1 | 0.05 | 0.16 |
| Neurosurgery | Other Nervous System Procedures | Transection/Avulsion - Other Cranial Nerve | 1 | 1 | 1 | 2% | -2% | 0 | 0 | 0 | -9% | -22% | OR | 1 | 1 | 1 | 0.02 | -0.02 |
| Neurosurgery | Other Nervous System Procedures | Transection/Avulsion - Other Nerve | 2 | 2 | 2 | 4% | 9% | 1 | 1 | 1 | -5% | -9% | OR | 2 | 2 | 2 | 0.04 | 0.09 |
| Neurosurgery | Skull/Meninges/Brain Procedures | Application/Removal - Fixation Devices - Skull | 11 | 11 | 12 | 5% | 14% | 3 | 3 | 3 | 5% | 14% | OR | 11 | 11 | 12 | 0.05 | 0.14 |
| Neurosurgery | Skull/Meninges/Brain Procedures | Aspiration/Injection - Skull/Meninges/Brain | 15 | 15 | 16 | 4% | 11% | 7 | 6 | 6 | -5% | -8% | OR | 15 | 15 | 16 | 0.04 | 0.11 |
| Neurosurgery | Skull/Meninges/Brain Procedures | Cerebrospinal Fluid Shunt (CSF) - Replacement/Revision | 3 | 3 | 3 | 5% | 15% | 2 | 2 | 2 | 5% | 15% | OR | 3 | 3 | 3 | 0.05 | 0.15 |
| Neurosurgery | Skull/Meninges/Brain Procedures | Endoscopic Transnasal/Transphenoidal Surgery | 1 | 4 | 14 | 214% | 931% | 1 | 4 | 14 | 214% | 931% | OR | 1 | 4 | 14 | 2.14 | 9.31 |
| Neurosurgery | Skull/Meninges/Brain Procedures | Fracture Treatment - Skull | 2 | 2 | 2 | 3% | 8% | 2 | 2 | 2 | 3% | 8% | OR | 2 | 2 | 2 | 0.03 | 0.08 |
| Neurosurgery | Skull/Meninges/Brain Procedures | Other Procedures - Skull/Meninges/Brain | 22 | 23 | 25 | 5% | 17% | 4 | 4 | 5 | 5% | 17% | OR | 22 | 23 | 25 | 0.05 | 0.17 |
| Neurosurgery | Skull/Meninges/Brain Procedures | Pump/Infusion System Implantation - Skull | 1 | 1 | 1 | 33% | 79% | 1 | 1 | 1 | 33% | 79% | OR | 1 | 1 | 1 | 0.33 | 0.79 |
| Neurosurgery | Skull/Meninges/Brain Procedures | Stereotactic Lesion Creation - Skull/Brain | 17 | 22 | 29 | 29% | 70% | 14 | 17 | 21 | 21% | 49% | OR | 17 | 22 | 29 | 0.29 | 0.7 |
| Neurosurgery | Skull/Meninges/Brain Procedures | Ventricular Puncture | 6 | 6 | 6 | 2% | 8% | 4 | 4 | 4 | -5% | -7% | OR | 6 | 6 | 6 | 0.02 | 0.08 |
| Obstetrics | Abortion | Abortion - D&C | 440 | 395 | 356 | -10% | -19% | 79 | 71 | 64 | -10% | -19% | OR | 440 | 395 | 356 | -0.1 | -0.19 |
| Obstetrics | Abortion | Abortion - D&E | 215 | 193 | 173 | -10% | -19% | 41 | 37 | 33 | -10% | -19% | OR | 215 | 193 | 173 | -0.1 | -0.19 |
| Obstetrics | Abortion | Abortion - Other | 32 | 28 | 26 | -11% | -19% | 7 | 7 | 6 | -11% | -19% | OR | 32 | 28 | 26 | -0.11 | -0.19 |
| Obstetrics | Fetal Procedures | Ectopic Pregnancy Surgical Treatment | 3 | 3 | 3 | -3% | -6% | 3 | 2 | 2 | -3% | -6% | OR | 3 | 3 | 3 | -0.03 | -0.06 |
| Obstetrics | Fetal Procedures | Ectopic Pregnancy Surgical Treatment - Laparoscopic | 30 | 29 | 29 | -3% | -5% | 27 | 26 | 25 | -3% | -5% | OR | 30 | 29 | 29 | -0.03 | -0.05 |
| Obstetrics | Fetal Testing | Amniocentesis | 518 | 335 | 221 | -35% | -57% | 171 | 111 | 73 | -35% | -57% | | | | | | |
| Obstetrics | Fetal Testing | Fetal Contraction Stress Test | 52 | 50 | 49 | -3% | -6% | 21 | 19 | 18 | -9% | -16% | | | | | | |
| Obstetrics | Fetal Testing | Fetal Non-Stress Test | 8,605 | 9,152 | 9,827 | 6% | 14% | 2,882 | 2,842 | 2,870 | -1% | 0% | | | | | | |
| Obstetrics | Fetal Testing | Genetic Testing | 115 | 132 | 150 | 15% | 30% | 41 | 42 | 44 | 4% | 8% | | | | | | |
| Obstetrics | Fetal Testing | Other Fetal Testing | 246 | 290 | 339 | 18% | 38% | 209 | 235 | 262 | 13% | 25% | | | | | | |
| Obstetrics | Newborn Care | Antepartum Care | 1,854 | 1,798 | 1,753 | -3% | -5% | 89 | 86 | 84 | -3% | -5% | | | | | | |
| Obstetrics | Newborn Care | Newborn Evaluation And Management | 195 | 198 | 201 | 1% | 3% | 56 | 57 | 58 | 1% | 3% | | | | | | |
| Obstetrics | Newborn Care | Newborn Resuscitation | 2 | 2 | 2 | 2% | 4% | 2 | 2 | 2 | 2% | 4% | | | | | | |
| Obstetrics | Newborn Care | Postpartum Care | 594 | 575 | 562 | -3% | -5% | 50 | 49 | 48 | -3% | -5% | | | | | | |
| Obstetrics | Other Obstetrical Procedures | Miscarriage Treatment | 1,032 | 1,047 | 1,072 | 1% | 4% | 819 | 831 | 851 | 1% | 4% | | | | | | |
| Obstetrics | Other Obstetrical Procedures | Other Obstetrical Procedures | 48 | 46 | 45 | -3% | -6% | 20 | 20 | 19 | -3% | -6% | | | | | | |
| Oncology | Chemotherapy | Chemotherapy | 3,118 | 3,241 | 3,462 | 4% | 11% | 814 | 1,160 | 1,697 | 42% | 108% | | | | | | |
| Oncology | Radiation Therapy | Brachytherapy Treatment - High Dose Rate (HDR) | 160 | 180 | 202 | 13% | 26% | 142 | 154 | 164 | 8% | 16% | | | | | | |
| Oncology | Radiation Therapy | Brachytherapy Treatment - Low Dose Rate (LDR) | 226 | 243 | 266 | 8% | 18% | 204 | 207 | 214 | 2% | 5% | | | | | | |
| Oncology | Radiation Therapy | IMRT | 750 | 942 | 1,131 | 26% | 51% | 535 | 623 | 694 | 17% | 30% | | | | | | |
| Oncology | Radiation Therapy | Proton Beam Treatment | 24 | 37 | 61 | 57% | 158% | 24 | 37 | 61 | 57% | 158% | | | | | | |
| Oncology | Radiation Therapy | Radiation Treatment - Conventional | 1,712 | 1,648 | 1,798 | -4% | 5% | 1,117 | 1,039 | 1,105 | -7% | -1% | | | | | | |
| Oncology | Radiation Therapy | Stereotactic Body Radiation Therapy (SBRT) | 49 | 58 | 66 | 18% | 34% | 47 | 54 | 60 | 14% | 27% | | | | | | |
| Oncology | Radiation Therapy | Stereotactic Radiosurgery (SRS) | 85 | 94 | 101 | 10% | 19% | 82 | 88 | 93 | 7% | 12% | | | | | | |
| Ophthalmology | Cataract Procedures | Extracapsular Cataract Removal without Intraocular Lens Implantation | 8 | 8 | 8 | 0% | 4% | 3 | 3 | 2 | -12% | -16% | OR | 8 | 8 | 8 | 0 | 0.04 |
| Ophthalmology | Cataract Procedures | Extracapsular Phacoemulsification with Intraocular Lens Implantation | 16,795 | 18,692 | 21,902 | 11% | 30% | 6,282 | 6,180 | 6,642 | -2% | 6% | OR | 16795 | 18692 | 21902 | 0.11 | 0.3 |
| Ophthalmology | Cataract Procedures | Intracapsular Cataract Removal with Intraocular Lens Implantation | 19 | 19 | 19 | 0% | 3% | 7 | 6 | 6 | -12% | -17% | OR | 19 | 19 | 19 | 0 | 0.03 |
| Ophthalmology | Cataract Procedures | Intracapsular Cataract Removal without Intraocular Lens Implantation | 2 | 2 | 2 | -5% | -4% | 1 | 1 | 1 | -16% | -22% | OR | 2 | 2 | 2 | -0.05 | -0.04 |
| Ophthalmology | Cataract Procedures | Intraocular Lens Implantation/Revision | 112 | 121 | 139 | 9% | 24% | 42 | 40 | 42 | -4% | 1% | OR | 112 | 121 | 139 | 0.09 | 0.24 |
| Ophthalmology | Cataract Procedures | Other Cataract Procedures | 49 | 49 | 51 | -1% | 4% | 12 | 10 | 8 | -20% | -34% | OR | 49 | 49 | 51 | -0.01 | 0.04 |
| Ophthalmology | Cataract Procedures | Other Cataract Procedures - Phacofragmentation | 43 | 47 | 53 | 7% | 21% | 9 | 8 | 8 | -8% | -11% | OR | 43 | 47 | 53 | 0.07 | 0.21 |
| Ophthalmology | Cataract Procedures | Secondary Cataract Laser Surgery (Yag Capsulotomy) | 5,166 | 5,684 | 6,615 | 10% | 28% | 1,932 | 1,879 | 2,006 | -3% | 4% | PR | | | | | |
| Ophthalmology | Cornea Procedures | Biopsy - Cornea | 2 | 2 | 2 | 5% | 14% | 1 | 1 | 1 | -2% | -1% | OR | 2 | 2 | 2 | 0.05 | 0.14 |
| Ophthalmology | Cornea Procedures | Cornea Transplant | 173 | 185 | 205 | 6% | 18% | 80 | 79 | 83 | -1% | 3% | OR | 173 | 185 | 205 | 0.06 | 0.18 |

| Service Line | Sub Service Line | OPG Description | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth | 2012 HOPD Volume | 2017 HOPD Volume | 2022 HOPD Volume | 5YR Growth | 10YR Growth | OR Case Volumes: Procedure Location | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ophthalmology | Cornea Procedures | Laceration Repair - Cornea | 19 | 19 | 21 | 3% | 11% | 4 | 4 | 4 | -6% | -8% | OR | 19 | 19 | 21 | 0.03 | 0.11 |
| Ophthalmology | Cornea Procedures | Lesion Destruction/Removal - Cornea | 43 | 46 | 50 | 6% | 17% | 12 | 11 | 12 | -3% | -2% | OR | 43 | 46 | 50 | 0.06 | 0.17 |
| Ophthalmology | Cornea Procedures | Other Procedures - Cornea | 11 | 11 | 11 | 2% | 6% | 0 | 0 | 0 | -2% | 2% | OR | 11 | 11 | 11 | 0.02 | 0.06 |
| Ophthalmology | Cornea Procedures | Pterygium Excision/Transposition | 145 | 160 | 180 | 10% | 24% | 66 | 69 | 73 | 3% | 9% | OR | 145 | 160 | 180 | 0.1 | 0.24 |
| Ophthalmology | Cornea Procedures | Scraping - Cornea | 57 | 62 | 70 | 8% | 21% | 1 | 1 | 1 | 8% | 21% | OR | 57 | 62 | 70 | 0.08 | 0.21 |
| Ophthalmology | Eyeglasses & Contact Lens Services | Contact Lens Fitting | 367 | 391 | 434 | 7% | 18% | 15 | 16 | 17 | 7% | 18% | | | | | | |
| Ophthalmology | Eyeglasses & Contact Lens Services | Eyeglasses Fitting | 41 | 44 | 48 | 5% | 16% | 2 | 2 | 2 | 5% | 16% | | | | | | |
| Ophthalmology | Eyeglasses & Contact Lens Services | Other Eyeglasses & Contact Lens Services | 38 | 39 | 40 | 1% | 5% | 2 | 2 | 2 | 1% | 5% | | | | | | |
| Ophthalmology | Eyelid Procedures | Biopsy - Eyelid | 348 | 402 | 479 | 15% | 38% | 10 | 12 | 14 | 15% | 38% | OR | 348 | 402 | 479 | 0.15 | 0.38 |
| Ophthalmology | Eyelid Procedures | Canthus Procedures | 37 | 41 | 49 | 12% | 33% | 13 | 13 | 14 | -1% | 5% | OR | 37 | 41 | 49 | 0.12 | 0.33 |
| Ophthalmology | Eyelid Procedures | Chalazion (Cyst) Excision - Eyelid | 567 | 573 | 598 | 1% | 6% | 35 | 34 | 36 | -3% | 1% | PR | | | | | |
| Ophthalmology | Eyelid Procedures | Entropion/Ectropian Repair | 251 | 269 | 304 | 7% | 21% | 67 | 61 | 59 | -8% | -12% | OR | 251 | 269 | 304 | 0.07 | 0.21 |
| Ophthalmology | Eyelid Procedures | Excision/Repair - Eyelid | 92 | 102 | 118 | 11% | 28% | 34 | 34 | 35 | 0% | 3% | OR | 92 | 102 | 118 | 0.11 | 0.28 |
| Ophthalmology | Eyelid Procedures | Foreign Body Removal - Eyelid | 28 | 28 | 30 | 2% | 8% | 4 | 3 | 2 | -24% | -43% | OR | 28 | 28 | 30 | 0.02 | 0.08 |
| Ophthalmology | Eyelid Procedures | Lesion Destruction/Excision - Eyelid | 504 | 553 | 624 | 10% | 24% | 30 | 33 | 37 | 10% | 24% | OR | 504 | 553 | 624 | 0.1 | 0.24 |
| Ophthalmology | Eyelid Procedures | Lesion Drainage - Eyelid | 48 | 52 | 59 | 9% | 22% | 3 | 4 | 4 | 9% | 22% | OR | 48 | 52 | 59 | 0.09 | 0.22 |
| Ophthalmology | Eyelid Procedures | Other Procedures - Eyelid | 61 | 67 | 77 | 11% | 27% | 14 | 13 | 13 | -7% | -12% | OR | 61 | 67 | 77 | 0.11 | 0.27 |
| Ophthalmology | Eyelid Procedures | Reconstruction - Blepharoplasty | 386 | 436 | 511 | 13% | 33% | 126 | 126 | 130 | 0% | 3% | OR | 386 | 436 | 511 | 0.13 | 0.33 |
| Ophthalmology | Eyelid Procedures | Trichiasis Correction | 1,628 | 1,909 | 2,354 | 17% | 45% | 21 | 24 | 30 | 17% | 45% | PR | | | | | |
| Ophthalmology | Glaucoma Procedures | Aqueous Drainage | 119 | 150 | 194 | 26% | 63% | 11 | 9 | 7 | -18% | -33% | OR | 119 | 150 | 194 | 0.26 | 0.63 |
| Ophthalmology | Glaucoma Procedures | Injection - Anterior Chamber | 15 | 18 | 22 | 16% | 44% | 1 | 1 | 1 | -5% | 18% | OR | 15 | 18 | 22 | 0.16 | 0.44 |
| Ophthalmology | Glaucoma Procedures | Iridectomy | 15 | 15 | 16 | 2% | 7% | 4 | 4 | 4 | -5% | -7% | OR | 15 | 15 | 16 | 0.02 | 0.07 |
| Ophthalmology | Glaucoma Procedures | Laser Repair - Iridectomy/Iridotomy | 1,291 | 2,024 | 3,059 | 57% | 137% | 125 | 141 | 143 | 13% | 15% | PR | | | | | |
| Ophthalmology | Glaucoma Procedures | Laser Repair - Trabeculoplasty | 1,960 | 3,042 | 4,595 | 55% | 134% | 92 | 89 | 73 | -3% | -20% | PR | | | | | |
| Ophthalmology | Glaucoma Procedures | Other Glaucoma Procedures | 2 | 2 | 2 | 17% | 44% | 1 | 1 | 1 | 14% | 38% | OR | 2 | 2 | 2 | 0.17 | 0.44 |
| Ophthalmology | Glaucoma Procedures | Sclera Fistulization - Trabeculectomy | 258 | 344 | 474 | 33% | 83% | 130 | 165 | 219 | 27% | 69% | OR | 258 | 344 | 474 | 0.33 | 0.83 |
| Ophthalmology | Glaucoma Procedures | Shunt Placement/Revision | 93 | 109 | 133 | 17% | 44% | 44 | 49 | 56 | 10% | 27% | OR | 93 | 109 | 133 | 0.17 | 0.44 |
| Ophthalmology | Glaucoma Procedures | Trabeculotomy | 3 | 3 | 4 | 2% | 9% | 2 | 2 | 2 | 4% | 17% | OR | 3 | 3 | 4 | 0.02 | 0.09 |
| Ophthalmology | Lacrimal System Procedures | Dacryocystorhinostomy | 59 | 62 | 68 | 5% | 16% | 25 | 25 | 26 | -1% | 1% | OR | 59 | 62 | 68 | 0.05 | 0.16 |
| Ophthalmology | Lacrimal System Procedures | Exploration/Probing - Lacrimal System | 700 | 849 | 1,073 | 21% | 53% | 40 | 34 | 27 | -16% | -33% | PR | | | | | |
| Ophthalmology | Lacrimal System Procedures | Foreign Body Removal - Lacrimal System | 16 | 16 | 18 | 5% | 15% | 1 | 0 | 0 | -21% | -37% | OR | 16 | 16 | 18 | 0.05 | 0.15 |
| Ophthalmology | Lacrimal System Procedures | Lacrimal Gland/Sac Excision | 1 | 1 | 2 | 2% | 7% | 0 | 0 | 0 | -4% | -3% | OR | 1 | 1 | 2 | 0.02 | 0.07 |
| Ophthalmology | Lacrimal System Procedures | Other Lacrimal System Procedures | 28 | 30 | 32 | 4% | 13% | 5 | 4 | 4 | -12% | -20% | OR | 28 | 30 | 32 | 0.04 | 0.13 |
| Ophthalmology | Lacrimal System Procedures | Punctum Closure - Plug | 1,771 | 1,851 | 2,010 | 5% | 14% | 35 | 37 | 40 | 5% | 14% | PR | | | | | |
| Ophthalmology | Lacrimal System Procedures | Punctum Closure - Thermocauterization/Ligation/Laser | 112 | 116 | 125 | 4% | 12% | 2 | 2 | 3 | 5% | 13% | OR | 112 | 116 | 125 | 0.04 | 0.12 |
| Ophthalmology | Lacrimal System Procedures | Punctum Dilation | 230 | 258 | 302 | 12% | 31% | 2 | 3 | 3 | 12% | 31% | PR | | | | | |
| Ophthalmology | Lacrimal System Procedures | Punctum Incision | 37 | 41 | 48 | 12% | 31% | 0 | 0 | 0 | 12% | 31% | OR | 37 | 41 | 48 | 0.12 | 0.31 |
| Ophthalmology | Other Eye Procedures | Adhesion Removal - Anterior Chamber | 32 | 36 | 42 | 13% | 33% | 7 | 6 | 6 | -6% | -11% | OR | 32 | 36 | 42 | 0.13 | 0.33 |
| Ophthalmology | Other Eye Procedures | Artificial Eye Fitting | 4 | 4 | 4 | 0% | 3% | 0 | 0 | 0 | 0% | 3% | | | | | | |
| Ophthalmology | Other Eye Procedures | Biopsy - Conjunctiva | 18 | 20 | 22 | 9% | 21% | 3 | 3 | 2 | -15% | -29% | OR | 18 | 20 | 22 | 0.09 | 0.21 |
| Ophthalmology | Other Eye Procedures | Brow Reconstruction | 63 | 74 | 88 | 18% | 40% | 32 | 36 | 41 | 12% | 28% | OR | 63 | 74 | 88 | 0.18 | 0.4 |
| Ophthalmology | Other Eye Procedures | Ciliary Body Destruction | 53 | 59 | 67 | 11% | 26% | 15 | 15 | 14 | -3% | -5% | OR | 53 | 59 | 67 | 0.11 | 0.26 |
| Ophthalmology | Other Eye Procedures | Conjunctivoplasty | 38 | 42 | 48 | 11% | 27% | 12 | 12 | 12 | -2% | -2% | OR | 38 | 42 | 48 | 0.11 | 0.27 |
| Ophthalmology | Other Eye Procedures | Exploratory Surgery - Orbit | 16 | 16 | 17 | 3% | 8% | 10 | 10 | 10 | -2% | -1% | OR | 16 | 16 | 17 | 0.03 | 0.08 |
| Ophthalmology | Other Eye Procedures | Eye Removal | 23 | 23 | 24 | 0% | 3% | 8 | 7 | 7 | -8% | -14% | OR | 23 | 23 | 24 | 0 | 0.03 |
| Ophthalmology | Other Eye Procedures | Eye Removal with Implant | 19 | 20 | 21 | 4% | 12% | 13 | 13 | 13 | 0% | 2% | OR | 19 | 20 | 21 | 0.04 | 0.12 |
| Ophthalmology | Other Eye Procedures | Fine Needle Aspiration - Eye | 1 | 1 | 1 | 3% | 5% | 0 | 0 | 0 | -8% | -16% | OR | 1 | 1 | 1 | 0.03 | 0.05 |
| Ophthalmology | Other Eye Procedures | Foreign Body Removal - Eye | 1,352 | 1,372 | 1,424 | 2% | 5% | 176 | 178 | 185 | 2% | 5% | OR | 1352 | 1372 | 1424 | 0.02 | 0.05 |
| Ophthalmology | Other Eye Procedures | Fracture Treatment - Eye Socket | 16 | 16 | 16 | 0% | 3% | 11 | 11 | 11 | 0% | 3% | OR | 16 | 16 | 16 | 0 | 0.03 |
| Ophthalmology | Other Eye Procedures | Injection - Orbit | 247 | 275 | 316 | 11% | 28% | 7 | 8 | 9 | 11% | 28% | OR | 247 | 275 | 316 | 0.11 | 0.28 |
| Ophthalmology | Other Eye Procedures | Iridoplasty - Photocoagulation | 34 | 38 | 44 | 13% | 29% | 2 | 2 | 1 | -31% | -50% | OR | 34 | 38 | 44 | 0.13 | 0.29 |
| Ophthalmology | Other Eye Procedures | Optic Nerve Decompression | 5 | 6 | 7 | 14% | 33% | 3 | 4 | 4 | 9% | 21% | OR | 5 | 6 | 7 | 0.14 | 0.33 |
| Ophthalmology | Other Eye Procedures | Orbital Implant Placement/Revision | 8 | 9 | 9 | 3% | 6% | 5 | 4 | 4 | -3% | -5% | OR | 8 | 9 | 9 | 0.03 | 0.06 |
| Ophthalmology | Other Eye Procedures | Orthoptic/Pleoptic Training (Eye Exercises) | 882 | 902 | 977 | 2% | 11% | 26 | 27 | 29 | 2% | 11% | OR | 882 | 902 | 977 | 0.02 | 0.11 |
| Ophthalmology | Other Eye Procedures | Other Eye Procedures | 76 | 79 | 85 | 4% | 12% | 13 | 12 | 11 | -9% | -14% | OR | 76 | 79 | 85 | 0.04 | 0.12 |
| Ophthalmology | Other Eye Procedures | Other Intraocular Lens Procedures | 48 | 57 | 69 | 18% | 43% | 15 | 16 | 17 | 4% | 10% | OR | 48 | 57 | 69 | 0.18 | 0.43 |
| Ophthalmology | Other Eye Procedures | Other Lesion Excision - Eye | 26 | 28 | 32 | 9% | 21% | 12 | 12 | 12 | 0% | 1% | OR | 26 | 28 | 32 | 0.09 | 0.21 |
| Ophthalmology | Other Eye Procedures | Other Procedures - Conjunctiva | 114 | 125 | 138 | 9% | 21% | 14 | 12 | 11 | -9% | -16% | OR | 114 | 125 | 138 | 0.09 | 0.21 |
| Ophthalmology | Other Eye Procedures | Other Procedures - Eye Muscle | 12 | 12 | 13 | 5% | 11% | 3 | 2 | 2 | -5% | -8% | OR | 12 | 12 | 13 | 0.05 | 0.11 |
| Ophthalmology | Other Eye Procedures | Reinforcement - Sclera | 6 | 6 | 7 | 6% | 18% | 2 | 2 | 2 | -7% | -10% | OR | 6 | 6 | 7 | 0.06 | 0.18 |
| Ophthalmology | Other Eye Procedures | Strabismus Surgery | 266 | 267 | 277 | 1% | 4% | 151 | 142 | 137 | -6% | -10% | OR | 266 | 267 | 277 | 0.01 | 0.04 |
| Ophthalmology | Other Eye Procedures | Subconjunctival Injection | 119 | 132 | 150 | 11% | 26% | 5 | 5 | 6 | 11% | 26% | PR | | | | | |
| Ophthalmology | Other Eye Procedures | Wound Repair - Sclera | 80 | 85 | 94 | 7% | 18% | 17 | 15 | 12 | -17% | -30% | OR | 80 | 85 | 94 | 0.07 | 0.18 |
| Ophthalmology | Other Ophthalmological Diagnostic Testing | Biometry | 1,617 | 1,974 | 2,530 | 22% | 56% | 49 | 59 | 76 | 22% | 56% | | | | | | |
| Ophthalmology | Other Ophthalmological Diagnostic Testing | Electro-Oculography | 50 | 57 | 67 | 15% | 35% | 1 | 2 | 2 | 15% | 35% | | | | | | |
| Ophthalmology | Other Ophthalmological Diagnostic Testing | Electroretinography | 24 | 28 | 33 | 15% | 35% | 1 | 1 | 1 | 15% | 35% | | | | | | |
| Ophthalmology | Other Ophthalmological Diagnostic Testing | Fluorescein Angioscopy | 3,905 | 4,652 | 5,770 | 19% | 48% | 117 | 140 | 173 | 19% | 48% | | | | | | |
| Ophthalmology | Other Ophthalmological Diagnostic Testing | Fundus Photography | 3,159 | 3,726 | 4,511 | 18% | 43% | 95 | 112 | 135 | 18% | 43% | | | | | | |
| Ophthalmology | Other Ophthalmological Diagnostic Testing | Glaucoma Screening | 10 | 12 | 15 | 23% | 55% | 0 | 0 | 0 | 23% | 55% | | | | | | |
| Ophthalmology | Other Ophthalmological Diagnostic Testing | Gonioscopy | 2,045 | 2,447 | 3,024 | 20% | 48% | 61 | 73 | 91 | 20% | 48% | | | | | | |
| Ophthalmology | Other Ophthalmological Diagnostic Testing | Indocyanine-Green Angiography | 28 | 33 | 41 | 18% | 47% | 1 | 1 | 1 | 18% | 47% | | | | | | |
| Ophthalmology | Other Ophthalmological Diagnostic Testing | Oculoelectromyography - Needle | 2 | 2 | 3 | 16% | 42% | 0 | 0 | 0 | 17% | 43% | | | | | | |
| Ophthalmology | Other Ophthalmological Diagnostic Testing | Ophthalmodynamometry | 10 | 11 | 15 | 20% | 52% | 0 | 0 | 0 | 20% | 52% | | | | | | |
| Ophthalmology | Other Ophthalmological Diagnostic Testing | Ophthalmoscopy | 4,562 | 5,425 | 6,637 | 19% | 45% | 137 | 163 | 199 | 19% | 45% | | | | | | |
| Ophthalmology | Other Ophthalmological Diagnostic Testing | Photography - Extra-Ocular | 549 | 645 | 782 | 17% | 42% | 16 | 19 | 23 | 17% | 42% | | | | | | |
| Ophthalmology | Other Ophthalmological Diagnostic Testing | Photography - Special Anterior Segment | 258 | 312 | 395 | 21% | 53% | 8 | 9 | 12 | 21% | 53% | | | | | | |
| Ophthalmology | Other Ophthalmological Diagnostic Testing | Provocative Tests | 25 | 30 | 37 | 19% | 47% | 1 | 1 | 1 | 18% | 46% | | | | | | |
| Ophthalmology | Other Ophthalmological Diagnostic Testing | Scanning Computerized Imaging | 4,056 | 4,854 | 6,002 | 20% | 48% | 122 | 146 | 180 | 20% | 48% | | | | | | |
| Ophthalmology | Other Ophthalmological Diagnostic Testing | Serial Tonometry | 161 | 192 | 236 | 19% | 47% | 5 | 6 | 7 | 19% | 47% | | | | | | |

| Service Line | Sub Service Line | OPG Description | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth | 2012 HOPD Volume | 2017 HOPD Volume | 2022 HOPD Volume | 5YR Growth | 10YR Growth | OR Case Volumes: Procedure Location | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ophthalmology | Other Ophthalmological Diagnostic Testing | Tonography | 64 | 77 | 95 | 20% | 48% | 2 | 2 | 3 | 20% | 48% | | | | | | |
| Ophthalmology | Refractive Surgery | Astigmatism Sight Revision | 26 | 28 | 32 | 8% | 22% | 3 | 2 | 1 | -43% | -70% | OR | 26 | 28 | 32 | 0.08 | 0.22 |
| Ophthalmology | Refractive Surgery | Epithelium Removal | 65 | 66 | 70 | 3% | 9% | 6 | 6 | 6 | 3% | 9% | OR | 65 | 66 | 70 | 0.03 | 0.09 |
| Ophthalmology | Refractive Surgery | Keratomileusis (Lasik) | 256 | 327 | 436 | 28% | 70% | 5 | 7 | 9 | 28% | 70% | OR | 256 | 327 | 436 | 0.28 | 0.7 |
| Ophthalmology | Refractive Surgery | Radial Keratotomy | 2 | 2 | 2 | 3% | 10% | 0 | 0 | 0 | 4% | 12% | OR | 2 | 2 | 2 | 0.03 | 0.1 |
| Ophthalmology | Vision Exams | Other Medical Ophthalmology | 402 | 422 | 467 | 5% | 16% | 20 | 21 | 23 | 5% | 16% | | | | | | |
| Ophthalmology | Vision Exams | Vision Exams | 167,311 | 186,506 | 216,732 | 11% | 30% | 1,673 | 1,865 | 2,167 | 11% | 30% | | | | | | |
| Ophthalmology | Vitreo-Retinal Procedures | Aspiration - Retina/Vitreous | 11 | 12 | 13 | 7% | 20% | 3 | 3 | 3 | -10% | -17% | OR | 11 | 12 | 13 | 0.07 | 0.2 |
| Ophthalmology | Vitreo-Retinal Procedures | Detached Retina Procedures - Other | 91 | 106 | 125 | 17% | 37% | 20 | 19 | 18 | -3% | -7% | OR | 91 | 106 | 125 | 0.17 | 0.37 |
| Ophthalmology | Vitreo-Retinal Procedures | Detached Retina Procedures - Photocoagulation | 441 | 512 | 597 | 16% | 35% | 24 | 15 | 10 | -38% | -61% | OR | 441 | 512 | 597 | 0.16 | 0.35 |
| Ophthalmology | Vitreo-Retinal Procedures | Detached Retina Repair - Injection | 34 | 36 | 38 | 5% | 11% | 3 | 3 | 6 | 33% | 138% | OR | 34 | 36 | 38 | 0.05 | 0.11 |
| Ophthalmology | Vitreo-Retinal Procedures | Detached Retina Repair - Scleral Buckling | 63 | 63 | 64 | 0% | 3% | 44 | 41 | 39 | -7% | -11% | OR | 63 | 63 | 64 | 0 | 0.03 |
| Ophthalmology | Vitreo-Retinal Procedures | Detached Retina Repair with Vitrectomy | 278 | 325 | 388 | 17% | 39% | 195 | 212 | 235 | 9% | 21% | OR | 278 | 325 | 388 | 0.17 | 0.39 |
| Ophthalmology | Vitreo-Retinal Procedures | Diabetic Retinopathy Destruction - Cryotherapy/Diathermy | 9 | 10 | 10 | 7% | 16% | 3 | 2 | 2 | -11% | -19% | OR | 9 | 10 | 10 | 0.07 | 0.16 |
| Ophthalmology | Vitreo-Retinal Procedures | Diabetic Retinopathy Destruction - Photocoagulation | 1,538 | 1,966 | 2,540 | 28% | 65% | 0 | 0 | 0 | 0% | 0% | OR | 1538 | 1966 | 2540 | 0.28 | 0.65 |
| Ophthalmology | Vitreo-Retinal Procedures | Implant Material Removal | 17 | 20 | 24 | 18% | 43% | 11 | 12 | 14 | 14% | 34% | OR | 17 | 20 | 24 | 0.18 | 0.43 |
| Ophthalmology | Vitreo-Retinal Procedures | Injection - Vitreous | 442 | 729 | 1,200 | 65% | 171% | 26 | 37 | 50 | 38% | 88% | PR | | | | | |
| Ophthalmology | Vitreo-Retinal Procedures | Lesion Destruction - Choroid | 2 | 2 | 3 | 0% | 9% | 0 | 0 | 0 | 0% | 0% | OR | 2 | 2 | 3 | 0 | 0.09 |
| Ophthalmology | Vitreo-Retinal Procedures | Lesion Destruction - Choroid - Photocoagulation | 164 | 153 | 150 | -7% | -8% | 0 | 0 | 0 | 0% | 0% | PR | | | | | |
| Ophthalmology | Vitreo-Retinal Procedures | Lesion Destruction - Choroid - Photodynamic Therapy | 1,191 | 1,967 | 3,314 | 65% | 178% | 83 | 118 | 170 | 42% | 105% | PR | | | | | |
| Ophthalmology | Vitreo-Retinal Procedures | Lesion Destruction - Choroid - Thermotherapy | 32 | 40 | 55 | 27% | 72% | 0 | 0 | 0 | 0% | 0% | OR | 32 | 40 | 55 | 0.27 | 0.72 |
| Ophthalmology | Vitreo-Retinal Procedures | Lesion Destruction - Retina | 5 | 6 | 6 | 8% | 18% | 1 | 1 | 1 | -11% | -23% | OR | 5 | 6 | 6 | 0.08 | 0.18 |
| Ophthalmology | Vitreo-Retinal Procedures | Lesion Destruction - Retina - Photocoagulation | 1,547 | 1,675 | 1,843 | 8% | 19% | 0 | 0 | 0 | 0% | 0% | PR | | | | | |
| Ophthalmology | Vitreo-Retinal Procedures | Lesion Destruction - Retina - Radiation | 4 | 5 | 5 | 9% | 19% | 1 | 1 | 1 | 9% | 19% | OR | 4 | 5 | 5 | 0.09 | 0.19 |
| Ophthalmology | Vitreo-Retinal Procedures | Macular Drusen Destruction - Photocoagulation | 1 | 1 | 1 | 6% | 19% | 0 | 0 | 0 | 0% | 0% | PR | | | | | |
| Ophthalmology | Vitreo-Retinal Procedures | Other Vitreo-Retinal Procedures | 4 | 5 | 5 | 7% | 19% | 2 | 2 | 2 | 7% | 19% | OR | 4 | 5 | 5 | 0.07 | 0.19 |
| Ophthalmology | Vitreo-Retinal Procedures | Retrobulbar Injection - Diabetic Retinopathy | 110 | 125 | 149 | 14% | 35% | 22 | 25 | 30 | 14% | 35% | PR | | | | | |
| Ophthalmology | Vitreo-Retinal Procedures | Severing Vitreous Strands - Laser | 32 | 36 | 44 | 15% | 37% | 2 | 2 | 2 | -1% | 1% | PR | | | | | |
| Ophthalmology | Vitreo-Retinal Procedures | Vitrectomy | 664 | 792 | 975 | 19% | 47% | 398 | 436 | 493 | 10% | 24% | OR | 664 | 792 | 975 | 0.19 | 0.47 |
| Ophthalmology | Vitreo-Retinal Procedures | Vitreous Substitute Injection | 17 | 20 | 24 | 18% | 41% | 2 | 1 | 0 | -44% | -73% | OR | 17 | 20 | 24 | 0.18 | 0.41 |
| Orthopedics | Foot | Achilles Tendon Repair | 118 | 118 | 123 | 1% | 5% | 68 | 63 | 60 | -8% | -12% | OR | 118 | 118 | 123 | 0.01 | 0.05 |
| Orthopedics | Foot | Amputation - Foot | 142 | 154 | 172 | 9% | 21% | 92 | 92 | 95 | 0% | 4% | OR | 142 | 154 | 172 | 0.09 | 0.21 |
| Orthopedics | Foot | Biopsy - Foot | 3 | 3 | 3 | 2% | 12% | 1 | 1 | 1 | -16% | -26% | | | | | | |
| Orthopedics | Foot | Bone Excision - Foot | 500 | 517 | 549 | 3% | 10% | 275 | 259 | 250 | -6% | -9% | OR | 500 | 517 | 549 | 0.03 | 0.1 |
| Orthopedics | Foot | Bone Removal - Foot | 183 | 190 | 204 | 4% | 11% | 101 | 95 | 93 | -5% | -8% | OR | 183 | 190 | 204 | 0.04 | 0.11 |
| Orthopedics | Foot | Bone Repair/Revision - Foot | 87 | 88 | 90 | 1% | 4% | 48 | 44 | 41 | -8% | -14% | OR | 87 | 88 | 90 | 0.01 | 0.04 |
| Orthopedics | Foot | Bunion Correction | 930 | 945 | 981 | 2% | 6% | 464 | 426 | 398 | -8% | -14% | OR | 930 | 945 | 981 | 0.02 | 0.06 |
| Orthopedics | Foot | Excision - Morton's Neuroma | 213 | 218 | 226 | 2% | 6% | 98 | 90 | 83 | -9% | -16% | OR | 213 | 218 | 226 | 0.02 | 0.06 |
| Orthopedics | Foot | Exploratory Surgery - Foot | 32 | 33 | 35 | 3% | 9% | 17 | 16 | 16 | -6% | -9% | OR | 32 | 33 | 35 | 0.03 | 0.09 |
| Orthopedics | Foot | Foreign Body Removal - Foot | 183 | 186 | 196 | 1% | 7% | 51 | 52 | 55 | 1% | 7% | OR | 183 | 186 | 196 | 0.01 | 0.07 |
| Orthopedics | Foot | Fusion - Foot | 208 | 224 | 247 | 8% | 19% | 140 | 139 | 142 | 0% | 2% | OR | 208 | 224 | 247 | 0.08 | 0.19 |
| Orthopedics | Foot | Hammertoe Repair | 998 | 1,047 | 1,130 | 5% | 13% | 479 | 451 | 436 | -6% | -9% | OR | 998 | 1047 | 1130 | 0.05 | 0.13 |
| Orthopedics | Foot | Joint Lining Removal - Foot | 14 | 14 | 15 | 1% | 5% | 9 | 9 | 8 | -6% | -10% | OR | 14 | 14 | 15 | 0.01 | 0.05 |
| Orthopedics | Foot | Joint/Muscle Release - Foot | 152 | 159 | 173 | 5% | 14% | 83 | 80 | 79 | -4% | -6% | OR | 152 | 159 | 173 | 0.05 | 0.14 |
| Orthopedics | Foot | Lesion Excision - Tendon - Foot | 107 | 109 | 113 | 1% | 5% | 59 | 54 | 51 | -8% | -13% | OR | 107 | 109 | 113 | 0.01 | 0.05 |
| Orthopedics | Foot | Lesion Excision/Curettage - Foot | 52 | 53 | 57 | 3% | 9% | 28 | 27 | 26 | -6% | -9% | OR | 52 | 53 | 57 | 0.03 | 0.09 |
| Orthopedics | Foot | Lesion Incision/Drainage - Foot | 81 | 85 | 93 | 5% | 15% | 24 | 26 | 28 | 5% | 15% | | | | | | |
| Orthopedics | Foot | Metatarsal Incision | 48 | 49 | 52 | 3% | 8% | 26 | 25 | 24 | -6% | -11% | OR | 48 | 49 | 52 | 0.03 | 0.08 |
| Orthopedics | Foot | Nerve Excision - Foot | 3 | 3 | 3 | 1% | 3% | 2 | 1 | 1 | -9% | -18% | OR | 3 | 3 | 3 | 0.01 | 0.03 |
| Orthopedics | Foot | Other Procedures - Foot | 194 | 201 | 215 | 4% | 11% | 107 | 101 | 98 | -6% | -8% | | | | | | |
| Orthopedics | Foot | Plantar Fascia Procedures - Endoscopic Fasciotomy | 75 | 82 | 93 | 10% | 24% | 37 | 36 | 37 | -1% | 0% | OR | 75 | 82 | 93 | 0.1 | 0.24 |
| Orthopedics | Foot | Plantar Fascia Procedures - Extracorporeal Shock Wave Therapy (ESWT) | 53 | 78 | 119 | 48% | 125% | 15 | 18 | 22 | 22% | 51% | | | | | | |
| Orthopedics | Foot | Plantar Fascia Procedures - Fasciectomy/Fasciotomy | 163 | 177 | 196 | 8% | 20% | 82 | 80 | 80 | -2% | -2% | OR | 163 | 177 | 196 | 0.08 | 0.2 |
| Orthopedics | Foot | Repair/Revision - Foot | 9 | 9 | 10 | 4% | 13% | 4 | 4 | 4 | -7% | -11% | OR | 9 | 9 | 10 | 0.04 | 0.13 |
| Orthopedics | Foot | Soft Tissue Biopsy - Foot | 28 | 28 | 30 | 3% | 9% | 8 | 7 | 6 | -15% | -27% | | | | | | |
| Orthopedics | Foot | Tendon/Muscle Repair/Revision - Foot | 71 | 71 | 73 | 0% | 3% | 44 | 40 | 38 | -8% | -12% | OR | 71 | 71 | 73 | 0 | 0.03 |
| Orthopedics | Foot | Tumor Excision - Foot | 138 | 139 | 144 | 1% | 5% | 69 | 63 | 58 | -9% | -15% | OR | 138 | 139 | 144 | 0.01 | 0.05 |
| Orthopedics | Fracture/Dislocation Treatment | Cast Application/Removal - Arm/Leg | 5,626 | 5,589 | 5,649 | -1% | 0% | 281 | 279 | 282 | -1% | 0% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Cast Application/Removal - Body | 111 | 111 | 113 | 0% | 2% | 12 | 12 | 12 | 0% | 2% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Cast Application/Removal - Hand | 195 | 193 | 192 | -1% | -2% | 8 | 8 | 8 | -1% | -2% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Cast Application/Removal - Hip | 3 | 3 | 3 | 1% | 5% | 2 | 2 | 2 | 1% | 5% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Cast Application/Removal - Other | 612 | 599 | 593 | -2% | -3% | 43 | 42 | 41 | -2% | -3% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Cast Application/Removal - Shoulder | 7 | 7 | 7 | 2% | 5% | 4 | 4 | 4 | 2% | 5% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Dislocation Treatment - Arm/Wrist | 16 | 16 | 17 | 2% | 5% | 10 | 10 | 10 | 2% | 5% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Dislocation Treatment - Foot | 88 | 89 | 91 | 1% | 3% | 60 | 60 | 62 | 1% | 3% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Dislocation Treatment - Hand | 189 | 189 | 191 | 0% | 1% | 149 | 149 | 151 | 0% | 1% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Dislocation Treatment - Hip | 116 | 130 | 149 | 12% | 28% | 108 | 120 | 138 | 12% | 28% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Dislocation Treatment - Knee | 38 | 37 | 37 | -2% | -3% | 32 | 31 | 31 | -2% | -3% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Dislocation Treatment - Shoulder | 391 | 396 | 404 | 1% | 3% | 321 | 325 | 331 | 1% | 3% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Fixation Device Application/Removal | 1,104 | 1,117 | 1,140 | 1% | 3% | 474 | 448 | 425 | -6% | -10% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Fracture Debridement | 44 | 46 | 49 | 4% | 11% | 18 | 19 | 20 | 4% | 11% | OR | 44 | 46 | 49 | 0.04 | 0.11 |
| Orthopedics | Fracture/Dislocation Treatment | Fracture Treatment - Elbow | 363 | 370 | 383 | 2% | 6% | 272 | 271 | 273 | -1% | 0% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Fracture Treatment - Femur | 137 | 144 | 156 | 5% | 14% | 84 | 88 | 95 | 5% | 14% | OR | 137 | 144 | 156 | 0.05 | 0.14 |
| Orthopedics | Fracture/Dislocation Treatment | Fracture Treatment - Foot | 2,529 | 2,538 | 2,582 | 0% | 2% | 581 | 509 | 449 | -12% | -23% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Fracture Treatment - Hand | 2,016 | 1,972 | 1,973 | -2% | -2% | 564 | 494 | 441 | -12% | -22% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Fracture Treatment - Hip | 6 | 6 | 7 | 6% | 14% | 2 | 2 | 2 | 6% | 14% | OR | 6 | 6 | 7 | 0.06 | 0.14 |
| Orthopedics | Fracture/Dislocation Treatment | Fracture Treatment - Humerus | 659 | 680 | 726 | 3% | 10% | 191 | 184 | 183 | -4% | -4% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Fracture Treatment - Knee | 181 | 196 | 218 | 9% | 21% | 49 | 49 | 51 | 1% | 4% | OR | 181 | 196 | 218 | 0.09 | 0.21 |
| Orthopedics | Fracture/Dislocation Treatment | Fracture Treatment - Lower Leg | 221 | 221 | 228 | 0% | 3% | 84 | 80 | 78 | -5% | -7% | | | | | | |

| Service Line | Sub Service Line | OPG Description | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth | 2012 HOPD Volume | 2017 HOPD Volume | 2022 HOPD Volume | 5YR Growth | 10YR Growth | Procedure Location | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | OR Case Volumes | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Fracture Treatment - Pelvis | 40 | 42 | 45 | 4% | 11% | 9 | 9 | 10 | 4% | 11% | OR | 40 | 42 | 45 | 0.04 | 0.11 |
| Orthopedics | Fracture/Dislocation Treatment | Fracture Treatment - Radius/Ulna | 2,926 | 2,928 | 3,026 | 0% | 3% | 1,024 | 968 | 944 | -5% | -8% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Fracture Treatment - Shoulder | 403 | 418 | 443 | 4% | 10% | 137 | 134 | 134 | -2% | -2% | OR | 403 | 418 | 443 | 0.04 | 0.1 |
| Orthopedics | Fracture/Dislocation Treatment | Fracture Treatment - Tail Bone | 9 | 9 | 9 | -1% | 1% | 2 | 2 | 2 | -1% | 1% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Splint Application - Arm | 2,635 | 2,610 | 2,637 | -1% | 0% | 1,212 | 1,200 | 1,213 | -1% | 0% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Splint Application - Foot | 93 | 93 | 94 | 0% | 1% | 5 | 5 | 5 | 0% | 1% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Splint Application - Hand | 757 | 740 | 738 | -2% | -2% | 295 | 289 | 288 | -2% | -2% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Splint Application - Leg | 1,700 | 1,681 | 1,682 | -1% | -1% | 952 | 941 | 942 | -1% | -1% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Strapping Application - Elbow/Wrist | 180 | 180 | 181 | 0% | 0% | 38 | 38 | 38 | 0% | 0% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Strapping Application - Foot | 4,959 | 5,112 | 5,335 | 3% | 8% | 347 | 358 | 373 | 3% | 8% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Strapping Application - Hand | 61 | 60 | 60 | -2% | -1% | 20 | 20 | 20 | -2% | -1% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Strapping Application - Knee | 217 | 214 | 213 | -1% | -2% | 80 | 79 | 79 | -1% | -2% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Strapping Application - Other | 65 | 66 | 67 | 1% | 3% | 3 | 3 | 3 | 1% | 3% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Strapping Application - Shoulder | 112 | 111 | 112 | -1% | 0% | 55 | 54 | 55 | -1% | 0% | | | | | | |
| Orthopedics | Fracture/Dislocation Treatment | Strapping Application - Toe | 525 | 542 | 567 | 3% | 8% | 21 | 22 | 23 | 3% | 8% | | | | | | |
| Orthopedics | General Surgical Orthopedics | Adhesion Removal - Tricep | 1 | 1 | 1 | 2% | 7% | 1 | 1 | 1 | 2% | 7% | | | | | | |
| Orthopedics | General Surgical Orthopedics | Apiration/Injection - Bone | 23 | 24 | 26 | 5% | 12% | 2 | 2 | 2 | 5% | 12% | | | | | | |
| Orthopedics | General Surgical Orthopedics | Apiration/Injection - Tendon | 160 | 162 | 170 | 2% | 6% | 5 | 5 | 5 | 2% | 6% | | | | | | |
| Orthopedics | General Surgical Orthopedics | Aspiration/Injection - Joint | 50,561 | 60,810 | 75,123 | 20% | 49% | 1,517 | 1,824 | 2,254 | 20% | 49% | | | | | | |
| Orthopedics | General Surgical Orthopedics | Biopsy - Bone | 116 | 123 | 135 | 6% | 17% | 83 | 88 | 96 | 6% | 17% | OR | 116 | 123 | 135 | 0.06 | 0.17 |
| Orthopedics | General Surgical Orthopedics | Biopsy - Joint | 2 | 2 | 2 | 7% | 18% | 2 | 2 | 2 | 7% | 18% | OR | 2 | 2 | 2 | 0.07 | 0.18 |
| Orthopedics | General Surgical Orthopedics | Biopsy - Muscle | 111 | 115 | 123 | 3% | 10% | 67 | 69 | 74 | 3% | 10% | OR | 111 | 115 | 123 | 0.03 | 0.1 |
| Orthopedics | General Surgical Orthopedics | Bone Excision - Other | 4 | 4 | 4 | 3% | 9% | 2 | 2 | 2 | -7% | -11% | OR | 4 | 4 | 4 | 0.03 | 0.09 |
| Orthopedics | General Surgical Orthopedics | Bone Excision - Tibia/Fibula | 19 | 20 | 21 | 2% | 8% | 13 | 12 | 12 | -6% | -8% | OR | 19 | 20 | 21 | 0.02 | 0.08 |
| Orthopedics | General Surgical Orthopedics | Bone Graft | 6 | 6 | 6 | -2% | 0% | 4 | 4 | 3 | -10% | -15% | OR | 6 | 6 | 6 | -0.02 | 0 |
| Orthopedics | General Surgical Orthopedics | Bone Removal - Arm/Wrist | 28 | 29 | 31 | 4% | 10% | 16 | 15 | 15 | -5% | -8% | OR | 28 | 29 | 31 | 0.04 | 0.1 |
| Orthopedics | General Surgical Orthopedics | Bone Removal - Leg/Ankle | 2 | 2 | 3 | 3% | 11% | 1 | 1 | 1 | -6% | -7% | OR | 2 | 2 | 3 | 0.03 | 0.11 |
| Orthopedics | General Surgical Orthopedics | Bone Removal - Shoulder | 103 | 106 | 111 | 3% | 9% | 67 | 64 | 62 | -5% | -7% | OR | 103 | 106 | 111 | 0.03 | 0.09 |
| Orthopedics | General Surgical Orthopedics | Bone Repair/Revision - Tibia/Fibula | 5 | 6 | 6 | 3% | 9% | 5 | 5 | 5 | 3% | 9% | OR | 5 | 6 | 6 | 0.03 | 0.09 |
| Orthopedics | General Surgical Orthopedics | Bone Stimulation | 72 | 89 | 111 | 23% | 54% | 2 | 3 | 3 | 23% | 54% | | | | | | |
| Orthopedics | General Surgical Orthopedics | Bone Tumor Ablation - Radiofrequency | 9 | 9 | 9 | 1% | 6% | 6 | 6 | 6 | -5% | -8% | | | | | | |
| Orthopedics | General Surgical Orthopedics | Capsule Excision - Hip | 1 | 1 | 1 | 4% | 17% | 0 | 1 | 1 | 1% | 12% | OR | 1 | 1 | 1 | 0.04 | 0.17 |
| Orthopedics | General Surgical Orthopedics | Cartilage Excision - Knee | 1 | 2 | 2 | 1% | 4% | 1 | 1 | 1 | -2% | -3% | OR | 1 | 2 | 2 | 0.01 | 0.04 |
| Orthopedics | General Surgical Orthopedics | Decompression - Lower Leg | 9 | 9 | 9 | 3% | 9% | 7 | 7 | 7 | 0% | 3% | | | | | | |
| Orthopedics | General Surgical Orthopedics | Exploratory Surgery - Elbow | 9 | 9 | 10 | 2% | 9% | 7 | 7 | 7 | 0% | 3% | OR | 9 | 9 | 10 | 0.02 | 0.09 |
| Orthopedics | General Surgical Orthopedics | Exploratory Surgery - Hip | 1 | 1 | 1 | 8% | 19% | 1 | 1 | 1 | 5% | 14% | OR | 1 | 1 | 1 | 0.08 | 0.19 |
| Orthopedics | General Surgical Orthopedics | Exploratory Surgery - Knee | 15 | 16 | 17 | 5% | 15% | 10 | 10 | 11 | 2% | 8% | OR | 15 | 16 | 17 | 0.05 | 0.15 |
| Orthopedics | General Surgical Orthopedics | Extracororeal Shock Wave Therapy (ESWT) - Other | 10 | 11 | 13 | 12% | 35% | 1 | 1 | 1 | 12% | 35% | | | | | | |
| Orthopedics | General Surgical Orthopedics | Foreign Body Removal - Arm/Wrist | 12 | 12 | 12 | 1% | 6% | 5 | 5 | 5 | 1% | 6% | OR | 12 | 12 | 12 | 0.01 | 0.06 |
| Orthopedics | General Surgical Orthopedics | Foreign Body Removal - Leg | 10 | 10 | 10 | 2% | 6% | 4 | 4 | 4 | 2% | 6% | OR | 10 | 10 | 10 | 0.02 | 0.06 |
| Orthopedics | General Surgical Orthopedics | Foreign Body Removal - Muscle | 111 | 112 | 116 | 1% | 5% | 41 | 41 | 43 | 1% | 5% | OR | 111 | 112 | 116 | 0.01 | 0.05 |
| Orthopedics | General Surgical Orthopedics | Foreign Body Removal - Shoulder | 4 | 4 | 5 | 5% | 15% | 3 | 3 | 3 | 5% | 15% | OR | 4 | 4 | 5 | 0.05 | 0.15 |
| Orthopedics | General Surgical Orthopedics | Fusion - Forearm | 2 | 2 | 2 | 1% | 5% | 1 | 1 | 1 | -1% | -1% | OR | 2 | 2 | 2 | 0.01 | 0.05 |
| Orthopedics | General Surgical Orthopedics | Fusion - Knee | 0 | 1 | 1 | 4% | 13% | 0 | 0 | 0 | 1% | 7% | OR | 0 | 1 | 1 | 0.04 | 0.13 |
| Orthopedics | General Surgical Orthopedics | Fusion - Lower Leg | 1 | 1 | 1 | 3% | 10% | 1 | 1 | 1 | 0% | 4% | OR | 1 | 1 | 1 | 0.03 | 0.1 |
| Orthopedics | General Surgical Orthopedics | Fusion - Pelvis | 1 | 1 | 1 | 3% | 6% | 1 | 1 | 1 | 1% | 1% | OR | 1 | 1 | 1 | 0.03 | 0.06 |
| Orthopedics | General Surgical Orthopedics | Implant Removal - Ankle | 3 | 3 | 4 | 0% | 2% | 2 | 2 | 2 | -9% | -14% | OR | 3 | 3 | 4 | 0 | 0.02 |
| Orthopedics | General Surgical Orthopedics | Implant Removal - Elbow | 1 | 1 | 2 | 2% | 6% | 1 | 1 | 1 | -5% | -8% | OR | 1 | 1 | 2 | 0.02 | 0.06 |
| Orthopedics | General Surgical Orthopedics | Implant Removal - Hip | 1 | 2 | 2 | 7% | 22% | 1 | 1 | 1 | 0% | 6% | OR | 1 | 2 | 2 | 0.07 | 0.22 |
| Orthopedics | General Surgical Orthopedics | Injection - Tendon | 10,860 | 11,164 | 11,785 | 3% | 9% | 217 | 223 | 236 | 3% | 9% | | | | | | |
| Orthopedics | General Surgical Orthopedics | Joint Lining Removal - Elbow | 4 | 4 | 4 | -3% | -2% | 2 | 2 | 2 | -6% | -9% | OR | 4 | 4 | 4 | -0.03 | -0.02 |
| Orthopedics | General Surgical Orthopedics | Joint Lining Removal - Knee | 3 | 3 | 3 | 8% | 20% | 1 | 2 | 2 | 4% | 12% | OR | 3 | 3 | 3 | 0.08 | 0.2 |
| Orthopedics | General Surgical Orthopedics | Joint Lining Removal - Shoulder | 0 | 0 | 1 | 15% | 31% | 0 | 0 | 0 | 13% | 26% | OR | 0 | 0 | 1 | 0.15 | 0.31 |
| Orthopedics | General Surgical Orthopedics | Joint/Muscle Release - Elbow | 1 | 1 | 1 | -1% | 2% | 1 | 1 | 1 | -3% | -2% | OR | 1 | 1 | 1 | -0.01 | 0.02 |
| Orthopedics | General Surgical Orthopedics | Joint/Muscle Release - Lower Leg | 6 | 6 | 6 | 2% | 5% | 3 | 3 | 3 | -2% | -2% | OR | 6 | 6 | 6 | 0.02 | 0.05 |
| Orthopedics | General Surgical Orthopedics | Lesion Excision/Currettage - Arm | 69 | 72 | 77 | 4% | 11% | 43 | 43 | 45 | 1% | 4% | OR | 69 | 72 | 77 | 0.04 | 0.11 |
| Orthopedics | General Surgical Orthopedics | Lesion Excision/Currettage - Femur | 14 | 14 | 15 | 1% | 7% | 11 | 10 | 11 | -1% | 2% | OR | 14 | 14 | 15 | 0.01 | 0.07 |
| Orthopedics | General Surgical Orthopedics | Lesion Excision/Currettage - Knee | 36 | 36 | 38 | 2% | 7% | 24 | 24 | 24 | -1% | 1% | OR | 36 | 36 | 38 | 0.02 | 0.07 |
| Orthopedics | General Surgical Orthopedics | Lesion Excision/Currettage - Lower Leg/Ankle | 76 | 77 | 79 | 1% | 4% | 45 | 43 | 43 | -4% | -4% | OR | 76 | 77 | 79 | 0.01 | 0.04 |
| Orthopedics | General Surgical Orthopedics | Lesion Excision/Currettage - Pelvis/Hip | 34 | 35 | 37 | 3% | 9% | 23 | 22 | 23 | -1% | 1% | OR | 34 | 35 | 37 | 0.03 | 0.09 |
| Orthopedics | General Surgical Orthopedics | Lesion Excision/Currettage - Shoulder | 6 | 6 | 7 | 0% | 5% | 4 | 4 | 4 | -3% | -2% | OR | 6 | 6 | 7 | 0 | 0.05 |
| Orthopedics | General Surgical Orthopedics | Lesion Incision/Drainage - Arm/Wrist | 33 | 34 | 37 | 4% | 12% | 12 | 12 | 12 | -4% | -2% | OR | 33 | 34 | 37 | 0.04 | 0.12 |
| Orthopedics | General Surgical Orthopedics | Lesion Incision/Drainage - Hip | 10 | 11 | 12 | 6% | 17% | 6 | 6 | 7 | 1% | 8% | OR | 10 | 11 | 12 | 0.06 | 0.17 |
| Orthopedics | General Surgical Orthopedics | Lesion Incision/Drainage - Lower Leg | 20 | 21 | 23 | 4% | 13% | 8 | 8 | 9 | -2% | 1% | OR | 20 | 21 | 23 | 0.04 | 0.13 |
| Orthopedics | General Surgical Orthopedics | Lesion Incision/Drainage - Shoulder | 10 | 11 | 12 | 5% | 13% | 3 | 3 | 3 | -4% | -3% | OR | 10 | 11 | 12 | 0.05 | 0.13 |
| Orthopedics | General Surgical Orthopedics | Lesion Incision/Drainage - Thigh/Knee | 24 | 25 | 28 | 5% | 15% | 12 | 12 | 13 | 0% | 5% | OR | 24 | 25 | 28 | 0.05 | 0.15 |
| Orthopedics | General Surgical Orthopedics | Muscle Graft | 10 | 11 | 12 | 5% | 13% | 7 | 7 | 6 | -3% | -3% | OR | 10 | 11 | 12 | 0.05 | 0.13 |
| Orthopedics | General Surgical Orthopedics | Other Orthopedic Procedures | 281 | 290 | 308 | 3% | 10% | 157 | 154 | 158 | -2% | 1% | | | | | | |
| Orthopedics | General Surgical Orthopedics | Other Procedures - Knee | 2 | 2 | 2 | 1% | 4% | 2 | 2 | 2 | 1% | 4% | OR | 2 | 2 | 2 | 0.01 | 0.04 |
| Orthopedics | General Surgical Orthopedics | Repair/Revision - Radius/Ulna | 29 | 30 | 32 | 2% | 7% | 19 | 19 | 19 | -1% | 1% | OR | 29 | 30 | 32 | 0.02 | 0.07 |
| Orthopedics | General Surgical Orthopedics | Tendon/Muscle Repair/Revision - Lower Leg | 30 | 30 | 31 | 1% | 4% | 30 | 30 | 31 | 1% | 4% | OR | 30 | 30 | 31 | 0.01 | 0.04 |
| Orthopedics | General Surgical Orthopedics | Tumor Excision - Thigh/Knee | 75 | 76 | 79 | 1% | 6% | 75 | 76 | 79 | 1% | 6% | OR | 75 | 76 | 79 | 0.01 | 0.06 |
| Orthopedics | Hand | Amputation - Hand | 72 | 75 | 80 | 5% | 11% | 63 | 65 | 67 | 2% | 6% | OR | 72 | 75 | 80 | 0.05 | 0.11 |
| Orthopedics | Hand | Arthroplasty - Hand | 157 | 167 | 178 | 6% | 13% | 93 | 95 | 98 | 3% | 6% | OR | 157 | 167 | 178 | 0.06 | 0.13 |
| Orthopedics | Hand | Biopsy - Hand | 10 | 11 | 11 | 5% | 12% | 6 | 6 | 6 | 1% | 4% | OR | 10 | 11 | 11 | 0.05 | 0.12 |
| Orthopedics | Hand | Bone Excision - Hand | 35 | 36 | 38 | 3% | 9% | 20 | 20 | 20 | 0% | 1% | OR | 35 | 36 | 38 | 0.03 | 0.09 |
| Orthopedics | Hand | Capsule Repair - Hand | 12 | 12 | 12 | 0% | 2% | 7 | 6 | 6 | -3% | -5% | OR | 12 | 12 | 12 | 0 | 0.02 |
| Orthopedics | Hand | Carpal Tunnel Injection | 450 | 500 | 569 | 11% | 26% | 14 | 15 | 17 | 11% | 26% | | | | | | |
| Orthopedics | Hand | Carpal Tunnel Release | 2,475 | 2,775 | 3,187 | 12% | 29% | 1,237 | 1,252 | 1,294 | 1% | 5% | OR | 2475 | 2775 | 3187 | 0.12 | 0.29 |

| Service Line | Sub Service Line | OPG Description | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth | 2012 HOPD Volume | 2017 HOPD Volume | 2022 HOPD Volume | 5YR Growth | 10YR Growth | OR Case Volumes: Procedure Location | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Orthopedics | Hand | Decompression - Hand | 5 | 5 | 6 | 2% | 8% | 2 | 2 | 2 | -4% | -4% | | | | | | |
| Orthopedics | Hand | Exploratory Surgery - Hand | 35 | 36 | 37 | 2% | 7% | 25 | 25 | 25 | 0% | 2% | OR | 35 | 36 | 37 | 0.02 | 0.07 |
| Orthopedics | Hand | Fasciotomy/Fasciectomy - Palm | 143 | 154 | 168 | 8% | 17% | 81 | 84 | 87 | 3% | 8% | OR | 143 | 154 | 168 | 0.08 | 0.17 |
| Orthopedics | Hand | Fusion - Hand | 86 | 89 | 94 | 4% | 9% | 56 | 56 | 57 | 0% | 3% | OR | 86 | 89 | 94 | 0.04 | 0.09 |
| Orthopedics | Hand | Ganglion Excision | 578 | 583 | 600 | 1% | 4% | 289 | 263 | 243 | -9% | -16% | OR | 578 | 583 | 600 | 0.01 | 0.04 |
| Orthopedics | Hand | Joint Lining Removal - Hand | 64 | 66 | 70 | 4% | 10% | 36 | 37 | 37 | 0% | 3% | OR | 64 | 66 | 70 | 0.04 | 0.1 |
| Orthopedics | Hand | Joint/Muscle Release - Hand | 59 | 60 | 62 | 1% | 5% | 37 | 36 | 36 | -2% | -1% | OR | 59 | 60 | 62 | 0.01 | 0.05 |
| Orthopedics | Hand | Lesion Excision/Currettage - Hand | 262 | 267 | 280 | 2% | 7% | 135 | 131 | 132 | -3% | -3% | OR | 262 | 267 | 280 | 0.02 | 0.07 |
| Orthopedics | Hand | Lesion Incision/Drainage - Hand | 83 | 85 | 89 | 3% | 7% | 32 | 31 | 31 | -5% | -5% | | | | | | |
| Orthopedics | Hand | Other Procedures - Hand | 103 | 104 | 109 | 1% | 6% | 59 | 57 | 58 | -3% | -3% | | | | | | |
| Orthopedics | Hand | Repair/Revision - Hand | 15 | 15 | 15 | -2% | -3% | 12 | 11 | 11 | -5% | -8% | OR | 15 | 15 | 15 | -0.02 | -0.03 |
| Orthopedics | Hand | Replantation - Hand | 1 | 1 | 1 | 3% | 6% | 1 | 1 | 1 | 3% | 6% | OR | 1 | 1 | 1 | 0.03 | 0.06 |
| Orthopedics | Hand | Tendon/Muscle Repair/Revision/Incision - Hand | 382 | 384 | 394 | 1% | 3% | 224 | 216 | 214 | -4% | -5% | OR | 382 | 384 | 394 | 0.01 | 0.03 |
| Orthopedics | Hand | Trigger Finger Release | 673 | 740 | 823 | 10% | 22% | 336 | 334 | 334 | -1% | -1% | | | | | | |
| Orthopedics | Joint Replacement | Arthroplasty - Ankle | 16 | 34 | 73 | 109% | 348% | 14 | 29 | 60 | 102% | 319% | OR | 16 | 34 | 73 | 1.09 | 3.48 |
| Orthopedics | Joint Replacement | Arthroplasty - Elbow | 16 | 32 | 69 | 108% | 344% | 14 | 27 | 57 | 101% | 315% | OR | 16 | 32 | 69 | 1.08 | 3.44 |
| Orthopedics | Joint Replacement | Arthroplasty - Hip - Partial | 1 | 1 | 1 | 8% | 22% | 1 | 1 | 1 | 7% | 22% | OR | 1 | 1 | 1 | 0.08 | 0.22 |
| Orthopedics | Joint Replacement | Arthroplasty - Hip - Revision | 1 | 1 | 2 | 24% | 62% | 1 | 1 | 2 | 23% | 61% | OR | 1 | 1 | 2 | 0.24 | 0.62 |
| Orthopedics | Joint Replacement | Arthroplasty - Hip - Total (THA) | 16 | 51 | 167 | 226% | 969% | 15 | 50 | 163 | 226% | 967% | OR | 16 | 51 | 167 | 2.26 | 9.69 |
| Orthopedics | Joint Replacement | Arthroplasty - Knee - Other | 5 | 11 | 26 | 116% | 385% | 5 | 11 | 25 | 116% | 384% | OR | 5 | 11 | 26 | 1.16 | 3.85 |
| Orthopedics | Joint Replacement | Arthroplasty - Knee - Revision | 2 | 2 | 3 | 9% | 26% | 2 | 2 | 3 | 9% | 26% | OR | 2 | 2 | 3 | 0.09 | 0.26 |
| Orthopedics | Joint Replacement | Arthroplasty - Knee - Total (TKA) | 71 | 166 | 388 | 133% | 445% | 70 | 163 | 380 | 133% | 444% | OR | 71 | 166 | 388 | 1.33 | 4.45 |
| Orthopedics | Joint Replacement | Arthroplasty - Knee - Unicompartmental (UKA) | 32 | 109 | 373 | 241% | 1065% | 27 | 87 | 281 | 225% | 958% | OR | 32 | 109 | 373 | 2.41 | 10.65 |
| Orthopedics | Joint Replacement | Arthroplasty - Shoulder | 40 | 74 | 141 | 87% | 254% | 35 | 63 | 116 | 81% | 231% | OR | 40 | 74 | 141 | 0.87 | 2.54 |
| Orthopedics | Sports Medicine | Ankle/Heel Procedures - Arthroscopy | 101 | 103 | 107 | 2% | 7% | 65 | 64 | 64 | -3% | -3% | OR | 101 | 103 | 107 | 0.02 | 0.07 |
| Orthopedics | Sports Medicine | Arm/Hand Procedures - Arthroscopy | 99 | 102 | 107 | 3% | 9% | 59 | 58 | 58 | -2% | -2% | OR | 99 | 102 | 107 | 0.03 | 0.09 |
| Orthopedics | Sports Medicine | Arm/Hand Procedures - Other | 168 | 172 | 182 | 2% | 8% | 114 | 112 | 113 | -2% | -1% | OR | 168 | 172 | 182 | 0.02 | 0.08 |
| Orthopedics | Sports Medicine | Hip Procedures - Arthroscopy | 72 | 166 | 361 | 129% | 400% | 53 | 116 | 243 | 120% | 360% | OR | 72 | 166 | 361 | 1.29 | 4 |
| Orthopedics | Sports Medicine | Knee Procedures - Articular Cartilage Procedures - Carticel | 5 | 6 | 7 | 18% | 47% | 4 | 5 | 6 | 18% | 47% | OR | 5 | 6 | 7 | 0.18 | 0.47 |
| Orthopedics | Sports Medicine | Knee Procedures - Articular Cartilage Procedures - Other | 575 | 560 | 563 | -3% | -2% | 328 | 292 | 268 | -11% | -18% | OR | 575 | 560 | 563 | -0.03 | -0.02 |
| Orthopedics | Sports Medicine | Knee Procedures - Ligament Procedures - ACL Reconstruction | 491 | 491 | 504 | 0% | 3% | 280 | 256 | 240 | -9% | -14% | OR | 491 | 491 | 504 | 0 | 0.03 |
| Orthopedics | Sports Medicine | Knee Procedures - Ligament Procedures - Other | 24 | 24 | 24 | -2% | 0% | 16 | 16 | 15 | -4% | -6% | OR | 24 | 24 | 24 | -0.02 | 0 |
| Orthopedics | Sports Medicine | Knee Procedures - Meniscus Procedures - Repair/Meniscectomy | 3,523 | 3,851 | 4,289 | 9% | 22% | 2,007 | 2,007 | 2,040 | 0% | 2% | OR | 3523 | 3851 | 4289 | 0.09 | 0.22 |
| Orthopedics | Sports Medicine | Knee Procedures - Meniscus Procedures - Transplant | 17 | 18 | 18 | 2% | 6% | 10 | 9 | 9 | -6% | -11% | OR | 17 | 18 | 18 | 0.02 | 0.06 |
| Orthopedics | Sports Medicine | Knee Procedures - Other | 390 | 405 | 432 | 4% | 11% | 265 | 267 | 277 | 1% | 5% | OR | 390 | 405 | 432 | 0.04 | 0.11 |
| Orthopedics | Sports Medicine | Other Sports Medicine Procedures | 33 | 35 | 38 | 7% | 18% | 18 | 19 | 20 | 3% | 10% | OR | 33 | 35 | 38 | 0.07 | 0.18 |
| Orthopedics | Sports Medicine | Other Sports Medicine Procedures - Arthroscopy | 16 | 17 | 18 | 7% | 17% | 10 | 11 | 11 | 4% | 10% | OR | 16 | 17 | 18 | 0.07 | 0.17 |
| Orthopedics | Sports Medicine | Shoulder Procedures - Arthroscopy | 1,065 | 1,155 | 1,281 | 8% | 20% | 692 | 694 | 711 | 0% | 3% | OR | 1065 | 1155 | 1281 | 0.08 | 0.2 |
| Orthopedics | Sports Medicine | Shoulder Procedures - Other | 47 | 43 | 39 | -10% | -16% | 32 | 29 | 26 | -12% | -21% | OR | 47 | 43 | 39 | -0.1 | -0.16 |
| Orthopedics | Sports Medicine | Shoulder Procedures - Rotator Cuff Repair | 1,029 | 1,186 | 1,389 | 15% | 35% | 638 | 665 | 705 | 4% | 10% | OR | 1029 | 1186 | 1389 | 0.15 | 0.35 |
| Pain Management | Destructions (Neurolysis & Adhesiolysis) | Adhesiolysis | 178 | 205 | 247 | 16% | 39% | 62 | 51 | 43 | -17% | -31% | OR | 178 | 205 | 247 | 0.16 | 0.39 |
| Pain Management | Destructions (Neurolysis & Adhesiolysis) | Neurolysis | 1,964 | 2,228 | 2,593 | 13% | 32% | 483 | 326 | 207 | -32% | -57% | OR | 1964 | 2228 | 2593 | 0.13 | 0.32 |
| Pain Management | Injections/Blocks | Injection - Epidural | 14,512 | 16,192 | 18,707 | 12% | 29% | 5,039 | 4,032 | 3,219 | -20% | -36% | | | | | | |
| Pain Management | Injections/Blocks | Injection - Facet Joint | 3,405 | 3,767 | 4,299 | 11% | 26% | 1,182 | 938 | 740 | -21% | -37% | | | | | | |
| Pain Management | Injections/Blocks | Injection - Other | 267 | 305 | 362 | 14% | 36% | 93 | 76 | 62 | -18% | -33% | | | | | | |
| Pain Management | Injections/Blocks | Injection - Somatic Nerve | 3,601 | 3,970 | 4,506 | 10% | 25% | 565 | 476 | 396 | -16% | -30% | | | | | | |
| Pain Management | Injections/Blocks | Injection - Sympathetic Nerve | 322 | 326 | 342 | 1% | 6% | 112 | 81 | 59 | -27% | -47% | | | | | | |
| Pain Management | Injections/Blocks | Sacroiliac Joint Injection | 21 | 23 | 27 | 12% | 32% | 7 | 6 | 5 | -19% | -35% | | | | | | |
| Pain Management | Injections/Blocks | Trigger Point Injection | 3,988 | 4,264 | 4,716 | 7% | 18% | 317 | 256 | 208 | -19% | -35% | | | | | | |
| Pain Management | Intradiscal Electrothermal Therapy (IDET) | Intradiscal Electrothermal Therapy (IDET) | 14 | 15 | 16 | 4% | 12% | 12 | 13 | 14 | 4% | 12% | OR | 14 | 15 | 16 | 0.04 | 0.12 |
| Pain Management | Other Pain Management Procedures | Other Pain Management Procedures | 2 | 2 | 2 | -2% | -1% | 1 | 0 | 0 | -30% | -51% | | | | | | |
| Pain Management | Other Pain Management Procedures | Prolotherapy | 11 | 12 | 14 | 8% | 20% | 0 | 0 | 0 | 8% | 20% | | | | | | |
| Physical Therapy/R | Attended Physical Therapy Application | Contrast Bath | 23 | 24 | 25 | 3% | 9% | 0 | 0 | 1 | 3% | 9% | | | | | | |
| Physical Therapy/R | Attended Physical Therapy Application | Electrical Stimulation - Attended | 4,954 | 5,842 | 7,112 | 18% | 44% | 198 | 234 | 284 | 18% | 44% | | | | | | |
| Physical Therapy/R | Attended Physical Therapy Application | Hubbard Tank | 25 | 24 | 23 | -5% | -9% | 1 | 0 | 0 | -5% | -9% | | | | | | |
| Physical Therapy/R | Attended Physical Therapy Application | Iontophoresis | 1,299 | 1,360 | 1,455 | 5% | 12% | 169 | 177 | 189 | 5% | 12% | | | | | | |
| Physical Therapy/R | Attended Physical Therapy Application | Other Application | 388 | 394 | 409 | 2% | 5% | 16 | 16 | 16 | 2% | 5% | | | | | | |
| Physical Therapy/R | Attended Physical Therapy Application | Ultrasound | 5,355 | 5,430 | 5,642 | 1% | 5% | 375 | 380 | 395 | 1% | 5% | | | | | | |
| Physical Therapy/R | Evaluations/Tests | Athletic Training Evaluation | 6 | 6 | 6 | -2% | -2% | 0 | 0 | 0 | -1% | -1% | | | | | | |
| Physical Therapy/R | Evaluations/Tests | Occupational Therapy Evaluation | 1,289 | 1,287 | 1,311 | 0% | 2% | 168 | 167 | 170 | 0% | 2% | | | | | | |
| Physical Therapy/R | Evaluations/Tests | Orthotic/Prosthetic Checkout | 297 | 293 | 297 | -1% | 0% | 30 | 29 | 30 | -1% | 0% | | | | | | |
| Physical Therapy/R | Evaluations/Tests | Physical Performance Test | 418 | 418 | 429 | 0% | 2% | 29 | 29 | 30 | 0% | 2% | | | | | | |
| Physical Therapy/R | Evaluations/Tests | Physical Therapy Evaluation | 15,294 | 15,088 | 15,159 | -1% | -1% | 3,518 | 3,470 | 3,486 | -1% | -1% | | | | | | |
| Physical Therapy/R | Therapeutic Procedures | Acupuncture | 7,479 | 7,384 | 7,473 | -1% | 0% | 150 | 148 | 149 | -1% | 0% | | | | | | |
| Physical Therapy/R | Therapeutic Procedures | Aquatic Exercise | 5,413 | 6,665 | 8,410 | 23% | 55% | 379 | 467 | 589 | 23% | 55% | | | | | | |
| Physical Therapy/R | Therapeutic Procedures | Biofeedback Training (non-Incontinence) | 375 | 372 | 384 | -1% | 3% | 15 | 15 | 15 | -1% | 3% | | | | | | |
| Physical Therapy/R | Therapeutic Procedures | Chiropractic Manipulation | 310,536 | 312,505 | 324,450 | 1% | 4% | 3,105 | 3,125 | 3,245 | 1% | 4% | | | | | | |
| Physical Therapy/R | Therapeutic Procedures | Cognitive Skills Development | 257 | 286 | 332 | 11% | 29% | 46 | 51 | 60 | 11% | 29% | | | | | | |
| Physical Therapy/R | Therapeutic Procedures | Gait Training Therapy | 4,060 | 4,226 | 4,574 | 4% | 13% | 325 | 338 | 366 | 4% | 13% | | | | | | |
| Physical Therapy/R | Therapeutic Procedures | Group Therapeutic Procedures | 2,008 | 2,163 | 2,390 | 8% | 19% | 402 | 433 | 478 | 8% | 19% | | | | | | |
| Physical Therapy/R | Therapeutic Procedures | Home Health Services | 1,016 | 1,334 | 1,758 | 31% | 73% | 0 | 0 | 0 | 0% | 0% | | | | | | |
| Physical Therapy/R | Therapeutic Procedures | Manual Therapy | 135,043 | 157,129 | 187,600 | 16% | 39% | 5,402 | 6,285 | 7,504 | 16% | 39% | | | | | | |
| Physical Therapy/R | Therapeutic Procedures | Massage Therapy | 18,752 | 20,039 | 22,129 | 7% | 18% | 563 | 601 | 664 | 7% | 18% | | | | | | |
| Physical Therapy/R | Therapeutic Procedures | Neuromuscular Reeducation | 19,460 | 22,610 | 27,143 | 16% | 39% | 584 | 678 | 814 | 16% | 39% | | | | | | |
| Physical Therapy/R | Therapeutic Procedures | Occupational Therapy | 13 | 13 | 13 | -1% | -1% | 3 | 3 | 3 | -1% | -1% | | | | | | |
| Physical Therapy/R | Therapeutic Procedures | Orthotic Training | 771 | 771 | 791 | 0% | 3% | 93 | 93 | 95 | 0% | 3% | | | | | | |
| Physical Therapy/R | Therapeutic Procedures | Osteopathic Manipulation | 5,244 | 5,323 | 5,586 | 2% | 7% | 52 | 53 | 56 | 2% | 7% | | | | | | |
| Physical Therapy/R | Therapeutic Procedures | Other Therapeutic Procedures | 4,408 | 4,352 | 4,379 | -1% | -1% | 793 | 783 | 788 | -1% | -1% | | | | | | |
| Physical Therapy/R | Therapeutic Procedures | Self Care Training | 1,659 | 1,675 | 1,744 | 1% | 5% | 149 | 151 | 157 | 1% | 5% | | | | | | |

| Service Line | Sub Service Line | OPG Description | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth | 2012 HOPD Volume | 2017 HOPD Volume | 2022 HOPD Volume | 5YR Growth | 10YR Growth | OR Case Volumes: Procedure Location | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Physical Therapy/Rehabilitation | Therapeutic Procedures | Therapeutic Activities | 29,376 | 35,835 | 45,112 | 22% | 54% | 1,469 | 1,792 | 2,256 | 22% | 54% | | | | | | |
| Physical Therapy/Rehabilitation | Therapeutic Procedures | Therapeutic Exercises | 94,306 | 114,426 | 142,169 | 21% | 51% | 9,431 | 11,443 | 14,217 | 21% | 51% | | | | | | |
| Physical Therapy/Rehabilitation | Therapeutic Procedures | Work Conditioning | 215 | 251 | 307 | 17% | 43% | 4 | 5 | 6 | 17% | 43% | | | | | | |
| Physical Therapy/Rehabilitation | Unattended Physical Therapy Application | Diathermy | 232 | 213 | 200 | -8% | -14% | 5 | 4 | 4 | -8% | -14% | | | | | | |
| Physical Therapy/Rehabilitation | Unattended Physical Therapy Application | Electrical Stimulation - Unattended | 4,112 | 3,710 | 3,434 | -10% | -16% | 164 | 148 | 137 | -10% | -16% | | | | | | |
| Physical Therapy/Rehabilitation | Unattended Physical Therapy Application | Hot/Cold Pack Application | 1,996 | 2,024 | 2,116 | 1% | 6% | 140 | 142 | 148 | 1% | 6% | | | | | | |
| Physical Therapy/Rehabilitation | Unattended Physical Therapy Application | Infrared | 180 | 181 | 191 | 1% | 6% | 4 | 4 | 4 | 1% | 6% | | | | | | |
| Physical Therapy/Rehabilitation | Unattended Physical Therapy Application | Microwave | 4 | 4 | 4 | 5% | 13% | 0 | 0 | 0 | 5% | 13% | | | | | | |
| Physical Therapy/Rehabilitation | Unattended Physical Therapy Application | Paraffin Bath | 88 | 93 | 101 | 5% | 14% | 7 | 7 | 8 | 5% | 14% | | | | | | |
| Physical Therapy/Rehabilitation | Unattended Physical Therapy Application | Traction | 1,986 | 1,977 | 2,024 | 0% | 2% | 60 | 59 | 61 | 0% | 2% | | | | | | |
| Physical Therapy/Rehabilitation | Unattended Physical Therapy Application | Ultraviolet | 26 | 26 | 27 | 2% | 5% | 3 | 3 | 3 | 2% | 5% | | | | | | |
| Physical Therapy/Rehabilitation | Unattended Physical Therapy Application | Vasopneumatic Device Application | 91 | 94 | 100 | 4% | 10% | 3 | 3 | 3 | 4% | 10% | | | | | | |
| Physical Therapy/Rehabilitation | Unattended Physical Therapy Application | Whirlpool | 402 | 415 | 444 | 3% | 11% | 12 | 12 | 13 | 3% | 11% | | | | | | |
| Podiatry | General Podiatry | Avulsion - Nail Plate | 4,471 | 4,663 | 5,039 | 4% | 13% | 89 | 93 | 101 | 4% | 13% | | | | | | |
| Podiatry | General Podiatry | Biopsy - Nail | 249 | 295 | 362 | 19% | 46% | 5 | 6 | 7 | 19% | 46% | | | | | | |
| Podiatry | General Podiatry | Clot Drainage - Nail | 279 | 284 | 301 | 2% | 8% | 72 | 74 | 78 | 2% | 8% | | | | | | |
| Podiatry | General Podiatry | Corn/Callus Procedures | 10,290 | 11,458 | 13,371 | 11% | 30% | 206 | 229 | 267 | 11% | 30% | | | | | | |
| Podiatry | General Podiatry | Debridement - Nail | 24,576 | 26,187 | 29,293 | 7% | 19% | 492 | 524 | 586 | 7% | 19% | | | | | | |
| Podiatry | General Podiatry | Excision - Nail Fold | 378 | 393 | 426 | 4% | 13% | 19 | 20 | 21 | 4% | 13% | | | | | | |
| Podiatry | General Podiatry | Loss of Protective Sensation (LOPS) Evaluation/Services | 131 | 158 | 198 | 21% | 51% | 4 | 5 | 6 | 21% | 51% | | | | | | |
| Podiatry | General Podiatry | Nail Trimming | 2,589 | 2,893 | 3,391 | 12% | 31% | 78 | 87 | 102 | 12% | 31% | | | | | | |
| Podiatry | General Podiatry | Removal - Nail | 3,566 | 3,611 | 3,760 | 1% | 5% | 107 | 108 | 113 | 1% | 5% | | | | | | |
| Podiatry | General Podiatry | Repair - Nail | 85 | 86 | 90 | 1% | 5% | 53 | 53 | 56 | 1% | 5% | | | | | | |
| Psychiatry | Psychiatry | Diagnostic Interview | 23,156 | 22,774 | 23,209 | -2% | 0% | 1,621 | 1,594 | 1,625 | -2% | 0% | | | | | | |
| Psychiatry | Psychiatry | Electroconvulsive Therapy | 455 | 468 | 499 | 3% | 10% | 392 | 402 | 429 | 3% | 10% | | | | | | |
| Psychiatry | Psychiatry | Environmental Intervention | 160 | 157 | 158 | -2% | -1% | 16 | 16 | 16 | -2% | -1% | | | | | | |
| Psychiatry | Psychiatry | Family Psychotherapy | 19,449 | 18,791 | 18,941 | -3% | -3% | 778 | 752 | 758 | -3% | -3% | | | | | | |
| Psychiatry | Psychiatry | Group Psychotherapy | 12,052 | 11,782 | 11,844 | -2% | -2% | 1,326 | 1,296 | 1,303 | -2% | -2% | | | | | | |
| Psychiatry | Psychiatry | Hypnotherapy | 39 | 39 | 41 | 2% | 6% | 1 | 1 | 1 | 2% | 6% | | | | | | |
| Psychiatry | Psychiatry | Medication Management | 46,969 | 46,514 | 47,458 | -1% | 1% | 3,758 | 3,721 | 3,797 | -1% | 1% | | | | | | |
| Psychiatry | Psychiatry | Narcosynthesis | 3 | 3 | 3 | -1% | 1% | 0 | 0 | 0 | 0% | 0% | | | | | | |
| Psychiatry | Psychiatry | Other Psychiatric Services | 1,053 | 1,037 | 1,057 | -2% | 0% | 147 | 145 | 148 | -2% | 0% | | | | | | |
| Psychiatry | Psychiatry | Psychoanalysis | 40 | 38 | 38 | -3% | -3% | 2 | 2 | 2 | -3% | -3% | | | | | | |
| Psychiatry | Psychiatry | Psychophysiological Therapy | 135 | 131 | 132 | -3% | -3% | 1 | 1 | 1 | -3% | -3% | | | | | | |
| Psychiatry | Psychiatry | Psychotherapy - Office/Outpatient | 273,239 | 266,600 | 267,935 | -2% | -2% | 8,197 | 7,998 | 8,038 | -2% | -2% | | | | | | |
| Pulmonology | Bronchoscopy | Bronchoscopy - Diagnostic | 371 | 493 | 675 | 33% | 82% | 325 | 429 | 587 | 32% | 80% | | | | | | |
| Pulmonology | Bronchoscopy | Bronchoscopy - Procedural | 848 | 1,134 | 1,558 | 34% | 84% | 744 | 986 | 1,356 | 33% | 82% | | | | | | |
| Pulmonology | Bronchoscopy | Tracheobronchoscopy | 58 | 93 | 155 | 62% | 168% | 9 | 14 | 23 | 62% | 168% | | | | | | |
| Pulmonology | Pulmonary Function/Diagnostic Testing | Airway Closing Volume | 240 | 265 | 297 | 10% | 24% | 36 | 40 | 45 | 10% | 24% | | | | | | |
| Pulmonology | Pulmonary Function/Diagnostic Testing | Carbon Monoxide Diffusion | 519 | 603 | 713 | 16% | 37% | 78 | 90 | 107 | 16% | 37% | | | | | | |
| Pulmonology | Pulmonary Function/Diagnostic Testing | CO2 Expiration | 13 | 15 | 18 | 13% | 35% | 2 | 2 | 3 | 13% | 35% | | | | | | |
| Pulmonology | Pulmonary Function/Diagnostic Testing | Compliance Study | 70 | 80 | 94 | 15% | 35% | 10 | 12 | 14 | 15% | 35% | | | | | | |
| Pulmonology | Pulmonary Function/Diagnostic Testing | Expired Gas Analysis | 90 | 101 | 117 | 13% | 30% | 13 | 15 | 18 | 13% | 30% | | | | | | |
| Pulmonology | Pulmonary Function/Diagnostic Testing | Flow Volume Loop | 1,125 | 1,265 | 1,456 | 12% | 29% | 169 | 190 | 218 | 12% | 29% | | | | | | |
| Pulmonology | Pulmonary Function/Diagnostic Testing | Function Test | 866 | 947 | 1,053 | 9% | 22% | 130 | 142 | 158 | 9% | 22% | | | | | | |
| Pulmonology | Pulmonary Function/Diagnostic Testing | Maldistribution Analysis | 12 | 14 | 17 | 18% | 41% | 2 | 2 | 3 | 18% | 41% | | | | | | |
| Pulmonology | Pulmonary Function/Diagnostic Testing | Membrane Diffusion | 4 | 4 | 5 | 16% | 39% | 1 | 1 | 1 | 16% | 39% | | | | | | |
| Pulmonology | Pulmonary Function/Diagnostic Testing | Other Pulmonary Diagnostic Testing | 107 | 121 | 138 | 13% | 29% | 16 | 18 | 21 | 13% | 29% | | | | | | |
| Pulmonology | Pulmonary Function/Diagnostic Testing | Oxygen Saturation | 16,391 | 18,474 | 21,221 | 13% | 29% | 2,459 | 2,771 | 3,183 | 13% | 29% | | | | | | |
| Pulmonology | Pulmonary Function/Diagnostic Testing | Plethysmography | 1,083 | 1,124 | 1,187 | 4% | 10% | 206 | 213 | 225 | 4% | 10% | | | | | | |
| Pulmonology | Pulmonary Function/Diagnostic Testing | Resistance Test | 52 | 59 | 68 | 13% | 30% | 8 | 9 | 10 | 13% | 30% | | | | | | |
| Pulmonology | Pulmonary Function/Diagnostic Testing | Spirometry (Breathing Capacity) | 29,109 | 32,742 | 37,439 | 12% | 29% | 4,366 | 4,911 | 5,616 | 12% | 29% | | | | | | |
| Pulmonology | Pulmonary Function/Diagnostic Testing | Stress Test | 309 | 359 | 423 | 16% | 37% | 46 | 54 | 64 | 16% | 37% | | | | | | |
| Pulmonology | Pulmonary Function/Diagnostic Testing | Thoracic Gas Volume | 15 | 18 | 22 | 20% | 45% | 2 | 3 | 3 | 20% | 45% | | | | | | |
| Pulmonology | Pulmonary Function/Diagnostic Testing | Vital Capacity Test | 1,935 | 2,106 | 2,330 | 9% | 20% | 290 | 316 | 350 | 9% | 20% | | | | | | |
| Pulmonology | Respiratory Rehabilitation/Assistance | Chest Wall Manipulation for Lung Function | 531 | 698 | 946 | 31% | 78% | 11 | 14 | 19 | 31% | 78% | | | | | | |
| Pulmonology | Respiratory Rehabilitation/Assistance | Chest/Lung Drainage - Needle | 366 | 393 | 435 | 7% | 19% | 263 | 283 | 313 | 7% | 19% | | | | | | |
| Pulmonology | Respiratory Rehabilitation/Assistance | Inhalation Treatment/Sputum Induction | 9,429 | 12,380 | 16,708 | 31% | 77% | 377 | 495 | 668 | 31% | 77% | | | | | | |
| Pulmonology | Respiratory Rehabilitation/Assistance | NETT Pulmonary Rehabilitation | 2 | 2 | 2 | 4% | 13% | 0 | 0 | 0 | 4% | 13% | | | | | | |
| Pulmonology | Respiratory Rehabilitation/Assistance | Oxygenator/Heat Exchanger Assembly/Operation | 5 | 5 | 6 | 4% | 9% | 1 | 1 | 2 | 4% | 9% | | | | | | |
| Pulmonology | Respiratory Rehabilitation/Assistance | Pneumonia Inhalation Treatment | 69 | 74 | 81 | 7% | 18% | 8 | 9 | 10 | 7% | 18% | | | | | | |
| Pulmonology | Respiratory Rehabilitation/Assistance | Respiratory Strength Therapy | 140 | 191 | 258 | 37% | 84% | 46 | 48 | 54 | 3% | 15% | | | | | | |
| Pulmonology | Respiratory Rehabilitation/Assistance | Ventilation Assistance | 6,491 | 6,622 | 6,932 | 2% | 7% | 325 | 331 | 347 | 2% | 7% | | | | | | |
| Pulmonology | Respiratory Rehabilitation/Assistance | Ventilation Assistance - CNAP | 3 | 3 | 3 | 2% | 6% | 0 | 0 | 0 | 2% | 6% | | | | | | |
| Pulmonology | Respiratory Rehabilitation/Assistance | Ventilation Assistance - CPAP | 372 | 530 | 758 | 42% | 104% | 69 | 80 | 94 | 16% | 38% | | | | | | |
| Radiology | CT | Abdominal/Pelvic CT | 53,905 | 55,166 | 58,325 | 2% | 8% | 37,855 | 39,731 | 43,731 | 5% | 16% | | | | | | |
| Radiology | CT | Abdominal/Pelvic CT Angiography | 1,054 | 1,494 | 1,864 | 42% | 77% | 733 | 1,066 | 1,384 | 45% | 89% | | | | | | |
| Radiology | CT | Bone Density CT | 736 | 674 | 649 | -8% | -12% | 423 | 397 | 397 | -6% | -6% | | | | | | |
| Radiology | CT | Cardiac CT | 109 | 127 | 144 | 16% | 32% | 85 | 102 | 122 | 20% | 43% | | | | | | |
| Radiology | CT | Cardiac CT Angiography | 535 | 727 | 853 | 36% | 59% | 362 | 503 | 614 | 39% | 70% | | | | | | |
| Radiology | CT | Chest CT | 20,252 | 21,122 | 22,811 | 4% | 13% | 13,684 | 14,612 | 16,412 | 7% | 20% | | | | | | |
| Radiology | CT | Chest CT Angiography | 801 | 867 | 954 | 8% | 19% | 623 | 696 | 803 | 12% | 29% | | | | | | |
| Radiology | CT | CT Colonography (Virtual Colonoscopy) | 196 | 250 | 279 | 28% | 43% | 176 | 227 | 257 | 29% | 46% | | | | | | |
| Radiology | CT | Extremity CT | 2,002 | 2,036 | 2,113 | 2% | 6% | 1,256 | 1,311 | 1,419 | 4% | 13% | | | | | | |
| Radiology | CT | Extremity CT Angiography | 24 | 33 | 41 | 40% | 73% | 14 | 20 | 26 | 45% | 88% | | | | | | |
| Radiology | CT | Head/Neck/Brain CT | 45,255 | 45,277 | 47,559 | 0% | 5% | 33,888 | 34,795 | 38,079 | 3% | 12% | | | | | | |
| Radiology | CT | Head/Neck/Brain CT Angiography | 1,241 | 1,531 | 1,780 | 23% | 44% | 861 | 1,092 | 1,323 | 27% | 54% | | | | | | |
| Radiology | CT | Other CT | 1,757 | 1,759 | 1,849 | 0% | 5% | 922 | 950 | 1,044 | 3% | 13% | | | | | | |
| Radiology | CT | Other CT Angiography | 3 | 3 | 3 | 5% | 14% | 2 | 2 | 2 | 7% | 22% | | | | | | |

| Service Line | Sub Service Line | OPG Description | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth | 2012 HOPD Volume | 2017 HOPD Volume | 2022 HOPD Volume | 5YR Growth | 10YR Growth | OR Case Volumes: Procedure Location | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radiology | CT | Spine CT | 4,426 | 4,330 | 4,470 | -2% | 1% | 3,018 | 3,029 | 3,255 | 0% | 8% | | | | | | |
| Radiology | Mammography | Mammography Diagnostic | 25,377 | 26,183 | 28,601 | 3% | 13% | 14,377 | 15,208 | 17,032 | 6% | 18% | | | | | | |
| Radiology | Mammography | Mammography Screening | 72,325 | 74,621 | 81,513 | 3% | 13% | 40,883 | 43,461 | 48,916 | 6% | 20% | | | | | | |
| Radiology | MRI | Abdominal/Pelvic MR Angiography | 951 | 1,108 | 1,263 | 17% | 33% | 506 | 655 | 844 | 29% | 67% | | | | | | |
| Radiology | MRI | Abdominal/Pelvic MRI | 3,021 | 3,264 | 3,494 | 8% | 16% | 1,508 | 1,792 | 2,150 | 19% | 43% | | | | | | |
| Radiology | MRI | Bone/Joint MRI | 24,255 | 26,235 | 27,572 | 8% | 14% | 9,030 | 10,839 | 12,842 | 20% | 42% | | | | | | |
| Radiology | MRI | Brain MR Angiography | 5,319 | 5,274 | 5,236 | -1% | -2% | 2,183 | 2,414 | 2,718 | 11% | 25% | | | | | | |
| Radiology | MRI | Brain MRI | 13,356 | 14,341 | 15,226 | 7% | 14% | 6,482 | 7,696 | 9,202 | 19% | 42% | | | | | | |
| Radiology | MRI | Breast MRI | 2,361 | 2,569 | 2,635 | 9% | 12% | 852 | 1,053 | 1,246 | 24% | 46% | | | | | | |
| Radiology | MRI | Cardiac MRI | 158 | 184 | 204 | 16% | 29% | 97 | 124 | 154 | 28% | 59% | | | | | | |
| Radiology | MRI | Chest MR Angiography | 79 | 87 | 97 | 10% | 22% | 43 | 52 | 64 | 21% | 51% | | | | | | |
| Radiology | MRI | Chest MRI | 159 | 162 | 163 | 2% | 2% | 58 | 67 | 77 | 15% | 32% | | | | | | |
| Radiology | MRI | Extremity MR Angiography | 692 | 852 | 1,047 | 23% | 51% | 374 | 507 | 698 | 36% | 87% | | | | | | |
| Radiology | MRI | Head/Neck MR Angiography | 1,772 | 2,030 | 2,337 | 15% | 32% | 885 | 1,117 | 1,440 | 26% | 63% | | | | | | |
| Radiology | MRI | Head/Neck MRI | 680 | 723 | 759 | 6% | 12% | 282 | 332 | 393 | 18% | 39% | | | | | | |
| Radiology | MRI | MR Spectroscopy | 9 | 10 | 10 | 3% | 7% | 6 | 7 | 8 | 13% | 32% | | | | | | |
| Radiology | MRI | MRI Guided Procedure | 9 | 13 | 19 | 50% | 122% | 6 | 9 | 15 | 65% | 173% | | | | | | |
| Radiology | MRI | Other MRI | 12 | 12 | 12 | 0% | 1% | 4 | 4 | 5 | 12% | 29% | | | | | | |
| Radiology | MRI | Spine MR Angiography | 3 | 3 | 3 | 0% | 3% | 1 | 1 | 1 | 11% | 29% | | | | | | |
| Radiology | MRI | Spine MRI | 28,979 | 29,836 | 30,282 | 3% | 4% | 11,640 | 13,299 | 15,218 | 14% | 31% | | | | | | |
| Radiology | Nuclear Medicine | Bone Nuclear Imaging | 6,381 | 6,584 | 6,995 | 3% | 10% | 4,784 | 5,238 | 5,849 | 9% | 22% | | | | | | |
| Radiology | Nuclear Medicine | Brain Nuclear Imaging | 48 | 45 | 40 | -5% | -17% | 30 | 30 | 27 | 1% | -7% | | | | | | |
| Radiology | Nuclear Medicine | Cardiology Nuclear Imaging | 8,140 | 7,897 | 8,255 | -3% | 1% | 3,832 | 3,999 | 4,443 | 4% | 16% | | | | | | |
| Radiology | Nuclear Medicine | Cerebrospinal Nuclear Imaging | 40 | 42 | 47 | 4% | 17% | 28 | 31 | 37 | 11% | 31% | | | | | | |
| Radiology | Nuclear Medicine | Gastrointestinal Nuclear Imaging | 2,775 | 2,898 | 3,142 | 4% | 13% | 2,108 | 2,337 | 2,663 | 11% | 26% | | | | | | |
| Radiology | Nuclear Medicine | Genitourinary Nuclear Imaging | 121 | 121 | 118 | 0% | -2% | 31 | 33 | 34 | 6% | 9% | | | | | | |
| Radiology | Nuclear Medicine | Hematological/Lymphatic Nuclear Imaging | 217 | 233 | 275 | 8% | 27% | 183 | 207 | 245 | 13% | 33% | | | | | | |
| Radiology | Nuclear Medicine | Inflammatory Nuclear Imaging | 122 | 129 | 145 | 5% | 18% | 102 | 112 | 127 | 10% | 24% | | | | | | |
| Radiology | Nuclear Medicine | Kidney Nuclear Imaging | 564 | 590 | 657 | 5% | 17% | 440 | 488 | 571 | 11% | 30% | | | | | | |
| Radiology | Nuclear Medicine | Liver/Spleen Nuclear Imaging | 125 | 114 | 88 | -9% | -29% | 95 | 92 | 75 | -3% | -21% | | | | | | |
| Radiology | Nuclear Medicine | Lung Nuclear Imaging | 495 | 447 | 344 | -10% | -31% | 429 | 408 | 315 | -5% | -27% | | | | | | |
| Radiology | Nuclear Medicine | Other Nuclear Medicine | 166 | 176 | 192 | 6% | 15% | 31 | 36 | 42 | 14% | 33% | | | | | | |
| Radiology | Nuclear Medicine | Radiopharmaceutical Therapy | 311 | 315 | 320 | 1% | 3% | 208 | 225 | 241 | 8% | 16% | | | | | | |
| Radiology | Nuclear Medicine | Thyroid Nuclear Imaging | 1,965 | 2,003 | 2,058 | 2% | 5% | 1,491 | 1,617 | 1,752 | 8% | 18% | | | | | | |
| Radiology | Nuclear Medicine | Tumor Nuclear Imaging | 113 | 94 | 55 | -17% | -51% | 87 | 77 | 48 | -11% | -44% | | | | | | |
| Radiology | Nuclear Medicine | Vascular Nuclear Imaging | 12 | 12 | 14 | 5% | 20% | 8 | 10 | 13 | 21% | 64% | | | | | | |
| Radiology | PET | Brain PET | 178 | 272 | 366 | 52% | 105% | 88 | 149 | 226 | 70% | 158% | | | | | | |
| Radiology | PET | Myocardial PET | 72 | 104 | 145 | 44% | 102% | 35 | 57 | 90 | 61% | 154% | | | | | | |
| Radiology | PET | Tumor PET | 6,761 | 7,888 | 9,533 | 17% | 41% | 3,319 | 4,325 | 5,888 | 30% | 77% | | | | | | |
| Radiology | Ultrasound | AAA Screen | 288 | 420 | 656 | 46% | 128% | 147 | 216 | 337 | 47% | 129% | | | | | | |
| Radiology | Ultrasound | Abdominal Ultrasound | 36,524 | 41,522 | 47,989 | 14% | 31% | 18,688 | 21,353 | 24,679 | 14% | 32% | | | | | | |
| Radiology | Ultrasound | Bone Density Ultrasound | 354 | 357 | 322 | 1% | -9% | 7 | 7 | 6 | 1% | -9% | | | | | | |
| Radiology | Ultrasound | Breast Ultrasound | 17,729 | 19,483 | 21,115 | 10% | 19% | 9,057 | 9,978 | 10,814 | 10% | 19% | | | | | | |
| Radiology | Ultrasound | Extracranial Ultrasound | 12,906 | 15,406 | 19,315 | 19% | 50% | 4,711 | 5,736 | 7,299 | 22% | 55% | | | | | | |
| Radiology | Ultrasound | Head/Neck Ultrasound | 7,204 | 8,110 | 9,169 | 13% | 27% | 3,064 | 3,480 | 3,958 | 14% | 29% | | | | | | |
| Radiology | Ultrasound | Obstetrical Ultrasound | 43,971 | 47,708 | 53,010 | 8% | 21% | 11,909 | 12,983 | 14,426 | 9% | 21% | | | | | | |
| Radiology | Ultrasound | Ophthalmic Ultrasound | 6,693 | 7,387 | 8,070 | 10% | 21% | 134 | 148 | 161 | 10% | 21% | | | | | | |
| Radiology | Ultrasound | Other Ultrasound | 18,567 | 19,721 | 20,483 | 6% | 10% | 4,286 | 4,578 | 4,755 | 7% | 11% | | | | | | |
| Radiology | Ultrasound | Pelvic Ultrasound | 21,985 | 22,345 | 21,585 | 2% | -2% | 6,931 | 7,132 | 6,946 | 3% | 0% | | | | | | |
| Radiology | Ultrasound | Ultrasound Guided Procedure | 1,184 | 1,366 | 1,581 | 15% | 33% | 563 | 650 | 752 | 16% | 34% | | | | | | |
| Radiology | X-Ray | Abdominal X-Ray | 19,999 | 20,576 | 21,226 | 3% | 6% | 13,599 | 13,992 | 14,434 | 3% | 6% | | | | | | |
| Radiology | X-Ray | Arthrography | 337 | 335 | 316 | -1% | -6% | 182 | 182 | 173 | 0% | -5% | | | | | | |
| Radiology | X-Ray | Bone Density X-Ray | 26,995 | 29,364 | 32,699 | 9% | 21% | 8,099 | 8,809 | 9,810 | 9% | 21% | | | | | | |
| Radiology | X-Ray | Chest X-Ray | 130,575 | 134,177 | 137,448 | 3% | 5% | 81,620 | 83,644 | 85,491 | 2% | 5% | | | | | | |
| Radiology | X-Ray | Diskography | 129 | 132 | 137 | 3% | 6% | 77 | 79 | 82 | 3% | 6% | | | | | | |
| Radiology | X-Ray | Gastrointestinal X-Ray | 9,412 | 9,345 | 8,948 | -1% | -5% | 6,824 | 6,760 | 6,461 | -1% | -5% | | | | | | |
| Radiology | X-Ray | Genitourinary X-Ray | 1,410 | 1,393 | 1,370 | -1% | -3% | 994 | 980 | 962 | -1% | -3% | | | | | | |
| Radiology | X-Ray | Head/Skull X-Ray | 7,798 | 7,576 | 7,076 | -3% | -9% | 2,963 | 2,879 | 2,689 | -3% | -9% | | | | | | |
| Radiology | X-Ray | Joint X-Ray | 1,022 | 1,064 | 1,125 | 4% | 10% | 368 | 383 | 405 | 4% | 10% | | | | | | |
| Radiology | X-Ray | Lymphangiography | 1 | 1 | 1 | 0% | 0% | 1 | 1 | 1 | 0% | 0% | | | | | | |
| Radiology | X-Ray | Musculoskeletal X-Ray | 168,423 | 168,333 | 164,192 | 0% | -3% | 55,580 | 55,550 | 54,183 | 0% | -3% | | | | | | |
| Radiology | X-Ray | Myelography | 249 | 271 | 308 | 9% | 24% | 162 | 176 | 200 | 9% | 24% | | | | | | |
| Radiology | X-Ray | Neck/Spine X-Ray | 36,339 | 36,433 | 35,773 | 0% | -2% | 14,179 | 14,095 | 13,743 | -1% | -3% | | | | | | |
| Radiology | X-Ray | Other X-Ray | 4,040 | 4,269 | 4,627 | 6% | 15% | 1,515 | 1,608 | 1,750 | 6% | 15% | | | | | | |
| Radiology | X-Ray | Pyelography | 3,510 | 3,474 | 3,312 | -1% | -6% | 2,440 | 2,409 | 2,292 | -1% | -6% | | | | | | |
| Radiology | X-Ray | X-Ray Angiography | 177 | 184 | 192 | 4% | 8% | 168 | 175 | 182 | 4% | 8% | | | | | | |
| Radiology | X-Ray | X-Ray Fluoroscopy | 765 | 763 | 738 | 0% | -3% | 413 | 412 | 399 | 0% | -3% | | | | | | |
| Spine | Decompression | Discectomy - Conventional | 511 | 819 | 1,278 | 60% | 150% | 420 | 574 | 753 | 37% | 79% | OR | 511 | 819 | 1278 | 0.6 | 1.5 |
| Spine | Decompression | Discectomy - Percutaneous | 57 | 52 | 48 | -7% | -16% | 24 | 18 | 14 | -24% | -43% | OR | 57 | 52 | 48 | -0.07 | -0.16 |
| Spine | Decompression | Laminectomy | 151 | 237 | 372 | 57% | 147% | 138 | 202 | 293 | 47% | 113% | OR | 151 | 237 | 372 | 0.57 | 1.47 |
| Spine | Decompression | Other Decompression Procedures - Spine | 22 | 20 | 18 | -10% | -19% | 14 | 13 | 12 | -10% | -19% | OR | 22 | 20 | 18 | -0.1 | -0.19 |
| Spine | Excision/Osteotomy | Vertebral Osteotomy - Anterior (Includes Discectomy) | 2 | 2 | 2 | 1% | 2% | 2 | 2 | 2 | -3% | -8% | OR | 2 | 2 | 2 | 0.01 | 0.02 |
| Spine | Fusion | Spinal Fusion - Cervical | 98 | 156 | 236 | 58% | 140% | 93 | 140 | 202 | 51% | 117% | OR | 98 | 156 | 236 | 0.58 | 1.4 |
| Spine | Fusion | Spinal Fusion - Exploration | 3 | 4 | 6 | 56% | 145% | 2 | 4 | 6 | 54% | 140% | OR | 3 | 4 | 6 | 0.56 | 1.45 |
| Spine | Fusion | Spinal Fusion - Lumbar/Thoracic | 4 | 6 | 9 | 59% | 151% | 4 | 6 | 9 | 57% | 146% | OR | 4 | 6 | 9 | 0.59 | 1.51 |
| Spine | Other Spine Procedures | Biopsy - Bone - Spine | 11 | 11 | 11 | 1% | 4% | 6 | 6 | 6 | -3% | -3% | OR | 11 | 11 | 11 | 0.01 | 0.04 |
| Spine | Other Spine Procedures | Biopsy - Spinal Cord | 2 | 2 | 2 | 6% | 14% | 1 | 2 | 2 | 6% | 14% | OR | 2 | 2 | 2 | 0.06 | 0.14 |
| Spine | Other Spine Procedures | Bone Graft - Spine | 5 | 5 | 6 | 8% | 19% | 5 | 5 | 5 | 5% | 12% | OR | 5 | 5 | 6 | 0.08 | 0.19 |
| Spine | Other Spine Procedures | Fracture Treatment - Spine | 50 | 52 | 57 | 5% | 14% | 16 | 17 | 19 | 5% | 14% | OR | 50 | 52 | 57 | 0.05 | 0.14 |

| Service Line | Sub Service Line | OPG Description | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth | 2012 HOPD Volume | 2017 HOPD Volume | 2022 HOPD Volume | 5YR Growth | 10YR Growth | OR Case Volumes: Procedure Location | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spine | Other Spine Procedures | Lesion Aspiration - Percutaneous - Spine | 1 | 1 | 1 | 2% | 10% | 0 | 0 | 0 | -3% | 0% | OR | 1 | 1 | 1 | 0.02 | 0.1 |
| Spine | Other Spine Procedures | Other Procedures - Spine | 155 | 154 | 156 | 0% | 1% | 113 | 112 | 114 | 0% | 1% | OR | 155 | 154 | 156 | 0 | 0.01 |
| Spine | Other Spine Procedures | Spinal Component Excision | 5 | 5 | 6 | 1% | 3% | 5 | 5 | 4 | -6% | -11% | OR | 5 | 5 | 6 | 0.01 | 0.03 |
| Spine | Other Spine Procedures | Spinal Instrumentation Application/Removal | 8 | 9 | 10 | 8% | 20% | 7 | 8 | 9 | 6% | 15% | OR | 8 | 9 | 10 | 0.08 | 0.2 |
| Spine | Other Spine Procedures | Spinal Puncture | 846 | 846 | 862 | 0% | 2% | 719 | 719 | 733 | 0% | 2% | OR | 846 | 846 | 862 | 0 | 0.02 |
| Spine | Other Spine Procedures | Vertebra Excision/Osteotomy | 1 | 1 | 1 | 10% | 18% | 0 | 0 | 0 | 10% | 18% | OR | 1 | 1 | 1 | 0.1 | 0.18 |
| Spine | Pain Pumps & Stimulators | Drug Infusion Pump - Analysis | 467 | 502 | 552 | 8% | 18% | 126 | 121 | 118 | -4% | -6% | | | | | | |
| Spine | Pain Pumps & Stimulators | Drug Infusion Pump - Catheter Implantation/Removal | 39 | 43 | 48 | 9% | 23% | 33 | 34 | 37 | 5% | 14% | | | | | | |
| Spine | Pain Pumps & Stimulators | Drug Infusion Pump - Pump Implantation/Removal | 14 | 15 | 17 | 8% | 21% | 11 | 12 | 13 | 4% | 13% | | | | | | |
| Spine | Pain Pumps & Stimulators | Drug Infusion Pump - Refilling and Maintenance | 463 | 499 | 548 | 8% | 18% | 41 | 30 | 21 | -28% | -50% | | | | | | |
| Spine | Pain Pumps & Stimulators | Spinal Cord Stimulator Lead/Pulse Generator Implant/Removal | 219 | 301 | 426 | 38% | 95% | 155 | 208 | 286 | 34% | 84% | | | | | | |
| Spine | Vertebral Compression Fracture Treatment | Kyphoplasty | 110 | 117 | 126 | 7% | 15% | 107 | 112 | 118 | 5% | 10% | OR | 110 | 117 | 126 | 0.07 | 0.15 |
| Spine | Vertebral Compression Fracture Treatment | Vertebroplasty | 319 | 341 | 367 | 7% | 15% | 297 | 310 | 327 | 4% | 10% | OR | 319 | 341 | 367 | 0.07 | 0.15 |
| Thoracic Surgery | Mediastinoscopy | Mediastinoscopy - Diagnostic/Biopsy | 54 | 61 | 71 | 13% | 32% | 49 | 55 | 64 | 13% | 32% | OR | 54 | 61 | 71 | 0.13 | 0.32 |
| Thoracic Surgery | Other Thoracic Surgery | Collapsed Lung Treatment | 120 | 150 | 192 | 24% | 59% | 102 | 127 | 163 | 24% | 59% | OR | 120 | 150 | 192 | 0.24 | 0.59 |
| Thoracic Surgery | Other Thoracic Surgery | Fracture Treatment - Rib/Sternum | 133 | 144 | 160 | 8% | 20% | 93 | 101 | 112 | 8% | 20% | OR | 133 | 144 | 160 | 0.08 | 0.2 |
| Thoracic Surgery | Other Thoracic Surgery | Lesion Drainage - Percutaneous - Lung | 1 | 1 | 1 | 11% | 23% | 1 | 1 | 1 | 11% | 23% | OR | 1 | 1 | 1 | 0.11 | 0.23 |
| Thoracic Surgery | Other Thoracic Surgery | Lung Puncture | 1 | 1 | 1 | 9% | 26% | 1 | 1 | 1 | 9% | 26% | OR | 1 | 1 | 1 | 0.09 | 0.26 |
| Thoracic Surgery | Other Thoracic Surgery | Other Thoracic Procedures | 18 | 18 | 19 | 3% | 9% | 13 | 14 | 15 | 3% | 9% | OR | 18 | 18 | 19 | 0.03 | 0.09 |
| Thoracic Surgery | Other Thoracic Surgery | Rib Removal | 4 | 4 | 4 | 5% | 13% | 3 | 3 | 3 | 5% | 13% | OR | 4 | 4 | 4 | 0.05 | 0.13 |
| Thoracic Surgery | Other Thoracic Surgery | Thoracostomy - Chest Tube Insertion | 36 | 39 | 44 | 8% | 21% | 30 | 33 | 37 | 8% | 21% | OR | 36 | 39 | 44 | 0.08 | 0.21 |
| Thoracic Surgery | Other Thoracic Surgery | Tumor Removal - Chest Wall | 7 | 7 | 7 | 2% | 8% | 4 | 5 | 5 | 2% | 8% | OR | 7 | 7 | 7 | 0.02 | 0.08 |
| Thoracic Surgery | Percutaneous Lung Biopsy | Biopsy - Percutaneous - Lung | 295 | 353 | 439 | 20% | 49% | 265 | 318 | 395 | 20% | 49% | OR | 295 | 353 | 439 | 0.2 | 0.49 |
| Thoracic Surgery | Thoracoscopy | Thoracoscopy - Biopsy | 2 | 2 | 3 | 29% | 72% | 2 | 2 | 3 | 29% | 72% | OR | 2 | 2 | 3 | 0.29 | 0.72 |
| Thoracic Surgery | Thoracoscopy | Thoracoscopy - Diagnostic | 1 | 1 | 2 | 25% | 66% | 1 | 1 | 2 | 25% | 66% | OR | 1 | 1 | 2 | 0.25 | 0.66 |
| Trauma | Burn Treatment | Burn Dressing/Debridement | 744 | 744 | 750 | 0% | 1% | 208 | 208 | 210 | 0% | 1% | | | | | | |
| Trauma | Other Trauma | Induction of Vomiting | 5 | 5 | 5 | 0% | -1% | 4 | 4 | 4 | 0% | -1% | | | | | | |
| Trauma | Wound Care | Active Wound Care Management | 1,107 | 1,340 | 1,594 | 21% | 44% | 277 | 335 | 399 | 21% | 44% | | | | | | |
| Trauma | Wound Care | Debridement - Muscle/Bone | 628 | 695 | 776 | 11% | 24% | 326 | 361 | 404 | 11% | 24% | OR | 628 | 695 | 776 | 0.11 | 0.24 |
| Trauma | Wound Care | Debridement - Skin | 11,589 | 12,183 | 12,902 | 5% | 11% | 2,550 | 2,680 | 2,838 | 5% | 11% | | | | | | |
| Trauma | Wound Care | Electrostimulation - Wound | 209 | 289 | 393 | 39% | 88% | 4 | 6 | 8 | 39% | 88% | | | | | | |
| Trauma | Wound Care | Hyperbaric Oxygen Therapy | 1,556 | 2,035 | 2,612 | 31% | 68% | 1,151 | 1,407 | 1,685 | 22% | 46% | | | | | | |
| Trauma | Wound Care | Penetrating Wound Exploration | 31 | 30 | 31 | 0% | 0% | 23 | 23 | 23 | 0% | 0% | | | | | | |
| Trauma | Wound Care | Superficial Wound Repair | 12,667 | 12,678 | 12,860 | 0% | 2% | 5,447 | 5,452 | 5,530 | 0% | 2% | | | | | | |
| Trauma | Wound Care | Suture Removal | 152 | 153 | 156 | 0% | 2% | 9 | 9 | 9 | 0% | 2% | | | | | | |
| Trauma | Wound Care | Wound Closure - Complex | 707 | 722 | 745 | 2% | 5% | 551 | 563 | 581 | 2% | 5% | OR | 707 | 722 | 745 | 0.02 | 0.05 |
| Trauma | Wound Care | Wound Closure - Intermediate | 1,391 | 1,398 | 1,422 | 0% | 2% | 918 | 923 | 938 | 0% | 2% | | | | | | |
| Trauma | Wound Care | Wound Closure - Simple | 234 | 241 | 251 | 3% | 7% | 138 | 142 | 148 | 3% | 7% | | | | | | |
| Trauma | Wound Care | Wound Drainage | 84 | 87 | 91 | 3% | 8% | 21 | 22 | 23 | 3% | 8% | | | | | | |
| Urology | General Urology | Anticarcinogenic Agent Injection - Bladder | 1,363 | 1,624 | 2,009 | 19% | 47% | 41 | 49 | 60 | 19% | 47% | OR | 1363 | 1624 | 2009 | 0.19 | 0.47 |
| Urology | General Urology | Aspiration - Bladder | 63 | 66 | 72 | 5% | 15% | 33 | 35 | 38 | 5% | 15% | | | | | | |
| Urology | General Urology | Biopsy - Urethra | 7 | 9 | 11 | 21% | 53% | 4 | 4 | 5 | 15% | 40% | | | | | | |
| Urology | General Urology | Bladder Irrigation | 1,148 | 1,372 | 1,693 | 19% | 47% | 69 | 82 | 102 | 19% | 47% | | | | | | |
| Urology | General Urology | Catheter Implantation - Bladder | 2,747 | 3,169 | 3,802 | 15% | 38% | 247 | 285 | 342 | 15% | 38% | | | | | | |
| Urology | General Urology | Cystoscopy - Biopsy | 265 | 289 | 327 | 9% | 24% | 26 | 29 | 33 | 9% | 24% | Cysto Rm | | | | | |
| Urology | General Urology | Cystoscopy - Bladder Dilation | 147 | 151 | 160 | 3% | 9% | 15 | 15 | 16 | 3% | 9% | Cysto Rm | | | | | |
| Urology | General Urology | Cystoscopy - Diagnostic | 7,634 | 8,308 | 9,317 | 9% | 22% | 763 | 831 | 932 | 9% | 22% | Cysto Rm | | | | | |
| Urology | General Urology | Cystoscopy - Female Urethral Syndrome Treatment | 112 | 119 | 130 | 6% | 16% | 11 | 12 | 13 | 6% | 16% | Cysto Rm | | | | | |
| Urology | General Urology | Cystoscopy - Other Lesion Resection/Fulguration | 213 | 233 | 267 | 10% | 25% | 21 | 23 | 27 | 10% | 25% | Cysto Rm | | | | | |
| Urology | General Urology | Cystoscopy - Other Procedures | 59 | 63 | 71 | 8% | 21% | 6 | 6 | 7 | 8% | 21% | Cysto Rm | | | | | |
| Urology | General Urology | Cystoscopy - Stent Implantation | 389 | 420 | 466 | 8% | 20% | 39 | 42 | 47 | 8% | 20% | Cysto Rm | | | | | |
| Urology | General Urology | Cystoscopy - Stricture Repair | 22 | 23 | 26 | 7% | 17% | 2 | 2 | 3 | 7% | 17% | Cysto Rm | | | | | |
| Urology | General Urology | Cystoscopy - Tumor Resection/Fulguration - Bladder | 472 | 522 | 600 | 11% | 27% | 47 | 52 | 60 | 11% | 27% | OR | 472 | 522 | 600 | 0.11 | 0.27 |
| Urology | General Urology | Cystoscopy - Ureter Catheterization | 412 | 443 | 489 | 7% | 19% | 41 | 44 | 49 | 7% | 19% | Cysto Rm | | | | | |
| Urology | General Urology | Cystoscopy - Urethra Dilation | 1,107 | 1,200 | 1,341 | 8% | 21% | 111 | 120 | 134 | 8% | 21% | Cysto Rm | | | | | |
| Urology | General Urology | Cystoscopy - Urethra Incision | 123 | 131 | 145 | 7% | 17% | 12 | 13 | 14 | 7% | 18% | Cysto Rm | | | | | |
| Urology | General Urology | Cystostomy Tube Change | 415 | 572 | 825 | 38% | 99% | 33 | 46 | 66 | 38% | 99% | Cysto Rm | | | | | |
| Urology | General Urology | Lesion Drainage - Urethra | 3 | 4 | 4 | 4% | 11% | 2 | 2 | 2 | 4% | 11% | OR | 3 | 4 | 4 | 0.04 | 0.11 |
| Urology | General Urology | Lesion Excision - Urethra | 15 | 15 | 16 | 4% | 11% | 9 | 9 | 10 | 4% | 11% | OR | 15 | 15 | 16 | 0.04 | 0.11 |
| Urology | General Urology | Meatotomy - Urethra | 33 | 33 | 35 | 1% | 7% | 22 | 22 | 23 | 0% | 6% | OR | 33 | 33 | 35 | 0.01 | 0.07 |
| Urology | General Urology | Other Procedures - Bladder | 29 | 31 | 34 | 6% | 18% | 20 | 21 | 24 | 6% | 18% | OR | 29 | 31 | 34 | 0.06 | 0.18 |
| Urology | General Urology | Other Procedures - Ureter | 5 | 6 | 6 | 7% | 21% | 4 | 4 | 5 | 7% | 21% | OR | 5 | 6 | 6 | 0.07 | 0.21 |
| Urology | General Urology | Other Procedures - Urethra | 12 | 12 | 13 | 2% | 7% | 9 | 9 | 10 | 2% | 7% | OR | 12 | 12 | 13 | 0.02 | 0.07 |
| Urology | General Urology | Other Procedures - Urinary Tract | 78 | 80 | 85 | 2% | 8% | 29 | 30 | 31 | 2% | 8% | OR | 78 | 80 | 85 | 0.02 | 0.08 |
| Urology | General Urology | Revision/Repair - Urethra | 87 | 100 | 120 | 15% | 38% | 67 | 73 | 83 | 10% | 24% | OR | 87 | 100 | 120 | 0.15 | 0.38 |
| Urology | General Urology | Stricture Dilation - Urethra | 911 | 868 | 858 | -5% | -6% | 856 | 816 | 806 | -5% | -6% | OR | 911 | 868 | 858 | -0.05 | -0.06 |
| Urology | General Urology | Transurethral Resection - Bladder | 76 | 91 | 112 | 20% | 47% | 54 | 62 | 72 | 13% | 32% | OR | 76 | 91 | 112 | 0.2 | 0.47 |
| Urology | General Urology | Urethra Removal | 7 | 7 | 7 | -2% | -1% | 5 | 5 | 5 | -2% | -1% | OR | 7 | 7 | 7 | -0.02 | -0.01 |
| Urology | Incontinence | Biofeedback Training | 399 | 600 | 969 | 50% | 143% | 28 | 42 | 68 | 50% | 143% | | | | | | |
| Urology | Incontinence | Bladder Reconstruction | 2 | 2 | 2 | -9% | -12% | 2 | 2 | 2 | -9% | -12% | OR | 2 | 2 | 2 | -0.09 | -0.12 |
| Urology | Incontinence | Implant Material Injection | 96 | 84 | 80 | -13% | -16% | 58 | 44 | 37 | -24% | -36% | OR | 96 | 84 | 80 | -0.13 | -0.16 |
| Urology | Incontinence | Implant Material Injection - Cystoscopy | 9 | 7 | 6 | -18% | -25% | 5 | 3 | 2 | -35% | -55% | OR | 9 | 7 | 6 | -0.18 | -0.25 |
| Urology | Incontinence | Inflatable Urethral Sphincter Procedures | 19 | 22 | 28 | 19% | 48% | 17 | 20 | 24 | 18% | 43% | OR | 19 | 22 | 28 | 0.19 | 0.48 |
| Urology | Incontinence | Pessary Implantation | 671 | 642 | 666 | -4% | -1% | 34 | 32 | 33 | -4% | -1% | OR | 671 | 642 | 666 | -0.04 | -0.01 |
| Urology | Incontinence | Pulsed Magnetic Neuromodulation | 29 | 41 | 60 | 41% | 105% | 0 | 0 | 0 | 0% | 0% | OR | 29 | 41 | 60 | 0.41 | 1.05 |
| Urology | Incontinence | Sling Procedure | 554 | 852 | 1,381 | 54% | 149% | 451 | 662 | 1,021 | 47% | 126% | OR | 554 | 852 | 1381 | 0.54 | 1.49 |
| Urology | Incontinence | Sling Procedure - Laparoscopic | 7 | 10 | 16 | 48% | 134% | 5 | 8 | 12 | 41% | 112% | OR | 7 | 10 | 16 | 0.48 | 1.34 |
| Urology | Incontinence | Urethra Reconstruction | 1 | 2 | 3 | 42% | 119% | 1 | 1 | 2 | 38% | 105% | OR | 1 | 2 | 3 | 0.42 | 1.19 |
| Urology | Incontinence | Urethral Suspension - Laparoscopic | 5 | 8 | 13 | 51% | 140% | 5 | 7 | 12 | 51% | 140% | OR | 5 | 8 | 13 | 0.51 | 1.4 |

| Service Line | Sub Service Line | OPG Description | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth | 2012 HOPD Volume | 2017 HOPD Volume | 2022 HOPD Volume | 5YR Growth | 10YR Growth | OR Case Volumes: Procedure Location | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Urology | Male Genital System | Biopsy - Male Genital System | 57 | 60 | 66 | 6% | 17% | 15 | 16 | 17 | 3% | 13% | OR | 57 | 60 | 66 | 0.06 | 0.17 |
| Urology | Male Genital System | Circumcision | 705 | 738 | 795 | 5% | 13% | 331 | 347 | 374 | 5% | 13% | OR | 705 | 738 | 795 | 0.05 | 0.13 |
| Urology | Male Genital System | Hydrocele Procedures | 184 | 195 | 212 | 6% | 15% | 110 | 114 | 120 | 4% | 9% | OR | 184 | 195 | 212 | 0.06 | 0.15 |
| Urology | Male Genital System | Lesion Destruction - Laser - Penis | 16 | 16 | 17 | 0% | 2% | 9 | 9 | 9 | -2% | 0% | | | | | | |
| Urology | Male Genital System | Lesion Destruction - Penis | 393 | 411 | 441 | 5% | 12% | 20 | 21 | 22 | 5% | 12% | | | | | | |
| Urology | Male Genital System | Lesion Drainage - Testis/Scrotum | 18 | 19 | 20 | 3% | 9% | 7 | 7 | 8 | 3% | 9% | | | | | | |
| Urology | Male Genital System | Lesion Excision - Epididymis | 34 | 35 | 36 | 3% | 7% | 25 | 26 | 27 | 3% | 7% | OR | 34 | 35 | 36 | 0.03 | 0.07 |
| Urology | Male Genital System | Lesion Excision - Penis | 29 | 29 | 30 | 0% | 3% | 8 | 8 | 8 | 0% | 3% | OR | 29 | 29 | 30 | 0 | 0.03 |
| Urology | Male Genital System | Lesion Excision - Scrotum | 3 | 3 | 3 | -1% | 2% | 1 | 1 | 1 | -1% | 2% | OR | 3 | 3 | 3 | -0.01 | 0.02 |
| Urology | Male Genital System | Lesion Excision - Spermatic Cord | 61 | 61 | 62 | -1% | 2% | 45 | 45 | 46 | -1% | 2% | OR | 61 | 61 | 62 | -0.01 | 0.02 |
| Urology | Male Genital System | Lesion Excision - Testis | 2 | 2 | 2 | 1% | 6% | 1 | 1 | 1 | 1% | 6% | OR | 2 | 2 | 2 | 0.01 | 0.06 |
| Urology | Male Genital System | Other Procedures - Male Genital System | 247 | 258 | 272 | 5% | 10% | 62 | 65 | 68 | 5% | 10% | OR | 247 | 258 | 272 | 0.05 | 0.1 |
| Urology | Male Genital System | Penile Prosthesis/Pump Procedures | 39 | 35 | 30 | -12% | -24% | 36 | 32 | 28 | -12% | -24% | OR | 39 | 35 | 30 | -0.12 | -0.24 |
| Urology | Male Genital System | Penis Removal | 1 | 1 | 1 | 11% | 25% | 1 | 1 | 1 | 11% | 25% | OR | 1 | 1 | 1 | 0.11 | 0.25 |
| Urology | Male Genital System | Pharmacologic Injection - Penis | 146 | 124 | 104 | -16% | -29% | 6 | 5 | 4 | -16% | -29% | OR | 146 | 124 | 104 | -0.16 | -0.29 |
| Urology | Male Genital System | Removal - Epididymis | 16 | 16 | 17 | 1% | 5% | 11 | 11 | 10 | -6% | -9% | OR | 16 | 16 | 17 | 0.01 | 0.05 |
| Urology | Male Genital System | Removal - Scrotum | 4 | 4 | 5 | 3% | 8% | 3 | 3 | 3 | -4% | -6% | OR | 4 | 4 | 5 | 0.03 | 0.08 |
| Urology | Male Genital System | Revision/Repair - Penis | 76 | 109 | 160 | 44% | 112% | 60 | 82 | 113 | 35% | 86% | OR | 76 | 109 | 160 | 0.44 | 1.12 |
| Urology | Male Genital System | Testis Removal (Orchiectomy) | 75 | 81 | 92 | 9% | 23% | 56 | 61 | 69 | 9% | 23% | OR | 75 | 81 | 92 | 0.09 | 0.23 |
| Urology | Male Genital System | Testis Removal (Orchiectomy) - Laparoscopic | 2 | 2 | 2 | 6% | 15% | 1 | 1 | 1 | 6% | 15% | OR | 2 | 2 | 2 | 0.06 | 0.15 |
| Urology | Male Genital System | Testis Transplantation/Prosthesis Implantation | 4 | 5 | 6 | 18% | 43% | 3 | 3 | 4 | 13% | 32% | OR | 4 | 5 | 6 | 0.18 | 0.43 |
| Urology | Male Genital System | Undescended Testis Procedures | 82 | 82 | 86 | 0% | 4% | 66 | 65 | 68 | 0% | 4% | OR | 82 | 82 | 86 | 0 | 0.04 |
| Urology | Male Genital System | Undescended Testis Procedures - Laparoscopic | 3 | 3 | 3 | 1% | 7% | 2 | 2 | 2 | 1% | 7% | OR | 3 | 3 | 3 | 0.01 | 0.07 |
| Urology | Male Genital System | Vasectomy | 1,489 | 1,461 | 1,510 | -2% | 1% | 119 | 117 | 121 | -2% | 1% | OR | 1489 | 1461 | 1510 | -0.02 | 0.01 |
| Urology | Male Genital System | Vasectomy Reversal | 6 | 5 | 6 | -2% | 0% | 0 | 0 | 0 | -2% | 0% | OR | 6 | 5 | 6 | -0.02 | 0 |
| Urology | Other Urological Diagnostic Testing | Male Genital Function Studies | 41 | 43 | 48 | 5% | 18% | 2 | 2 | 2 | 5% | 18% | | | | | | |
| Urology | Prostate | Biopsy - Needle - Prostate | 1,966 | 1,845 | 1,734 | -6% | -12% | 393 | 369 | 347 | -6% | -12% | PROC RM | | | | | |
| Urology | Prostate | Biopsy - Open - Prostate | 6 | 6 | 5 | -8% | -16% | 6 | 6 | 5 | -8% | -16% | OR | 6 | 6 | 5 | -0.08 | -0.16 |
| Urology | Prostate | Brachytherapy Placement - Prostate | 82 | 80 | 78 | -2% | -5% | 68 | 60 | 53 | -11% | -22% | OR | 82 | 80 | 78 | -0.02 | -0.05 |
| Urology | Prostate | Cryosurgical Ablation - Prostate | 14 | 20 | 28 | 41% | 102% | 9 | 11 | 15 | 30% | 72% | OR | 14 | 20 | 28 | 0.41 | 1.02 |
| Urology | Prostate | Digital Rectal Exam | 635 | 840 | 1,125 | 32% | 77% | 25 | 34 | 45 | 32% | 77% | OR | 635 | 840 | 1125 | 0.32 | 0.77 |
| Urology | Prostate | Incision - Prostate | 14 | 15 | 16 | 7% | 19% | 9 | 10 | 11 | 7% | 19% | OR | 14 | 15 | 16 | 0.07 | 0.19 |
| Urology | Prostate | Laser Coagulation - Prostate | 153 | 256 | 405 | 67% | 165% | 47 | 67 | 88 | 41% | 86% | OR | 153 | 256 | 405 | 0.67 | 1.65 |
| Urology | Prostate | Laser Vaporization - Prostate | 43 | 71 | 112 | 66% | 161% | 13 | 19 | 24 | 40% | 83% | OR | 43 | 71 | 112 | 0.66 | 1.61 |
| Urology | Prostate | Lesion Drainage - Prostate | 1 | 1 | 1 | 0% | 0% | 0 | 0 | 0 | -1% | 0% | | | | | | |
| Urology | Prostate | Other Procedures - Prostate | 3 | 3 | 3 | 7% | 22% | 2 | 2 | 2 | 7% | 22% | | | | | | |
| Urology | Prostate | Transurethral Microwave Therapy (TUMT) | 225 | 317 | 434 | 40% | 93% | 7 | 6 | 5 | -12% | -24% | OR | 225 | 317 | 434 | 0.4 | 0.93 |
| Urology | Prostate | Transurethral Needle Ablation (TUNA) | 98 | 129 | 168 | 32% | 72% | 11 | 13 | 17 | 18% | 54% | | | | | | |
| Urology | Prostate | Transurethral Resection of the Prostate (TURP) | 84 | 75 | 70 | -11% | -16% | 74 | 65 | 60 | -12% | -18% | OR | 84 | 75 | 70 | -0.11 | -0.16 |
| Urology | Prostate | Water-Induced Thermotherapy (WIT) | 2 | 3 | 4 | 38% | 90% | 0 | 0 | 0 | 40% | 93% | | | | | | |
| Urology | Renal Procedures | Abscess Drainage - Kidney | 5 | 5 | 5 | 1% | 2% | 5 | 5 | 5 | 1% | 2% | OR | 5 | 5 | 5 | 0.01 | 0.02 |
| Urology | Renal Procedures | Abscess Drainage - Kidney - Percutaneous | 3 | 3 | 3 | 5% | 12% | 3 | 3 | 3 | 5% | 12% | OR | 3 | 3 | 3 | 0.05 | 0.12 |
| Urology | Renal Procedures | Biopsy - Kidney - Percutaneous | 160 | 181 | 207 | 13% | 29% | 137 | 145 | 154 | 6% | 12% | OR | 160 | 181 | 207 | 0.13 | 0.29 |
| Urology | Renal Procedures | Catheter-Based Drainage/Injection - Kidney - Percutaneous | 64 | 72 | 83 | 13% | 31% | 55 | 57 | 61 | 4% | 12% | OR | 64 | 72 | 83 | 0.13 | 0.31 |
| Urology | Renal Procedures | Kidney Stone Removal - Percutaneous | 10 | 11 | 12 | 11% | 25% | 9 | 10 | 12 | 11% | 25% | OR | 10 | 11 | 12 | 0.11 | 0.25 |
| Urology | Renal Procedures | Lesion Ablation - Kidney - Laparoscopic | 1 | 1 | 1 | 11% | 25% | 1 | 1 | 1 | 11% | 25% | OR | 1 | 1 | 1 | 0.11 | 0.25 |
| Urology | Renal Procedures | Lesion Aspiration/Injection - Kidney - Percutaneous | 29 | 33 | 40 | 16% | 38% | 23 | 25 | 28 | 8% | 20% | OR | 29 | 33 | 40 | 0.16 | 0.38 |
| Urology | Renal Procedures | Nephrostomy Implantation/Replacement | 92 | 104 | 119 | 12% | 29% | 79 | 87 | 98 | 10% | 24% | OR | 92 | 104 | 119 | 0.12 | 0.29 |
| Urology | Renal Procedures | Removal - Kidney - Laparoscopic | 1 | 1 | 3 | 89% | 264% | 1 | 1 | 3 | 89% | 264% | OR | 1 | 1 | 3 | 0.89 | 2.64 |
| Urology | Renal Procedures | Renal Endoscopy - Biopsy | 0 | 1 | 1 | 22% | 46% | 0 | 0 | 1 | 15% | 31% | OR | 0 | 1 | 1 | 0.22 | 0.46 |
| Urology | Renal Procedures | Renal Endoscopy - Diagnostic | 1 | 2 | 2 | 3% | 9% | 1 | 1 | 1 | 3% | 9% | OR | 1 | 2 | 2 | 0.03 | 0.09 |
| Urology | Renal Procedures | Renal Endoscopy - Other Procedures | 11 | 13 | 15 | 15% | 35% | 10 | 11 | 12 | 9% | 21% | OR | 11 | 13 | 15 | 0.15 | 0.35 |
| Urology | Urodynamics | Cystometrogram | 244 | 284 | 341 | 16% | 40% | 24 | 28 | 34 | 16% | 40% | | | | | | |
| Urology | Urodynamics | Kidney Function Study | 27 | 28 | 29 | 3% | 8% | 10 | 11 | 11 | 3% | 8% | | | | | | |
| Urology | Urodynamics | Muscle Study (Electromyography) - Urethral/Anal Sphincter | 703 | 835 | 1,030 | 19% | 46% | 70 | 84 | 103 | 19% | 46% | | | | | | |
| Urology | Urodynamics | Residual Urine Study - Ultrasound | 710 | 862 | 1,104 | 21% | 55% | 71 | 86 | 110 | 21% | 55% | | | | | | |
| Urology | Urodynamics | Urethral Pressure Profile (Upp) | 39 | 45 | 53 | 15% | 37% | 4 | 4 | 5 | 15% | 37% | | | | | | |
| Urology | Urodynamics | Urinary Reflex Study | 10 | 12 | 14 | 19% | 45% | 1 | 1 | 1 | 19% | 45% | | | | | | |
| Urology | Urodynamics | Urine Capacity Study - Ultrasound | 5,353 | 6,403 | 8,006 | 20% | 50% | 535 | 640 | 801 | 20% | 50% | | | | | | |
| Urology | Urodynamics | Uroflowmetry | 3,663 | 4,336 | 5,310 | 18% | 45% | 366 | 434 | 531 | 18% | 45% | | | | | | |
| Urology | Urodynamics | Voiding Pressure Studies | 347 | 403 | 486 | 16% | 40% | 35 | 40 | 49 | 16% | 40% | | | | | | |
| Urology | Urolithiasis | Extracorporeal Shock Wave Lithotripsy (ESWL) | 1,121 | 1,175 | 1,247 | 5% | 11% | 998 | 1,034 | 1,097 | 4% | 10% | OR | 1121 | 1175 | 1247 | 0.05 | 0.11 |
| Urology | Urolithiasis | Stone Destruction/Removal (Litholapaxy) - Cystoscopy | 1,666 | 1,893 | 2,197 | 14% | 32% | 700 | 795 | 923 | 14% | 32% | OR | 1666 | 1893 | 2197 | 0.14 | 0.32 |
| Urology | Urolithiasis | Stone Removal - Open | 5 | 5 | 5 | -3% | -3% | 5 | 5 | 5 | -3% | -3% | OR | 5 | 5 | 5 | -0.03 | -0.03 |
| Vascular | Medical Vascular | Dynamic Infrared Perfusion Imaging (DIRI) | 2 | 2 | 2 | 20% | 52% | 0 | 0 | 1 | 20% | 52% | | | | | | |
| Vascular | Medical Vascular | Other Non-Invasive Vascular Study | 151 | 166 | 187 | 10% | 24% | 11 | 12 | 13 | 10% | 24% | | | | | | |
| Vascular | Medical Vascular | Peripheral Arterial Disease Rehabilitation | 38 | 44 | 46 | 16% | 23% | 0 | 0 | 0 | 16% | 23% | | | | | | |
| Vascular | Medical Vascular | Sclerotherapy | 696 | 745 | 756 | 7% | 9% | 21 | 22 | 23 | 7% | 9% | | | | | | |
| Vascular | Medical Vascular | Thermography | 2 | 2 | 2 | 9% | 21% | 0 | 0 | 0 | 9% | 21% | | | | | | |
| Vascular | Medical Vascular | Vascular Ultrasound Study | 25,279 | 27,983 | 31,642 | 11% | 25% | 11,881 | 12,609 | 13,665 | 6% | 15% | | | | | | |
| Vascular | Vascular Cath | Arterial Vascular Catheterization | 1,123 | 950 | 874 | -15% | -22% | 963 | 808 | 735 | -16% | -24% | | | | | | |
| Vascular | Vascular Cath | Central Venous Access Procedures | 2,646 | 3,108 | 3,752 | 17% | 42% | 2,302 | 2,704 | 3,264 | 17% | 42% | | | | | | |
| Vascular | Vascular Cath | Endovenous Laser Ablation | 417 | 731 | 944 | 75% | 126% | 28 | 36 | 33 | 30% | 16% | | | | | | |
| Vascular | Vascular Cath | Endovenous Radiofrequency Ablation | 407 | 734 | 989 | 80% | 143% | 27 | 37 | 34 | 34% | 25% | | | | | | |
| Vascular | Vascular Cath | Inferior Vena Cava Filter Placement | 46 | 51 | 58 | 12% | 27% | 46 | 51 | 58 | 12% | 27% | | | | | | |
| Vascular | Vascular Cath | Intravascular Peripheral Ultrasound | 4 | 6 | 9 | 61% | 153% | 3 | 5 | 8 | 61% | 153% | | | | | | |
| Vascular | Vascular Cath | Other Diagnostic Vascular Catheterization | 57 | 64 | 70 | 12% | 22% | 46 | 51 | 56 | 12% | 22% | | | | | | |
| Vascular | Vascular Cath | Other Transcatheter Vascular Procedure | 48 | 56 | 68 | 17% | 41% | 35 | 38 | 43 | 10% | 23% | | | | | | |
| Vascular | Vascular Cath | Percutaneous Transluminal Carotid Artery Stent Placement | 1 | 2 | 3 | 67% | 151% | 1 | 2 | 3 | 67% | 151% | Cath Lab | | | | | |

| Service Line | Sub Service Line | OPG Description | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth | 2012 HOPD Volume | 2017 HOPD Volume | 2022 HOPD Volume | 5YR Growth | 10YR Growth | OR Case Volumes: Procedure Location | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Vascular | Vascular Cath | Percutaneous Transluminal Peripheral Artery Atherectomy | 34 | 35 | 36 | 2% | 5% | 34 | 34 | 35 | 2% | 5% | Cath Lab | | | | | |
| Vascular | Vascular Cath | Percutaneous Transluminal Peripheral Artery Balloon Angioplasty | 293 | 330 | 371 | 12% | 26% | 285 | 307 | 328 | 8% | 15% | Cath Lab | | | | | |
| Vascular | Vascular Cath | Percutaneous Transluminal Peripheral Artery Stent Placement | 351 | 397 | 449 | 13% | 28% | 342 | 370 | 397 | 8% | 16% | Cath Lab | | | | | |
| Vascular | Vascular Cath | Percutaneous Transluminal Peripheral Venous Balloon Angioplasty | 730 | 907 | 1,044 | 24% | 43% | 612 | 753 | 866 | 23% | 42% | Cath Lab | | | | | |
| Vascular | Vascular Cath | Percutaneous Transluminal Pulmonary Artery Balloon Angioplasty | 1 | 1 | 1 | -2% | 1% | 1 | 1 | 1 | -2% | 1% | Cath Lab | | | | | |
| Vascular | Vascular Cath | Transcatheter Biopsy | 24 | 31 | 38 | 27% | 60% | 21 | 27 | 33 | 27% | 60% | Cath Lab | | | | | |
| Vascular | Vascular Cath | Transcatheter Embolization | 249 | 312 | 382 | 25% | 54% | 142 | 166 | 189 | 16% | 33% | Cath Lab | | | | | |
| Vascular | Vascular Cath | Transcatheter Peripheral Thrombolysis | 90 | 97 | 104 | 8% | 15% | 48 | 48 | 47 | 0% | -1% | Cath Lab | | | | | |
| Vascular | Vascular Cath | Vascular Sealing Device Implant | 82 | 98 | 116 | 19% | 42% | 82 | 98 | 116 | 19% | 42% | | | | | | |
| Vascular | Vascular Cath | Venous Catheterization | 3,604 | 3,138 | 2,718 | -13% | -25% | 748 | 629 | 519 | -16% | -31% | | | | | | |
| Vascular | Vascular Surgery | Arterial Embolectomy/Thrombectomy | 7 | 8 | 10 | 12% | 31% | 7 | 8 | 10 | 12% | 31% | OR | 7 | 8 | 10 | 0.12 | 0.31 |
| Vascular | Vascular Surgery | Endovascular Abdominal Aortic Aneurysm Stent Graft Implant | 2 | 2 | 3 | 21% | 54% | 2 | 2 | 3 | 21% | 54% | OR | 2 | 2 | 3 | 0.21 | 0.54 |
| Vascular | Vascular Surgery | Femoropopliteal Vein Harvest | 1 | 1 | 1 | 10% | 27% | 1 | 1 | 1 | 10% | 27% | OR | 1 | 1 | 1 | 0.1 | 0.27 |
| Vascular | Vascular Surgery | Hemodialysis Access/Shunt Procedures | 685 | 750 | 847 | 10% | 24% | 584 | 630 | 703 | 8% | 20% | OR | 685 | 750 | 847 | 0.1 | 0.24 |
| Vascular | Vascular Surgery | Intra-Arterial Infusion Pump Procedure | 9 | 11 | 14 | 22% | 52% | 8 | 9 | 12 | 22% | 52% | OR | 9 | 11 | 14 | 0.22 | 0.52 |
| Vascular | Vascular Surgery | Other Blood Vessel Repair | 12 | 13 | 15 | 8% | 21% | 12 | 13 | 15 | 8% | 21% | OR | 12 | 13 | 15 | 0.08 | 0.21 |
| Vascular | Vascular Surgery | Other Cardiothoracic Surgery | 1 | 1 | 1 | 2% | 5% | 1 | 1 | 1 | 2% | 5% | OR | 1 | 1 | 1 | 0.02 | 0.05 |
| Vascular | Vascular Surgery | Other Vascular Surgery | 205 | 226 | 260 | 10% | 26% | 164 | 181 | 208 | 10% | 26% | OR | 205 | 226 | 260 | 0.1 | 0.26 |
| Vascular | Vascular Surgery | Phlebectomy/Vein Stripping | 59 | 53 | 52 | -9% | -11% | 32 | 29 | 29 | -10% | -12% | OR | 59 | 53 | 52 | -0.09 | -0.11 |
| Vascular | Vascular Surgery | Portal Decompression Procedures | 37 | 43 | 50 | 16% | 35% | 37 | 43 | 50 | 16% | 35% | OR | 37 | 43 | 50 | 0.16 | 0.35 |
| Vascular | Vascular Surgery | Thromboendarterectomy | 4 | 4 | 4 | 4% | 14% | 4 | 4 | 4 | 4% | 14% | OR | 4 | 4 | 4 | 0.04 | 0.14 |
| Vascular | Vascular Surgery | Vascular Exploration/Revision | 41 | 44 | 49 | 7% | 21% | 38 | 41 | 46 | 7% | 21% | OR | 41 | 44 | 49 | 0.07 | 0.21 |
| Vascular | Vascular Surgery | Vascular Ligation | 211 | 220 | 239 | 4% | 13% | 133 | 139 | 151 | 4% | 13% | OR | 211 | 220 | 239 | 0.04 | 0.13 |
| Vascular | Vascular Surgery | Venous Thrombectomy | 3 | 3 | 3 | 13% | 33% | 3 | 3 | 3 | 13% | 33% | OR | 3 | 3 | 3 | 0.13 | 0.33 |
| Total | | | 8011656 | 8406360 | 9064965 | | | 1229622 | 1280237 | 1369061 | | | | 130226 | 141224 | 159736 | **8%** | **23%** |

The Advisory Board Company | Health Care Advisory Board
Inpatient Market Estimator

**Brief Description**

Welcome to the Inpatient Market Estimator. Developed by the Advisory Board's Data and Analytics Group, this easy-to-use online tool generates population-based estimates of current and forecasted inpatient volumes, length of stay, and bed days for any geography within the US and may be useful for market-sizing and strategic planning purposes. Employing market-specific population figures adjusted for local age and gender characteristics, the tool applies national use rates to estimate likely inpatient utilization for a specific market by service lines, sub-service lines or individual DRGs. For more information please contact the Data and Analytics Group at Analytics@advisory.com

**select which level you would like to view your customized service or**

Service Line | Sub Service Line | MSDRG | [illegible]

**Service Name**

Hartford PSA

**Service Description**

**LOCALES SELECTED**

06099|Cancelled|
06074|Cancelled|
06114|Cancelled|
06067|Cancelled|
06068|Cancelled|
06081|Cancelled|
06013|Cancelled|
06458|Cancelled|
06029|Cancelled|
06096|Cancelled|
06117|Cancelled|
06097|Cancelled|
06052|Cancelled|
06107|Cancelled|
06042|Cancelled|
06082|Cancelled|
06095|Cancelled|
06095|Cancelled|
06082|Cancelled|
06106|Cancelled|
06103|Cancelled|
06066|Cancelled|
06111|Cancelled|
06093|Cancelled|
06085|Cancelled|
06453|Cancelled|
06088|Cancelled|
06083|Cancelled|
06053|Cancelled|
06457|Cancelled|
06112|Cancelled|
06048|Cancelled|
06098|Cancelled|
06473|Cancelled|
06081|Cancelled|
06013|Cancelled|
06113|Cancelled|
06092|Cancelled|
06018|Cancelled|
06103|Cancelled|
06105|Cancelled|
06073|Cancelled|
06026|Cancelled|
06118|Cancelled|
06016|Cancelled|
06062|Cancelled|
06029|Cancelled|
06078|Cancelled|
06116|Cancelled|
06078|Cancelled|
06108|Cancelled|
06451|Cancelled|
06051|Cancelled|
06120|Cancelled|
06088|Cancelled|
06022|Cancelled|
06032|Cancelled|
06118|Cancelled|
06403|Cancelled|

**DEMOGRAPHICS SELECTED**

0 - 4 years old
5 - 9 years old
10 - 14 years old
15 - 19 years old
20 - 24 years old
25 - 29 years old
30 - 34 years old
35 - 39 years old
40 - 44 years old
45 - 49 years old
50 - 54 years old
55 - 59 years old
60 - 64 years old
65 - 69 years old
70 - 74 years old
75 - 79 years old
80 - 84 years old
85- years old
Female
Male

| Service Line | 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth | 2012 ALOS | 2017 ALOS | 2022 ALOS | 2012 Days | 2017 Days | 2022 Days | 5YR Growth | 10YR Growth | Surgical | Surgical Cases 2012 Volume | 2017 Volume | 2022 Volume | 5YR Growth | 10YR Growth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cardiac Services | 18,044 | 15,539 | 14,512 | -14% | -20% | 4.0 | 4.1 | 4.2 | 71,739 | 64,413 | 61,406 | -10% | -14% | | 0 | 0 | 0 | 0 | 0 |
| ENT | 1,684 | 1,646 | 1,658 | -2% | -2% | 2.9 | 2.9 | 2.7 | 4,951 | 4,702 | 4,547 | -5% | -8% | Y | 1684 | 1646 | 1658 | -0.02 | -0.02 |
| General Medicine | 48,100 | 49,623 | 50,402 | 3% | 5% | 5.0 | 4.8 | 4.7 | 239,690 | 240,005 | 237,557 | 0% | -1% | | 0 | 0 | 0 | 0 | 0 |
| General Surgery | 9,418 | 9,508 | 9,621 | 1% | 2% | 8.2 | 8.0 | 7.9 | 76,887 | 76,483 | 76,109 | -1% | -1% | Y | 9418 | 9508 | 9621 | 0.01 | 0.02 |
| Gynecology | 2,350 | 2,144 | 1,995 | -9% | -15% | 2.6 | 2.5 | 2.5 | 6,031 | 5,459 | 5,060 | -9% | -16% | Y | 2350 | 2144 | 1995 | -0.09 | -0.15 |
| Invalid | 1,166 | 1,198 | 1,240 | 3% | 6% | 9.0 | 9.0 | 9.0 | 10,440 | 10,732 | 11,110 | 3% | 6% | | 0 | 0 | 0 | 0 | 0 |
| Neonatology | 11,608 | 11,740 | 11,826 | 1% | 2% | 3.8 | 3.7 | 3.5 | 44,031 | 43,055 | 41,437 | -2% | -6% | | 0 | 0 | 0 | 0 | 0 |
| Neurology | 6,064 | 5,874 | 5,962 | -3% | -2% | 4.5 | 4.4 | 4.4 | 27,007 | 26,047 | 26,479 | -4% | -2% | | 0 | 0 | 0 | 0 | 0 |
| Neurosurgery | 970 | 1,067 | 1,178 | 10% | 21% | 7.6 | 7.6 | 7.5 | 7,395 | 8,066 | 8,833 | 9% | 19% | Y | 970 | 1067 | 1178 | 0.1 | 0.21 |
| Obstetrics | 14,191 | 13,844 | 13,514 | -2% | -5% | 2.7 | 2.6 | 2.5 | 38,251 | 36,188 | 34,269 | -5% | -10% | | 0 | 0 | 0 | 0 | 0 |
| Oncology/Hematology (Medical) | 4,395 | 4,337 | 4,298 | -1% | -2% | 5.3 | 5.1 | 5.0 | 23,243 | 22,271 | 21,489 | -4% | -8% | | 0 | 0 | 0 | 0 | 0 |
| Ophthalmology | 192 | 173 | 157 | -10% | -18% | 3.2 | 3.2 | 3.2 | 621 | 557 | 501 | -10% | -19% | Y | 192 | 173 | 157 | -0.1 | -0.18 |
| Orthopedics | 8,952 | 9,058 | 9,511 | 1% | 6% | 4.3 | 4.1 | 4.0 | 38,434 | 37,502 | 37,957 | -2% | -1% | Y | 8952 | 9058 | 9511 | 0.01 | 0.06 |
| Other Trauma | 1,356 | 1,311 | 1,278 | -3% | -6% | 3.9 | 3.8 | 3.8 | 5,223 | 4,985 | 4,811 | -5% | -8% | | 0 | 0 | 0 | 0 | 0 |
| Rehabilitation | 1,519 | 1,562 | 1,728 | 3% | 14% | 13.2 | 13.8 | 14.3 | 20,096 | 21,494 | 24,706 | 7% | 23% | | 0 | 0 | 0 | 0 | 0 |
| Spine | 3,339 | 3,227 | 3,194 | -3% | -4% | 3.5 | 3.5 | 3.6 | 11,782 | 11,410 | 11,360 | -3% | -4% | Y | 3339 | 3227 | 3194 | -0.03 | -0.04 |
| Thoracic Surgery | 799 | 844 | 883 | 6% | 11% | 8.7 | 8.3 | 7.9 | 6,945 | 6,988 | 6,969 | 1% | 0% | Y | 799 | 844 | 883 | 0.06 | 0.11 |
| Urology | 2,099 | 2,101 | 2,126 | 0% | 1% | 3.9 | 3.8 | 3.7 | 8,169 | 7,962 | 7,855 | -3% | -4% | Y | 2099 | 2101 | 2126 | 0 | 0.01 |
| Vascular Services | 2,920 | 2,697 | 2,611 | -8% | -11% | 5.5 | 5.3 | 5.1 | 16,063 | 14,391 | 13,425 | -10% | -16% | Y | 2920 | 2697 | 2611 | -0.08 | -0.11 |
| **Total** | | | | | | | | | | | | | | | **32723** | **32465** | **32934** | **-1%** | **1%** |

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Marketing and Planning Leadership Council

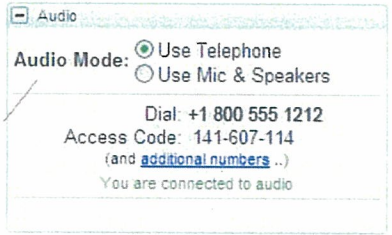
# Ambulatory Surgery Investment: 2013 Outlook

November 27, 2012

# Managing your audio

### Use Telephone

If you select the "use telephone" option please dial in with the phone number and access code provided.

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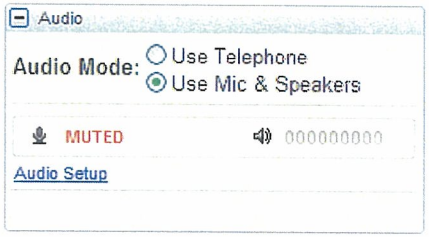


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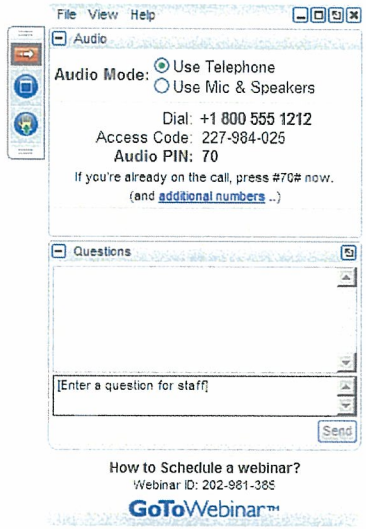


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Use the blue and white square to maximize the presentation area.

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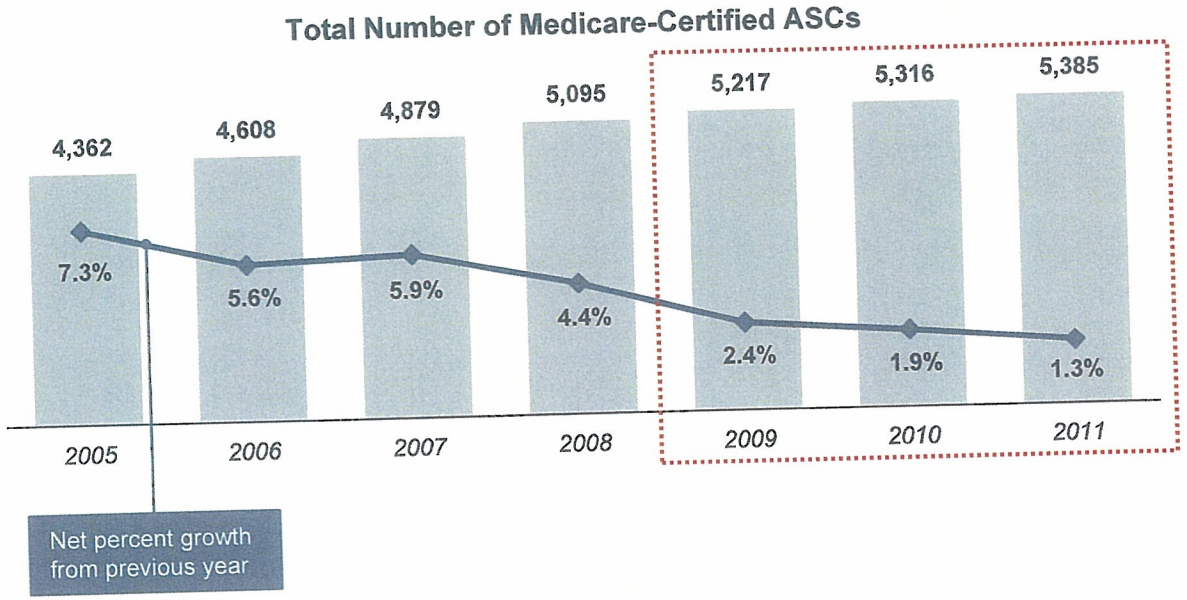
# Historic ASC Growth Past the Tipping Point




Source: "Report to the Congress: Medicare Payment Policy," MedPAC, March 2012; Marketing and Planning Leadership Council interviews and analysis.

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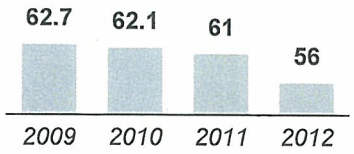
# Physician Investors Deterred by Market Headwinds

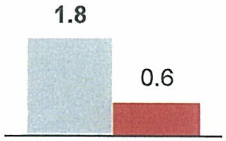
## 1

### Increased Reimbursement Pressure

**ASC Reimbursement, % of HOPD**



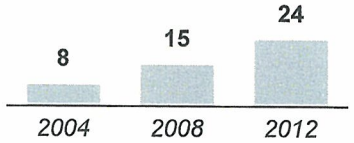

**2013 Payment Update**



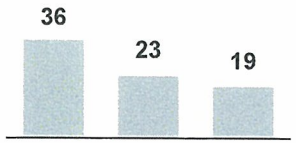

## 2

### Shrinking Physician Supply

**Specialists Employed**




**Eligible Physicians per ASC**




## 3

### Uncertainty Under Value-Based Payment

Quality Reporting

Payer Network Access

Increased Competition

Source: Marketing and Planning Leadership Council interviews and analysis

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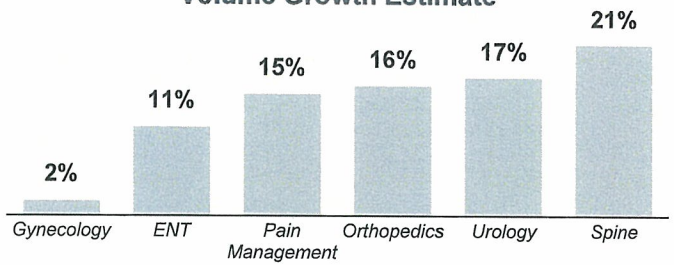
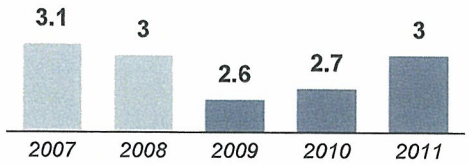
# Demand Outlook Still Favorable for Key Specialties

## 5-Year Total Outpatient Volume Growth Estimate




## Median Cases/OR Recovering from 2009-2011[1]




## Drivers of Growth

**Aging Population**

**Technology Pushing Procedures to Outpatient Setting**

**CMS Approvals for Outpatient Procedures**

1) VMG 2011 Intellimarketer Multi-specialty ASC Study

Source: Marketing and Planning Leadership Council interviews and analysis

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# Saturation Draws New Players to Market

## Hospitals and Management Companies Picking Up the Slack

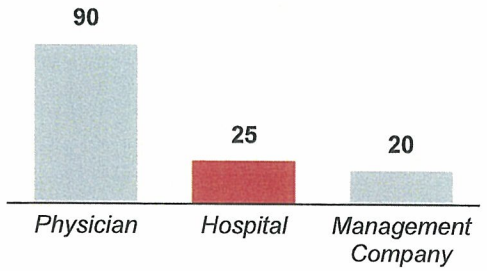
### Management Companies Seeking Growth

- Consolidate at the Top
- Turnaround Low Performers
- Limited DeNovo ASCs

### Hospitals & Health Systems Seeking Outpatient Foothold

- Build Outpatient Centers
- Acquire and Convert
- JV and Manage

### Involvement In ASC Ownership[1]




**63%**

Of ASC operators expect acquisition activity to increase

1) Approximation; ASCA's 2011 ASC Employee Salary & Benefits Survey

Source: VMG Intelimarker 2011 Multi-speciality ASC Study; Marketing and Planning Leadership Council interviews and analysis

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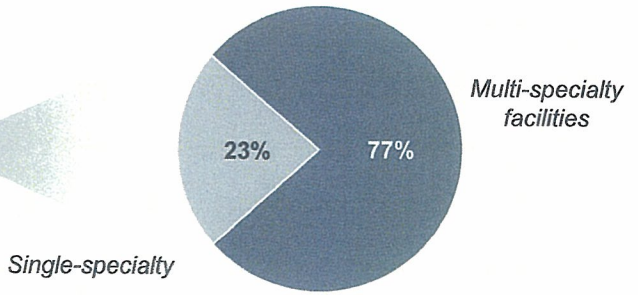
# Multi-Specialty ASCs in High Demand

## Growth Among Top Management Firms

| | June 2011 | Q3 2012 |
|---|---|---|
| AmSurg | 208 | 228 |
| USPI | 191 | 202 |
| Surgery Partners | 11 | 50 |

## ASCs acquired by AmSurg, 2011




> "We substantially diversified our revenues through **strong growth in the number of our multi-specialty facilities**, with multi-specialty revenues accounting for 31% of fourth-quarter 2011 total revenues versus 12% for fourth-quarter 2007.
>
> *AmSurg 2011 Annual Report*

Source: AmSurg 2011 Annual Report, available at: http://phx.corporate-ir.net/phoenix.zhtml?c=83089&p=irol-reportsannual, accessed October 26, 2012; *Multi-Specialty ASC Intellimarker 2011*, VMG Health LLC, 2011, available at: http://www.vmghealth.com/Downloads/VMG_Intellimarker11.pdf, accessed October 26 2012.; Marketing and Planning Leadership Council interviews and analysis

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# ASCs, Management Firms Seek Stability in Hospitals

## Hospital Presence Threatens ASC Development

### Threats to ASC Industry

*Greatest Challenges to ASC Over Next 5 Years[1]*

1. Limited Physician Pool
2. Hospital Employment
3. CMS Reimbursement
4. Economic Recovery

### Benefits of Hospital Partnership

- ✓ **Health System Brand**
- ✓ **Access to Physicians**
- ✓ **Payer Network Opportunity**
- ✓ **Bargaining Power for Supplies**
- ✓ **Reduced Competition**
- ✓ **Need for CON[2]**

> ASCs and management companies view the hospital as a safe-haven; they have staying power and strength in the market…
>
> *Senior Vice President, Management Company*

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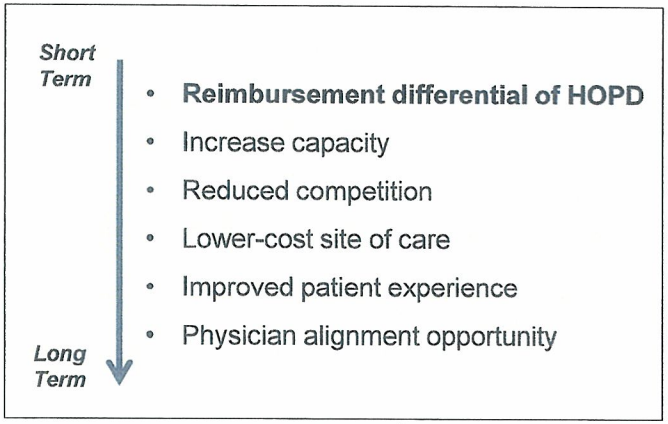
1) VMG 2011 ValueDriver ASC Survey
2) Certificate of Need

Source: Marketing and Planning Leadership Council interviews and analysis

# Deprioritize Payment Advantage in Decision Criteria

## Benefits of ASC to Hospital




### Attention On Payments

- Medpac evaluates opportunity to equalize payments for set of comparable procedures
- OIG adds review of ASC payment system to 2013 agenda

> If not equal, [payments] will move to be a lot closer…At least some hospitals are being progressive in their thinking and looking it as: no matter what there is going to be pressure on reimbursement, higher level of accountability/ So if we can do this procedure cost-effectively in an ASC, that is the right long-term strategy…
>
> *Industry Leader*

Source: Marketing and Planning Leadership Council interviews and analysis

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# Evaluating ASC Opportunities for Hospitals

## Strategic Considerations

- Fit with long-term goals/strategy of hospital
- Capacity need (e.g. multispecialty vs. single specialty)
- Market dynamics (number and quality of competing facilities)
- Financial benefit to both parties
- Cultural fit between physician group and hospital

## Feasibility Considerations

### Physicians

- Age of physicians
- Dynamic between physicians
- Physician recruitment & retention history

### Facility

- Location relative to hospital and competitors
- Age and condition of facility
- Demand sustainability

### Quality

- Operational efficiency
- Quality and satisfaction performance
- Brand / reputation of ASC

Source: Marketing and Planning Leadership Council research and analysis

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# Risks & Opportunities in Hospital Acquisitions

## 100% Hospital Owned

### BUILD

- Hospitals or health system builds and operates an outpatient department
- Requires significant capital and appropriate market demand to meet capacity

### BUY

- Hospitals or health system acquires an existing ASC facility from physicians
- Requires significant capital, management capacity, physician relationships, aligned incentives

## Joint Venture

### MAJORITY (>51%)

- Hospitals or health system has majority ownership and operates ASC
- Requires capital, management capacity, joint-leadership, aligned incentives

### MINORITY (<49%)

- Hospitals or health system builds and operates an outpatient department
- Requires less capital, physician relationships, need for capacity in specific specialty

### Risks

- Operational learning curve for hospital managers
- Physician performance
- Conflict with employed physicians
- Not enough demand to fill capacity

Source: Marketing and Planning Leadership Council interviews and analysis

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# Role of the Management Firm in the ASC JV

## Typical Joint Venture Model with 3rd Party Contracting

**ASC Board**

- Responsible for governance of ASC
- Includes representatives from all ownership parties (seats based on ownership level)
- Facilitates joint decision-making

### Hospital

- Owns majority of ASC with management company (51%)
- Hospital has right to control ASC (e.g. budget, capital, issuance of shares)
- Hospital can obtain hospital contract rates

### Management Company

- Owns smaller portion of hospital's majority share (~10-20%)
- Contracted to perform operational management of ASC
- Responsible for quality, efficiency, customer, staff satisfaction

### Physician Group

- Individual physicians collectively own minority share of ASC (49%)
- Responsible for performing clinical services and some administrative responsibilities (e.g. meeting attendance

Source: Marketing and Planning Leadership Council interviews and analysis

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# Co-Management Structure, Viable Alternative

## Incentive Fees Facilitate Alignment, Enable Independent Physicians

### 5 Steps to Structuring Incentive Fees to Mitigate Risk in ASC Investment

1. Give appropriate weight to incentive fees, 30-70%
2. Identify objective, performance-based metrics
3. Establish a baseline for benchmarking performance
4. Create incentives based on variable outcomes
5. Choose metrics for evaluation performance across functions

### Performance-Based Metrics[1]

**Operational**
- On-time starts
- OR turn around time (wheels in/out)

**Financial**
- Up front cash collection
- Collection goal met

**Patient Safety**
- Patient burns/falls
- Wrong site/side/patient/procedure

**Clinical Outcomes**
- Unexpected patient care within 24 hrs
- Patients receiving incomplete discharge instructions

**Satisfaction**
- Patient satisfaction rates
- Staff/physician satisfaction rates

1) For more see: http://www.advisory.com/Research/Marketing-and-Planning-Leadership-Council/Service-Line-Transformation/2012/08/Incentive-fees-mitigate-risk-to-hospitals-in-co-managed-ASCs

Source: Marketing and Planning Leadership Council interviews and analysis

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# ASC Role In the ACO Model

## Benefits to ASC Integration into the ACO Network

### Lower Cost of Care

- ASCs are designed and managed to operate cost-effectively
- ASCs operate at 30-40% of the cost of HOPDs
- ACOs can incorporate ASCs into the network rather than build additional outpatient capacity to meet future volumes to contain costs

### Convenient Site of Care

- ASCs can boost ACOs ability to compete for patients
- Better access, convenience and turn around time in ASCs leads to high rates of patient satisfaction
- Offering alternative sites of care that meet patient needs can help keep patients in-network

### Physician Alignment

- ASC integration into the network is an opportunity to collaborate with highly independent specialists
- Joint ventured or co-managed ASCs can help ACOs manage outcomes through shared risk with physicians

Source: Marketing and Planning Leadership Council interviews and analysis

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# Key Takeaways

1. Reimbursement pressure, limited physician supply and uncertainty under value-based payment has shifted the market power from physicians to management companies and hospitals

2. Although multispecialty ASCs are potentially more attractive investments for most hospitals, highly specialized "focus-factories" for orthopedics, GI and other high volume specialties are still financially viable

3. Hospitals should base investment decisions on long-term strategic fit: need for future capacity, competency in specific specialty, efficient sites of care, and physician alignment

4. As the market shifts to value-based payment, ASCs and management firms will be seeking partnerships with hospitals to secure payer network access, patient populations and market stability.

Source: Marketing and Planning Leadership Council interviews and analysis

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Questions?

Shay Pratt
prattm@adivsory.com

Madhavi Kasinadhuni
kasinadm@advisory.com

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ASCA
Ambulatory Surgery Center Association

AMBULATORY SURGERY CENTERS

# QUALITY AND ACCESS ACT OF 2013

## SECTION 1

Ambulatory Surgerical Center Quality and Access Act of 2013

## SECTION 2

Requires the Centers for Medicare & Medicaid Services (CMS) to use the hospital market basket as the update factor when determining the update for payments for services performed in ambulatory surgery centers (ASCs). Currently, ASCs do not have a market basket update and the default update mechanism is the Consumer Price Index for All Urban Consumers (CPI-U), which does not appropriately measure the costs of an ASC. The provision does not affect the productivity adjusters mandated for all providers by the Patient Protection and Affordable Care Act (PPACA) or the secondary rescaling required for budget neutrality in the ASC pool.

## SECTION 3

Requires the development of a value-based purchasing (VBP) program for ASCs by January 1, 2015. The system would be established as follows:

- Each reporting facility would be assigned a score based on its performance on the quality measurements;
- Facilities would not be required to report on those measures that were inappropriate for their facility, i.e., shaving of the surgical site in ASCs that perform ophthalmic procedures;
- CMS would develop an estimate of the total amount that Medicare is expected to spend on hospital outpatient department (HOPD) and ASC procedures for the coming year for procedures that are eligible to be performed in an ASC. The estimate would be based on spending in the three prior years and would be adjusted for beneficiary demographics, eligible procedures and other factors, such as changes in the proportion of beneficiaries enrolled in Medicare Advantage plans;
- Each year, CMS would compare the actual spending to its estimated spending for procedures eligible to be performed in an ASC that were performed in either an HOPD or an ASC. If the actual spending for these procedures is less than the estimated spending, the difference would create the shared savings or bonus pool. This system is similar to the VBP system designed for the home health demonstration mentioned in the Secretary's report to Congress on VBP for ASCs;

- The shared savings pool would be divided, with 50 percent of the pool being retained by CMS and returned as savings to the Medicare program. The other 50 percent of the pool would be used to provide bonuses to high quality ASCs;
- The creation of the mechanism to provide bonuses to individual ASCs is left to the discretion of the Secretary with instructions to reward providers for both improvement and attainment; however, the Secretary is required to spend 50 percent of the savings pool on ASC bonuses.

## SECTION 4

Directs CMS to add a representative from the ASC community to the membership of the Advisory Panel on Hospital Outpatient Payment since decisions made by the panel affect both HOPD and ASC facility fees and eligible procedures.

## SECTION 5

Requires transparency in the Medicare process for approving procedures that are allowed to be performed in the ASC setting. Currently, CMS can exclude a procedure from being performed in an ASC out of a general concern for patient safety, because it is reported using a CPT-unlisted code or for any one of the following criteria:

- generally results in excessive blood loss;
- requires major or prolonged invasion of body cavities;
- directly involves major blood vessels;
- is generally emergent or life-threatening in nature;
- commonly requires systemic thrombolytic therapy; or
- typically requires active medical monitoring and care at midnight following the procedure.

The agency is not required to disclose which of the criteria triggers the exclusion. The Ambulatory Surgery Center Quality and Access Act requires CMS to disclose which of the criteria triggers the exclusion and prohibits CMS from excluding procedures reported with unlisted codes from the ASC setting.

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113TH CONGRESS
1ST SESSION

# S. 1137

To amend title XVIII of the Social Security Act to modernize payments for ambulatory surgical centers under the Medicare program, and for other purposes.

---

IN THE SENATE OF THE UNITED STATES

JUNE 11, 2013

Mr. WYDEN (for himself, Ms. LANDRIEU, Ms. CANTWELL, Mr. MERKLEY, and Mr. BLUMENTHAL) introduced the following bill; which was read twice and referred to the Committee on Finance

---

# A BILL

To amend title XVIII of the Social Security Act to modernize payments for ambulatory surgical centers under the Medicare program, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

**SECTION 1. SHORT TITLE.**

This Act may be cited as the "Ambulatory Surgical Center Quality and Access Act of 2013".

**SEC. 2. ALIGNING UPDATES FOR AMBULATORY SURGICAL CENTER SERVICES WITH UPDATES FOR OPD SERVICES.**

Section 1833(i)(2)(D) of the Social Security Act (42 U.S.C. 13951(i)(2)(D)) is amended—

(1) by redesignating clause (vi) as clause (vii);

(2) in the first sentence of clause (v), by inserting before the period the following: "and, in the case of 2014 or a subsequent year, by the adjustment described in subsection (t)(3)(G) for the respective year"; and

(3) by inserting after clause (v) the following new clause:

"(vi) In implementing the system described in clause (i) for 2014 and each subsequent year, there shall be an annual update under such system for the year equal to the OPD fee schedule increase factor specified under subsection (t)(3)(C)(iv) for such year, adjusted in accordance with clauses (iv) and (v).".

**SEC. 3. TRANSPARENCY OF QUALITY REPORTS AND APPLICATION OF VALUE-BASED PURCHASING TO ASCS.**

(a) QUALITY MEASURES.—Paragraph (7) of section 1833(i) of the Social Security Act (42 U.S.C. 1395l(i))

is amended by adding at the end the following new subparagraphs:

"(C) To the extent that quality measures implemented by the Secretary under this paragraph for ambulatory surgical centers and under section 1833(t)(17) for hospital outpatient departments are applicable to the provision of surgical services in both ambulatory surgical centers and hospital outpatient departments, the Secretary shall make reported data available on the website 'Medicare.gov' in a manner that will permit side-by-side comparisons on such measures for ambulatory surgical centers and hospital outpatient departments in the same geographic area.

"(D) For each procedure covered for payment in an ambulatory surgical center, the Secretary shall publish, along with the quality reporting comparisons provided for in subparagraph (C), comparisons of the Medicare payment and beneficiary copayment amounts for the procedure when performed in ambulatory surgical centers and hospital outpatient departments in the same geographic area.

"(E) The Secretary shall ensure that an ambulatory surgery center and a hospital has the opportunity to review, and submit any corrections for, the data to be made public with respect to the ambulatory surgery center under subparagraph (C)(ii) prior to such data being made public.".

(b) AMBULATORY SURGICAL CENTER VALUE-BASED PURCHASING PROGRAM.—Section 1833(i) of the Social Security Act (42 U.S.C. 1395l(i)) is amended by adding at the end the following new paragraph:

"(8) VALUE-BASED PURCHASING PROGRAM.—

"(A) ESTABLISHMENT.—The Secretary shall establish an ambulatory surgical center value-based purchasing program (in this subsection referred to as the 'Program') under which, subject to subparagraph (I), each ambulatory surgical center that the Secretary determines meets (or exceeds) the performance standards under subparagraph (D) for the performance period (as established under subparagraph (E)) for a calendar year is eligible, from the amounts made available in the total shared savings pool under subparagraph (I)(iv), for shared savings under subparagraph (I), which

shall be in the form, after application of the adjustments under clauses (iv), (v), and (vi) of paragraph (2)(D), of an increase in the amount of payment determined under the payment system under paragraph (2)(D) for surgical services furnished by such center during the subsequent year, by the value-based percentage amount under subparagraph (H) specified by the Secretary for such center and year.

"(B) PROGRAM START DATE.—The Program shall apply to payments for procedures occurring on or after January 1, 2015.

"(C) MEASURES.—

"(i) IN GENERAL.—For purposes of the Program, the Secretary shall select measures from the measures specified under paragraph (7).

"(ii) AVAILABILITY OF MEASURE AND DATA.—The Secretary may not select a measure under this paragraph for use under the Program with respect to a performance period for a calendar year unless such measure has been included, and the reported data available, on the website

'Medicare.gov', for at least 1 year prior to the beginning of such performance period.

"(iii) MEASURE NOT APPLICABLE UNLESS ASC FURNISHES SERVICES APPROPRIATE TO MEASURE.—A measure selected under this paragraph for use under the Program shall not apply to an ambulatory surgical center if such center does not furnish services appropriate to such measure.

"(D) PERFORMANCE STANDARDS.—

"(i) ESTABLISHMENT.—The Secretary shall establish performance standards with respect to measures selected under subparagraph (C)(i) for a performance period for a calendar year.

"(ii) ACHIEVEMENT AND IMPROVEMENT.—The performance standards established under clause (i) shall include levels of achievement and improvement.

"(iii) TIMING.—The Secretary shall establish and announce the performance standards under clause (i) not later than 60 days prior to the beginning of the performance period for the calendar year involved.

"(E) PERFORMANCE PERIOD.—For purposes of the Program, the Secretary shall establish the performance period for a calendar year. Such performance period shall begin and end prior to the beginning of such calendar year.

"(F) ASC PERFORMANCE SCORE.—The Secretary shall develop a methodology for assessing the total performance of each ambulatory surgery center based on performance standards with respect to the measures selected under subparagraph (C) for a performance period (as established under subparagraph (E)). Using such methodology, the Secretary shall provide for an assessment (in this subsection referred to as the 'ASC performance score') for each ambulatory surgical center for each performance period. The methodology shall provide that the ASC performance score is determined using the higher of its achievement or improvement score for each measure.

"(G) APPEALS.—The Secretary shall establish a process by which ambulatory surgery centers may appeal the calculation of the ambulatory surgery center's performance with respect to the performance standards established

under subparagraph (D) and the ambulatory surgery center performance score under subparagraph (E). The Secretary shall ensure that such process provides for resolution of appeals in a timely manner.

"(H) CALCULATION OF VALUE-BASED INCENTIVE PAYMENT.—

"(i) VALUE-BASED PERCENTAGE AMOUNT.—For purposes of subparagraph (A), the Secretary shall specify a value-based percentage amount for an ambulatory surgical center for a calendar year.

"(ii) REQUIREMENTS.—In specifying the value-based percentage amount for each ambulatory surgical center for a calendar year under clause (i), the Secretary shall ensure that such percentage is based on—

"(I) the ASC performance score of the ambulatory surgery center under subparagraph (F); and

"(II) the amount of the total savings pool made available under subparagraph (I)(iii)(I) for such year.

"(I) ANNUAL CALCULATION OF SHARED SAVINGS FUNDING FOR VALUE-BASED INCENTIVE PAYMENTS.—

"(i) DETERMINING BONUS POOL.—In each year of the Program, ambulatory surgery centers shall be eligible to receive payment for shared savings under the Program only if for such year the sum of—

"(I) the estimated amount of expenditures under this title for Medicare fee-for-service beneficiaries (as defined in section 1899(h)(3)) for surgical services for which payment is made under the payment system under paragraph (2), adjusted for beneficiary characteristics, and

"(II) the estimated amount of expenditures under this title for Medicare fee-for-service beneficiaries (as so defined) for the same surgical services for which payment is made under the prospective payment system under subsection (t), adjusted for beneficiary characteristics,

is at least the percent specified by the Secretary below the applicable benchmark determined for such year under clause (ii). For purposes of this subparagraph, such sum shall be referred to as 'estimated expenditures'. The Secretary shall determine the appropriate percent described in the preceding sentence to account for normal variation in volume of services under this title and to account for changes in the coverage of services in ambulatory surgery centers and hospital outpatient departments during the performance period involved.

"(ii) ESTABLISH AND UPDATE BENCHMARK.—For purposes of clause (i), the Secretary shall calculate a benchmark for each year described in such clause equal to the product of—

"(I) estimated expenditures described in clause (i) for such year, and

"(II) the average annual growth in estimated expenditures for the most recent three years.

Such benchmark shall be reset at the start of each calendar year, and adjusted for changes in enrollment under the Medicare fee-for-service program.

"(iii) PAYMENTS BASED ON SHARED SAVINGS.—If the requirement under clause (i) is met for a year—

"(I) 50 percent of the total savings pool estimated under clause (iv) for such year shall be made available for shared savings to be paid to ambulatory surgical centers under this paragraph;

"(II) a percent (as determined appropriate by the Secretary, in accordance with subparagraph (H)) of such amount made available for such year shall be paid as shared savings to each ambulatory surgery center that is determined under the Program to have met or exceeded performance scores for such year; and

"(III) all funds made available under subclause (I) for such year shall be used and paid as sharing sav-

ings for such year in accordance with subclause (II).

"(iv) ESTIMATE OF THE TOTAL SAVINGS POOL.—For purposes of clause (iii), the Secretary shall estimate for each year of the Program the total savings pool as the product of—

"(I) the conversion factor for such year determined by the Secretary under the payment system under paragraph (2)(D) divided by the conversion factor calculated under subsection (t)(3)(C) for such year for covered OPD services, multiplied by 100, and

"(II)(aa) the product of the estimated Medicare expenditures for surgical services described in clause (i)(I) furnished during such year to Medicare fee-for-service beneficiaries (as defined in section 1899(h)(3)) for which payment is made under subsection (t) and the average annual growth in the estimated Medicare expenditures for such services furnished

to Medicare fee-for-service beneficiaries (as so defined) for which payment is made under subsection (t) in the most recent available 3 years, less

"(bb) the estimated Medicare expenditures for surgical services described in clause (i)(I) furnished to Medicare fee-for-service beneficiaries for which payment was made under subsection (t) in the most recent year.

"(J) NO EFFECT IN SUBSEQUENT CALENDAR YEARS.—The value-based percentage amount under subparagraph (H) and the percent determined under subparagraph (I)(iii)(I) shall apply only with respect to the calendar year involved, and the Secretary shall not take into account such amount or percentage in making payments to an ambulatory surgery center under this section in a subsequent calendar year.".

**SEC. 4. ADVISORY PANEL ON HOSPITAL OUTPATIENT PAYMENT REPRESENTATION.**

(a) ASC REPRESENTATIVE.—The second sentence of section 1833(t)(9)(A) of the Social Security Act (42 U.S.C. 1395l(t)(9)(A)) is amended by inserting "and sup-

pliers subject to the prospective payment system (including at least one ambulatory surgical center representative)" after "an appropriate selection of representatives of providers".

(b) EFFECTIVE DATE.—The amendment made by subsection (a) shall take effect on the date of the enactment of this Act.

**SEC. 5. REASONS FOR EXCLUDING ADDITIONAL PROCEDURES FROM ASC APPROVED LIST.**

(a) IN GENERAL.—Section 1833(i)(1) of the Social Security Act (42 U.S.C. 1395l(i)(1)) is amended by adding at the end the following: "In updating such lists for application in years beginning after the date of the enactment of this sentence, for each procedure that was requested to be included in such lists during the public comment period but which the Secretary does not propose (in the final rule updating such lists) to so include in such lists, Secretary shall cite in such final rule the specific criteria in paragraph (b) or (c) of section 416.166 of title 42, Code of Federal Regulations, based on which the procedure was excluded. If paragraph (b) of such section is cited for exclusion of a procedure, the Secretary shall identify the peer reviewed research or the evidence upon which such determination is based. The Secretary may not use

or cite section 416.166(c)(7) of such title as criteria or a basis for exclusion of a procedure from such lists.".

(b) EFFECTIVE DATE.—The amendment made by subsection (a) shall apply to lists of ambulatory surgery procedures for application in years beginning after the date of the enactment of this Act.

○

**SENATOR JOHN FONFARA**
*First District*

Legislative Office Building, Room 3700
Hartford, CT 06106-1591
Tel. (860) 240-0043
Fax (860) 240-0036
www.SenatorFonfara.cga.ct.gov

State of Connecticut
**SENATE**

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*Vice Chair*
General Law
*Ranking Member*
Program Review & Investigations
*Member*
Internship
Legislative Management

July 11, 2013

Commissioner Jewel Mullen, MD, MPH, MPA
State of Connecticut
Department of Public Health
410 Capitol Avenue
Hartford, CT 06134

Dear Dr. Mullen:

I am writing today in support of Hartford Hospital's proposed plans for an ambulatory surgery center. Hartford Hospital has a long history of providing and introducing sophisticated high-quality orthopedic services and advances to the region, including but not limited to orthopedic trauma surgery services, joint replacement surgery, bone reconstruction surgery, and other specialty and general orthopedic services.

Given a growing need and demand for high value cost-effective orthopedic services, the Hospital is committed to developing comprehensive musculoskeletal services that would include, as a critical component, an ambulatory surgery center dedicated to providing ambulatory orthopedic surgical services located on the Hartford Hospital main campus in Hartford. An initiative like this will not only respond to a growing demand in orthopedic services but will continue to provide the security of good jobs for many and contribute greatly to the economic stability of the city.

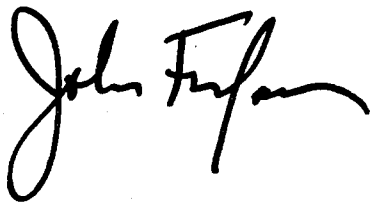
Furthermore, the Hospital's Musculoskeletal Institute will be one component of a nationally recognized orthopedic center of excellence that offers high quality and cost-effective orthopedic services. Such a Center will be a unique asset to the region. In addition, the Musculoskeletal Institute will provide specialized and sophisticated orthopedic services, along with a commitment to the development of evidence-based best practices, clinical treatment protocols, commitment to technological advances, clinical research and valuable opportunities for orthopedic-related clinical educational opportunities, including for the University of Connecticut orthopedic surgical residency program. It is a great example of our ability to not only create a high quality center of care but also provide for great academic partnerships, so that patients receive the highest level of quality care in the most appropriate, cost effective setting.

I believe that the creation of Hartford Hospital's Musculoskeletal Center could result in it becoming a destination for orthopedic services, including ambulatory surgery services. National

experts project strong growth for orthopedics, including ambulatory surgery in the Greater Hartford Market. The growing demand for orthopedic services is consistent with the needs generated by an aging population and the continued transition from inpatient to ambulatory intervention in orthopedic surgery.

I urge approval of Hartford Hospital's Certificate of Need request for the benefit of the region and all of its residents.

Sincerely,



John W. Fonfara
State Senator, 1st District

PEDRO E. SEGARRA
MAYOR

July 9, 2013

Commissioner Jewel Mullen, MD, MPH, MPA
State of Connecticut
Department of Public Health
410 Capitol Avenue
Hartford, CT06134

Dear Dr. Mullen:

I am writing today in support of Hartford Hospital's proposed plans for an ambulatory surgery center. Hartford Hospital's presence in the City of Hartford is a historic and significant partnership. As an acute tertiary care hospital, it has a long history of providing and introducing sophisticated high-quality orthopedic services and advances to the region, including but not limited to orthopedic trauma surgery services, joint replacement surgery, bone reconstruction surgery, and other specialty and general orthopedic services.

Given a growing need and demand for high value cost-effective orthopedic services, the Hospital is committed to developing comprehensive musculoskeletal services that would include, as a critical component, an ambulatory surgery center dedicated to providing ambulatory orthopedic surgical services located on the Hartford Hospital main campus in Hartford. Hartford Hospital is a major asset to the Greater Hartford community and specifically to the city of Hartford. The Hospital employs over 7,500 people from the region, many of whom are Hartford residents. An initiative like this will not only respond to a growing demand in orthopedic services but will continue to provide the security of good jobs for many and contribute greatly to the economic stability of the city.

The Hospital's Musculoskeletal Institute will be one component of a nationally recognized orthopedic center of excellence that offers high quality and cost-effective orthopedic services.
In addition, the Musculoskeletal Institute will provide specialized and sophisticated orthopedic services, along with a commitment to the development of evidence-based best practices, clinical treatment protocols, commitment to technological advances, clinical research and valuable opportunities for orthopedic-related clinical educational opportunities, including for the University of Connecticut orthopedic surgical residency program.

550 Main Street
Hartford, Connecticut 06103
Telephone (860) 757-9500
Facsimile (860) 722-6606

HARTFORD HAS IT

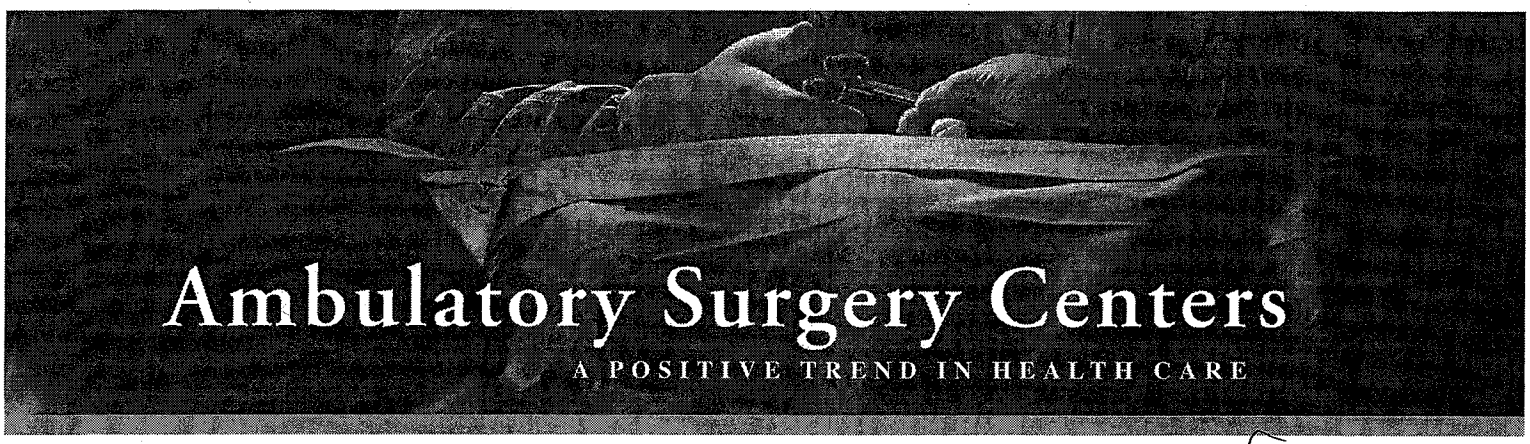
It is projected that the creation of the Musculoskeletal Center will result in it becoming a destination for orthopedic services, including ambulatory surgery services.

We know that national experts project strong growth for orthopedics, including ambulatory surgery in the Greater Hartford Market. The growing demand for orthopedic services is consistent with the needs generated by an aging population and the continued transition from inpatient to ambulatory intervention in orthopedic surgery.

I urge approval of Hartford Hospital's Certificate of Need request for the benefit of the greater Hartford region and all of its residents.

Respectfully,

Pedro E. Segarra
Mayor



# Ambulatory Surgery Centers

## A POSITIVE TREND IN HEALTH CARE

*Ambulatory surgery centers (ASCs) are health care facilities which offer patients the opportunity to have selected surgical and procedural services performed outside the hospital setting. Since their inception more than three decades ago, ASCs have demonstrated an exceptional ability to improve quality and customer service while simultaneously reducing costs. At a time when most developments in health care services and technology typically come with a higher price tag, ASCs stand out as an exception to the rule.*

## A PROGRESSIVE MODEL FOR SURGICAL SERVICES

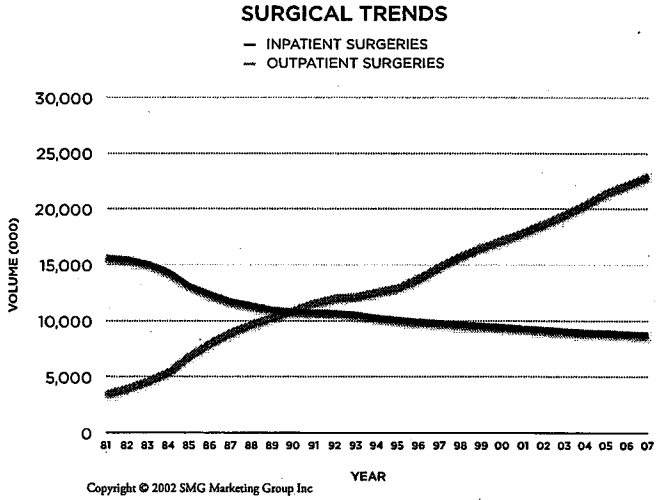
As our nation struggles with how to improve a troubled health care system, the experience of ASCs is a rare example of a successful transformation in health care delivery.

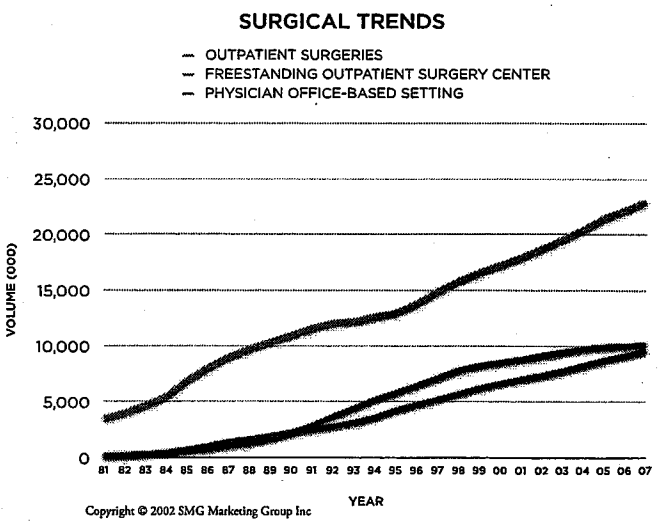
Thirty years ago, virtually all surgery was performed in hospitals. Waits of weeks or months for an appointment were not uncommon, and patients typically spent several days in the hospital and several weeks out of work in recovery. In many countries, surgery is still like this today, but not in the United States.

Physicians have led the development of ASCs. The first facility was opened in 1970 by two physicians who saw an opportunity to establish a high-quality, cost-effective alternative to inpatient hospital care for surgical services. Faced with frustrations like scheduling delays, limited operating room availability, and challenges in obtaining new equipment due to hospital budgets and policies, physicians were looking for a better way - and developed it in ASCs.

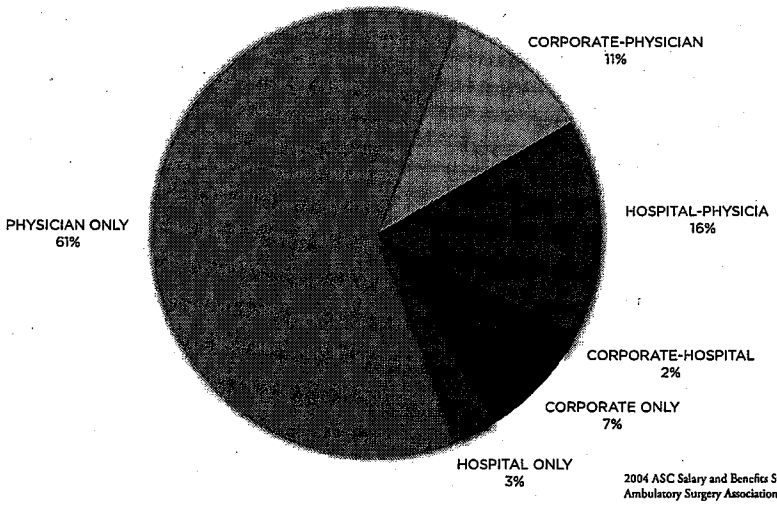
Physicians continue to provide the impetus for the development of new ASCs. By operating in ASCs instead of hospitals, physicians gain the opportunity to have more direct control over their surgical practices.[1] In the ASC setting, physicians are able to schedule procedures more conveniently, assemble teams of specially-trained and highly skilled staff, ensure the equipment and supplies being used are best suited to their technique, and design facilities tailored to their specialties. Simply stated, physicians are striving for, and have found in ASCs, the professional autonomy over their work environment and over the quality of care that has not been available to them in hospitals. These benefits explain why physicians who do not have ownership interest in ASCs (and therefore do not benefit financially from performing procedures in an ASC) choose to work in ASCs in such high numbers.

Given the history of their involvement with making ASCs a reality, it is not surprising physicians continue to have ownership in virtually all (90%) ASCs. But what is more interesting to note is how many ASCs are jointly owned by local hospitals that now increasingly recognize and embrace the value of the ASC model. According to the most recent data available, hospitals have ownership interest in 21% of all ASCs; 3% are owned entirely by hospitals.[2]



## ASC OWNERSHIP STRUCTURE



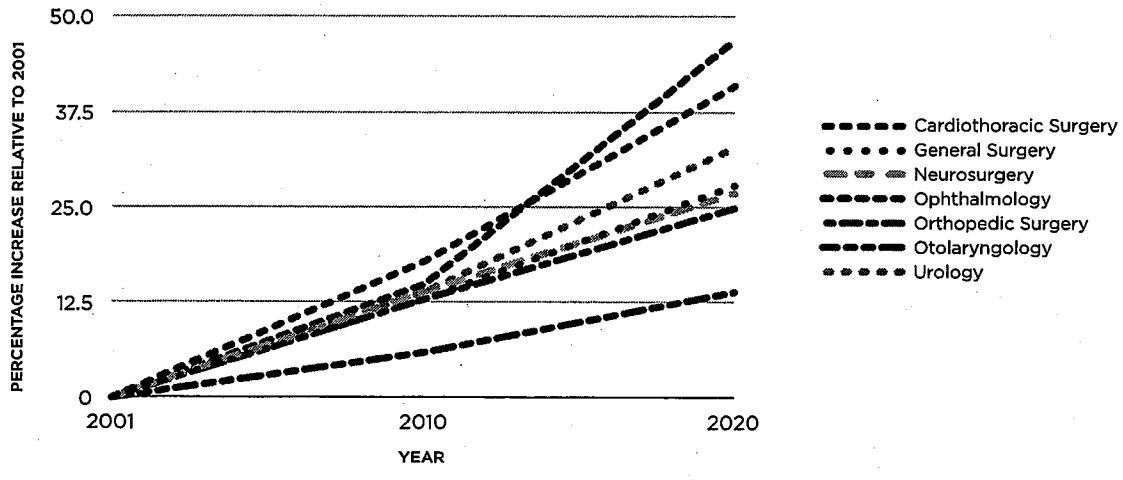

2004 ASC Salary and Benefits Survey, Federated Ambulatory Surgery Association, 2004.

## ASCs ALLOW PHYSICIANS TO WORK EFFICIENTLY

A recent analysis examined the impact of the aging population on the demand for surgical procedures and attendant need for surgical subspecialists. This study concluded that the aging population would be a major force in driving significant growth in the demand for surgical services. The forecasted growth in work by the year 2020 varied from 14 percent to 47 percent, depending on specialty.[3] Meeting these surgical needs will be a challenge. Solutions include increasing the number of surgical residency positions, increasing the workloads of surgeons in the workforce, and improving the efficiency of surgeons.

Utilizing settings that allow physicians to practice efficiently will help mitigate the impact of the aging population on the anticipated shortage in the surgery workforce. ASCs offer physicians the ability to work more efficiently and are therefore uniquely positioned to play an important role in managing the increased need for surgical services as it arises in the years ahead.

### FORECASTED DEMAND GROWTH IN THE NUMBER OF PROCEDURES BY SPECIALTY




Erzioni DA, Liu JH, Maggard MA, Ko CY. The aging population and its impact on the surgery workforce. Ann Surg. 2003 Aug;238(2):170-7.

# ASCs ARE HIGHLY REGULATED TO ENSURE QUALITY AND SAFETY

Health care facilities in the United States are highly regulated by federal and state entities. ASCs are not excluded from this oversight.

The safety and quality of care offered in ASCs is evaluated by independent observers through three processes: state licensure, Medicare certification and voluntary accreditation.

Most states require ASCs to be licensed in order to operate. Each state determines the specific requirements ASCs must meet for licensure. Most state licensure programs require rigorous initial and ongoing inspection and reporting.

All ASCs serving Medicare beneficiaries must be certified by the Medicare program. In order to be certified, an ASC must comply with standards developed by the federal government for the specific purpose of ensuring the safety of the patient and the quality of the facility, physicians, staff, services and management of the ASC. The ASC must demonstrate compliance with these Medicare standards initially and on an ongoing basis.

In addition to state and federal inspections, many ASCs choose to go through voluntary accreditation by an independent accrediting organization. Accrediting organizations for ASCs include the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), the Accreditation Association for Ambulatory Health Care (AAAHC), the American Association for the Accreditation of Ambulatory Surgery Facilities (AAAASF) and the American Osteopathic Association (AOA). ASCs must meet specific standards during on-site inspections by these organizations in order to be accredited. All accrediting organizations require an ASC to engage in external benchmarking, which allows the facility to compare its performance to the performance of other ASCs.

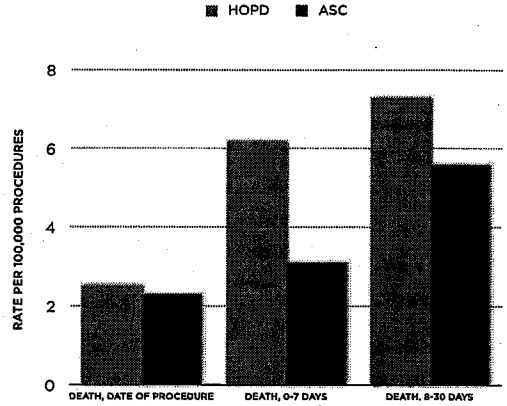
In addition to requiring certification in order to participate in the Medicare program, federal regulations also limit the scope of surgical procedures reimbursed in ASCs.[5] Generally, services are limited to elective procedures with short anesthesia and operating times not requiring an overnight stay. These limitations do not apply to hospital outpatient departments (HOPDs).[6]

The federal government views ASCs and HOPDs as distinct types of providers. As a result, the federal regulations governing HOPDs and ASCs differ. Another reason for differing regulations is that, in a hospital, the same operating room may be used interchangeably to provide services to both inpatients and outpatients. For example, a procedure room in the HOPD may be used to perform a service for an inpatient and then used to perform the same procedure for an ambulatory patient who is discharged home immediately thereafter. In other words, ambulatory patients seen on an outpatient basis in an HOPD may utilize exactly the same facilities used to provide services to patients who have been admitted to the hospital. Consequently, the inpatient standards for hospitals are applied to HOPDs.[7]

On the other hand, ASCs provide services in facilities specifically designed to perform selected outpatient surgical services. The different requirements developed by the federal government appropriately reflect the fundamental differences in the hospital setting versus the ASC.[8]

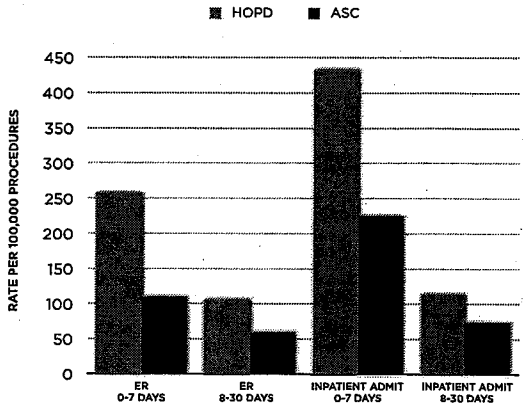
ASCs consistently perform as well as, if not better than, HOPDs when quality and safety is examined. A recent study[9] included an examination of the rates of inpatient hospital admission and death in elderly patients following common outpatient surgical procedures in HOPDs and ASCs. Rates of inpatient hospital admission and death were lower in freestanding ASCs as compared to HOPDs. Even after controlling for factors associated with higher-risk patients, ASCs had low adverse outcome rates.

**RATE OF ADVERSE EVENTS: DEATH**




Fleisher LA, Pasternak LR, Herbert R, Anderson GF. Inpatient hospital admission and death after outpatient surgery in elderly patients: importance of patient and system characteristics and location of care. Arch Surg. 2004 Jan;139(1):67-72.

**RATE OF ADVERSE EVENTS: ER VISIT OR INPATIENT ADMISSION**




Fleisher LA, Pasternak LR, Herbert R, Anderson GF. Inpatient hospital admission and death after outpatient surgery in elderly patients: importance of patient and system characteristics and location of care. Arch Surg. 2004 Jan;139(1):67-72.

## SPECIFIC FEDERAL REQUIREMENTS GOVERNING ASCs

In order to participate in the Medicare program, ASCs are required to meet certain conditions set by the federal government designed to ensure the facility is operated in a manner that ensures the safety of patients and the quality of services. Some of these requirements are highlighted in more detail below.

ASCs are required to maintain complete, comprehensive and accurate medical records. The content of these records must include a medical history and physical examination relevant to the reason for the surgery and the type of anesthesia planned. In addition, a physician must examine the patient immediately before surgery to evaluate the risk of anesthesia and the procedure to be performed. Prior to discharge each patient must be evaluated by a physician for proper anesthesia recovery.

CMS requires ASCs to ensure patients do not acquire infections during their care at these facilities. ASCs must establish a program for identifying and preventing infections, maintaining a sanitary environment, and reporting outcomes to appropriate authorities. The program must be one of active surveillance and include specific procedures for prevention, early detection, control, and investigation of infectious and communicable diseases in accordance with the recommendations of the Centers for Disease Control. In fact, ASCs have historically had very low infection rates.[10]

A registered nurse trained in the use of emergency equipment and in cardiopulmonary resuscitation must be available whenever a patient is in the ASC. To further protect patient safety, ASCs are also required to have an effective means of transferring patients to a hospital for additional care in the event an emergency occurs. Written guidelines outlining arrangements for ambulance services and transfer of medical information are mandatory. An ASC must have a written transfer agreement with a local hospital, or all physicians performing surgery in the ASC must have admitting privileges at the designated hospital. Although these safeguards are in place, hospital admissions as a result of complications following ambulatory surgery are rare.[9,11]

Continuous quality improvement is an important means of assuring patients are receiving the best care possible. ASCs are required to implement and monitor policies that ensure the facility provides quality health care in a safe environment. An ASC, with the active participation of the medical staff, is required to conduct an ongoing, comprehensive assessment of the quality of care provided.

The excellent outcomes associated with ambulatory surgery reflect the commitment that the ASC industry has made to quality and safety. One of the many reasons that ASCs continue to be so successful with patients, physicians and insurers is their keen focus on ensuring the quality of the services provided.

**Medicare Requirements for ASCs and Hospitals Are The Same Where Services are Comparable**

| Required Standards | ASC | Hospital |
|---|---|---|
| Compliance with state licensure law | ☑ | ☑ |
| Governing body | ☑ | ☑ |
| Surgical services | ☑ | ☑ |
| Evaluation of quality | ☑ | ☑ |
| Environment | ☑ | ☑ |
| Medical staff | ☑ | ☑ |
| Nursing services | ☑ | ☑ |
| Medical records | ☑ | ☑ |
| Pharmaceutical services | ☑ | ☑ |
| Laboratory services | ☑ | ☑ |
| Radiologic services | ☑ | ☑ |

Source: *42 CFR 416, 42 CFR 482*

## THE ASC INDUSTRY IS COMMITTED TO REPORTING QUALITY MEASURES

A fundamental change in the way the government assures the quality of health care services is well underway. The Department of Health and Human Services has launched its Quality Initiative to assure quality health care through accountability and public disclosure.

The ASC industry is excited to have the opportunity to make its excellent outcomes more widely known to the public through this initiative. Leaders from the ASC industry, along with associations and related organizations with a focus on health care quality and safety, have come together in a collaborative effort to identify specific measures for quality appropriate to ASCs. This group, the ASC Quality Collaboration, strongly endorses the vision that measures of quality which are appropriate to ASCs should be congruent with measures utilized for other outpatient surgery settings. The continued development of these measures will involve a number of different stakeholders including ASC clinical and administrative leaders, health policy researchers, CMS and other key federal and state governmental agencies. The group will also work with the National Quality Forum to achieve consensus on the proposed quality measures.

### PATIENT SATISFACTION

*Patient satisfaction is a hallmark of the ASC industry. This year, more than eight million Americans will undergo surgery in an ASC. Virtually all of those patients will return home the same day and will resume most normal activities within a matter of days. Talk to these patients and you will hear how overwhelmingly satisfied they are with their ASC experience. Recent surveys show average patient satisfaction levels in ASCs exceeding 90 percent.[4] Safe and high quality services, ease of scheduling, greater personal attention and lower costs are among the main reasons cited for the growing popularity of ASCs as a place for having surgery.*

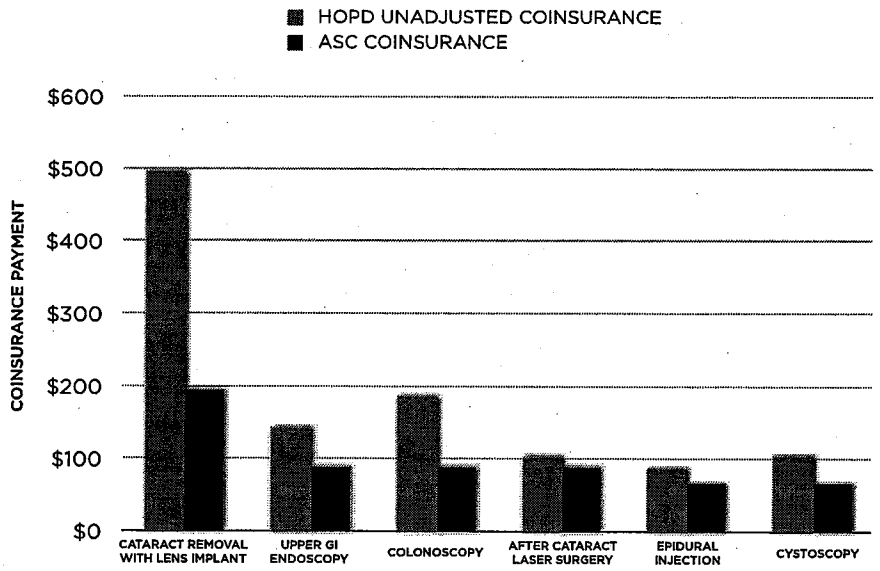
## ASCs PROVIDE CARE AT SIGNIFICANT COST SAVINGS

Not only are ASCs focused on ensuring patients have the best surgical experience possible, the care they provide is also more affordable. One of the reasons ASCs have been so successful is they offer valuable surgical and procedural services at a lower cost when compared to hospital charges for the same services. Beginning in 2007, Medicare payments to ASCs will be lower than or equal to Medicare payments to HOPDs for comparable services for 100 percent of procedures.[12]

In addition, patients typically pay less coinsurance for procedures performed in the ASC than for comparable procedures in the hospital setting. For example, a Medicare beneficiary could pay as much as $496 in coinsurance for a cataract extraction procedure performed in a HOPD, whereas that same beneficiary's copayment in the ASC would be only $195; a Medicare beneficiary could pay as much as $186 in coinsurance for a colonoscopy performed in a HOPD, whereas that same beneficiary's copayment for the same procedure performed in an ASC would be only $89. By having surgery in the ASC the patient may save as much as 61%, or more than $300, compared to their out-of-pocket coinsurance for the same procedure in the hospital.

Without the emergence of ASCs as an option for care, health care expenditures would have been billions of dollars higher over the past three decades. Studies have shown the Medicare program would pay approximately $464 million more per year if all procedures performed in an ASC were instead furnished at a hospital.[13] Private insurance companies tend to save similarly, which means employers also incur lower health care costs by utilizing ASC services. Employers and insurers, particularly managed care entities, are driving ASC growth in many areas, because they recognize ASCs are able to deliver consistent, high quality outcomes at a significant savings. As the number of surgical procedures performed in ASCs grows, the Medicare program may realize even greater savings - and of course Medicare beneficiaries will realize additional out-of-pocket savings as well.[13]

### MEDICARE COINSURANCE RATES ARE LOWER IN ASCs




MedPAC, Report to the Congress: Medicare Payment Policy, March 2004.

## THE ASC INDUSTRY SUPPORTS DISCLOSURE OF PRICING INFORMATION

It is the general practice of ASCs to make pricing information available to the patient in advance of surgery. The industry is eager to make price transparency a reality, not only for Medicare beneficiaries, but for all patients. To offer maximum benefit to the consumer, these disclosures should outline the total price of the planned surgical procedure and the specific portion for which the patient would be responsible. This will empower health care consumers as they evaluate and compare costs for the same service amongst various health care providers.

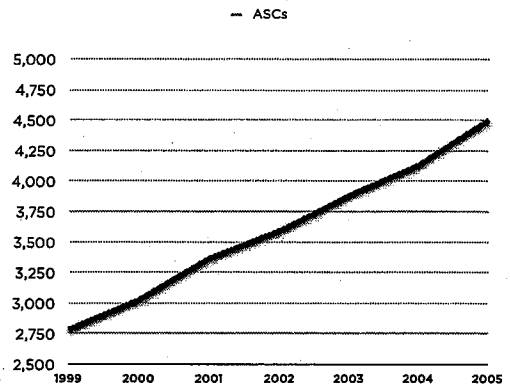
## ASCs IMPROVE PATIENT CHOICE, DEMAND FOR ASCS GROWS

Technological advancement has allowed a growing range of procedures to be performed safely on an outpatient basis. Faster acting and more effective anesthetics and less invasive techniques, such as arthroscopy, have driven this outpatient migration. Procedures that only a few years ago required major incisions, long-acting anesthetics and extended convalescence can now be performed through closed techniques utilizing short-acting anesthetics, and with minimal recovery time. As medical innovation continues to advance, more and more procedures will be able to be performed safely in the outpatient setting.

The number of ASCs continues to grow in response to demand from the key participants in surgical care – patients, physicians and insurers. This demand has been made possible by technology, but has been driven by high levels of patient satisfaction, efficient physician practice, high levels of quality and the cost savings that have benefited all. The number of Medicare certified ASCs has grown from 2786 in 1999 to 4506 in 2005, with an average annual growth rate of 8.3%.[14]

Further impetus to future ASC growth has been given by MedPAC, which has recommended that the CMS list of approved ASC procedures be expanded. This would allow a broader range of choice for patients and surgeons. Specifically, MedPAC has recommended the procedures approved for the ASC setting be revised so that ASCs can receive payment for any surgical procedure, with the exception of those surgeries requiring an overnight stay or which pose a significant safety risk when furnished in an ASC.8 Adoption of these recommendations would allow Medicare beneficiaries to access an extended range of surgical services – a range of surgical services which is already available to patients with private insurance.[15]

**NUMBER OF MEDICARE-CERTIFIED ASCs**




MedPAC, Data Book, June 2006.

## ASCs WILL CONTINUE TO LEAD INNOVATION IN OUTPATIENT SURGICAL CARE

As leaders of the revolution in surgical care who led to the establishment of affordable and safe outpatient surgery, the ASC industry has shown itself to be ahead of the curve in identifying promising avenues for improving the delivery of health care.

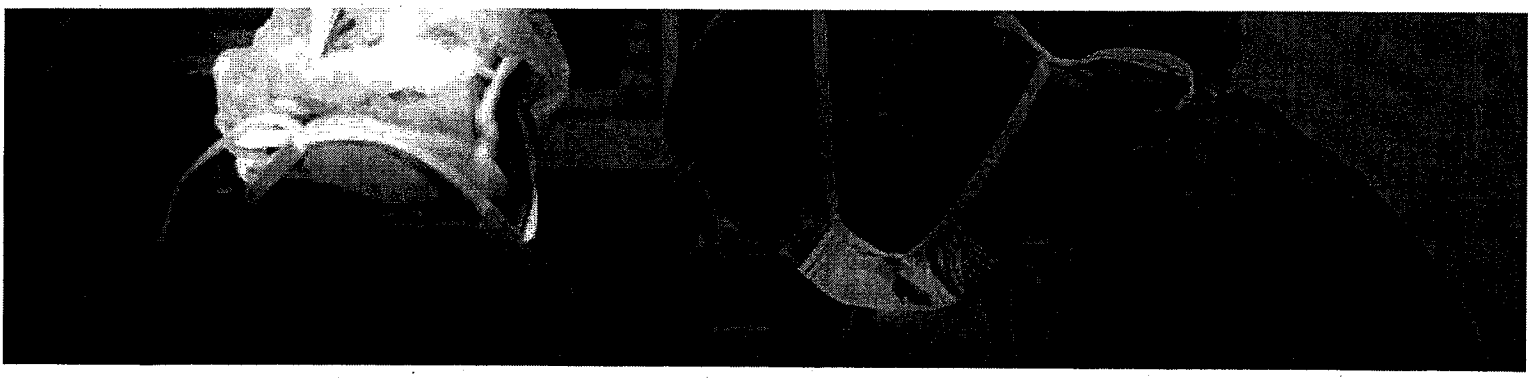
With a solid track record of performance in stakeholder satisfaction, safety, quality and cost management, the ASC industry is already embracing the changes that will allow it to continue to play a leading role in raising the standards of performance in the delivery of outpatient surgical services.

As always, the ASC industry welcomes any opportunity to clarify the services it offers, the regulations and standards governing its operations, and the ways in which it ensures safe, high-quality care for patients.

## POLICY CONSIDERATIONS

Given the continued fiscal challenges posed by administering health care programs, policy makers and regulators should continue to focus on fostering innovative methods of health care delivery that offer safe, high-quality care so progressive changes in the nation's health care system can be implemented.

Support should be reserved for those policies that promote the utilization of sites of service providing more affordable care while maintaining high quality and safety standards. In light of the many benefits ASCs have brought to the nation's health care system, it will be important for future payment and coverage policies to continue to strengthen access to and utilization of ASCs.



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# Growth of Ambulatory Surgical Centers, Surgery Volume, and Savings to Medicare

Lane Koenig, PhD[1] and Qian Gu, PhD[1]

**We studied the impact of the growth of ambulatory surgical centers (ASCs) on total Medicare procedure volume and ASC market share from 2000 to 2009 for four common outpatient procedures: cataract surgery, upper gastrointestinal procedures, colonoscopy, and arthroscopy. ASC growth was not significantly associated with Medicare volume, except for colonoscopy. An additional ASC operating room per 100,000 population results in a 1.8% increase in colonoscopies performed in all outpatient settings. Increases in the number of ASCs were associated with greater ASC market share with effects ranging from 4- to 6-percentage-point gains for each additional ASC operating room per 100,000. The study demonstrates that continued growth of ASCs could reduce Medicare spending, because ASCs are paid a fraction of the amount paid to hospital outpatient departments for the same services.**

**SUPPLEMENTARY MATERIAL** is linked to the online version of the paper at http://www.nature.com/ajg

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## Introduction

The past decade has seen a rapid increase in the number of ambulatory surgical centers (ASCs), facilities where surgeries that do not require a hospital stay can be performed. Between 2004 and 2009, the number of Medicare-certified ASCs increased by 28%, growing from 4,106 to 5,260 (1). These facilities often offer specialized care by focusing on a single condition or a small number of conditions, such as cataract surgery, colonoscopy, or orthopedic surgery.

Policy makers' reaction to the rapid growth of ASCs has been mixed, as a result of perceived offsetting benefits and costs to patients and payers. On the benefits side, ASCs and other specialized surgical facilities may offer convenient locations, short wait times, high quality, and high patient satisfaction (2–8). For Medicare, ASCs also offer significant savings, with ASC payment rates approximately 56% of those paid to hospital outpatient departments for the same services in 2011.

On the negative side, physician ownership of ASCs raises concerns of self-referral, whereby a physician increases his or her procedure volume for financial gain. Although incentives for physician self-referral are inherent in any fee-for-service system, the issue is whether profits derived from an ASC facility fee paid to physician owners result in more surgical services.

A few studies have examined the relationship between the presence of an ASC, physician ownership, and procedure volume, providing limited evidence on the "induced demand" hypothesis. Using data from Florida, Hollingsworth *et al.* found a greater increase in annual caseloads of presumed ASC owners from the pre- to the post-ownership period as compared with nonowners for five common types of procedures performed in ASCs (9). Hollingsworth *et al.* inferred ownership status from surgical volume at an ASC, based on the safe-harbor rules in the anti-kickback statute that require physicians to perform at least a third of their surgeries at the outpatient facility in which they have a financial interest (10). In similar work, Hollingsworth and others reported a higher level and growth of annual caseloads of urological surgery for physician owners than for nonowners (11,12). Using data from one private insurer and 42 ASCs and specialty hospitals in Idaho, Mitchell compared the frequency of use of three procedures between physician owners and nonowners of ASCs (13). Mitchell observed a substantially higher frequency of procedure use among patients treated by physician owners than among those treated by nonowners.

Although the findings noted above are supportive of the induced demand hypothesis, these studies have important limitations, often noted by the researchers. First, prior studies are unable to determine whether factors other than financial considerations explain the connection between the volume of surgeries performed by owners and their decision to invest in an ASC. For example, it may be that physician owners, on the basis of their patient populations, were constrained by capacity and unable to satisfy patient demand prior to ASC ownership. This hypothesis is consistent with the findings of Hollingsworth *et al.* (9) and others who observed higher

[1]KNG Health Consulting LLC, Rockville, Maryland, USA. **Correspondence:** Lane Koenig, PhD, KNG Health Consulting LLC, 1445 Research Boulevard, Suite 320, Rockville, Maryland 20850, USA. E-mail: lane.koenig@knghealth.com



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annual caseloads of eventual owners in the pre-ownership period than those of nonowners. Second, the studies are unable to capture market phenomena that affect the underlying (and potentially unmet) demand for surgical care in a community. Finally, these studies are limited by the use of data from a specific geographic area (e.g., Idaho, Florida) and/or a specific population (e.g., workers' compensation patients) for selected surgery types.

Along with the question of whether the growth of ASCs induces demand, the question of whether this hypothesized induced demand drives up Medicare spending remains to be answered. Prior papers have not studied the financial impact of increased ASC utilization on the Medicare program. Growth in the number of ASCs may raise total procedure volume, but its effect on aggregate Medicare spending also depends on the migration of procedures from hospital outpatient departments to ASCs. Since ASCs are paid a fraction of what hospitals are paid, the migration could potentially result in net savings to Medicare.

In this paper, we address two questions. First, we studied the issue of induced demand by examining the effect of ASCs on the total volume of selected outpatient procedures covered by Medicare. Second, we projected the net financial effect of ASCs on Medicare spending between 2011 and 2015 under illustrative scenarios of ASC growth.

In addition to examining the potential financial effects of ASC use on Medicare, this study has other important advantages over prior work. We separately examined the ASC effects on total procedure volume and ASC market share. Thus, our study provides a more complete picture of the market dynamics associated with ASC growth and allows us to estimate the net financial effect of ASC growth on Medicare spending. We use national Medicare data rather than rely on single-state data. Finally, we use a fixed-effects model to control for underlying population demand.

## Methods

***Data source.*** The study's primary data source was the Medicare Physician/Supplier Procedures Summary (PSPS) files from 2000 to 2009. The PSPS files contain information on the number of Medicare-covered procedures by place of services. Medicare Provider of Services files were used to measure the number of health-care facilities, including ASCs and hospitals. We used the Census State Population Estimates to measure total state population and demographic distribution (age, sex, race, and ethnicity) among the elderly population. Medicare enrollment data were used to measure the number of Medicare Part B Fee-For-Service (FFS) enrollees and the percentage of disabled enrollees.

Several sources of data were used to obtain state-level demographic characteristics and health-care resources: the Area Resource File to measure the number of health-care professionals; the Behavior Risk Factor Surveillance System to compute the percentage of overweight people and people with poor health among the elderly population; and the Census State Median Income data.

***Procedure selection.*** For our analyses, we selected four common groups of procedures that are performed in outpatient settings using Current Procedural Terminology (CPT) codes: (i) cataract removal/lens insertion (CPT 66830–66986); (ii) arthroscopy (CPT 29800–29899); (iii) upper gastrointestinal (GI) procedures (CPT 43200–43273); and (iv) colonoscopy (CPT 45355–45392, G0105, G0121). Cataract removal, upper GI procedures, and colonoscopy are all common procedures performed on the elderly population. Orthopedic surgery is a growing service area of ASCs. We chose arthroscopy as a specific set of procedures to represent orthopedic procedures. Together, these four procedure categories accounted for 51% of all Medicare-allowed services or 62% of all Medicare-allowed charges for ASCs in 2009.

***Unit of observation and modeling approach.*** The unit of observation in the analytical file is the state-year. The sample covers 50 states in the United States and stretches over 10 years from 2000 to 2009. We used multivariate regression analysis to assess the effect of ASCs on total procedure volume and market share in Medicare. For each procedure group, we fitted one regression model for total procedure volume and the other for the ASC market share. Total procedure volume includes Medicare-billed procedures performed in ASCs, hospital outpatient departments, and physicians' offices per 1,000 Medicare Part B FFS beneficiaries. Only procedures that are covered under both the Medicare outpatient payment schedule and the ASC payment schedule are included in the computation of total procedure volume. ASC market share is defined as the number of procedures performed at ASCs divided by the total volume for each procedure group.

The procedure volume regression model assesses the impact of ASC growth on service utilization of the entire market. If ASCs (and associated physician ownership) induce demand, we would observe a positive effect of the number of ASCs on total procedure volume. The ASC market share regression examines the extent to which the growth of ASCs leads to the migration of procedures from other outpatient settings to ASCs. The key independent variable in the regressions is the number of ASC operating rooms per 100,000 people.

We used three types of measures to control for health-care demand: (i) demographic composition of the elderly population (age, sex, race, and ethnicity distribution in people aged 65 or older and median household income); (ii) health status of the elderly population (percentage overweight and percentage in poor health among people aged 65 or older and percentage of disabled in Medicare FFS population); and (iii) health-care resources (number of practicing MDs and number of hospitals providing outpatient surgery services per 100,000 people and percentage of surgeons among practicing MDs). The models included state fixed effect and time fixed effect to control for unobserved demand factors.

We simulated the impact of ASC growth on Medicare spending in 2011–2015 under a variety of scenarios based on the regression results. Statistically insignificant coefficients for the number of ASC operating rooms were treated as zero in the simulation. We first determined the projected values of the independent variables for 2011–2015. We used the Census state population projection files for population estimates and

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**Table 1. Summary statistics of procedure volume, ASC market share, and ASC operation rooms**

| | 2000 | 2003 | 2006 | 2009 |
|---|---|---|---|---|
| *Procedure volume per 1,000 Medicare beneficiaries* | | | | |
| Cataract removal/lens insertion | 55.8 (9.1) | 57.9 (9.5) | 61 (12.2) | 60.5 (8.7) |
| Arthroscopy | 6.3 (1.8) | 7.5 (1.9) | 10.5 (3) | 11.71 (3) |
| Upper gastrointestinal procedures | 38.2 (6.4) | 45.8 (7.1) | 52.1 (8.3) | 54.4 (9.1) |
| Colonoscopy | 58.6 (10) | 84.5 (12.3) | 90.9 (11.4) | 83.7 (10.8) |
| *ASC market share (%)* | | | | |
| Cataract removal/lens insertion | 43.4 (15.3) | 50.6 (16) | 54.2 (16.5) | 60.5 (16) |
| Arthroscopy | 18.1 (9.6) | 24.2 (12.1) | 30.1 (12.9) | 31.8 (13.4) |
| Upper gastrointestinal procedures | 20 (12.5) | 26.4 (15.2) | 33.1 (17.4) | 35.7 (16.7) |
| Colonoscopy | 22.2 (13.5) | 29.5 (16.4) | 37 (18.7) | 40.9 (18) |
| ASC operation rooms per 100,000 population | 2.9 (1.6) | 3.5 (1.8) | 4.2 (2.1) | 4.5 (2.0) |

Mean and s.d. (in parentheses) across states in selected years are reported. Medicare beneficiaries are Medicare Part B Fee-For-Service plan enrollees. Procedure volume includes procedures from all outpatient care settings, including ASCs, hospital outpatient departments, and offices.
ASC, ambulatory surgical center.
Source: Authors' analysis of the analytical sample.

**Table 2. Summary statistics of demographic distribution, health status, and health-care resources**

| | 2000 | 2003 | 2006 | 2009 |
|---|---|---|---|---|
| Aged 75–84 in elderly population (%) | 35.1 (1.4) | 35.7 (1.4) | 35.2 (1.3) | 33.0 (1.1) |
| Aged 85+ in elderly population (%) | 12.2 (1.5) | 12.7 (1.6) | 13.5 (1.7) | 14.0 (1.7) |
| Male in elderly population (%) | 41.6 (1.8) | 42.0 (1.7) | 42.4 (1.7) | 42.9 (1.6) |
| Hispanic origin in elderly population (%) | 3.1 (5.1) | 3.5 (5.4) | 3.9 (5.7) | 4.3 (5.9) |
| Black in elderly population (%) | 8.0 (11.1) | 8.0 (10.9) | 8.1 (10.6) | 8.1 (10.3) |
| People with poor health in elderly population (%) | 29.3 (5.6) | 29.2 (5.4) | 28.2 (5.3) | 25.7 (4.7) |
| Overweight people in elderly population (%) | 58 (4.1) | 59.7 (4.1) | 61.8 (3.6) | 63.4 (3.6) |
| Disabled in Medicare Part B Fee-For-Service population (%) | 13.9 (3) | 15.2 (3.2) | 16.6 (3.4) | 17.1 (3.4) |
| Median household income ($000) | 52.2 (8) | 50.7 (7.6) | 51.6 (8.3) | 49.9 (7.6) |
| Practicing MDs per 100,000 population | 167.9 (30.1) | 179 (31.9) | 182.8 (34.5) | 174.6 (32.1) |
| Surgeons in practicing MDs (%) | 24.9 (1.8) | 24.2 (1.8) | 23.3 (1.8) | 22.9 (1.9) |
| Hospitals with outpatient surgery services per 100,000 population | 1.8 (0.9) | 1.8 (1.0) | 1.8 (1.0) | 1.9 (1.1) |

Mean and s.d. (in parentheses) across states in selected years are reported. Elderly population includes people aged 65 or older.
Source: Authors' analysis of the analytical sample.

demographic distribution. For other variables, we used a 4-year moving average of the annual growth rate of the most recent years to project the growth rate from 2010 to 2015. For example, we used actual data from 2008 and 2009 and projected data from 2010, 2011, and 2012 to project values in 2013. The state and time fixed effects were included in the projection estimates. For the time fixed effects, we used a 4-year moving average. For ASC rooms per capita, we designed four scenarios assuming different ASC growth rates (described further below).

Using the projected values for the independent variables and the coefficients from the regression models, we projected total Medicare procedure volume and ASC market share. For Medicare payments, we used the 2011 Medicare outpatient prospective payment system (OPPS) fee schedule, the Medicare ASC fee schedule, and the Medicare physician fee schedule (MPFS) for payments for physician practice expenses. These payment rates were multiplied by the projected volume at ASCs, hospital outpatient departments, and physician offices to estimate Medicare spending. We projected an increase at an annual rate of 1% in the rates of future Medicare payments for services under the OPPS and the MPFS, and growth of 0.5% for ASC services for 2012–2015. These assumptions are based on Medicare Payment Advisory Commission recommendations for updating the Medicare OPPS, ASC Fee Schedule, and Medicare physician fee schedules.

## Results

***Descriptive analysis.*** **Table 1** presents trends and cross-sectional variation of key variables. Volume per capita increased in the past decade across all four procedures at different rates. Colonoscopy experienced a rapid growth in the first half of the decade and then slowed considerably. Upper GI procedures and arthroscopy have been increasing at a relatively steady pace. The growth of cataract procedures was mild compared with growth in other procedures.

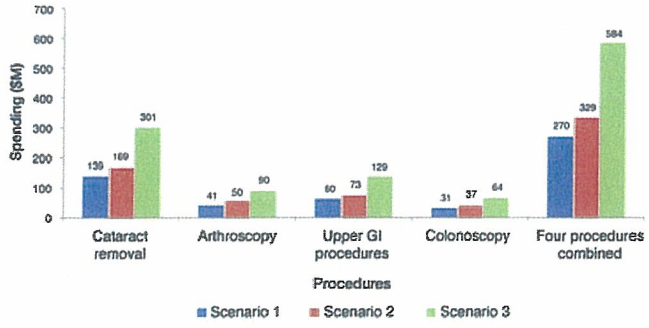


**Figure 1.** Total additional Medicare spending from 2011 to 2015 under alternative scenarios that restrict the growth of ambulatory surgical centers (ASCs). Additional cost compared with base scenario. The base scenario assumes that ASCs grow at historical rates in 2011–2015. Scenario 1 assumes that per capita ASC rooms stay at 2009 levels in 2011–2015. Scenario 2 assumes that the number of ASC rooms stays at 2009 levels in 2011–2015. Scenario 3 assumes that ASC rooms decrease in 2011–2015 at a rate so that the number of ASC rooms in 2015 is the same as that in 2007. Cost shown is the total cost from 2011 to 2015 and is expressed in million dollars. (Source: Authors' analysis of the analytical sample.)

ASCs have been gaining market share across all years. Procedures performed at ASCs now account for more than 60% of cataract procedures and 30–40% of other procedures performed on FFS Medicare beneficiaries. The number of ASC operating rooms has been growing across all years, although the growth in recent years has slowed down. Summary statistics of the control variables in the regression model are listed in **Table 2**.

***Regression analysis.*** **Table 3** shows the estimated impact of ASC growth on the total procedure volume and ASC market share from the regression analysis. After controlling the variables and fixed effects specified above, we found statistically significant association between ASCs and service utilization for one procedure group, colonoscopy. The analysis revealed no statistically significant association between number of ASC operating rooms and Medicare utilization of cataract procedures, arthroscopy, or upper GI procedures.

With respect to colonoscopy, one additional ASC operating room per 100,000 population is associated with 1.47 more procedures per 1,000 Medicare Part B FFS beneficiaries. The effect of an additional ASC operating room per 100,000 represents a 5.3% increase from the average ASC volume of colonoscopies in the analytical sample (or an increase of 1.8% in colonoscopies performed in all outpatient settings). It is important to note that one additional ASC operating room per 100,000 is a substantial increase, considering that the mean number of ASC operating rooms per 100,000 in the analytical sample is 3.8.

The findings show a significant impact of the number of ASC operating rooms on ASC market share for each procedure category. One additional ASC operating room per 100,000 population leads to a 4-percentage-point gain in ASC market share for the procedure categories of cataract removal/lens insertion and arthroscopy. The ASC market share effect of an additional ASC operating room is 6% for the categories of upper GI procedures and colonoscopy.

***Cost simulation.*** In light of concerns regarding physician ownership of ASCs, the focus has been on the potential cost of ASCs in increasing volume and spending. As a result, we designed scenarios to better understand the potential implications of different ASC growth rates for Medicare spending over the period from 2011 to 2015.

Four scenarios of ASC growth were modeled. The "base scenario" assumes projected growth of ASCs based on the 4-year moving average. Scenario 1 ("population growth rate") assumes that ASC operating rooms per capita remain at 2009 levels. Scenario 2 ("no growth") assumes that the number of ASC rooms remains at 2009 levels. Scenario 3 ("negative growth") assumes that the number of ASC rooms decreases at a rate such that the number of ASC rooms in 2015 is equal to the number in 2007. Modeling these scenarios provides insights into the potential impact of policies that would restrict growth of ASCs.

**Figure 1** presents the change in Medicare spending under the three alternatives relative to the base scenario. Under all three alternatives, Medicare spending is higher than that under the base scenario. From 2011 to 2015, the most restrictive scenario (scenario 3) would result in Medicare spending $584 million more than in the base scenario across all selected procedure groups. The two less restrictive scenarios would increase Medicare spending by $329 million and $270 million relative to the base scenario, respectively.

The potential savings to Medicare if ASC growth continues at historical rates is easy to understand for cataract procedures,

**Table 3. Impact of ASC operation rooms on procedure utilization and ASC market share**

| Impact of one additional ASC operation room per 100,000 population on: | Cataract procedures | Arthroscopy | Upper GI procedures | Colonoscopy |
|---|---|---|---|---|
| Procedures per 1,000 Medicare beneficiaries | 0.56 (0.56) | 0.10 (0.11) | −0.09 (0.28) | 1.47* (0.46) |
| Market share of ASCs | 0.04* (0.005) | 0.04* (0.004) | 0.06* (0.004) | 0.06* (0.004) |
| Sample size | 500 | 500 | 500 | 500 |

Standard deviations are listed in parentheses. Medicare beneficiaries include Medicare Part B Fee-For-Service plan enrollees. All regressions include control variables described in the Methods section and state and year fixed effects. Coefficients of market share are expressed in fractions, not percentage points: a coefficient of 0.06 means market share increases by 6 percentage points.
*$P \leq 0.01$.
ASC, ambulatory surgical center.
Source: Authors' analysis of the analytical sample.

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arthroscopy, and upper GI procedures, as ASC growth does not increase total procedure volume but does increase ASC market share. Colonoscopy is an interesting case in that continued growth of ASCs would still result in Medicare savings. The reason is that the savings to Medicare from migration of services from other outpatient settings to ASCs is greater than the additional Medicare spending from increases in the total volume of colonoscopies associated with ASC growth.

## Discussion

The study findings show that the association between ASC growth and service utilization is not as strong as previous studies suggest. We found that ASC growth is associated with increased total utilization for colonoscopy only. For other common procedures, including cataract procedures, arthroscopy, and upper GI procedures, we did not observe increased Medicare utilization as a result of ASC growth.

There are a number of potential reasons that our findings differ from those of previous studies. One explanation is that our approach (using state-level time series data and fixed effects) better enabled us to disentangle the potentially spurious relationship between ASCs and increased utilization by controlling for underlying demand factors. Previous studies note that induced demand is only one of many plausible reasons for their observed associations between ASCs and procedure volume. In addition, our analysis evaluated the association between ASCs and utilization at the national level. Prior research generally focused on a single state or region, which may generate results that are not generalizable to the national level.

Although we cannot reject the hypothesis that ASCs created greater Medicare volume of colonoscopy, the growth of ASCs may have helped meet the growing demand for these services. In early 1999, the Centers for Disease Control and Prevention launched its Screen for Life: National Colorectal Cancer Action Campaign. Since the initiative began, the percentage of adults aged 50 or older who have ever had a sigmoidoscopy or colonoscopy increased from 44% in 1999 to 53% in 2004 to 64% in 2010 (14). Moreover, new rules in the Affordable Care Act of 2010 waive beneficiary cost-sharing for screening colonoscopies, which is expected to further increase the demand for these services.

A careful examination of the impact of ASC growth should include both changes in total volume and the migration of services from other outpatient settings to ASCs, which was largely overlooked by previous studies. Our analysis shows that ASCs gain significant market share across all procedures as they grow. Since ASCs are paid a fraction of what is paid to hospitals for the same procedures under Medicare, a migration from other outpatient settings to ASCs could reduce Medicare spending. Our results suggest that ASC growth at historical rates could save hundreds of millions of dollars to Medicare over the next 5 years, compared with slower growth rates.

There are two potentially important limitations of the study. First, as with previous studies, our test of induced demand is indirect. Specifically, we do not observe physician ownership of ASCs directly, but, instead, determine the association between the number of ASC operating rooms and overall surgical volume.

Second, we used fixed effects to control for differences in unobserved demand factors across states and time. A concern with this approach is whether there is sufficient variation in the growth of ASCs and procedure volume across states and years to detect a significant relationship. However, our analysis indicates significant variation in key variables. For example, the interquartile range (i.e., the difference between the 75th and 25th percentiles) of the state-level cumulative growth in per capita ASCs was 62% (96% – 34%) from 2000 to 2009, while the interquartile ranges of state-level growth of procedure volume were 14% (17% – 3%) for cataract removal, 41% (112% – 71%) for arthroscopy, 17% (49% – 32%) for upper GI procedures, and 18% (55% – 37%) for colonoscopy during the same period. Further, we found statistically significant effects on volume for some control variables with limited variation across years, such as the percentage of the elderly population aged 85 or older. This suggests ample variations in our sample to detect statistical significance (see **Supplementary Tables S1** and **S2** online).

Our study suggests that ASCs could play an important role in moving to a health-care system that offers greater value by producing high-quality care at lower cost. The policy debate should address the concern of physician ownership of ASCs in a broader context that includes recognition of the benefits of ASCs. Movement in Medicare toward value-based purchasing and delivery system reforms should work to increase the value of ASCs to Medicare and beneficiaries.

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## CONFLICT OF INTEREST

**Guarantor of the article:** Lane Koenig, PhD.
**Specific author contributions:** Lane Koenig: designing approach, interpreting results, drafting manuscript; Qian Gu: conducting analysis, interpreting results, drafting manuscript.
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**Potential competing interests:** None.

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# Can Ambulatory Care Fix Our Costly Healthy-Care System?

*By Barbara Mannino / Published March 08, 2012 / FOXBusiness*

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Ambulatory surgery centers have transformed the outpatient experience for millions of Americans by offering a less-costly and more-convenient alternative to hospitals for surgical care and diagnostic and preventive procedures, experts say.

"Ambulatory surgery centers (ASCs) represent what everyone

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—patient, provider and payer—seems to want [in health care]," says Dr. David Shapiro, an anesthesiologist and president of Ambulatory Surgery Center Association (ASCA).

A 2009 report from KNG Health Consulting, LLC cites an historic shift away from hospital inpatient surgeries toward outpatient settings. This shift, combined with technological advances like laparoscopic surgery and improved anesthesia with quicker onset and faster offset, contributed to the significant ASC growth over the last 40 years.

Today, more than 5,300 Medicare-certified U.S. centers provide same-day predominantly elective services like gastrointestinal, ophthalmologic, pain management, orthopedics, dermatology and others to patients with insurance funded by public and private payers.

The highly-specialized approach and small scale of these centers when compared to hospitals enable them to pass along direct savings to patients through lower copays and out-of-pocket expenses. Private insurers, Medicare and Medicaid, and employers also benefit from the lower costs.

For Medicare, the reduction in health-care spending is $2.6 billion a year, and an additional $2.4 billion in savings could be wrung out

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of the system annually if just half of eligible surgeries moved to the ASC setting, according to the most recent statistics from ASCA.

## Good for Patients

Physicians claim the smaller settings at ASCs help them develop better relationships and trust with patients. According to ASCA, patient satisfaction rates consistently range in the 92nd percentile.

"Patients feel less anxious, are exposed to less infection, and experience better results following anesthesia when compared to undergoing surgery in the hospital setting," says Dawn Spencer, chief operating officer at The Center for Ambulatory Surgery.

She adds the service model enables patients to bring any concerns directly and in real-time to their physician who has direct case-knowledge.

ASCs also offer patients access to various convenient locations, ease in scheduling surgeries and short wait-times, especially because there is no opportunity for the unscheduled interruption of emergency surgeries.

ASCs are often termed "focused factories" because services are managed around the experience of a particular procedure.

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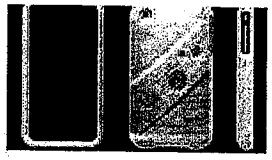
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"The entire system benefits from the repetition and specialization: preoperative nursing care, interoperative medical care of an anesthesiologist, radiologist or surgeon, and postoperative care," claims Shapiro, "and the patient benefits."

ASCs are subject to rigorous oversight and independent inspections to assess compliance with both state and national standards. These onsite surveys, like those conducted at hospitals and other facilities, evaluate ASCs on a wide range of demanding clinical, operational and quality standards.

In addition to state and Medicare standards, many ASCs seek additional accreditation from one of four accrediting bodies, which are recognized by CMS for their high standards of quality care. These include the Accreditation Association for Ambulatory Health Care (AAAHC), The Joint Commission, the American Association for Accreditation for Ambulatory Surgery Facilities and the American Osteopathic Association (AOA).

The AAAHC, for example, has 350 practicing healthcare professional surveyors—physicians, nurses and medical directors—who conduct scrupulous surveys and accredit thousands of ASC organizations, according to spokesperson Geoffrey Charleton-Perrin. These professionals also fulfil a consultative and educational function, providing guidance beyond

accreditation for continuous quality improvement.

Currently, ASCA says more than 90% of ASCs are at least partly physician-owned. ASC detractors take issue with this ownership status saying it induces self-referrals.

But Spencer calls this a "hollow argument," citing the Stark Law, which regulates and outlines physician investment guidelines in 11 designated health services but does **not** impose restrictions on a physician's ability to invest in ASCs.

Investments in ASCs, however, must comply with state laws and the federal Anti-Kickback statute which provides certain safe harbor protections that require the full compliance of each physician investor who must: be in a position to refer patients directly to the ASC and perform surgery on such referred patients; derive at least one-third of medical practice income from procedures performed at the ASC; and perform at least one-third of procedures that may be performed in an ASC at the investment entity ASC if the investment is in a multispecialty center.

Lane Koenig, KNG founder and president says "our research has found the literature overstates the importance of self-referrals."

Spencer also claims a high standard of care and outcomes result when physicians assume the financial risk of ownership.

**Competition**

Currently hospitals are trending toward opening free-standing centers, sometimes collaborating with physicians. Still, hospitals are facing competition from ASCs, says Caroline Steinberg, vice president of trends analysis at the American Hospital Association.

Steinberg claims consumers are not aware that nonhospital surgery centers have a lower regulatory threshold, less stringent quality standards and no emergency backup.

Shapiro disagrees. "ASCs have all the necessary safeguards in place to manage an emergency and ensure patient safety," he says, "including patient transfer agreements with nearby hospitals. In fact, because of its confidence in the quality of care it provides, the ASC industry has long advocated for a national quality reporting program for ASCs, which Medicare introduced this year."

When it comes to infection prevention, adds Shapiro, ASCs are also the only surgical providers complying, as mandated by Medicare, with an extensive and comprehensive infection prevention checklist developed collaboratively by Medicare and the Centers for Disease Control and Prevention.

Also precautionary: Patients with comorbidities typically are treated at hospitals. ASC patient selection is based on the whole patient,

including evaluation of the home environment to which a patient will be discharged.

The Joint Commission alone accredits 500 ASCs, two-thirds with "deemed status" accreditation and CMS certification, says Mike Dye, senior associate of the ambulatory care program. The Joint Commission represents the gold seal of approval that assures patients ASCs meet the exact same expectations as hospitals. "Accredited surgical care is an indicator of quality," Dye says.

Dye emphasizes that all accrediting organizations perform unannounced onsite surveys which afford patients with added assurance; no one is prepping ahead of time.

Also, Koenig claims ASCs have helped to meet the increased demand for preventative services like colonoscopies and upper gastrointestinal endoscopic (GI) procedures and make consumers more aware of the early diagnosis, treatment, quality of life and cost benefits of these services.

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# The Role of Knee Alignment in Disease Progression and Functional Decline in Knee Osteoarthritis FREE

Leena Sharma, MD; Jing Song, MS; David T. Felson, MD, MPH; September Cahue, BS; Eli Shamiyeh, MS; Dorothy D. Dunlop, PhD

*JAMA*. 2001;286(2):188-195. doi:10.1001/jama.286.2.188.

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## ABSTRACT

ABSTRACT | METHODS | RESULTS | COMMENT | REFERENCES

**Context** Knee osteoarthritis (OA) is a leading cause of disability in older persons. Few risk factors for disease progression or functional decline have been identified. Hip-knee-ankle alignment influences load distribution at the knee; varus and valgus alignment increase medial and lateral load, respectively.

**Objective** To test the hypotheses that (1) varus alignment increases risk of medial knee OA progression during the subsequent 18 months, (2) valgus alignment increases risk of subsequent lateral knee OA progression, (3) greater severity of malalignment is associated with greater subsequent loss of joint space, and (4) greater burden of malalignment is associated with greater subsequent decline in physical function.

**Design and Setting** Prospective longitudinal cohort study conducted March 1997 to March 2000 at an academic medical center in Chicago, Ill.

**Participants** A total of 237 persons recruited from the community with primary knee OA, defined by presence of definite tibiofemoral osteophytes and at least some difficulty with knee-requiring activity; 230 (97%) completed the study.

**Main Outcome Measures** Progression of OA, defined as a 1-grade increase in severity of joint space narrowing on semiflexed, fluoroscopically confirmed knee radiographs; change in narrowest joint space width; and change in physical function between baseline and 18 months, compared by knee alignment at baseline.

**Results** Varus alignment at baseline was associated with a 4-fold increase in the odds of medial progression, adjusting for age, sex, and body mass index (adjusted odds ratio [OR], 4.09; 95% confidence interval [CI], 2.20-7.62). Valgus alignment at baseline was associated with a nearly 5-fold increase in the odds of lateral progression (adjusted OR, 4.89; 95% CI, 2.13-11.20). Severity of varus correlated with greater medial joint space loss during the subsequent 18 months ($R$ = 0.52; 95% CI, 0.40-0.62 in dominant knees), and severity of valgus correlated with greater subsequent lateral joint space loss ($R$ = 0.35; 95% CI, 0.21-0.47 in dominant knees). Having alignment of more than 5° (in either direction) in both knees at baseline was associated with significantly greater functional deterioration during the 18 months than having alignment of 5° or less in both knees, after adjusting for age, sex, body mass index, and pain.

**Conclusion** This is, to our knowledge, the first demonstration that in primary knee OA varus alignment increases risk of medial OA progression, that valgus alignment increases risk of lateral OA progression, that burden of malalignment predicts decline in physical function, and that these effects can be detected after as little as 18 months of observation.

Twelve percent of the US population aged 25 to 75 years has symptoms and signs of osteoarthritis (OA).[1] Disability due to OA is largely a result of knee or hip involvement. The risk of disability attributable to knee OA alone is as great as that due to cardiac disease and greater than that due to any other medical condition in elderly persons.[2] Knee OA also substantially increases risk of disability due to other medical conditions.[3]

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Increased awareness of the impact of knee OA has provided impetus to accelerate development of disease-modifying agents (ie, treatments that delay OA progression).[4] At present, there are no disease-modifying drugs for OA.

Poor understanding of the natural history of OA contributes to the slow development of interventions that modify the course of the disease. This deficiency of knowledge hinders development of novel interventions to target factors responsible for disease progression and functional decline; it also clouds the ability to identify patients who are unlikely to benefit from investigational treatments.

In the investigation of a candidate risk factor in OA studies, 3 key questions arise. Does the factor contribute to (1) incidence (ie, new occurrence) of osteoarthritic disease? (2) disease progression in those who already have OA? and (3) disability in those with OA? The literature on knee OA is weighted toward the first question. However, the second and third questions are crucial to the goal of reducing the burden of knee OA. In a subset of individuals, knee OA remains in the mild state that characterizes newly developed OA; Dieppe[5] has stated that in this subset, OA should not even be considered a disease—OA that progresses beyond mild stages is responsible for the bulk of both individual and societal costs of OA. Knowledge of the factors that lead to progression and functional decline will aid development of interventions to modify disease course and patient-centered outcomes.

In the investigation of knee OA progression, the recommended primary outcome is joint space change, measured via radiographic images acquired using special protocols that maximize accuracy and reliability.[6-13] The sparse literature regarding progression is limited by its reliance on conventional, extended-knee radiography (ie, without the protocols now considered essential).

Osteoarthritis is widely believed to be the result of local mechanical factors acting within the context of systemic susceptibility.[14-16] Certain site-specific factors in the local joint environment govern how load is distributed across the articular cartilage of a given joint. However, the effect of such factors on OA progression or patient-centered outcomes is largely unexamined.

At the knee, alignment (ie, the hip-knee-ankle angle) is a key determinant of load distribution. In theory, any shift from a neutral or collinear alignment of the hip, knee, and ankle affects load distribution at the knee.[17] The load-bearing axis is represented by a line drawn from mid femoral head to mid ankle. In a varus knee, this line passes medial to the knee and a moment arm is created, which increases force across the medial compartment. In a valgus knee, the load-bearing axis passes lateral to the knee, and the resulting moment arm increases force across the lateral compartment.[17] Disproportionate medial transmission of load results from a stance-phase adduction moment.[18] This adduction moment reflects the magnitude of intrinsic compressive load on the medial compartment during gait.[19] Varus-valgus alignment is a key determinant of this moment.

These mechanical effects of alignment on load distribution make it biologically plausible that both varus and valgus alignment contribute to OA progression. Further support comes from animal studies[17] as well as surgical studies, which identify knee alignment as a predictor of knee procedure outcomes. The question that has not been answered is, does knee alignment influence risk of structural progression and functional decline in knee OA?

In this study, we tested whether (1) varus alignment at baseline increases risk of subsequent medial tibiofemoral compartment OA progression, (2) valgus alignment at baseline increases risk of subsequent lateral compartment OA progression, (3) severity of varus or valgus malalignment at baseline is correlated with subsequent change in medial or lateral joint space width, respectively, and (4) greater burden of malalignment at baseline is associated with greater subsequent deterioration in physical function.

## METHODS

ABSTRACT | METHODS | RESULTS | COMMENT | REFERENCES

### Participants

The Mechanical Factors in Arthritis of the Knee (MAK) study is a longitudinal study of the contribution of mechanical factors to disease progression and functional decline in knee OA. Participants were recruited. from the community through advertising in periodicals targeting elderly persons, 67 neighborhood organizations, letters to members of the registry of the Buehler Center on Aging at Northwestern University, Chicago, Ill, and local referrals.

Inclusion and exclusion criteria were based on National Institute of Arthritis and Musculoskeletal and Skin Diseases/National Institute on Aging–sponsored multidisciplinary workshop recommendations for knee OA progression studies.[6] Inclusion criteria were definite tibiofemoral osteophyte presence (Kellgren/Lawrence [K/L] radiographic grade ≥2) of 1 or both knees and at least some difficulty with knee-requiring activity. Exclusion criteria were corticosteroid injection within the previous 3 months or history of avascular necrosis, rheumatoid or other inflammatory arthritis, periarticular fracture, Paget disease, villonodular synovitis, joint infection, ochronosis, neuropathic arthropathy, acromegaly, hemochromatosis, Wilson disease, osteochondromatosis, gout, pseudogout, or osteopetrosis. Approval was obtained from the Office for

**guinea pigs with spontaneous osteoarthritis.** *Clin Orthop Relat Res* 2011;;469 (10):2796-805.
**Scientific and clinical advances leading to improved treatment of knee osteoarthritis.** *Med Sci Sports Exerc* 2008;;40 (2):191-2.

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the Protection of Research Subjects–Institutional Review Board of Northwestern University. Written informed consent was obtained from all participants.

### Alignment

To assess alignment, a single anteroposterior radiograph of the lower extremity was obtained. A 130 × 36-cm graduated grid cassette was used to include the full limb of tall participants.[20] By filtering the x-ray beam in a graduated fashion, this cassette accounts for the unique soft tissue characteristics of the hip and ankle. Participants stood without footwear, with tibial tubercles facing forward. The tibial tubercle, a knee-adjacent site not distorted by OA, was used as positioning landmark.[21] The patella is often used to position normal knees,[20] but the possibility of patellofemoral OA precluded this approach. The x-ray beam was centered at the knee at a distance of 2.4 m. A setting of 100 to 300 mA/s and 80-90 kV was used, depending on limb size and tissue characteristics.

Alignment was measured as the angle formed by the intersection of the mechanical axes of the femur (the line from femoral head center to femoral intercondylar notch center) and the tibia (the line from ankle talus center to the center of the tibial spine tips).[17,21-22] A knee was defined as varus when alignment was more than 0° in the varus direction, valgus when it was more than 0° in the valgus direction, and neutral when alignment was 0°.[20,22-24] The angle made by the femur and tibia on a knee x-ray was not used because it does not consider the proximal femur, femoral or tibial shafts, or ankle[25]; is highly variable as opposed to full-limb measurements[22]; and is not typically used in orthopedic clinical or biomechanical studies.

One experienced reader made all measurements. Reliability was high for measurements of varus (intraclass correlation coefficient [ICC], 0.99) and valgus (ICC, 0.98) alignment.

### Varus-Valgus Laxity

Because physical examination laxity tests are unreliable,[26-27] a device to measure varus-valgus laxity was designed by Thomas Buchanan, PhD.[28-29] This device and the measurement protocol address sources of variation in knee laxity tests, ie, inadequate thigh and ankle immobilization, incomplete muscle relaxation, variation of the knee flexion angle, variation of load applied, and imprecise measurement of rotation.[26-27,30]

The system consists of a bench with an arc-shaped, low-friction track running medially and laterally. The distal shank is attached to a sled, which travels within the track. A handheld dynamometer fits into the sled and is used to apply load. Participants assumed a seated position, with the thigh and ankle immobilized and the study knee at 20° flexion.[31] An auditory signal indicates when a load of 40 newtons (12 newtons/m) has been applied.[32]

Laxity was measured as the angular deviation at the sled after varus and valgus load. Total rotation, the sum of varus and valgus rotation for each knee, was examined as previously described.[32-34] All laxity measurements were performed by the same examiner and assistant. Our reliability with this device was very good (within-session ICC, 0.85-0.96; between-session ICC, 0.84-0.90).

### Knee Radiographs

For knee radiographs at baseline and 18 months, the Buckland-Wright protocol[35] was followed. This protocol meets recommendations for knee OA studies provided by multidisciplinary workshops[6] and the Task Force of the Osteoarthritis Research Society International.[9] Per this protocol, knee position, criteria for beam alignment relative to knee center, radiopaque markers to account for magnification, and measurement landmarks were specified. All radiographs were obtained in the same unit by 2 trained technicians.

The standing semiflexed view of the knee in this protocol is optimal for joint space assessment because it achieves superimposition of the anterior and posterior joint margins.[12,36-37] The knee was flexed until the tibial plateau was horizontal, parallel to the beam and perpendicular to the film. To control for rotation, the heel was fixed and the foot rotated until the tibial spines were central within the femoral notch. Knee position was confirmed by fluoroscopy before films were taken. Foot maps made at baseline were used to standardize repositioning at 18 months. These protocol elements enhance accuracy and precision of joint space assessment.[12,37] Even without fluoroscopic confirmation, the semiflexed view was superior to the extended or schuss views[38]; the fluoroscopic approach, by confirming the same position in all radiographs, further reduces variability.

### Radiographic Progression

Joint space assessment is the widely recommended primary outcome for knee OA progression studies[9,11,39] and provides a compartment-specific measure, which was required in this study.

Medial and lateral progression were defined as a 1-grade or greater increase in severity of joint space narrowing in the medial and lateral compartments, respectively. We used the 4-grade scale (ie, 0 = none; 1 = possible; 2 = definite; and 3 = severe) with atlas representations from Altman et al.[8]

Joint space was also measured at the narrowest point in each compartment. The femoral boundary was the distal convex margin of the condyles. The tibial boundary was the line extending from tibial spine to outer margin, across the center of the articular fossa, defined by the superior margin of the bright radiodense band of the subchondral cortex.[35,40] The narrowest interbone distance of each compartment was measured using

calipers with electronic readout.[6,40-41] Joint space area and midcompartment width are less sensitive to change than narrowest joint space width.[35]

Other approaches (ie, osteophyte grade, K/L grade) had limitations. Although osteophytes can be graded per compartment, they are often more prominent in the uninvolved compartment. The K/L grade provides a global score without separate information for the medial and lateral compartments (ie, 0 = normal; 1 = possible osteophytes; 2 = definite osteophytes and possible joint space narrowing; 3 = moderate/multiple osteophytes, definite narrowing, some sclerosis, and possible attrition; and 4 = large osteophytes, marked narrowing, severe sclerosis, and definite attrition).

One experienced reader assessed radiographs using an atlas.[8] Reliability for joint space grading ($\kappa$ coefficient, 0.80-0.86) and measurement (ICC, 0.95-0.98) was very good. Reading of knee and full-limb radiographs occurred in separate sessions. The reader was blinded to knee data when assessing alignment and to alignment data when assessing knee radiographs.

### Physical Function and Pain

Physical function was assessed using an observed measure, chair-stand performance (rate of chair stands per minute, based on the time required to complete 5 repetitions of rising from a chair and sitting down), using the protocol of Guralnik et al[42] and Seeman et al.[43] The sit-stand transfer is closely linked to knee status.[44] Of the lower-extremity joints, the knee often exhibits the greatest peak torques during this task.[45-47] Average pain during the past week was recorded on separate 0- to 100-mm visual analog scales (VASs) for each knee.

### Statistical Analysis

For analyses of OA progression, knees not at risk of progressing (ie, those with the highest grade of joint space narrowing at baseline) were excluded. Descriptive data (proportions) and correlations were provided separately for dominant and nondominant knees, with dominance ascertained using the question, "In order to kick a ball, which leg would you use?" All statistical tests were conducted using a nominal $\alpha$ level of .05. The risk of progression was analyzed from logistic regression, using generalized estimating equations (GEEs) to include data from 1 or both knees of each participant. Odds ratios (ORs) were calculated for medial and lateral progression, first entering alignment (unadjusted OR), then adding age, sex, and body mass index (BMI) (adjusted OR). Odds ratios were recalculated after additional adjustment for laxity. The associated 95% confidence intervals (CIs) were calculated; a 95% CI of more than 1.00 indicates that alignment is significantly associated with progression. The same approach was taken to explore the relationship between alignment and progression assessed using K/L grade.

Next, the relationship between baseline varus alignment (in degrees; varus as a positive value, neutral as 0, and valgus as a negative value) and change in medial joint space width from baseline to 18 months, each as a continuous variable, was examined in dominant knees using linear regression analysis. A decrease in joint space was analyzed as a positive value. Similarly, the relationship between baseline valgus alignment (valgus as a positive value, neutral as 0, and varus as a negative value) and change in lateral joint space width from baseline to 18 months was examined.

For analyses of physical function, participants whose chair-stand performance could not further decline (ie, those who could not perform the test at baseline) were excluded. Participants were divided into 3 alignment groups based on having 0, 1, or 2 knees with baseline alignment of more than 5° from neutral (in either direction). Change from baseline to 18 months in chair-stand rate was regressed on alignment group status to evaluate unadjusted and age-, sex-, and BMI-adjusted differences between groups. To explore the mediating role of pain, further analyses additionally adjusted for pain.

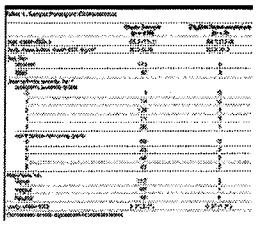
We also explored the relationship between baseline alignment group and functional decline, designated as at least 20% worsening in chair-stand rate. Logistic regression analysis was used to evaluate the unadjusted and adjusted odds of performance decline related to alignment group status.

## RESULTS

ABSTRACT | METHODS | RESULTS | COMMENT | REFERENCES

Of 237 participants at risk for progression in at least 1 knee, 7 (3%) did not return at 18 months; 5 died and 2 could not be reached. Selected characteristics of these participants are presented in Table 1. No participant received therapy that might have affected the progression rate.

**Table 1.** Sample Participant Characteristics



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### Radiographic Progression

In dominant knees, medial OA progression occurred in 28 (31%) of 89 varus vs 9 (9%) of 102 nonvarus knees. Of the 37 dominant knees with medial progression, 28 (76%) were varus at baseline. Mean varus alignment was 3.34° at baseline and 3.82° at 18 months. Results were similar in nondominant knees.

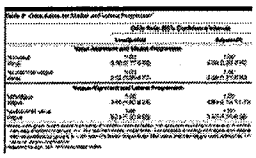
Lateral OA progression occurred in 19 (22%) of 88 valgus vs 5 (5%) of 103 nonvalgus knees. Of 24 dominant knees with lateral progression, 19 (79%) were valgus. Mean valgus alignment was 3.21° at baseline and 3.24° at 18 months. Results were similar in nondominant knees.

The average change in the compartment that was narrower at baseline was a loss of 0.45 mm over 18 months. Definite joint space narrowing (grade ≥2) was present in either the medial or the lateral compartment but never in both. In no knee did both medial and lateral progression occur; tibiofemoral progression was a unicompartmental event.

### Medial Progression

In GEE logistic regression analyses, varus vs nonvarus (referent) alignment at baseline was associated with a 5-fold increase in the odds of medial progression during the subsequent 18 months (Table 2). After adjustment for age, sex, and BMI, varus alignment was still associated with a 4-fold increase in the odds of medial progression.

**Table 2.** Odds Ratios for Medial and Lateral Progression*



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In calculating risk in varus vs nonvarus knees, we recognized that medial OA may be associated with varus, valgus, or neutral alignment. Therefore, the risk associated with varus alignment was compared with the risk conferred by any other possible alignment for a given knee. To determine the progression risk associated with varus alignment when the comparison group was neutral or nearly neutral knees, we repeated the analysis with a referent group consisting of neutral (0°) or mildly valgus (≤2°) knees. Varus alignment was still associated with a 3-fold increase in risk of medial progression in adjusted analyses (Table 2).

### Lateral Progression

In GEE logistic regression analyses, valgus vs nonvalgus (referent) alignment at baseline was associated with an almost 4-fold increase in the odds of lateral progression during the subsequent 18 months (Table 2). This relationship persisted after adjustment for age, sex, and BMI.

When the referent group was neutral or nearly neutral (≤2° varus) knees, valgus alignment was associated with a more than 3-fold increase in the odds of subsequent lateral OA progression in both unadjusted and adjusted analyses (Table 2).

These logistic regression analyses were repeated after additionally controlling for varus-valgus laxity, with little effect on results. The OR for the relationship between varus alignment and medial progression, adjusting for age, sex, BMI, and laxity, was 4.01 (95% CI, 2.19-7.62). The OR for the relationship between valgus alignment and lateral progression, adjusting for age, sex, BMI, and laxity, was 4.78 (95% CI, 2.08-11.02).

Results of analyses of medial progression were not affected by excluding lateral progressors from the nonprogressor group. Results of analyses of lateral progression also were not affected by excluding medial progressors from the nonprogressor group.

### Malalignment Severity at Baseline and Change in Joint Space

The relationship between baseline severity of varus alignment and change in medial joint space width from baseline to 18 months, each as a continuous variable, was examined in dominant knees. Greater varus alignment correlated with greater subsequent loss of joint space ($R$ = 0.52; 95% CI, 0.40-0.62).

Similarly, the relationship between baseline severity of valgus and change in lateral joint space width from baseline to 18 months was examined in dominant knees. Severity of valgus correlated with the magnitude of loss of lateral joint space width ($R$ = 0.35; 95% CI, 0.21-0.47). These relationships persisted after adjustment for age, sex, BMI, and laxity.

### Alignment at Baseline and Progression of K/L Grade

Given the historical role of the K/L grading system in knee OA studies, we also examined the relationship between baseline alignment and K/L grade progression (≥1-grade increase). However, knees that progress by K/L grade include some knees with medial progression and other knees with lateral progression. Therefore, this analysis tests a different hypothesis—does varus alignment increase risk of progression in either the medial (mechanically stressed by varus alignment) or the lateral (not stressed) compartment, and does valgus alignment increase risk of progression in either the medial (not stressed) or the lateral (stressed by valgus alignment) compartment? Notably, there is no rationale to support a link between varus alignment and lateral progression or between valgus alignment and medial progression.

Even with this limitation of the K/L grading system, valgus alignment was associated with an increase in risk of K/L grade progression (OR, 2.51; 95% CI, 0.91-6.89), and varus alignment was associated with a significant increase in risk of K/L grade progression (OR, 3.61; 95% CI, 1.33-9.85), further attesting to the strength of their effects. Finally, absolute severity of malalignment as a continuous variable was significantly associated with K/L grade progression.

### Burden of Knee Malalignment at Baseline and Change in Physical Function

Burden of malalignment at baseline predicted deterioration in physical function between baseline and 18 months. Participants were classified into 1 of 3 groups at baseline: those who had alignment of 5° or less in both knees (n = 126), 1 knee with alignment of more than 5° (n = 52), or both knees with alignment of more than 5° (n = 37). Physical functional outcome was analyzed as a continuous variable, ie, change in chair-stand rate from baseline to 18 months. Change did not differ between the first 2 groups, but significantly greater deterioration in chair-stand performance was found in participants who had alignment of more than 5° in both knees vs participants who had alignment of 5° or less in both knees (Table 3). The difference between these groups persisted after adjusting for age, sex, and BMI.

**Table 3.** Alignment Group Differences in Change in Chair-Stand Rate, Baseline to 18 Months

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We also explored the relationship between burden of malalignment and functional decline, designating decline as at least 20% worsening in chair-stand rate. Thirty-four (16%) of the 215 participants able to perform the test at baseline had functional decline by this definition, including 10% of the 126 with alignment in both knees of 5° or less, 21% of the 52 with alignment of more than 5° in 1 knee, and 27% of the 37 with alignment of more than 5° in both knees. The odds of functional decline were doubled (OR, 2.33; 95% CI, 0.97-5.62) by having 1 knee with alignment of more than 5° vs both knees with alignment of 5° or less and were tripled by having alignment of more than 5° in both knees vs alignment of 5° or less in both knees (OR, 3.22; 95% CI, 1.28-8.12). This association persisted after adjusting for age, sex, and BMI.

### Burden of Malalignment, Functional Deterioration, and Pain

To explore whether pain is an intervening variable in the relationship between knee alignment and functional deterioration, first we examined the relationship between alignment and pain at baseline, then we examined whether the relationship between alignment and functional deterioration was lost after accounting for pain. Average pain increased as malalignment increased (alignment< 4° = pain score of 25.2 mm on the VAS; alignment >4° but <8° = pain score of 37.7 mm; and alignment ≥8° = pain score of 41.2 mm). Pain severity was significantly associated with malalignment severity. Specifically, the GEE logistic regression analysis of alignment and pain showed an average VAS increase of 10 mm in knee pain with each 5° of malalignment. This relationship persisted after adjustment for age, sex, and BMI. Next, we repeated the analysis of the relationship between alignment group and change in chair-stand rate after additionally accounting for pain. As shown in Table 3, the burden of malalignment at baseline (ie, 2 vs 0 knees) continued to be significantly associated with subsequent functional deterioration.

## COMMENT

ABSTRACT | METHODS | RESULTS | COMMENT | REFERENCES

Varus alignment at baseline increased risk of medial knee OA progression over the 18 months of our study, and valgus alignment increased risk of subsequent lateral knee OA progression. The severity of varus malalignment at baseline correlated with the magnitude of medial joint space loss, and the baseline severity of valgus malalignment correlated with the magnitude of lateral joint space loss. A greater burden of malalignment at baseline was linked to greater decline in an observed measure of physical function. To our knowledge, this is the first demonstration that alignment influences risk of subsequent primary OA disease progression and decline in functional status and that these effects can be detected after as little as 18 months of observation.

In theory, varus and valgus alignment may each be a cause or result of progressive knee OA; therefore, it was essential to examine alignment at the beginning of the period during which progression was evaluated. Varus or valgus alignment that predates knee OA may be due to genetic, developmental, or posttraumatic factors. Animal model data support a link between preexisting varus or valgus alignment and OA development.[17] Knee alignment that results from knee OA may be due to loss of cartilage and bone height. However, even as a consequence of osteoarthritic disease, varus or valgus alignment may contribute to subsequent progression. The results of the current study, especially given the influence of alignment on load distribution, support this concept.

The presence of a relationship between alignment and progression by 18 months underscores the importanee of alignment as a risk factor. In knee OA progression studies, 18 months is a relatively early follow-up point, at which an effect may not as yet be detectable. The importance of alignment was further demonstrated by the finding of a strong relationship with progression even when the referent group included only neutral or nearly neutral knees. The alignment-associated odds of progression may be even greater at longer follow-up. The odds may be substantially greater if malalignment and knee OA are in a vicious cycle.

Varus or valgus alignment may stretch the capsule and collateral ligaments, increasing varus-valgus laxity, a potential mechanism of the alignment effect. If laxity were playing this role, then controlling for laxity should lead to a reduction in the alignment-progression relationship. In our study, this did not occur, suggesting that an increase in laxity is not a major mechanism for the alignment effect. Our study had more women than men; this sex distribution matches that of knee OA in the general population. The effects of alignment were independent of sex.

Burden of malalignment influenced patient-centered outcome, physical function assessed by chair-stand performance. In knee OA, risk factor profiles for structural disease progression and for disability overlap but are not identical. It was necessary to specifically examine the relationship between alignment and functional status. Longitudinal studies of patient-centered outcomes in knee OA have been rare; knowledge about risk factors has been derived chiefly from cross-sectional studies. We explored whether pain was an intervening factor in the alignment effect on function. While the strength of the alignment-function relationship was reduced slightly after accounting for pain, a significant relationship persisted, suggesting that at least some portion of the alignment effect is independent of pain.

The results of this study are consistent with biomechanical studies that have revealed that varus and valgus alignment increase medial and lateral load, respectively.[17,48-49] During gait, the impact of valgus on load distribution may not be comparable with that of varus alignment. In the normally aligned ambulating knee, load is disproportionately transmitted to the medial compartment.[50] Varus alignment further increases medial load during gait.[22] Valgus alignment is associated with an increase in lateral compartment peak pressures[49]; however, more load is still borne medially until more severe valgus is present.[51-52] Therefore, we expected to find that varus alignment had a stronger effect on medial progression risk than valgus on lateral progression risk, but the effects of varus and valgus were similar in magnitude. The severity of varus was similar to that of valgus; the lack of difference in potency could not be attributed to more severe valgus malalignment. Certainly, alignment in either direction increases compartmental load, giving credence to the concept that varus and valgus alignment each may contribute to subsequent progression. Differences between the magnitude of the effects of varus and valgus alignment may emerge with further follow-up.

A relationship between varus or valgus alignment and the natural progression of primary knee OA has not previously been demonstrated. Beliefs regarding this relationship have rested on biomechanical models and studies that are cross-sectional or of short duration and surgical outcome studies. Testing the immediate or short-term mechanical impact of a factor is not equivalent to testing its impact on a long-term structural outcome in a patient. The stage of investigation represented by the current study was necessary, both to demonstrate and to quantify the long-term effects of knee alignment on patient outcomes. Several orthopedic studies have demonstrated that knee alignment is associated with surgical outcome (eg, arthroplasty,[53] osteotomy,[54] meniscectomy,[55-57] and meniscal debridement[58]). While extremely important, these data do not address the role played by knee alignment in the nonsurgical, natural evolution of knee OA. In the operated knee, the development or progression of OA is linked to several factors not at play in natural progression (eg, nature of surgery and stage of OA at time of surgery).

Investigation of the influence of alignment on natural structural or patient-centered outcomes in unselected populations has been rare. Schouten et al[59] found that patient recollection of "bow-legs or knock-knees in childhood" was associated with a 5-fold increase in risk of OA progression. Others found that presence of "varus/valgus deformity," not further defined, did not differ between those who progressed and those who

did not.[60] In another study involving patients who were selected from a hospital practice on the basis of not having undergone surgery, and in whom alignment was considered only at the end of follow-up, 50% of 35 varus knees had progressive joint space narrowing.[61]

The proportion of participants whose OA progressed in the current study is comparable with studies using similar recruitment methods.[11,62]Also, an average joint space loss of 0.45 mm was detected over 18 months, or 0.30 mm over 12 months. This rate falls within the range of annual joint space loss in the literature (0.12 to 0.62 mm/y). Comparison with population-based studies, which have tended to use conventional, extended-knee radiography, is not possible. In previous progression studies, medial and lateral knee OA have been treated as a single condition, despite a belief that they differ in rate of progression and risk factor profile. Our results provide evidence that tibiofemoral OA progresses asymmetrically and illustrate that local risk factors are not only specific to joint but also to compartment.

The goal of this study was to examine the influence of alignment on structural and functional outcomes in patients with established OA. There is growing awareness that risk factors for incident OA differ from risk factors for OA progression. It is likely that knee alignment has a different effect on risk of incident OA from that shown here on risk of progression. The former effect may be smaller, given the less vulnerable state of the healthy knee. However, the effect on risk of incident OA cannot be inferred from these results and should be specifically examined.

These results suggest the need to develop and test, in patients with knee OA, the effect of interventions that reduce the stresses imposed by a given alignment. Interventions that reduce load in the stressed compartment on an ongoing basis may have a disease-modifying effect. Interventions that may hold promise (eg, "unloading" orthoses) have been examined in short-term studies; their long-term tolerability and effect on symptoms have been minimally evaluated, and their effect on progression and long-term functional outcomes is unknown.

In summary, varus alignment at baseline increased risk of subsequent medial OA progression and valgus alignment at baseline increased risk of subsequent lateral OA progression. Baseline severity of malalignment was correlated with the magnitude of subsequent joint space loss. Burden of malalignment at baseline was linked to greater decline in physical function.

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# Obesity and osteoarthritis: more complex than predicted!

P Pottie, N Presle, B Terlain, P Netter, D Mainard, and F Berenbaum

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## Short abstract

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Dysregulation of lipid homeostasis is one of the mechanisms leading to osteoarthritis

Osteoarthritis is usually considered to be a joint disorder the central pathological feature of which is cartilage destruction. However, this concept has evolved, and today osteoarthritis is generally regarded as a disease that may affect the whole joint (bone, muscles, ligaments and synovium). Although the aetiology of osteoarthritis is not established, the main risk factors are well known and commonly include mechanical, biochemical and genetic factors. Of these risk factors, obesity is beyond doubt considered a prominent one.

## Mechanobiology in obesity-induced osteoarthritis

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The overload effect on joint cartilage may explain part of the increased risk of osteoarthritis, at least for osteoarthritis of the knee, in overweight people. A recent discovery in the discipline of cartilage biology is the presence of mechanoreceptors at the surface of chondrocytes, which are sensitive to pressure and link extracellular environment to intracellular signalling cascades. Three types of mechanoreceptors have been described on chondrocytes: the stretch-activated channels, the α-5β1 integrin and CD44. Compression and stretch stimulate integrins and stretch-activated channels leading to the activation of signalling pathways (mitogen-activated protein kinase, NF-κB), as well as the release of second messengers (calcium, Inositol triphosphate and Adenosine monophosphate cyclic).[1] After mechanoreceptor activation, cytokines, growth factors and metalloproteinases may be expressed, and mediators such as prostaglandins or nitric oxide may be produced.[2] As experimental studies have shown that under specific conditions overload may trigger both inhibition of matrix synthesis and cartilage degradation, we can speculate that obesity may induce cartilage damage through activation of these mechanoreceptors. In the same manner, the mechanoreceptors expressed on osteoblasts[3,4] may also be involved in the impaired response of chondrocytes to the obesity-induced overload.

## Adipokines: the metabolic link between obesity and osteoarthritis?

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Even if it is usually accepted that mechanical loading contributes to joint cartilage destruction in overweight patients, recent advances in the physiology of adipose tissue add further insights in understanding the relationship between obesity and osteoarthritis. Indeed, the positive association between overweight or obesity and osteoarthritis is observed not only for knee joints but also for non-weight bearing joints, such as hands.[5] Furthermore, if weight loss may prevent the onset of osteoarthritis, the loss of body fat is more closely related to symptomatic benefit than is the loss of body weight.[6] These patterns of joint involvement suggest that joint damage may be caused by systemic factors such as adipose factors, so called adipokines, which may provide a metabolic link between obesity and osteoarthritis. Today, adipose tissue, traditionally viewed as a passive store

of energy, is considered to be a real endocrine organ that releases a large number of factors, including cytokines, such as interleukin 1 and tumour necrosis factor α, as well as adipokines, such as leptin, adiponectin, resistin, visfatin, and so on, and new ones that are yet to be discovered. These adipokines exhibit pleiotropic functions mediated through both central and peripheral systems, including haemostasis, lipid and glucose metabolism, reproductive functions, blood pressure regulation, insulin sensitivity, bone formation and angiogenesis.[7] So, recent data strengthen the hypothesis that osteoarthritis is a systemic disorder in which dysregulation of lipid homeostasis can be one of the pathophysiological mechanisms leading to osteoarthritis.[8]

Recent studies provide evidence for a key role of leptin in cartilage homoeostasis. Leptin and its functional receptor have been identified in human chondrocytes and trigger intracellular signal transduction through the activation of STATs 1 and 5, but not STAT 3.[9] Leptin may have important biological effects in chondrocytes, on both growth factor synthesis and anabolism, and also on catabolism. Leptin expression is strongly upregulated in various articular tissues that undergo strong structural and biochemical changes during osteoarthritis—for example, cartilage, osteophytes and subchondral bone—when compared with normal tissues.[10,11] Interestingly, the pattern and level of leptin expression are related to the grade of cartilage destruction, and parallel those of growth factors (insulin-like growth factor I and transforming growth factor β-1). The intra-articular injection of leptin into the rat knee joint has a stimulatory effect on proteoglycan synthesis and is associated with increased expression of insulin-like growth factor I and TGFβ-1. In addition to mature cartilage, leptin is also produced in resting and prehypertrophic chondrocytes in the growth plate of mice.[12] In cultured human chondrocytes, leptin increases both the proliferation and the extracellular matrix synthesis, but in a biphasic manner, with a reduced stimulating effect at the highest concentrations. Leptin may thus have a beneficial effect on cartilage synthesis either directly or through the upregulation of growth factors. However, an excess of leptin may account for decreased extracellular matrix synthesis and may lead to lesions similar to those found in osteoarthritis with a high intra-articular level of growth factors.[13] The increased expression of leptin in markedly damaged cartilage suggests that leptin may trigger cartilage destruction, especially when associated with some local factors. The adipokine synergises with proinflammatory cytokines, such as interleukin 1, to increase nitric oxide production, which is known to interfere with chondrocytes function resulting, in the loss of cartilage matrix through induction of apoptosis, activation of metalloproteinases, and inhibition of proteoglycan and type II collagen synthesis.[14]

Little is known about the contribution of adiponectin and resistin in osteoarthritis-affected joints. Available data related to the potential effects of these adipokines in joint disorders indicated that they may have an active role in the pathogenesis of chronic inflammatory joint diseases such as rheumatoid arthritis.[15,16] The inducing effect of adiponectin on metalloproteinase 1 expression in synovial fibroblasts from patients with osteoarthritis suggests that this adipokine may also be associated with key pathways of cartilage matrix degradation.[15]

In patients with osteoarthritis, leptin, adiponectin and resistin are detected in both the synovial fluid and in the plasma.[17,18] The adipokines exhibit different patterns of distribution between the joint and the circulating compartment: plasma levels of resistin and adiponectin exceed those in the paired synovial fluid, whereas leptin concentrations in synovial fluid are higher than their plasma counterparts.[18] As was found in plasma from obese people when compared with normal subjects, the leptin to adiponectin ratio was shown to be higher in the synovial fluid of patients with osteoarthritis than in plasma. The resulting imbalance between two adipokines known to have opposite biological effects in various diseases such as diabetes or inflammation may contribute to the initiation and/or progression of osteoarthritis. Interestingly, this high level of leptin is associated with a decline in the soluble leptin receptor level, leading to a large rise in free leptin in synovial fluid, the presumed biologically active form of this adipokine. Moreover, a larger amount of free leptin is found in the synovial fluid from female patients with osteoarthritis than in that from male patients, and may explain why obesity and female sex are both risk factors for the development of osteoarthritis.

To date, no clear mechanism could explain the changes in the adipokine levels in the synovial fluid compared with plasma. Various tissues obtained from human osteoarthritis-affected joints release leptin and

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adiponectin. Among these tissues, the synovium and infrapatellar fat pad produce the highest amounts of adipokines.[18] Until recently, the fat pad, which is an extrasynovial but an intra-articular tissue, had been neglected. However, this adipose tissue is able to release growth factors, cytokines and adipokines.[19] Cross talk between the adipocytes and other cells located in the fat pad (macrophages), or in its vicinity (synoviocytes), may also regulate the production of various factors in the joint. Interestingly, osteophytes, which are osteocartilaginous metaplastic tissues, represent the major source of leptin but not of adiponectin. Altogether, these findings indicate that further investigations on the effect of the infrapatellar fat pad and its derived adipokines on chondrocyte metabolism would be helpful to better understand the pathogenesis of (knee) osteoarthritis.

## Is there a role for obesity-induced atherosclerosis?

Go to

In addition to osteoarthritis, obesity is commonly associated with vascular disease. An interesting hypothesis about the role of atherosclerosis in the progression of osteoarthritis has recently been proposed.[20] Microvascular changes predominantly affecting the venous circulation are early events occurring in subchondral bone during osteoarthritis. This vascular disease in subchondral bone may accelerate the osteoarthritis process either by altering cartilage nutrition or through direct ischaemic effects on bone. The vascular obstruction and the resulting intraosseous hypertension may also alter the mechanical properties of the bone, which exhibits thereafter a reduced ability to absorb shocks, leading to increased susceptibility of the cartilage to breakdown. Whether the use of statins as a specific treatment for the atheromatous vascular disease would be beneficial for osteoarthritis remains to be established.

## Is there any role for obesity-induced diabetes mellitus?

Go to

Obesity-associated diabetes mellitus may represent an additional factor in the pathophysiology of osteoarthritis through the formation of advanced glycation end products (AGEs). The accumulation of AGEs found in articular cartilage during osteoarthritis progression leads to increased stiffness of collagen due to AGE cross-linking.[21] This damage to the collagen network may alter the mechanical properties of the extracellular matrix, and may lead to cartilage changes associated with osteoarthritis. In addition, articular chondrocytes express the functional receptor for AGEs, which induces mitogen-activated protein kinase, NF-κB activity and metalloproteinase 13 production when stimulated with ligands.[22] Modifications of normal cartilage by AGEs also increase matrix degradation and decrease proteoglycan synthesis by chondrocytes.[23] Further studies are required to determine whether diabetes-induced accumulation of AGEs occurs in cartilage from obese patients, providing thereby a molecular mechanism by which obesity is a risk factor for the development of osteoarthritis.

In conclusion, many recent studies allow us to better understand the relationships between osteoarthritis and obesity. Although it is evident that mechanical components contribute to joint destruction in overweight people, osteoarthritis is considered not only a disease of articular cartilage but also a systemic disorder in which circulating factors linked to altered lipid and glucose metabolism may explain the diversity of pathophysiological changes found in generalised osteoarthritis. However, the potential contribution of adipose-derived cytokines in osteoarthritis would not preclude the involvement of other mechanisms, including activation of mechanoreceptors, vascular dysfunction in subchondral bone and accumulation of AGEs in cartilage. Further investigations are thus needed to find new pharmacological tools and new orientations in the treatment and prevention of this joint disease.

## Footnotes

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ISSUE BRIEF

# Bending the Obesity Cost Curve in Connecticut:

## REDUCING THE AVERAGE BODY MASS INDEX IN THE STATE BY 5 PERCENT COULD LEAD TO HEALTH CARE SAVINGS OF MORE THAN $2 BILLION IN 10 YEARS AND $7 BILLION IN 20 YEARS

The number of obese adults has grown dramatically in Connecticut over the past 15 years, and is expected to grow significantly in the next 20 years.

However, by using evidence-based strategies to improve nutrition and increase physical activity in our schools, neighborhoods and work places, Connecticut could significantly reduce obesity-related diseases and health spending.

A new analysis commissioned by the Trust for America's Health (TFAH) and the Robert Wood Johnson Foundation (RWJF) and conducted by the National Heart Forum (NHF) found that if Connecticut could reduce the average body mass index (BMI) of its residents by only 5 percent, the state could help prevent thousands of cases of type 2 diabetes, coronary heart disease and stroke, hypertension, cancer and arthritis, while saving millions of dollars. For a six-foot-tall person weighing 200 pounds, a 5 percent reduction in BMI would be the equivalent of losing roughly 10 pounds.[1]

**Body mass index** (BMI) is a calculation based on an individual's weight and height:

$$\text{BMI} = \frac{(\text{Weight in pounds})}{(\text{Height in inches}) \times (\text{Height in inches})} \times 703$$

**Obesity** is defined as an excessively high amount of fatty tissue in relation to lean tissue. An adult is considered to be obese if his or her BMI is 30 or above.

### PROJECTIONS FOR ANNUAL OBESITY-RELATED HEALTH

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| Obesity-Related Health Care Costs in Connecticut | |
|---|---|
| Potential Savings by 2020 if BMI is Reduced by 5% (cumulative) | Potential Savings by 2030 if BMI is Reduced by 5% (cumulative) |
| $2,626,000,000 | $7,370,000,000 |

| Potential Health and Cost Savings by Top Obesity-Related Health Problems | | | | | |
|---|---|---|---|---|---|
| | 2010 Number of Cases | Potential Cases Avoided by 2020 if BMI is Reduced by 5% (cumulative)* | Potential Cost Savings by 2020, if BMI is Reduced by 5% (cumulative) | Potential Cases Avoided by 2030 if BMI is Reduced by 5% (cumulative) | Potential Cost Savings by 2030, if BMI is Reduced by 5% (cumulative) |
| Type 2 Diabetes | 267,944 | 42,682 | $887,000,000 | 83,932 | $2,824,000,000 |
| Obesity-Related Cancers^ | 58,115 | 2,900 | $37,000,000 | 6,374 | $118,000,000 |
| Coronary Heart Disease & Stroke | 214,986 | 37,776 | $1,296,000,000 | 79,528 | $3,316,000,000 |
| Hypertension | 708,945 | 43,219 | $184,000,000 | 75,911 | $506,000,000 |
| Arthritis | 710,198 | 20,911 | $220,000,000 | 38,564 | $608,000,000 |

2010 baseline for potential cases, costs and savings

* National Heart Forum provided the total cases and cases avoided per 100,000 people, and TFAH used the state's 2011 census data to translate to the full population-based estimates.

^ Top obesity-related cancers include endometrial (uterine), esophageal, kidney, colon and post-menopausal breast cancer.

| Adult Obesity Rates in Connecticut | | | |
|---|---|---|---|
| Obesity Rate in 1995 | Obesity Rate in 2011 | Projected Obesity Rate in 2030 based on current trajectory* | Projected Obesity Rate in 2030 if BMI Decreased by 5%* |
| 11.8% | 24.5% | 46.5% | 40.5% |

*All ages, all genders, adjusted for self-reporting bias.

## PEER-REVIEWED PROJECTIONS OF FUTURE TRENDS

The analysis is based on a model developed by researchers at the National Heart Forum (NHF). Micro Health Simulations used the model in a peer-reviewed study, "Health and Economic Burden of the Projected Obesity Trends in the USA and UK," published in 2011 in *The Lancet*.[2] The full methodology is available in Appendix C of the *2012 F as in Fat* report (available at www.healthyamericans.org).

All models have limitations in forecasting the future, but they help predict the trajectory of trends based on past data. Trends can, of course, change significantly over time for a

Based on the predicted rise in obesity, researchers found the baseline potential growth in related costs could be $66 billion (+/- 45 billion). Within the potential range, it could be as low as $21 billion or as high as $111 billion.

In addition, due to expected increases in obesity, the projected baseline estimates for:[3]

- The number of new cases of diabetes could be 7.9 million (+/- 1.6 million) per year, which means it could be as low as 6.3 million or as high as 9.5 million;
- The number of

## EFFECTIVE WAYS TO REDUCE OBESITY

According to the U.S. Centers for Disease Control and Prevention (CDC), more than half of all Americans live with a preventable chronic disease, and many such diseases are related to obesity, poor nutrition and physical inactivity.[1]

A wide range of studies have found that effective disease-prevention programs in communities can improve nutrition, increase physical activity and reduce obesity rates.

- CDC's Community Preventive Services Taskforce conducts a systematic review and evaluation process to determine effective programs and policies for improving health and preventing disease. The results, published in the Community Guide for Preventive Services, feature a series of evidence-based, community approaches to increasing physical activity, promoting good nutrition, lowering diabetes rates and reducing obesity. The approaches include improving the built environment by building sidewalks and increasing access to parks; starting workplace wellness programs; and increasing physical activity in schools.[5]
- The Compendium of Proven Community-Based Prevention Programs by The New York Academy of Medicine (NYAM) includes a summary and examples from an extensive literature review that NYAM conducted of peer-reviewed studies evaluating the effectiveness of community-based disease-prevention programs.[6] NYAM identified 84 articles, including programs that can directly reduce obesity and obesity-related diseases.
- In 2011, the American Heart Association (AHA) published a review of more than 200 studies and concluded that most cardiovascular disease can be prevented or at least delayed until old age through a combination of direct medical care and community-based prevention programs and policies.[7] Some of the key findings included:[8]
  - Every $1 spent on building biking trails and walking paths could save approximately $3 in medical expenses.
  - For every $1 spent in wellness programs, companies could save $3.27 in medical costs and $2.73 in absenteeism costs.
  - Some interventions have been shown to help improve nutrition and activity habits in just one year and had a return of $1.17 for every $1 spent.
  - Participants in community-based programs who focused on improving nutrition and increasing physical activity had a 58 percent reduction in incidence of type 2 diabetes compared with drug therapy, which had a 31 percent reduction.

## ENDNOTES

1 **The BMI of a 6-foot (72-inch) tall, 200-pound person is calculated as follows:**
BMI = (Weight in Pounds / (Height in inches x Height in inches) ) x 703
BMI = (200/(72 x 72)) x 703
BMI = 27.12

**A 5% reduction in BMI for this individual would be:**
5% of Original BMI = Original BMI * 5%
5% of Original BMI = 27.12 x 0.05
5% of Original BMI = 1.36

2 Wang YC et al. Health and Economic Burden of the Projected Obesity Trends in the USA and the UK. *The Lancet*, 378, 2011.

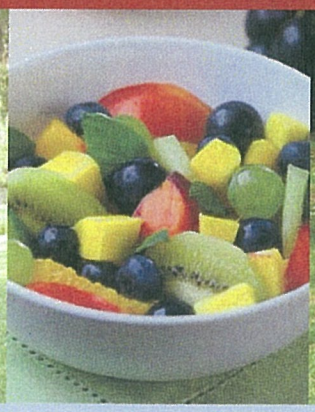
3 Note: Hypertension and arthritis were not included in The Lancet study, but were included in the state-by-state analysis. Potential new cases of hypertension and arthritis were calculated using the same process as used for diabetes, chronic heart disease and stroke and cancer.

4 Kung HC, Hoyert DL, Xu JQ, and Murphy SL. *Deaths: final data for 2005. National Vital Statistics Reports*

ISSUE REPORT

# F as in Fat:

## HOW OBESITY THREATENS AMERICA'S FUTURE 2012



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Irene Diamond Fund



## REPORT AUTHORS

**Jeffrey Levi, PhD.**
*Executive Director*
Trust for America's Health and
*Associate Professor in the Department of Health Policy*
The George Washington University School of Public Health and Health Services

**Laura M. Segal, MA**
*Director of Public Affairs*
Trust for America's Health

**Rebecca St. Laurent, JD**
*Health Policy Research Manager*
Trust for America's Health

**Albert Lang**
*Communications Manager*
Trust for America's Health

**Jack Rayburn**
*Government Relations Representative*
Trust for America's Health

## CONTRIBUTORS

**Kathryn Thomas, MJ**
*Senior Communications Officer*
Robert Wood Johnson Foundation

**Laura C. Leviton, PhD.**
*Special Advisor for Evaluation*
Robert Wood Johnson Foundation

**Tina J. Kauh, MS, PhD.**
*Research and Evaluation Program Officer*
Robert Wood Johnson Foundation

**Chuck Alexander, MA**
*Senior Vice President, and Director, Public Health Team*
Burness Communications

**Elizabeth Wenk, MA**
*Vice President*
Burness Communications

**Elizabeth Goodman, MS**
*Senior Associate*
Burness Communications

**Adam Zimmerman**
*Associate*
Burness Communications

## PEER REVIEWERS

**Scott Kahn, MD, MPH**
*Co-Director*
George Washington University Weight Management Center;
*and Faculty*
Department of Health Policy of the George Washington University School of Public Health and Health Services

**Monica Vinluan, JD**
*Project Director, Healthier Communities Initiatives*
The Y

# Introduction

***The following is a letter from Risa Lavizzo-Mourey, MD, MBA, president and CEO of the Robert Wood Johnson Foundation, and Jeff Levi, PhD, executive director of Trust for America's Health.***

The future health of the United States is at a crossroads, due in large part to the obesity epidemic. Each year, the Trust for America's Health (TFAH) and the Robert Wood Johnson Foundation (RWJF) issue *F as in Fat: How Obesity Threatens America's Future* to examine strategies for addressing the obesity crisis. In this ninth edition of the report, TFAH and RWJF also commissioned a new study to look at how obesity could impact the future health and wealth of our nation.

This new analysis provides a picture of two possible futures for the health of Americans over the next 20 years:

- If obesity rates continue on their current trajectory, it's estimated that:
  - Obesity rates for adults could reach or exceed 44 percent in every state and exceed 60 percent in 13 states;
  - The number of new cases of type 2 diabetes, coronary heart disease and stroke, hypertension and arthritis could increase 10 times between 2010 and 2020 — and then double again by 2030; and
  - Obesity-related health care costs could increase by more than 10 percent in 43 states and by more than 20 percent in nine states.
- But, if we could lower obesity trends by reducing the average adult BMI (body mass index) by only 5 percent in each state, we could spare millions of Americans from serious health problems and save billions of dollars in health spending — between 6.5 percent and 7.8 percent in costs in almost every state.[1]

As this year's report details, we have seen important inroads made toward preventing and reducing obesity around the country, especially among children. We know that real changes are possible. But we also have found that efforts will need to be intensified if we are going to achieve a major reduction in obesity and related health problems.

The promising results we see in some cities and states pave the way for more intensive efforts. Multiple studies and reports have demonstrated that the cities and states that took an early and comprehensive approach to preventing obesity have demonstrated progress toward reversing the epidemic. For instance, in California, overall rates of overweight and obesity among fifth-, seventh- and ninth-graders decreased by 1.1 percent from 2005 to 2010, and, in New York City, obesity in grades K-8 decreased 5.5 percent from 2006-07 to 2010-11.[2,3] In Mississippi, combined rates of overweight and obesity among all public elementary school students dropped from 43 percent in 2005 to 37.3 percent in 2011.[4]

While these cases showed that pockets of progress are possible, they also showed that children who face the biggest obstacles to healthy choices and are at greatest risk for obesity, such as children in lower-income families and Black and Hispanic children, did not share equally in progress. That's why a study released just this month tells the best story of all.

New data from Philadelphia show the city reduced obesity rates in ways that also helped to close the disparities gap. In addition to achieving an overall decline in obesity rates among public school students (from 21.5 percent of all public school students in the 2006-2007 school year to 20.5 percent in the 2009-2010 school year), the city made the largest improvements among Black male and Hispanic female students. For Black male students, rates declined from 20.66 percent to 19.08 percent, and rates for Hispanic female students declined from 22.26 percent to 20.61 percent within the same timeframe. We need to learn from the City of Brotherly Love and spread the actions and policies that work so all children can enjoy the benefits of better health.

These pockets of progress around the country are showing the positive impact that many policies and programs are having — but they need to be taken to scale. Fortunately, we know a lot about what it will take to bend the obesity curve in America.



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- Stepping up the investment in evidence-based, locally implemented prevention programs could help achieve results. The U.S. Centers for Disease Control and Prevention (CDC), The New York Academy of Medicine (NYAM) and others have identified a range of programs that have proved effective in reducing obesity and obesity-related disease levels by 5 percent or — in some cases — more. For example, a study of the Diabetes Prevention Program found that randomly selected participants reduced their diabetes risk by 16 percent for every kilogram (a little more than 2 pounds, 3 ounces) of weight they lost over a follow-up period of approximately three years. Another study reported the effects of an educational and mass media campaign developed by the Heart Health Program in Pawtucket, R.I. Five years into the intervention, the risks for cardiovascular disease and coronary heart disease also had decreased by 16 percent for randomly selected participants.[5]

- Recalibrating our goals could help us dramatically slow the national growth in obesity rates by preventing adults from gaining additional weight (including individuals who are currently obese, overweight and at a healthy weight), and by preventing kids from becoming overweight or obese in the first place. The research shows that a strategy of primary prevention that focuses on avoiding further gain can help improve health and reduce costs, and is a realistic and achievable goal. For example, in 2010, researchers reviewed 36 studies of corporate wellness programs, including those with successful weight-loss elements, and calculated that employers saved an average of $6 for every $1 spent. Researchers also noted that other benefits of such programs likely would include improved health.[6]

*F as in Fat* is an annual reminder of how critical it is to provide everyone living in our country, particularly our nation's children, with the opportunity to be as healthy as they can be. The forecasting study in this year's report demonstrates what's at stake.

If we take action, the number of Americans, particularly children, we could spare from type 2 diabetes, heart disease, cancer and other health problems is striking, and the savings in health care costs and increased productivity would have a real and positive impact on the economy. Investing in prevention today means a healthier, more productive and brighter future for our country and our children.

## BACKGROUND ON OBESITY AND BODY MASS INDEX (BMI)

Currently, more than 35 percent of adults are obese.[7] Obesity is defined as an excessively high amount of body fat or adipose tissue in relation to lean tissue. An adult is considered obese if his or her body mass index (BMI) is 30 or higher.

The new modeling study in this year's report projects what obesity rates and the consequences for disease rates and health care costs could be if the average state BMI continued to grow based on current trends for each state's population over the next 20 years.

The study also forecasts what would happen if average BMI in the state was reduced by 5 percent, which could translate to a 9 percent to 14 percent reduction in the states' obesity rates by 2030 depending on the state.

For example, on an individual level, reducing the BMI of an average adult by 1 percent would be equivalent to a weight loss of approximately 2.2 pounds.[8] According to the CDC, the average American male over age 20 weighs 194.7 pounds and the average American woman over age 20 weighs 164.7 pounds.[9]

## CHILDHOOD OBESITY: WHAT'S AT STAKE

Childhood obesity rates have climbed dramatically in the past 30 years. In 1980, the obesity rate for children ages 6 to 11 was 6.5 percent. By 2008, the rate grew to 19.6 percent. And, in 1980, 5 percent of teens ages 12 to 19 were obese. That rate climbed to 17 percent (approximately 12.5 million children and teens) by 2010.[10]

This change is having a major impact on the health of children and youths. If we don't reverse the epidemic, the current generation of young people could be the first in U.S. history to live sicker and die younger than their parents' generation. Nearly one-third of children and teens are currently obese or overweight, which is putting them at higher risks for developing a range of diseases and developing them earlier in life.[11]

Children who are obese are more than twice as likely to die before the age of 55 as children whose BMI is in the healthy range.[12] Around 70 percent of obese youths have at least one additional risk factor for cardiovascular disease, such as elevated total cholesterol, triglycerides, insulin or blood pressure.[13] Overweight and obese children and teens also are at higher risk for other health conditions, including asthma and sleep-disordered breathing.[14, 15] Children who are obese after the age of 6 are 50 percent more likely to be obese as adults, and among overweight tweens and teens ages 10 to 15, 80 percent were obese at age 25.[16, 17]

Being obese or overweight also can have a major social and emotional impact on children and youths. For instance, studies have found that overweight and obese children and teens face a higher risk for more severe and frequent bullying, are rejected by their peers more often, are chosen less as friends and are generally not as well-liked as healthy-weight children. Studies also have found that weight-based teasing is related to increased susceptibility to depression.[18, 19, 20]

Reducing and preventing childhood obesity is critical to improving the future health of the country, and consequently would help to lower health care costs and improve productivity. What's more, research supports the concept that focusing on children and getting them on a healthy path early in life is one of the areas where the greatest successes can be achieved.

For instance, a recent study from the *American Journal of Preventive Medicine* found that eliminating just 41 calories a day per person could halt rising body weight trends in children and teens ages 2 to 19, and eliminating 161 calories per day per person could reduce childhood obesity to 5 percent by 2020.[21] Researchers have created a tool to help estimate the impact of nutrition or physical activity interventions on specific populations. The tool is available at http://caloriccalculator.org.

Programs around the country are helping to change our culture to encourage healthier nutrition and increased physical activity. Some areas where there have been concerted efforts to prevent and reduce childhood obesity are demonstrating promising results. Initiatives ranging from Let's Move to the Alliance for a Healthier Generation to the Y are all having an impact and leading to positive change.

Reversing the childhood obesity crisis is at the core of the future health and wealth of the country. The evidence shows that the goal is achievable, but only if there is a sufficient investment in effective programs and policies.



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Drive Thru

# F AS IN FAT 2012 — CONTENTS


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## F AS IN FAT 2012 MAJOR FINDINGS

In August 2012, the Centers for Disease Control and Prevention released the latest rates of adult obesity in the United States. In 2011:

- Twelve states had an adult obesity rate above 30 percent.
- Mississippi had the highest rate of obesity at 34.9 percent, while Colorado had the lowest rate at 20.7 percent.
- Twenty-six of the 30 states with the highest obesity rates are in the Midwest and South.
- All 10 of the states with the highest rates of type 2 diabetes and hypertension are in the South.

## TWO FUTURES FOR AMERICA'S HEALTH: PROJECTIONS FOR OBESITY, DISEASES AND COSTS

The new analysis commissioned by TFAH and RWJF, and conducted by the National Heart Forum (NHF) was based on a peer-reviewed model published in *The Lancet*. The analysis includes projections for potential rates of obesity, health problems and health care costs in the year 2030 if current trends continued, and it examined how reducing the average body mass index (BMI) in the state by 5 percent could lower obesity rates and decrease costs. [22]

| | 2030: Obesity on Current Track | 2030: BMI Reduced by 5 Percent |
|---|---|---|
| Obesity Rates | ■ More than 60 percent of people could be obese in 13 states;<br>■ More than half of people could be obese in 39 states;<br>■ In all 50 states, more than 44 percent of people could be obese. | ■ No state would have an obesity rate above 60 percent;<br>■ More than half of people would be obese in 24 states;<br>■ Two states would have obesity rates under 40 percent. |
| Obesity-Related Disease Rates | By 2030, for every 100,000 people, the number of new Americans who could develop the five top diseases associated with obesity could range from:<br>■ Between 8,658 in Utah to 15,208 in West Virginia (average for all states: 12,127) for new cases of type 2 diabetes<br>■ Between 16,730 in Utah to 35,519 in West Virginia (average for all states: 26,573) for new cases of coronary heart disease and stroke<br>■ Between 17,790 in Utah to 30,508 in Maine (average for all states: 24,923) for new cases of hypertension<br>■ Between 12,504 in Utah to 18,725 in Maine (average for all states: 16,152) for new cases of arthritis<br>■ Between 2,468 in Utah to 4,897 in Maine (average for all states: 3,781) for new cases of obesity-related cancer | Thousands of cases of type 2 diabetes, coronary heart disease and stroke, hypertension and arthritis could be avoided in all states;<br>More than 100 cases of obesity-related cancer per 100,000 people could be prevented in all states;<br>States could avoid — per 100,000 people:<br>■ Between 1,810 and 3,213 new cases of type 2 diabetes<br>■ Between 1,427 and 2,512 new cases of hypertension<br>■ Between 1,339 and 2,898 new cases of coronary heart disease and stroke<br>■ Between 849 and 1,382 new cases of arthritis<br>■ Between 101 and 277 new cases of cancer. |
| Obesity-Related Health Care Costs | ■ Nine states could see increases of more than 20 percent;<br>■ 16 states and Washington, D.C., could expect increases between 15-20 percent;<br>■ 18 states could expect increases between 10-15 percent;<br>■ Only seven states could have increases lower than 10 percent. | ■ Every state except Florida would save between 6.5 and 7.8 percent on obesity-related health costs compared with 2030 projected costs if rates continue to increase at their current pace. (Florida would save 2.1 percent). |



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SECTION 1

# Obesity Rates and Related Trends

More than two-thirds (68 percent) of American adults are either overweight or obese.[23] Adult obesity rates have more than doubled — from 15 percent in 1980 to 35 percent in 2010, based on a national survey. [24, 25]

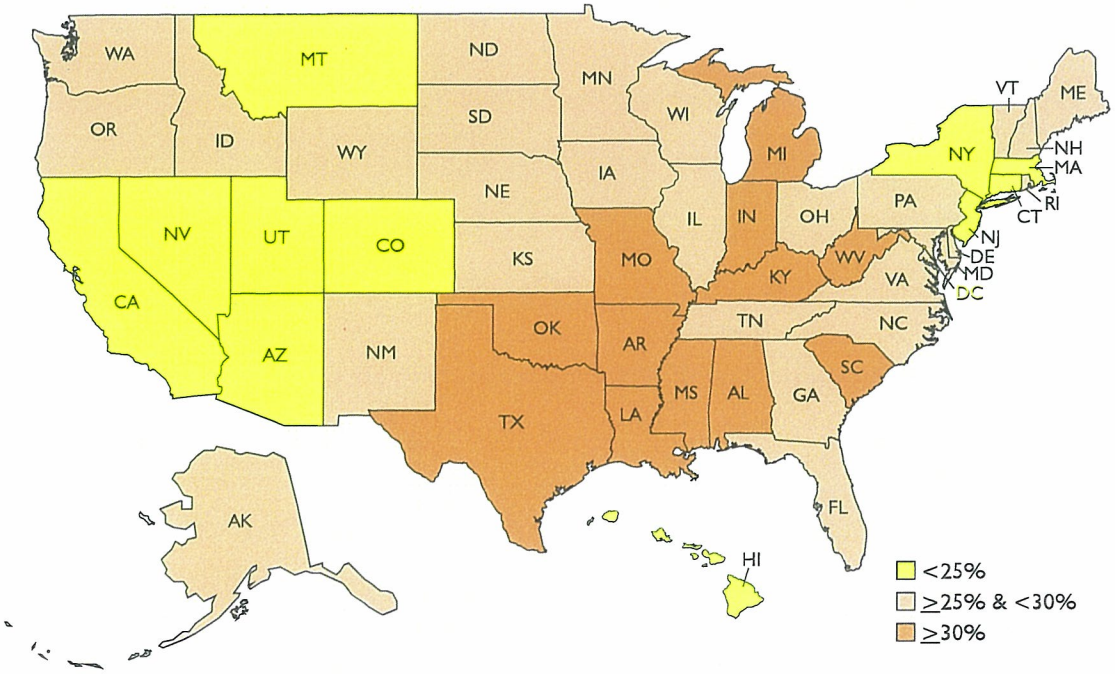
Rates of obesity among children ages 2–19 have more than tripled since 1980.[26,27] According to the most recent National Health and Nutrition Examination Survey (NHANES), 16.9 percent of children ages 2–19 are obese, and 31.7 percent are overweight or obese.[28] This translates to more than 12 million children and adolescents who are obese and more than 23 million who are either obese or overweight. Researchers at the U.S. Centers for Disease Control and Prevention (CDC) report that, during the period between 1999 and 2008, there was no statistically significant change in the number of children and adolescents with high BMI-for-age, except among the very heaviest boys ages 6–19.[29]

## A. ADULT OBESITY AND OVERWEIGHT RATES

In August 2012, CDC released the latest rates of obesity in the states. Twelve states currently have an adult obesity rate over 30 percent. Mississippi had the highest rate of obesity at 34.9 percent, while Colorado had the lowest rate at 20.7 percent. Twenty-six of the 30 states with the highest rates of obesity are in the South and Midwest. Northeastern and Western states comprise most of the states with the lowest rates of obesity.

The U.S. Department of Health and Human Services (HHS) set a national goal to reduce adult obesity rates to 30 percent in every state by the year 2020. Healthy People 2020 also sets a goal of increasing the percentage of people at a healthy weight (BMI <25) from 30.8 percent to 33.9 percent by 2020.

### 2011 Obesity Rates



# CHART ON OBESITY AND OVERWEIGHT RATES

| | ADULTS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Obesity | | Overweight & Obese | Diabetes | | Physical Inactivity | | Hypertension | |
| States | 2011 Percentage (95% Conf Interval) | Ranking | 2011 Percentage (95% Conf Interval) | 2011 Percentage (95% Conf Interval) | Ranking | 2011 Percentage (95% Conf Interval) | Ranking | 2011 Percentage (95% Conf Interval) | Ranking |
| Alabama | 32.0% (+/- 1.5) | 4 | 66.8% (+/- 1.6) | 11.8% (+/- 0.9) | 4 | 32.6% (+/- 1.6) | 5 | 40.0% (+/- 1.6) | 1 |
| Alaska | 27.4% (+/- 2.2) | 28 | 66.5% (+/- 2.4) | 7.9% (+/- 1.4) | 46 | 22.0% (+/- 2.0) | 41 | 29.4% (+/- 2.1) | 37 |
| Arizona | 24.7% (+/- 2.1) | 40 | 62.5% (+/- 2.4) | 9.5% (+/- 1.3) | 25 | 24.2% (+/- 2.2) | 34 | 28.0% (+/- 2.0) | 47 |
| Arkansas | 30.9% (+/- 2.2) | 7 | 65.0% (+/- 2.3) | 11.2% (+/- 1.2) | 6 | 30.9% (+/- 2.1) | 7 | 35.7% (+/- 2.1) | 8 |
| California | 23.8% (+/- 0.9) | 46 | 60.2% (+/- 1.1) | 8.9% (+/- 0.6) | 34 | 19.1% (+/- 0.9) | 49 | 27.8% (+/- 0.9) | 48 |
| Colorado | 20.7% (+/- 1.1) | 51 | 56.1% (+/- 1.3) | 6.7% (+/- 0.6) | 50 | 16.5% (+/- 1.0) | 51 | 24.9% (+/- 1.0) | 50 |
| Connecticut | 24.5% (+/- 1.5) | 42 | 59.6% (+/- 1.8) | 9.3% (+/- 0.9) | 31 | 25.3% (+/- 1.6) | 28 | 29.7% (+/- 1.5) | 36 |
| Delaware | 28.8% (+/- 1.9) | 19 | 63.9% (+/- 2.2) | 9.7% (+/- 1.1) | 22 | 27.0% (+/- 1.9) | 13 | 34.6% (+/- 1.9) | 10 |
| D.C. | 23.7% (+/- 1.9) | 47 | 52.8% (+/- 2.4) | 9.1% (+/- 1.1) | 33 | 19.8% (+/- 1.8) | 47 | 29.9% (+/- 2.0) | 33 |
| Florida | 26.6% (+/- 1.3) | 32 | 63.4% (+/- 1.4) | 10.4% (+/- 0.8) | 11 | 26.9% (+/- 1.3) | 16 | 34.2% (+/- 1.3) | 12 |
| Georgia | 28.0% (+/- 1.4) | 24 | 62.7% (+/- 1.6) | 10.1% (+/- 0.7) | 18 | 26.8% (+/- 1.4) | 18 | 32.3% (+/- 1.3) | 18 |
| Hawaii | 21.8% (+/- 1.5) | 50 | 55.8% (+/- 1.8) | 8.4% (+/- 0.8) | 38 | 21.3% (+/- 1.5) | 45 | 28.7% (+/- 1.5) | 43 |
| Idaho | 27.0% (+/- 1.8) | 30 | 62.3% (+/- 2.1) | 9.4% (+/- 1.0) | 29 | 21.4% (+/- 1.7) | 44 | 29.4% (+/- 1.7) | 37 |
| Illinois | 27.1% (+/- 1.8) | 29 | 64.1% (+/- 2.0) | 9.7% (+/- 1.1) | 22 | 25.2% (+/- 1.7) | 31 | 31.0% (+/- 1.8) | 24 |
| Indiana | 30.8% (+/- 1.4) | 8 | 65.7% (+/- 1.5) | 10.2% (+/- 0.8) | 15 | 29.3% (+/- 1.4) | 9 | 32.7% (+/- 1.3) | 15 |
| Iowa | 29.0% (+/- 1.4) | 18 | 64.8% (+/- 1.5) | 8.2% (+/- 0.7) | 43 | 25.9% (+/- 1.3) | 27 | 29.9% (+/- 1.3) | 33 |
| Kansas | 29.6% (+/- 0.9) | 13 | 64.4% (+/- 0.9) | 9.5% (+/- 0.5) | 25 | 26.8% (+/- 0.8) | 18 | 30.8% (+/- 0.8) | 27 |
| Kentucky | 30.4% (+/- 1.5) | 10 | 66.6% (+/- 1.6) | 10.8% (+/- 0.8) | 9 | 29.4% (+/- 1.5) | 8 | 37.9% (+/- 1.5) | 5 |
| Louisiana | 33.4% (+/- 1.5) | 2 | 67.6% (+/- 1.5) | 11.8% (+/- 0.9) | 4 | 33.8% (+/- 1.5) | 4 | 38.3% (+/- 1.4) | 4 |
| Maine | 27.8% (+/- 1.1) | 25 | 65.0% (+/- 1.2) | 9.6% (+/- 0.6) | 24 | 23.0% (+/- 1.0) | 38 | 32.2% (+/- 1.0) | 19 |
| Maryland | 28.3% (+/- 1.4) | 22 | 64.4% (+/- 1.6) | 9.4% (+/- 0.8) | 29 | 26.1% (+/- 1.4) | 26 | 31.3% (+/- 1.4) | 21 |
| Massachusetts | 22.7% (+/- 1.0) | 49 | 59.4% (+/- 1.2) | 8.0% (+/- 0.5) | 45 | 23.5% (+/- 1.0) | 37 | 29.2% (+/- 1.0) | 40 |
| Michigan | 31.3% (+/- 1.3) | 5 | 65.5% (+/- 1.4) | 10.0% (+/- 0.8) | 19 | 23.6% (+/- 1.2) | 36 | 34.2% (+/- 1.3) | 12 |
| Minnesota | 25.7% (+/- 1.1) | 36 | 62.5% (+/- 1.2) | 7.3% (+/- 0.6) | 49 | 21.8% (+/- 1.0) | 43 | 26.3% (+/- 1.0) | 49 |
| Mississippi | 34.9% (+/- 1.4) | 1 | 68.9% (+/- 1.5) | 12.3% (+/- 0.8) | 1 | 36.0% (+/- 1.5) | 1 | 39.2% (+/- 1.4) | 2 |
| Missouri | 30.3% (+/- 1.7) | 12 | 64.8% (+/- 1.8) | 10.2% (+/- 1.0) | 15 | 28.5% (+/- 1.6) | 10 | 34.3% (+/- 1.6) | 11 |
| Montana | 24.6% (+/- 1.4) | 41 | 60.3% (+/- 1.5) | 7.9% (+/- 0.7) | 46 | 24.4% (+/- 1.3) | 33 | 30.1% (+/- 1.3) | 31 |
| Nebraska | 28.4% (+/- 0.8) | 21 | 64.9% (+/- 0.9) | 8.4% (+/- 0.5) | 38 | 26.3% (+/- 0.8) | 22 | 28.5% (+/- 0.8) | 45 |
| Nevada | 24.5% (+/- 2.1) | 42 | 60.3% (+/- 2.4) | 10.4% (+/- 1.6) | 11 | 24.1% (+/- 2.2) | 35 | 30.9% (+/- 2.2) | 25 |
| New Hampshire | 26.2% (+/- 1.5) | 35 | 61.6% (+/- 1.8) | 8.7% (+/- 0.8) | 37 | 22.5% (+/- 1.5) | 40 | 30.6% (+/- 1.5) | 28 |
| New Jersey | 23.7% (+/- 1.1) | 47 | 61.5% (+/- 1.3) | 8.8% (+/- 0.6) | 36 | 26.4% (+/- 1.1) | 21 | 30.6% (+/- 1.1) | 28 |
| New Mexico | 26.3% (+/- 1.3) | 34 | 62.3% (+/- 1.4) | 10.0% (+/- 0.8) | 19 | 25.3% (+/- 1.3) | 28 | 28.5% (+/- 1.2) | 45 |
| New York | 24.5% (+/- 1.4) | 42 | 60.5% (+/- 1.6) | 10.4% (+/- 0.9) | 11 | 26.2% (+/- 1.4) | 24 | 30.6% (+/- 1.4) | 28 |
| North Carolina | 29.1% (+/- 1.5) | 17 | 65.2% (+/- 1.5) | 10.8% (+/- 0.8) | 9 | 26.7% (+/- 1.4) | 20 | 32.4% (+/- 1.3) | 17 |
| North Dakota | 27.8% (+/- 1.6) | 25 | 63.8% (+/- 1.9) | 8.3% (+/- 0.8) | 42 | 27.0% (+/- 1.6) | 13 | 28.9% (+/- 1.5) | 41 |
| Ohio | 29.6% (+/- 1.4) | 13 | 65.8% (+/- 1.4) | 10.0% (+/- 0.8) | 19 | 27.0% (+/- 1.3) | 13 | 32.7% (+/- 1.3) | 15 |
| Oklahoma | 31.1% (+/- 1.4) | 6 | 65.4% (+/- 1.5) | 11.1% (+/- 0.8) | 8 | 31.2% (+/- 1.4) | 6 | 35.5% (+/- 1.4) | 9 |
| Oregon | 26.7% (+/- 1.6) | 31 | 61.6% (+/- 1.7) | 9.3% (+/- 0.9) | 31 | 19.7% (+/- 1.5) | 48 | 29.8% (+/- 1.5) | 35 |
| Pennsylvania | 28.6% (+/- 1.3) | 20 | 64.5% (+/- 1.4) | 9.5% (+/- 0.7) | 25 | 26.3% (+/- 1.2) | 22 | 31.4% (+/- 1.2) | 20 |
| Rhode Island | 25.4% (+/- 1.6) | 37 | 62.5% (+/- 1.8) | 8.4% (+/- 0.8) | 38 | 26.2% (+/- 1.5) | 24 | 33.0% (+/- 1.5) | 14 |
| South Carolina | 30.8% (+/- 1.3) | 8 | 65.9% (+/- 1.4) | 12.0% (+/- 0.8) | 3 | 27.2% (+/- 1.3) | 11 | 36.4% (+/- 1.3) | 7 |
| South Dakota | 28.1% (+/- 1.9) | 23 | 64.5% (+/- 2.2) | 9.5% (+/- 1.1) | 25 | 26.9% (+/- 2.0) | 16 | 30.9% (+/- 1.9) | 25 |
| Tennessee | 29.2% (+/- 2.5) | 15 | 66.5% (+/- 2.8) | 11.2% (+/- 1.5) | 6 | 35.2% (+/- 2.7) | 2 | 38.6% (+/- 2.6) | 3 |
| Texas | 30.4% (+/- 1.4) | 10 | 65.9% (+/- 1.5) | 10.2% (+/- 0.8) | 15 | 27.2% (+/- 1.3) | 11 | 31.3% (+/- 1.3) | 21 |
| Utah | 24.4% (+/- 1.1) | 45 | 58.9% (+/- 1.3) | 6.7% (+/- 0.5) | 50 | 18.9% (+/- 1.0) | 50 | 22.9% (+/- 0.9) | 51 |
| Vermont | 25.4% (+/- 1.4) | 37 | 59.8% (+/- 1.6) | 7.7% (+/- 0.7) | 48 | 21.0% (+/- 1.3) | 46 | 29.3% (+/- 1.4) | 39 |
| Virginia | 29.2% (+/- 1.7) | 15 | 63.4% (+/- 1.9) | 10.4% (+/- 1.1) | 11 | 25.0% (+/- 1.0) | 32 | 31.2% (+/- 1.6) | 23 |
| Washington | 26.5% (+/- 1.2) | 33 | 61.0% (+/- 1.4) | 8.9% (+/- 0.7) | 34 | 21.9% (+/- 1.2) | 42 | 30.1% (+/- 1.2) | 31 |
| West Virginia | 32.4% (+/- 1.6) | 3 | 69.0% (+/- 1.7) | 12.1% (+/- 1.0) | 2 | 35.1% (+/- 1.6) | 3 | 37.1% (+/- 1.6) | 6 |
| Wisconsin | 27.7% (+/- 2.0) | 27 | 64.1% (+/- 2.2) | 8.4% (+/- 1.0) | 38 | 22.6% (+/- 1.8) | 39 | 28.9% (+/- 1.8) | 41 |
| Wyoming | 25.0% (+/- 1.6) | 39 | 61.2% (+/- 1.8) | 8.2% (+/- 1.0) | 43 | 25.3% (+/- 1.6) | 28 | 28.7% (+/- 1.6) | 43 |

Source: Behavior Risk Factor Surveillance System (BRFSS), CDC.



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## AND RELATED HEALTH INDICATORS IN THE STATES

### CHILDREN AND ADOLESCENTS

| States | 2011 YRBS | | | 2010 PedNSS | 2007 National Survey of Children's Health | | |
|---|---|---|---|---|---|---|---|
| | Percentage of Obese High School Students (95% Conf Interval) | Percentage of Overweight High School Students (95% Conf Interval) | Percentage of High School Students Who Were Physically Active At Least 60 Minutes on All 7 Days | Percentage of Obese Low-Income Children Ages 2-5 | Percentage of Overweight and Obese Children Ages 10-17 | Ranking | Percentage Participating in Vigorous Physical Activity Every Day Ages 6-17 |
| Alabama | 17.0 (+/- 3.9) | 15.8 (+/- 3.0) | 28.4 (+/- 4.3) | 14.1% | 36.1% (+/- 4.6) | 6 | 36.5% |
| Alaska | 11.5 (+/- 2.0) | 14.4 (+/- 2.1) | 21.3 (+/- 2.8) | N/A | 33.9% (+/- 4.4) | 12 | 30.4% |
| Arizona | 10.9 (+/- 1.9) | 13.9 (+/- 1.8) | 25.0 (+/- 2.0) | 14.2% | 30.6% (+/- 4.9) | 26 | 28.5% |
| Arkansas | 15.2 (+/- 2.1) | 15.4 (+/- 2.1) | 26.7 (+/- 3.3) | 14.1% | 37.5% (+/- 4.2) | 2 | 30.7% |
| California | N/A | N/A | N/A | 17.2% | 30.5% (+/- 6.4) | 28 | 30.0% |
| Colorado | 7.3 (+/- 2.4) | 10.7 (+/- 2.5) | 29.2 (+/- 2.8) | 9.1% | 27.2% (+/- 5.1) | 42 | 27.6% |
| Connecticut | 12.5 (+/- 2.7) | 14.1 (+/- 1.9) | 26.0 (+/- 3.1) | 15.8% | 25.7% (+/- 3.7) | 45 | 22.1% |
| Delaware | 12.2 (+/- 1.5) | 16.9 (+/- 2.1) | 24.9 (+/- 2.1) | N/A | 33.2% (+/- 4.1) | 16 | 31.1% |
| D.C. | N/A | N/A | N/A | 13.7% | 35.4% (+/- 4.8) | 9 | 26.3% |
| Florida | 11.5 (+/- 2.3) | 13.6 (+/- 1.1) | 25.8 (+/- 1.4) | 13.4% | 33.1% (+/- 6.1) | 17 | 34.1% |
| Georgia | 15.0 (+/- 2.3) | 15.8 (+/- 2.2) | 25.2 (+/- 3.0) | 13.5% | 37.3% (+/- 5.6) | 3 | 29.4% |
| Hawaii | 13.2 (+/- 2.4) | 13.4 (+/- 1.6) | 21.0 (+/- 2.3) | 9.1% | 28.5% (+/- 4.1) | 37 | 28.0% |
| Idaho | 9.2 (+/- 1.6) | 13.4 (+/- 1.8) | 25.9 (+/- 3.4) | 11.4% | 27.5% (+/- 3.9) | 41 | 25.0% |
| Illinois | 11.6 (+/- 1.7) | 14.5 (+/- 1.7) | 23.2 (+/- 2.3) | 14.6% | 34.9% (+/- 4.1) | 10 | 26.1% |
| Indiana | 14.7 (+/- 1.8) | 15.5 (+/- 2.1) | 24.2 (+/- 2.7) | 14.2% | 29.9% (+/- 4.3) | 31 | 31.3% |
| Iowa | 13.2 (+/- 3.2) | 14.5 (+/- 2.0) | 29.1 (+/- 3.3) | 14.7% | 26.5% (+/- 4.3) | 44 | 27.8% |
| Kansas | 10.2 (+/- 1.5) | 13.9 (+/- 1.8) | 30.2 (+/- 2.5) | 13.0% | 31.1% (+/- 4.2) | 22 | 25.2% |
| Kentucky | 16.5 (+/- 2.5) | 15.4 (+/- 1.6) | 21.9 (+/- 2.5) | 15.6% | 37.1% (+/- 4.1) | 4 | 25.9% |
| Louisiana | 16.1 (+/- 2.6) | 19.5 (+/- 4.5) | 24.2 (+/- 3.5) | 12.5% | 35.9% (+/- 4.6) | 7 | 34.0% |
| Maine | 11.5 (+/- 1.4) | 14.0 (+/- 1.1) | 23.7 (+/- 1.7) | 14.3% | 28.2% (+/- 3.8) | 39 | 32.7% |
| Maryland | 12.0 (+/- 1.7) | 15.4 (+/- 2.0) | 21.4 (+/- 2.8) | 15.7% | 28.8% (+/- 4.2) | 36 | 30.7% |
| Massachusetts | 9.9 (+/- 1.8) | 14.6 (+/- 1.4) | 22.4 (+/- 2.6) | 16.1% | 30.0% (+/- 4.6) | 30 | 26.6% |
| Michigan | 12.1 (+/- 1.6) | 15.3 (+/- 2.4) | 27.0 (+/- 2.7) | 13.3% | 30.6% (+/- 4.3) | 26 | 33.1% |
| Minnesota | N/A | N/A | N/A | 12.7% | 23.1% (+/- 4.0) | 50 | 34.8% |
| Mississippi | 15.8 (+/- 2.2) | 16.5 (+/- 2.0) | 25.9 (+/- 3.0) | 13.7% | 44.4% (+/- 4.3) | 1 | 29.0% |
| Missouri | N/A | N/A | N/A | 13.6% | 31.0% (+/- 4.1) | 23 | 29.6% |
| Montana | 8.5 (+/- 1.1) | 12.9 (+/- 1.4) | 28.7 (+/- 1.9) | 12.2% | 25.6% (+/- 3.7) | 48 | 31.5% |
| Nebraska | 11.6 (+/- 1.2) | 13.6 (+/- 1.3) | 28.0 (+/- 1.8) | 13.8% | 31.5% (+/- 4.6) | 21 | 26.2% |
| Nevada | N/A | N/A | N/A | 13.6% | 34.2% (+/- 5.4) | 11 | 24.4% |
| New Hampshire | 12.1 (+/- 1.7) | 14.1 (+/- 2.2) | N/A | 14.2% | 29.4% (+/- 3.9) | 35 | 29.0% |
| New Jersey | 11.0 (+/- 2.0) | 15.2 (+/- 1.9) | 28.0 (+/- 2.8) | 17.3% | 31.0% (+/- 4.5) | 23 | 29.1% |
| New Mexico | 12.8 (+/- 2.1) | 14.4 (+/- 1.2) | 26.3 (+/- 1.6) | 11.7% | 32.7% (+/- 5.0) | 19 | 27.0% |
| New York | 11.0 (+/- 1.3) | 14.7 (+/- 1.0) | 25.1 (+/- 2.4) | 14.5% | 32.9% (+/- 4.4) | 18 | 27.6% |
| North Carolina | 12.9 (+/- 3.2) | 15.9 (+/- 2.0) | 26.0 (+/- 2.4) | 15.5% | 33.5% (+/- 4.5) | 14 | 38.5% |
| North Dakota | 11.0 (+/- 1.7) | 14.5 (+/- 2.1) | 21.8 (+/- 1.9) | 14.1% | 25.7% (+/- 3.3) | 45 | 27.1% |
| Ohio | 14.7 (+/- 3.1) | 15.3 (+/- 2.3) | 25.4 (+/- 3.5) | 12.4% | 33.3% (+/- 4.7) | 15 | 32.1% |
| Oklahoma | 16.7 (+/- 3.0) | 16.3 (+/- 2.8) | 33.1 (+/- 4.1) | N/A | 29.5% (+/- 4.1) | 33 | 29.6% |
| Oregon | N/A | N/A | N/A | 15.1% | 24.3% (+/- 3.9) | 49 | 27.9% |
| Pennsylvania | N/A | N/A | N/A | 12.0% | 29.7% (+/- 4.8) | 32 | 35.4% |
| Rhode Island | 10.8 (+/- 2.3) | 14.9 (+/- 2.1) | 26.7 (+/- 4.0) | 15.5% | 30.1% (+/- 4.2) | 29 | 27.6% |
| South Carolina | 13.3 (+/- 3.0) | 16.3 (+/- 2.6) | 25.8 (+/- 2.9) | 12.8% | 33.7% (+/- 4.2) | 13 | 31.2% |
| South Dakota | 9.8 (+/- 2.0) | 14.1 (+/- 1.4) | 27.3 (+/- 3.5) | 16.1% | 28.4% (+/- 3.9) | 38 | 25.3% |
| Tennessee | 15.2 (+/- 1.6) | 17.3 (+/- 1.9) | 30.2 (+/- 2.8) | 14.5% | 36.5% (+/- 4.3) | 5 | 29.8% |
| Texas | 15.6 (+/- 2.0) | 16.0 (+/- 1.4) | 27.1 (+/- 2.7) | 15.3% | 32.2% (+/- 5.6) | 20 | 28.9% |
| Utah | 8.6 (+/- 1.7) | 12.2 (+/- 2.0) | 20.8 (+/- 2.6) | 8.7% | 23.1% (+/- 4.2) | 50 | 17.6% |
| Vermont | 9.9 (+/- 2.0) | 13.0 (+/- 1.7) | 24.4 (+/- 1.6) | 12.2% | 26.7% (+/- 4.5) | 43 | 36.6% |
| Virginia | 11.1 (+/- 2.5) | 17.2 (+/- 2.7) | 24.1 (+/- 4.0) | 15.5% | 31.0% (+/- 4.2) | 23 | 26.2% |
| Washington | N/A | N/A | N/A | 14.4% | 29.5% (+/- 5.0) | 33 | 27.6% |
| West Virginia | 14.6 (+/- 2.4) | 15.7 (+/- 2.4) | 29.0 (+/- 3.2) | 13.7% | 35.5% (+/- 3.9) | 8 | 33.2% |
| Wisconsin | 10.4 (+/- 1.6) | 15.0 (+/- 1.5) | 27.7 (+/- 3.6) | 14.1% | 27.9% (+/- 3.8) | 40 | 28.5% |
| Wyoming | 11.1 (+/- 1.4) | 12.0 (+/- 1.6) | 25.8 (+/- 2.1) | N/A | 25.7% (+/- 4.0) | 45 | 29.8% |

Source: Youth Risk Behavior Survey (YRBS) 2011, CDC. YRBS data are collected every 2 years. Percentages are as reported on the CDC website and can be found at <http://www.cdc.gov/HealthyYouth/yrbs/index.htm>. Note that previous YRBS reports used the term "overweight" to describe youth with a BMI at or above the 95th percentile for age and sex and "at risk for overweight" for those with a BMI at or above the 85th percentile, but below the 95th percentile. However, this report uses the terms "obese" and "overweight" based on the 2007 recommendations from the Expert Committee on the Assessment, Prevention, and Treatment of Child and Adolescent Overweight and Obesity convened by the American Medical Association. "Physically active at least 60 minutes on all 7 days" means that the student did any kind of physical activity that increased their heart rate and made them breathe hard some of the time for a total of least 60 minutes per day on each of the 7 days before the survey.

Source: Pediatric Nutrition Surveillance 2010 Report, Table 6. Available at http://www.cdc.gov/pednss/pednss_tables/pdf/national_table6.pdf

Source: National Survey of Children's Health, 2007. Overweight and Physical Activity Among Children: A Portrait of States and the Nation 2009, Health Resources and Services Administration, Maternal and Child Health Bureau. * & red indicates a statistically significant increase ($p < 0.05$) from 2003 to 2007. Over the same time period, AZ and IL had statistically significant increases in obesity rates, while OR saw a significant decrease. Meanwhile, NM and NV experienced significant increases in rates of overweight children between 2003 and 2007, while AZ had a decrease.



000210

## OBESITY RATES BY SEX AND RACE — 2011

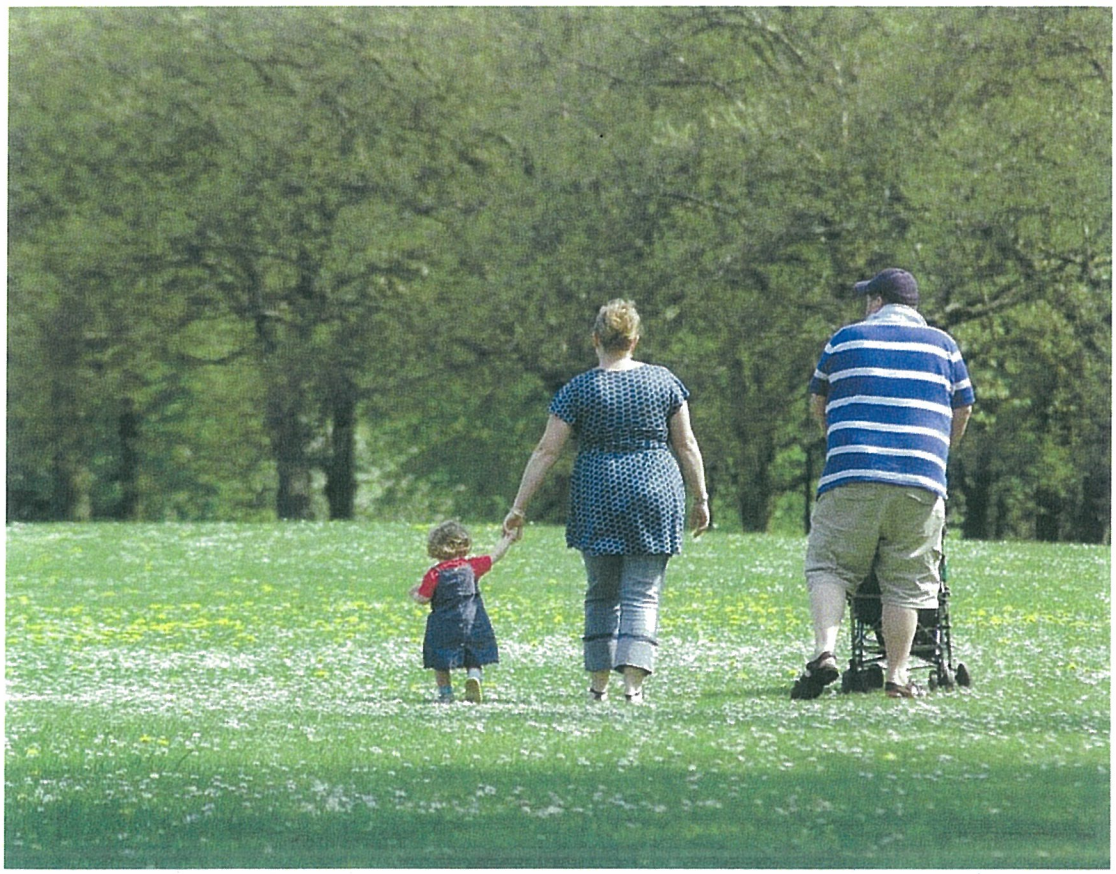
| | Adult Obesity | Obesity Rates by Sex | | Obesity Rates by Race/Ethnicity | | |
|---|---|---|---|---|---|---|
| | TOTAL | MEN | WOMEN | WHITE | BLACK | LATINO |
| Alabama | 32.0% (+/- 1.5) | 32.3% (+/- 2.5) | 31.8% (+/- 1.9) | 29.8% (+/- 1.8) | 40.1% (+/- 3.3) | 28.8% (+/- 13.4) |
| Alaska | 27.4% (+/- 2.2) | 28.0% (+/- 3.3) | 26.8% (+/- 3.0) | 25.9% (+/- 2.3) | NA | 32.3% (+/- 13.1) |
| Arizona | 24.7% (+/- 2.1) | 24.2% (+/- 3.1) | 25.1% (+/- 2.9) | 20.6% (+/- 2.1) | 27.0% (+/- 13.3) | 33.6% (+/- 5.7) |
| Arkansas | 30.9% (+/- 2.2) | 30.7% (+/- 3.4) | 31.1% (+/- 2.7) | 31.0% (+/- 2.4) | 38.5% (+/- 7.2) | 18.4% (+/- 8.9) |
| California | 23.8% (+/- 0.9) | 23.1% (+/- 1.4) | 24.5% (+/- 1.2) | 22.0% (+/- 1.1) | 33.1% (+/- 4.9) | 30.3% (+/- 1.9) |
| Colorado | 20.7% (+/- 1.1) | 21.1% (+/- 1.6) | 20.4% (+/- 1.4) | 18.9% (+/- 1.1) | 34.9% (+/- 8.0) | 26.6% (+/- 3.4) |
| Connecticut | 24.5% (+/- 1.5) | 25.6% (+/- 2.4) | 23.7% (+/- 2.0) | 23.1% (+/- 1.7) | 32.8% (+/- 6.5) | 32.6% (+/- 6.0) |
| Delaware | 28.8% (+/- 1.9) | 29.1% (+/- 2.9) | 28.5% (+/- 2.5) | 27.3% (+/- 2.1) | 38.2% (+/- 5.3) | 22.4% (+/- 9.8) |
| D.C. | 23.7% (+/- 1.9) | 18.5% (+/- 2.8) | 28.4% (+/- 2.8) | 10.7% (+/- 2.2) | 36.7% (+/- 3.4) | 13.3% (+/- 6.2) |
| Florida | 26.6% (+/- 1.3) | 27.8% (+/- 2.0) | 25.6% (+/- 1.7) | 25.0% (+/- 1.4) | 35.6% (+/- 4.5) | 27.9% (+/- 3.6) |
| Georgia | 28.0% (+/- 1.4) | 26.7% (+/- 2.2) | 29.3% (+/- 1.8) | 25.0% (+/- 1.6) | 36.8% (+/- 3.2) | 26.4% (+/- 6.6) |
| Hawaii | 21.8% (+/- 1.5) | 24.4% (+/- 2.3) | 19.3% (+/- 1.9) | 19.0% (+/- 2.6) | NA | 26.9% (+/- 6.2) |
| Idaho | 27.0% (+/- 1.8) | 26.0% (+/- 2.6) | 28.0% (+/- 2.4) | 25.8% (+/- 1.8) | NA | 36.1% (+/- 8.7) |
| Illinois | 27.1% (+/- 1.8) | 27.8% (+/- 2.7) | 26.6% (+/- 2.2) | 26.0% (+/- 1.8) | 39.2% (+/- 6.2) | 25.2% (+/- 6.6) |
| Indiana | 30.8% (+/- 1.4) | 30.9% (+/- 2.2) | 30.9% (+/- 1.9) | 29.5% (+/- 1.5) | 42.3% (+/- 5.9) | 35.1% (+/- 9.2) |
| Iowa | 29.0% (+/- 1.4) | 30.5% (+/- 2.0) | 27.5% (+/- 1.8) | 29.2% (+/- 1.4) | 27.8% (+/- 10.1) | 33.2% (+/- 8.5) |
| Kansas | 29.6% (+/- 0.9) | 30.0% (+/- 1.3) | 29.1% (+/- 1.1) | 29.1% (+/- 0.9) | 41.1% (+/- 5.1) | 30.5% (+/- 3.9) |
| Kentucky | 30.4% (+/- 1.5) | 29.6% (+/- 2.2) | 31.1% (+/- 2.0) | 29.6% (+/- 1.5) | 43.1% (+/- 7.7) | 22.2% (+/- 11.3) |
| Louisiana | 33.4% (+/- 1.5) | 33.1% (+/- 2.4) | 33.9% (+/- 1.8) | 31.1% (+/- 1.8) | 39.3% (+/- 3.0) | 37.5% (+/- 8.8) |
| Maine | 27.8% (+/- 1.1) | 28.1% (+/- 1.6) | 27.6% (+/- 1.4) | 27.9% (+/- 1.1) | 15.3% (+/- 10.7) | 30.3% (+/- 12.3) |
| Maryland | 28.3% (+/- 1.4) | 28.9% (+/- 2.3) | 27.9% (+/- 1.8) | 26.0% (+/- 1.6) | 37.9% (+/- 3.2) | 20.9% (+/- 7.0) |
| Massachusetts | 22.7% (+/- 1.0) | 24.2% (+/- 1.5) | 21.5% (+/- 1.2) | 22.2% (+/- 1.1) | 32.4% (+/- 4.7) | 31.0% (+/- 4.1) |
| Michigan | 31.3% (+/- 1.3) | 31.9% (+/- 2.0) | 30.7% (+/- 1.8) | 29.8% (+/- 1.5) | 40.9% (+/- 4.2) | 36.7% (+/- 8.6) |
| Minnesota | 25.7% (+/- 1.1) | 28.4% (+/- 1.6) | 22.9% (+/- 1.4) | 25.9% (+/- 1.1) | 28.4% (+/- 5.9) | 31.6% (+/- 7.8) |
| Mississippi | 34.9% (+/- 1.4) | 32.4% (+/- 2.2) | 37.4% (+/- 1.9) | 30.7% (+/- 1.7) | 42.9% (+/- 2.7) | 26.8% (+/- 10.3) |
| Missouri | 30.3% (+/- 1.7) | 29.8% (+/- 2.6) | 30.8% (+/- 2.2) | 29.4% (+/- 1.8) | 39.3% (+/- 6.2) | 27.8% (+/- 13.3) |
| Montana | 24.6% (+/- 1.4) | 25.9% (+/- 2.0) | 23.4% (+/- 1.8) | 24.2% (+/- 1.4) | NA | 22.5% (+/- 9.6) |
| Nebraska | 28.4% (+/- 0.8) | 29.3% (+/- 1.3) | 27.6% (+/- 1.2) | 28.3% (+/- 0.9) | 32.9% (+/- 5.4) | 29.8% (+/- 4.1) |
| Nevada | 24.5% (+/- 2.1) | 25.6% (+/- 3.1) | 23.5% (+/- 2.8) | 22.0% (+/- 2.1) | 31.2% (+/- 8.3) | 29.2% (+/- 6.1) |
| New Hampshire | 26.2% (+/- 1.5) | 28.1% (+/- 2.4) | 24.2% (+/- 1.9) | 26.5% (+/- 1.6) | NA | 22.9% (+/- 14.5) |
| New Jersey | 23.7% (+/- 1.1) | 25.5% (+/- 1.7) | 21.9% (+/- 1.4) | 23.1% (+/- 1.3) | 31.6% (+/- 3.4) | 27.2% (+/- 3.3) |
| New Mexico | 26.3% (+/- 1.3) | 26.4% (+/- 1.9) | 26.4% (+/- 1.6) | 22.6% (+/- 1.7) | 23.9% (+/- 10.0) | 30.0% (+/- 2.1) |
| New York | 24.5% (+/- 1.4) | 25.3% (+/- 2.1) | 23.9% (+/- 1.7) | 23.7% (+/- 1.7) | 32.6% (+/- 4.2) | 26.3% (+/- 3.9) |
| North Carolina | 29.1% (+/- 1.5) | 28.3% (+/- 2.2) | 30.0% (+/- 1.9) | 26.2% (+/- 1.6) | 40.8% (+/- 3.8) | 29.0% (+/- 6.8) |
| North Dakota | 27.8% (+/- 1.6) | 30.1% (+/- 2.4) | 25.4% (+/- 2.1) | 26.9% ( +/- 1.6) | NA | NA |
| Ohio | 29.6% (+/- 1.4) | 31.7% (+/- 2.1) | 27.6% (+/- 1.7) | 29.2% ( +/- 1.5) | 34.0% (+/- 4.7) | 32.2% (+/- 11.6) |
| Oklahoma | 31.1% (+/- 1.4) | 30.6% (+/- 2.2) | 31.5% (+/- 1.8) | 30.3% ( +/- 1.6) | 34.8% (+/- 6.5) | 28.7% (+/- 6.3) |
| Oregon | 26.7% (+/- 1.6) | 26.3% (+/- 2.4) | 27.3% (+/- 2.1) | 26.1% ( +/- 1.5) | NA | 28.8% (+/- 8.2) |
| Pennsylvania | 28.6% (+/- 1.3) | 29.6% (+/- 1.9) | 27.7% (+/- 1.6) | 28.0% ( +/- 1.3) | 36.0% (+/- 4.7) | 32.9% (+/- 7.6) |
| Rhode Island | 25.4% (+/- 1.6) | 27.7% (+/- 2.5) | 23.4% (+/- 1.9) | 24.9% ( +/- 1.7) | 35.2% (+/- 9.8) | 26.5% (+/- 5.6) |
| South Carolina | 30.8% (+/- 1.3) | 28.5% (+/- 2.0) | 33.1% (+/- 1.7) | 27.0% ( +/- 1.5) | 42.4% (+/- 2.8) | 25.0% (+/- 8.5) |
| South Dakota | 28.1% (+/- 1.9) | 29.9% (+/- 2.9) | 26.3% (+/- 2.5) | 26.7% ( +/- 2.0) | NA | 40.0% (+/- 15.1) |
| Tennessee | 29.2% (+/- 2.5) | 28.0% (+/- 3.8) | 30.5% (+/- 3.4) | 27.9% ( +/- 2.7) | 40.5% (+/- 8.2) | NA |
| Texas | 30.4% (+/- 1.4) | 31.0% (+/- 2.1) | 30.0% (+/- 1.9) | 27.1% ( +/- 1.7) | 39.6% (+/- 5.1) | 34.5% (+/- 2.7) |
| Utah | 24.4% (+/- 1.1) | 25.8% (+/- 1.6) | 22.9% (+/- 1.4) | 24.4% ( +/- 1.1) | 29.0% (+/- 14.3) | 24.2% (+/- 4.0) |
| Vermont | 25.4% (+/- 1.4) | 27.3% (+/- 2.2) | 23.6% (+/- 1.8) | 25.4% ( +/- 1.4) | NA | 23.5% (+/- 14.4) |
| Virginia | 29.2% (+/- 1.7) | 29.7% (+/- 2.6) | 28.6% (+/- 2.4) | 27.6% ( +/- 1.9) | 37.8% (+/- 4.8) | 31.4% (+/- 9.4) |
| Washington | 26.5% (+/- 1.2) | 28.0% (+/- 1.9) | 25.1% (+/- 1.6) | 27.1% ( +/- 1.4) | 39.5% (+/- 10.3) | 27.9% (+/- 5.0) |
| West Virginia | 32.4% (+/- 1.6) | 30.7% (+/- 2.4) | 34.3% (+/- 2.1) | 32.4% ( +/- 1.6) | 34.2% (+/- 10.8) | 29.1% (+/- 14.7) |
| Wisconsin | 27.7% (+/- 2.0) | 29.4% (+/- 2.9) | 26.1% (+/- 2.7) | 26.8% ( +/- 2.0) | 44.0% (+/- 10.8) | NA |
| Wyoming | 25.0% (+/- 1.6) | 26.1% (+/- 2.3) | 23.8% (+/- 2.2) | 24.9% ( +/- 1.7) | NA | 25.9% (+/- 6.6) |

| States with the Highest Obesity Rates | | |
|---|---|---|
| **Rank** | **State** | **Percentage of Adult Obesity** (Based on 2011 Data, Including Confidence Intervals) |
| 1 | Mississippi | 34.9% (+/- 1.4) |
| 2 | Louisiana | 33.4% (+/- 1.5) |
| 3 | West Virginia | 32.4% (+/- 1.6) |
| 4 | Alabama | 32.0% (+/- 1.5) |
| 5 | Michigan | 31.3% (+/- 1.3) |
| 6 | Oklahoma | 31.1% (+/- 1.4) |
| 7 | Arkansas | 30.9% (+/- 2.2) |
| 8 (tie) | Indiana | 30.8% (+/- 1.4) |
| 8 (tie) | South Carolina | 30.8% (+/- 1.3) |
| 10 (tie) | Kentucky | 30.4% (+/- 1.5) |
| 10 (tie) | Texas | 30.4% (+/- 1.4) |

Note: For rankings, 1 = Highest rate of obesity.

| States with the Lowest Obesity Rates | | |
|---|---|---|
| **Rank** | **State** | **Percentage of Adult Obesity** (Based on 2011 Data, Including Confidence Intervals) |
| 51 | Colorado | 20.7% (+/- 1.1) |
| 50 | Hawaii | 21.8% (+/- 1.5) |
| 49 | Massachusetts | 22.7% (+/- 1.0) |
| 47 (tie) | D.C. | 23.7% (+/- 1.9) |
| 47 (tie) | New Jersey | 23.7% (+/- 1.1) |
| 46 | California | 23.8% (+/- 0.9) |
| 45 | Utah | 24.4% (+/- 1.1) |
| 42 (tie) | Connecticut | 24.5% (+/- 1.5) |
| 42 (tie) | Nevada | 24.5% (+/- 2.1) |
| 42 (tie) | New York | 24.5% (+/- 1.4) |

Note: For rankings, 51 = Lowest rate of obesity.





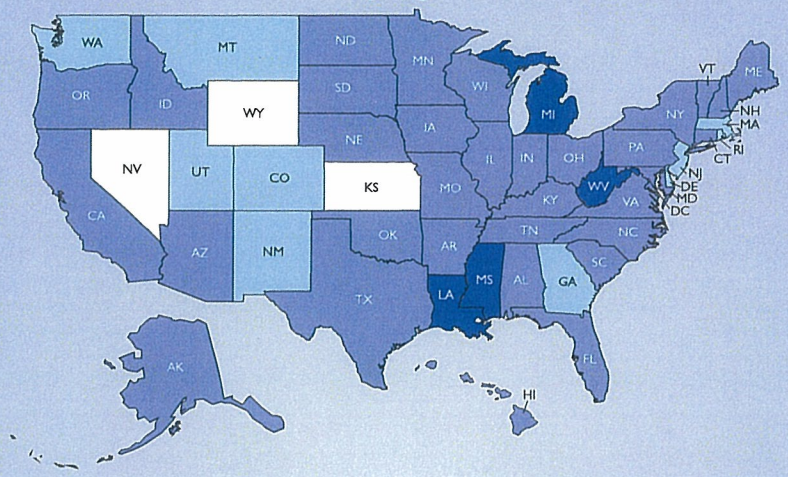
000212

## PAST OBESITY TRENDS* AMONG U.S. ADULTS

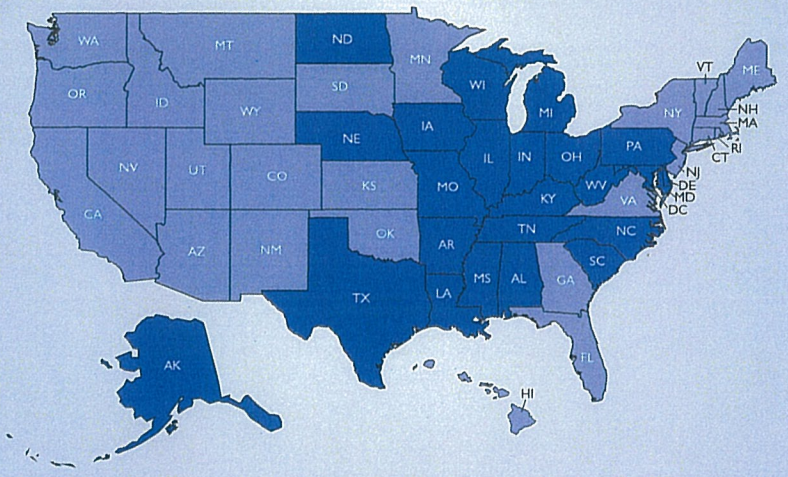
BRFSS, 1991, 1993-1995, 1998-2000, and 2008-2010 Combined Data

(*BMI ≥30, or about 30lbs overweight for 5'4" person)

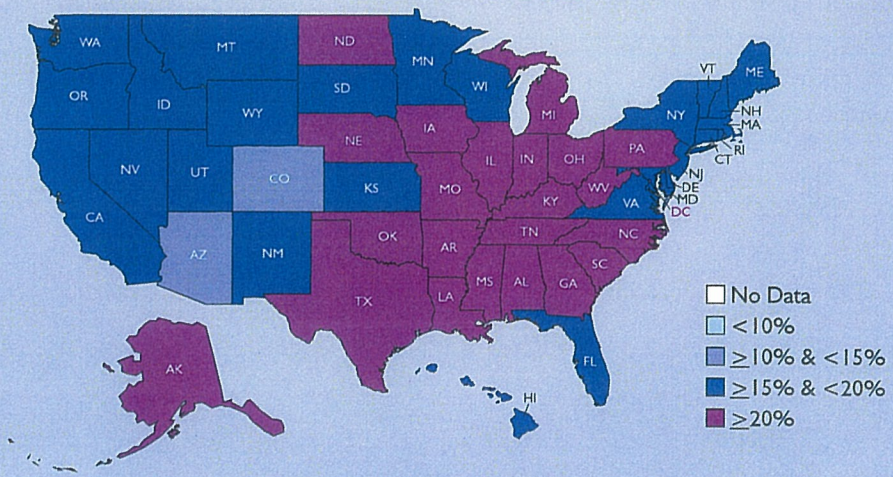
### 1991




### 1993–1995 Combined Data




### 1998–2000 Combined Data



## RATES AND RANKINGS METHODOLOGY[30]

The analysis in *F as in Fat* compares data from the Behavioral Risk Factor Surveillance System (BRFSS), the largest phone survey in the world.

BRFSS is the largest ongoing telephone health survey in the world. It is a state-based system of health surveys established by CDC in 1984. BRFSS completes more than 400,000 adult interviews each year. For most states, BRFSS is their only source of population-based health behavior data about chronic disease prevalence and behavioral risk factors.

BRFSS surveys a sample of adults in each state to get information on health risks and behaviors, health practices for preventing disease, and healthcare access mostly linked to chronic disease and injury. The sample is representative of the population of each state.

Washington, D.C., is included in the rankings because CDC provides funds to the city to conduct a survey in an equivalent way to the states.

The data are based on telephone surveys by state health departments, with assistance from CDC. Surveys ask people to report their weight and height, which is used to calculate BMI. Experts say rates of overweight and obesity are probably slightly higher than shown by the data because people tend to underreport their weight and exaggerate their height.[31]

BRFSS made two changes in methodology for its 2011 dataset to make the data more representative of the total population. These are making survey calls to cell-phone numbers and adopting a new weighting method:

- The first change is including and then growing the number of interview calls made to cell phone numbers. Estimates today are that 3 in 10 U.S. households have only cell phones.
- The second is a statistical measurement change, which involves the way the data are weighted to better match the demographics of the population in the state.

The new methodology means the BRFSS data will better represent lower-income and racial and ethnic minorities, as well as populations with lower levels of formal education. The size and direction of the effects will vary by state, the behavior under study, and other factors. Although generalizing is difficult because of these variables, it is likely that the changes in methods will result in somewhat higher estimates for the occurrence of behaviors that are more common among younger adults and to certain racial and ethnic groups.

The change in methodology makes direct comparisons to past data difficult.

In prior years, this report has included racial, ethnic and gender breakdowns by state. However, because there is only one year of data available using the new methodology, the sample sizes for some states are too small to reliably provide these breakdowns in this year's report.

More information on the methodology is available in Appendix B.

## DEFINITIONS OF OBESITY AND OVERWEIGHT

Obesity is defined as an excessively high amount of body fat or adipose tissue in relation to lean body mass.[32,33] Overweight refers to increased body weight in relation to height, which is then compared to a standard of acceptable weight.[34] An adult is considered obese if his or her body mass index (BMI), a calculation based on an individual's weight and height, is 30 or higher. The equation is:

$$\text{BMI} = \frac{(\text{Weight in pounds})}{(\text{Height in inches}) \times (\text{Height in inches})} \times 703$$

Adults with a BMI of 25 to 29.9 are considered overweight. The National Institutes of Health (NIH) adopted a lower optimal weight threshold in June 1998. Previously, the federal government defined overweight as a BMI of 28 for men and 27 for women.

On the basis of 2000 CDC growth charts, children and youth at or above the 95th percentile were defined as "overweight," while children at or above the 85th percentile but below the 95th percentile were defined as "at risk of overweight." However, in 2007, an expert committee recommended using the same cut points but changing the terminology by replacing "overweight" with "obese" and "at risk of overweight" with "overweight." The committee also added an additional cut point — BMI at or above the 99th percentile — to define "severe obesity."[35]

BMI is considered an important measure for understanding population trends. For individuals, it may be less accurate and should be used alongside other measures of risk, including waist size, waist-to-hip ratio, blood pressure, cholesterol level, and blood sugar, among others.[36]

## OBESITY AROUND THE WORLD

New information from the Organization for Economic Cooperation and Development (OECD) shows that, while more than half of adults are either overweight or obese in the majority of OECD countries, the rate of growth slowed or stopped in many countries over the last decade.[37] In England almost a quarter of the population is obese, up to 18 percent in Hungary are considered obese, and almost 15 percent in Spain and Ireland are obese.[38]

In England, Hungary, Italy, South Korea and Switzerland, obesity rates either stopped growing or slowed significantly, and Spain and France only increased by 2 percent to 3 percent.[39] But in Canada, Ireland and the United States, rates continued to increase, by up to 5 percent. During the last decade childhood obesity rates have leveled out in England, France, South Korea and the United States.[40]

Data also showed consistent disparities in obesity rates across many countries. Women with less education were two to three times more likely to be overweight or obese than women with higher education levels, and the trend stayed consistent throughout the decade with no improvements made to remedy the disparity.[41]

## SOCIOECONOMICS AND OBESITY

An analysis of the 2008-2010 BRFSS data looking at income, level of schooling completed and obesity finds strong correlations between obesity and income and between obesity and education:

- Nearly 33 percent of adults who did not graduate high school were obese, compared with 21.5 percent of those who graduated from college or technical college.
- More than 33 percent of adults who earn less than $15,000 per year were obese, compared with 24.6 percent of those who earned at least $50,000 per year.[42]

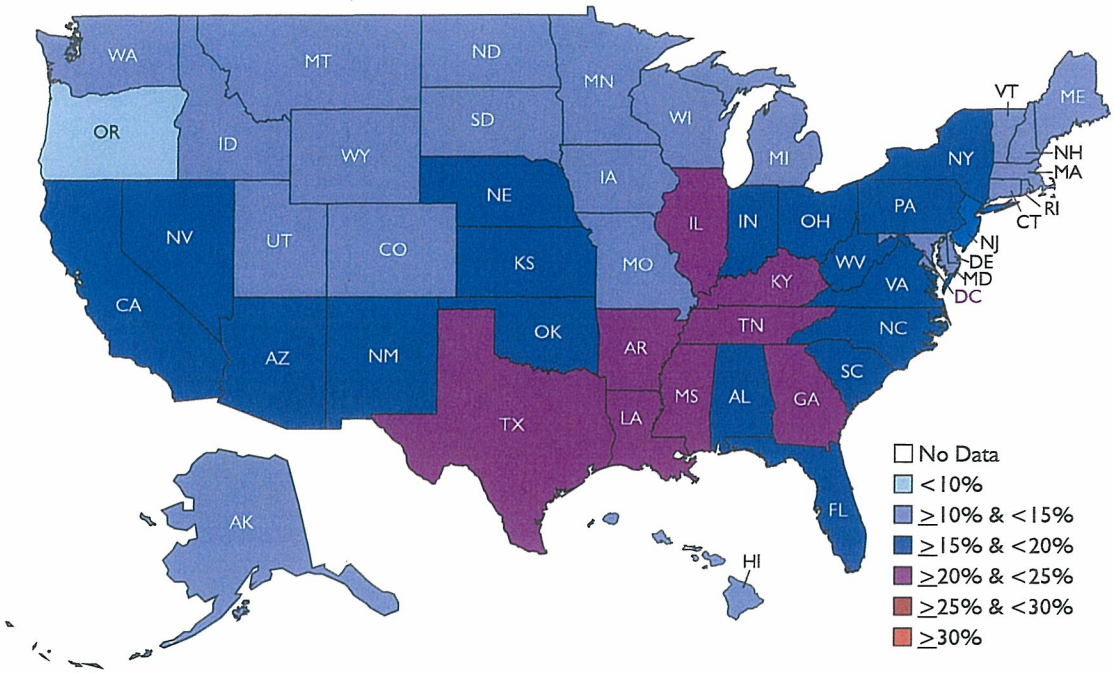
# B. CHILDHOOD AND YOUTH OBESITY AND OVERWEIGHT RATES

## 1. Study of Children Ages 10–17 (2007)

**The most recent data for childhood statistics on a state-by-state level are from the 2007 National Survey of Children's Health (NSCH).**[43] *The next NSCH release is expected in late 2012.* According to the 2007 study, obesity rates for children ages 10–17, defined as BMI greater than the 95th percentile for age group, ranged from a low of 9.6 percent in Oregon to a high of 21.9 percent in Mississippi. The NSCH study is based on a survey of parents in each state. The data are derived from parental reports, so they are not as reliable as measured data, such as NHANES, but they are the only source of comparative state-by-state data for children.

Nine of the 10 states with the highest rates of obese children are in the South. In 2003, when the last NSCH was conducted, only Washington, D.C., and three states — Kentucky, Tennessee and West Virginia — had childhood obesity rates higher than 20 percent. Four years later, in 2007, six more states had childhood obesity rates over 20 percent: Arkansas, Georgia, Illinois, Louisiana, Mississippi and Texas.

## OBESE 10- TO 17-YEAR-OLDS, 2007 NSCH




Source: National Survey on Children's Health, 2007.

| States with the Highest Rates of Obese 10- to 17-year-olds | | |
|---|---|---|
| **Rank** | **States** | **Percentage of Obese 10- to 17-year-olds** (95 percent Confidence Intervals) |
| 1 | Mississippi | 21.9% (+/- 3.5) |
| 2 | Georgia | 21.3% (+/- 5.1) |
| 3 | Kentucky | 21.0% (+/- 3.5) |
| 4 (tie) | Illinois | 20.7% (+/- 3.6) |
| 4 (tie) | Louisiana | 20.7% (+/- 4.0) |
| 6 | Tennessee | 20.6% (+/- 3.7) |
| 7 (tie) | Arkansas | 20.4% (+/- 3.6) |
| 7 (tie) | Texas | 20.4% (+/- 5.0) |
| 9 | D.C. | 20.1% (+/- 3.9) |
| 10 | West Virginia | 18.9% (+/- 3.2) |

*Note: For rankings, 1 = Highest rate of childhood obesity.

Eight of the states with the lowest rates of obese 10- to 17-year-olds are in the West.

| States with the Lowest Rates of Obese 10- to 17-year-olds | | |
|---|---|---|
| **Rank** | **States** | **Percentage of Obese 10- to 17-year-olds** (95 percent Confidence Intervals) |
| 51 | Oregon | 9.6% (+/- 2.7) |
| 50 | Wyoming | 10.2% (+/- 2.7) |
| 48 (tie) | Washington | 11.1% (+/- 3.4) |
| 48 (tie) | Minnesota | 11.1% (+/- 3.0) |
| 46 (tie) | Iowa | 11.2% (+/- 2.7) |
| 46 (tie) | Hawaii | 11.2% (+/- 2.8) |
| 44 (tie) | Utah | 11.4% (+/- 3.5) |
| 44 (tie) | North Dakota | 11.4% (+/- 2.5) |
| 42 (tie) | Montana | 11.8% (+/- 2.8) |
| 42 (tie) | Idaho | 11.8% (+/- 2.7) |

*Note: For rankings, 51 = Lowest rate of childhood obesity.



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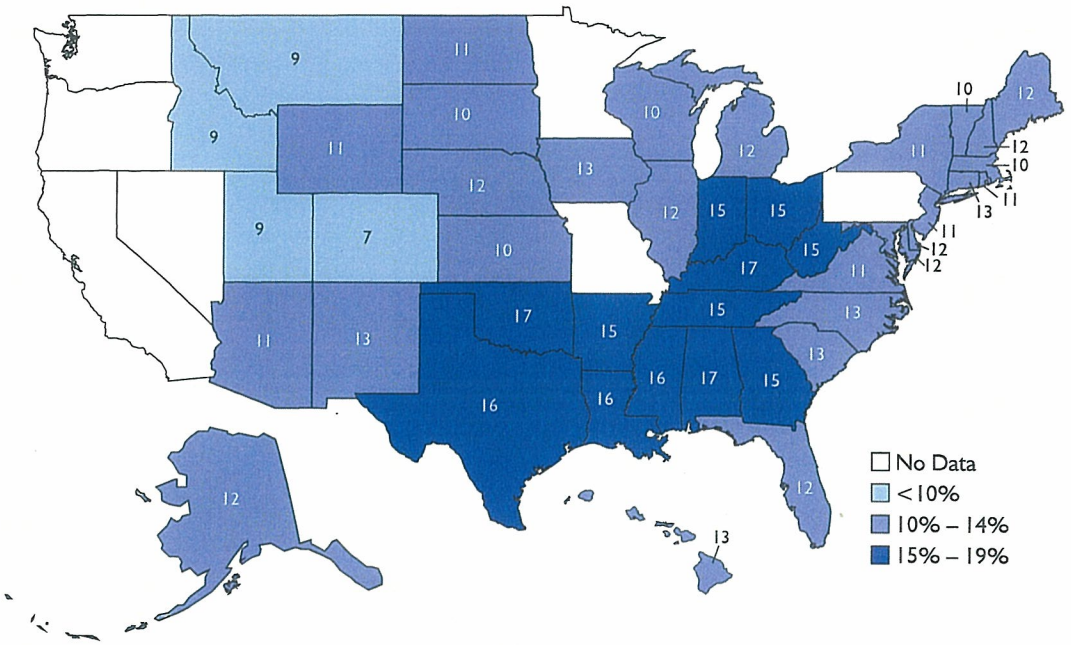
## 2. Study of High School Students

The Youth Risk Behavior Surveillance System (YRBSS) includes both national and state surveys that provide data on adolescent obesity and overweight rates, most recently in 2011.[44] The information from the YRBSS is based on self-reported information. According to the national survey, 13 percent of high school students were obese and 15.2 percent were overweight.[45] There has been an upward trend from 1999 to 2011 in the prevalence of students nationwide who were obese (10.6 percent to 13 percent) and who were overweight (14.2 percent to 15.2 percent).[46] Students also reported on whether or not they participated in at least 60 minutes of physical activity every day of the week. The most recent state surveys, conducted in 43 states, found a range in the percentage of high school students who were physically active for at least 60 minutes per day seven days a week, from a high of 33.1 percent in Oklahoma to a low of 20.8 percent in Utah, with a median prevalence of 25.8 percent.

The latest state surveys also found a range of obesity levels: a low of 7.3 percent in Colorado to a high of 17.0 percent in Alabama, with a median prevalence of 12.0 percent. Overweight prevalence among high school students ranged from a low of 10.7 percent in Colorado to a high of 19.5 percent in Louisiana, with a median prevalence of 14.7 percent.

### PERCENT OF OBESE HIGH SCHOOL STUDENTS — Selected U.S. States, Youth Risk Behavior Survey, 2011




Source: YBRS. Trend maps from 2003-2011 are available at: http://www.cdc.gov/healthyyouth/obesity/obesity-youth.htm.

| Percentage of Obese and Overweight U.S. High School Students by Sex | | |
|---|---|---|
| | Obese | Overweight |
| Female | 9.8% | 15.4% |
| Male | 16.1% | 15.1% |
| Total | 13.0% | 15.2% |

| Percentage of Obese and Overweight U.S. High School Students by Race/Ethnicity | | |
|---|---|---|
| | Obese | Overweight |
| White* | 11.5% | 14.2% |
| Black* | 18.2% | 16.2% |
| Hispanic | 14.1% | 17.4% |
| Total** | 13.0% | 15.2% |

Notes: *Non-Hispanic. **Other race/ethnicities are included in the total but are not presented separately.

| Percentage of Obese and Overweight U.S. High School Students by Sex and Race/Ethnicity | | | | |
|---|---|---|---|---|
| | Obese | | Overweight | |
| | Female | Male | Female | Male |
| White* | 7.7% | 15.0% | 13.8% | 14.7% |
| Black* | 18.6% | 17.7% | 19.6% | 12.8% |
| Hispanic | 8.6% | 19.2% | 18.0% | 16.9% |
| Total** | 9.8% | 16.1% | 15.4% | 15.1% |

Notes: *Non-Hispanic. **Other race/ethnicities are included in the total but are not presented separately.

## 3. Study of Children from Lower-Income Families (2010)

The Pediatric Nutrition Surveillance Survey (PedNSS), which examines children between the ages of 2 and 5 from lower-income families, found that 14.4 percent of this group is obese, compared with 12.1 percent for all U.S. children of a similar age.[47] The data for PedNSS is based on actual measurements rather than self reports.

The prevalence of obesity among children from lower-income families increased from 12.7 percent in 1999 to 14.4 percent in 2010, although rates have remained stable since 2003. The highest obesity rates were seen among American Indian and Alaska Native children (21.1 percent) and Latino children (17.6 percent).

## 4. Physical Inactivity in Adults

Physical inactivity in adults reflects the number of survey respondents who reported not engaging in physical activity or exercise during the previous 30 days other than doing their regular jobs.

Mississippi, the state with the highest rate of obesity, also had the highest reported percentage of inactivity at 36 percent.

| States with the Highest Physical Inactivity Rates, 2011 | | | |
|---|---|---|---|
| Rank | State | Percentage of Adult Physical Inactivity (Based on 2011 Data, Including Confidence Intervals) | Obesity Ranking |
| 1 | Mississippi | 36.0% (+/- 1.5) | 1 |
| 2 | Tennessee | 35.2% (+/- 2.7) | 15 (tie) |
| 3 | West Virginia | 35.1% (+/- 1.6) | 3 |
| 4 | Louisiana | 33.8% (+/- 1.5) | 2 |
| 5 | Alabama | 32.6% (+/- 1.6) | 4 |
| 6 | Oklahoma | 31.2% (+/- 1.4) | 6 |
| 7 | Arkansas | 30.9% (+/- 2.1) | 7 |
| 8 | Kentucky | 29.4% (+/- 1.5) | 10 (tie) |
| 9 | Indiana | 29.3% (+/- 1.4) | 8 (tie) |
| 10 | Missouri | 28.5% (+/- 1.6) | 12 |

*Note: For rankings, 1=Highest rate of physical inactivity

Colorado, the state with the lowest rate of adult obesity, also had the lowest reported rate of physical inactivity at 16.5 percent.

| States with the Lowest Physical Inactivity Rates, 2011 | | | |
|---|---|---|---|
| Rank | State | Percentage of Adult Physical Inactivity (Based on 2011 Data, Including Confidence Intervals) | Obesity Ranking |
| 51 | Colorado | 16.5% (+/- 1.8) | 51 |
| 50 | Utah | 18.9% (+/- 1.0) | 45 |
| 49 | California | 19.1% (+/- 0.9) | 46 |
| 48 | Oregon | 19.7% (+/- 1.5) | 31 |
| 47 | D.C. | 19.8% (+/- 1.8) | 47 (tie) |
| 46 | Vermont | 21.0% (+/- 1.3) | 37 (tie) |
| 45 | Hawaii | 21.3% (+/- 1.5) | 50 |
| 44 | Idaho | 21.4% (+/- 1.7) | 30 |
| 43 | Minnesota | 21.8% (+/- 1.0) | 36 |
| 42 | Washington | 21.9% (+/- 1.2) | 33 |

*Note: For rankings, 51 = Lowest rate of physical inactivity.

## D. TYPE 2 DIABETES AND HYPERTENSION IN ADULTS

Obesity and physical inactivity have been linked to a range of chronic diseases, including diabetes and hypertension. Seven of the 10 states with the highest diabetes rates are also in the top 10 for obesity rates; and 7 of the 10 states with the highest hypertension rates are also in the top 10 for obesity.

### 1. Type 2 Diabetes

All 10 of the states with the highest rates of type 2 diabetes are in the South.

**States with the Highest Rates of Adults with Type 2 Diabetes, 2011**

| Rank | State | Percentage of Adult Diabetes (Based on 2011 Data, Including Confidence Intervals) | Obesity Ranking |
|---|---|---|---|
| 1 | Mississippi | 12.3% (+/- 0.8) | 1 |
| 2 | West Virginia | 12.1% (+/- 1.0) | 3 |
| 3 | South Carolina | 12.0% (+/- 0.8) | 8 (tie) |
| 4 | Alabama | 11.8% (+/- 0.9) | 4 |
| 5 | Louisiana | 11.8% (+/- 0.9) | 2 |
| 6 (tie) | Arkansas | 11.2% (+/- 1.2) | 7 |
| 6 (tie) | Tennessee | 11.2% (+/- 1.5) | 15 (tie) |
| 8 | Oklahoma | 11.1% (+/- 0.8) | 6 |
| 9 (tie) | Kentucky | 10.8% (+/- 0.8) | 10 (tie) |
| 9 (tie) | North Carolina | 10.8% (+/- 0.8) | 17 |

*Note: For rankings, 1 = Highest rate of type 2 diabetes.

#### THE DIABETES BELT

In the 1960s researchers first identified the Southeastern United States as the "stroke belt," since strokes were much more frequent in that region than the rest of the country. Now, scientists are focusing on a "diabetes belt," made up of 644 counties in 15 mostly Southern states. This belt includes parts of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, West Virginia, and all of Mississippi.[48] The demographics of these 644 counties vary greatly from those of the overall country. They have a high percentage of Blacks, and, not surprisingly, a high number of people who are obese and lead sedentary lives.[49] Policymakers hope to use this new information to target resources to those who most need help.

### 2. Hypertension

All 10 states with the highest rates of hypertension are also in the South.

**States with the Highest Rates of Adult Hypertension, 2011**

| Rank | State | Percentage of Adult Hypertension (Based on 2011 Data, Including Confidence Intervals) | Obesity Ranking |
|---|---|---|---|
| 1 | Alabama | 40.0% (+/- 1.6) | 4 |
| 2 | Mississippi | 39.2% (+/- 1.4) | 1 |
| 3 | Tennessee | 38.6% (+/- 2.6) | 15 (tie) |
| 4 | Louisiana | 38.3% (+/- 1.4) | 2 |
| 5 | Kentucky | 37.9% (+/- 1.5) | 10 (tie) |
| 6 | West Virginia | 37.1% (+/- 1.6) | 3 |
| 7 | South Carolina | 36.4% (+/- 1.3) | 8 (tie) |
| 8 | Arkansas | 35.7% (+/- 2.1) | 7 |
| 9 | Oklahoma | 35.5% (+/- 1.4) | 6 |
| 10 | Delaware | 34.6% (+/- 1.9) | 19 |

*Note: For rankings, 1 = Highest rate of hypertension.

## E. FRUIT AND VEGETABLE CONSUMPTION

Fruit and vegetable consumption, as part of a healthy diet, is important for weight management, optimal child growth, and chronic disease prevention. Seven of the 10 states with the highest rates of obesity were also in the bottom 10 for fruit and vegetable consumption.

The number of individuals who reported eating fruits and vegetables five or more times a day was the lowest in West Virginia (7.9 percent) and was the highest in Washington, D.C. (25.6 percent). The data are from survey responses to the 2011 BRFSS survey.

**States with the Lowest Adult Fruit and Vegetable Consumption, 2011**

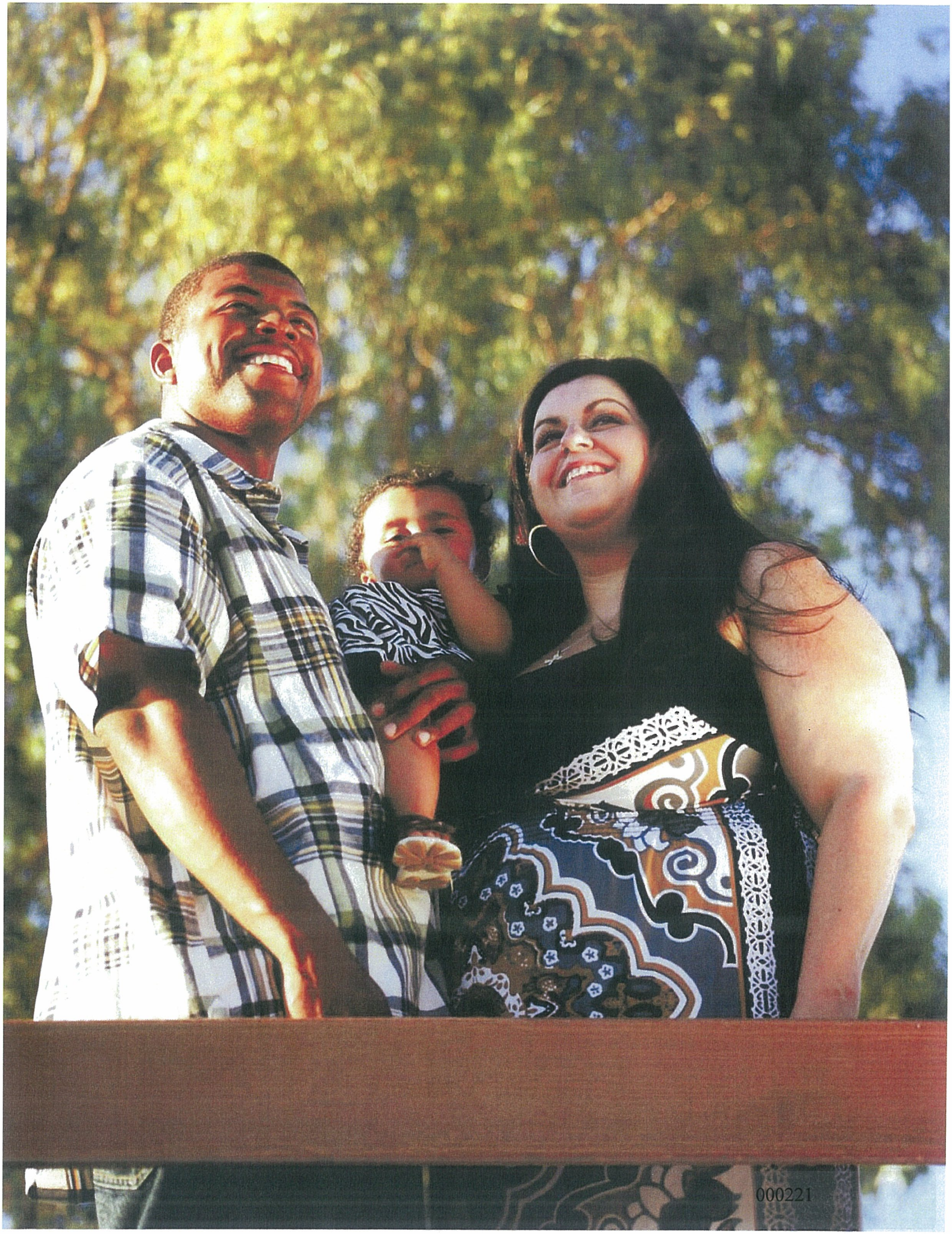
| Rank | State | Percentage of Adult Fruit and Vegetable Consumption (Based on 2011 Data, Including Confidence Intervals) | Obesity Ranking |
|---|---|---|---|
| 1 | West Virginia | 7.9% (+/- 0.9) | 3 |
| 2 | Louisiana | 8.2% (+/- 0.9) | 2 |
| 3 | Oklahoma | 9.8% (+/- 0.9) | 6 |
| 4 | Mississippi | 10.3% (+/- 1.0) | 1 |
| 5 (tie) | Kentucky | 10.6% (+/- 1.0) | 10 (tie) |
| 5 (tie) | Tennessee | 10.6% (+/- 1.9) | 15 (tie) |
| 7 | South Dakota | 11.0% (+/- 1.2) | 23 |
| 8 (tie) | Alabama | 12.5% (+/- 1.1) | 4 |
| 8 (tie) | South Carolina | 12.5% (+/- 0.9) | 8 |
| 10 | Delaware | 12.9% (+/- 1.4) | 19 |

Note: For rankings, 1 = Lowest rate of fruit and vegetable consumption.

**States with the Highest Adult Fruit and Vegetable Consumption, 2011**

| Rank | State | Percentage of Adult Fruit and Vegetable Consumption (Based on 2011 Data, Including Confidence Intervals) | Obesity Ranking |
|---|---|---|---|
| 51 | D.C. | 25.6% (+/- 2.1) | 47 (tie) |
| 50 | California | 24.4% (+/- 0.9) | 46 |
| 49 | Vermont | 22.7% (+/- 1.3) | 37 (tie) |
| 48 | New Hampshire | 22.5% (+/- 1.5) | 35 |
| 47 | Oregon | 22.3% (+/- 1.4) | 31 |
| 46 | Arizona | 21.4% (+/- 2.0) | 40 |
| 45 | Connecticut | 20.8% (+/- 1.4) | 42 (tie) |
| 44 | New York | 19.9% (+/- 1.3) | 42 (tie) |
| 43 | Rhode Island | 19.8% (+/- 1.4) | 37 (tie) |
| 42 | Hawaii | 19.7% (+/- 1.4) | 50 |

Note: For rankings, 51 = Highest rate of fruit and vegetable consumption.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SECTION 2

# Two Futures for America's Health

TFAH and RWJF commissioned the National Heart Forum (NHF) to conduct a modeling study to examine how obesity rates in states could change if trends continued on their current trajectory, including the potential impact on obesity-related diseases and costs by 2030. The analysis also looked at how disease rates and costs could be affected by lowering the average BMI in the state by only 5 percent in each state.

Currently, more than 35 percent of American adults are obese.[50] Individuals with a BMI of 30 or higher are considered obese. The report found if current trends continue, by the year 2030, more than 44 percent of adults could be obese, which could lead to major increases in obesity-related disease rates and health care costs. But, if states could reduce the average adult BMI by 5 percent, millions of Americans could be spared from preventable diseases and each state could save billions in health care costs. For an adult of average weight, reducing BMI by 1 percent is equivalent to a weight loss of around 2.2 pounds.[51]

The analysis concluded, therefore, that there are two potential futures for America's health.

## BACKGROUND

The study is based on a peer-reviewed model developed by researchers at the NHF and used for the basis of an analysis, "Health and Economic Burden of the Projected Obesity Trends in the USA and the UK," published in 2011 in *The Lancet*.[52] The full methodology is available in Appendix C.

The NHF is an international center for the prevention of avoidable chronic diseases, including coronary heart disease, stroke, cancer and diabetes. The organization is an alliance of 65 charitable organizations in the United Kingdom, including leading policy research experts on chronic disease prevention and promotes consensus-based healthy public policy.

## PEER-REVIEWED PROJECTIONS OF FUTURE TRENDS

The analysis is based on a model developed by researchers at the National Heart Forum. Micro Health Simulations used the model in a peer reviewed study, "Health and Economic Burden of the Projected Obesity Trends in the [United States and the United Kingdom]," published in 2011 in *The Lancet*.[53] The full methodology is available in Appendix C.

All models have limitations in forecasting the future, but they help predict the trajectory of trends based on past data. Trends can, of course, change significantly over time for a variety of reasons. However, having a sense of potential scenarios is particularly helpful to understand patterns, such as growth rates for diseases and costs projections, which can inform policy priorities and decisions.

The NHF study published in *The Lancet* in 2011 developed national projections for obesity and the potential growth in related disease rates and costs between 2010 and 2030, using data from the National Health and Nutrition Examination Survey (NHANES).

They found the number of obese Americans could grow from 32 percent, in 2011, to around 50 percent (+/- 5) in 2030, with the potential estimated low rate would be 45 and the high rate is 55.

Based on the predicted rise in obesity, they found the baseline potential growth in obesity costs could be $66 billion (+/- 45 billion). Within the potential range, it could be as low as $20 billion or as high as $110 billion.

In addition, they projected baseline estimates for:[54]

- The number of new cases of diabetes could be 7.9 million (+/- 1.6 million) per year, which means it could be as low as 6.3 million or as high as 9.5 million;
- The number of new cases of chronic heart disease and stroke could be 6.8 million (+/- 1.5 million) per year, which means it could be as low as 5.3 million or as high as 8.3 million; and
- The number of new cases of cancer could be 0.5 million (+/- 0.1 million) per year, which means it could be as low as 0.4 million or as high as 0.6 million.

The projections in the state-by-state analysis featured in the F as in Fat report are considered to be marginally more accurate than those reported in the national study, because the state-by-state study is based on data from the BRFSS instead of NHANES. BRFSS provides more data points than NHANES (10 versus seven). In other words, more data points enables researchers to estimate projections more precisely.

The modeling study also reflects adjustments of data to correct for self-reporting bias in BRFSS.[55]

These findings are similar to a 2012 study in the American Journal of Preventive Medicine. The study found that by 2030, 42 percent of U.S. adults will be obese.[56] This study also found that the rate of severe obesity will double by 2030, when more than 10 percent of adults will be considered severely obese.[57] The projected increase in obesity is estimated to cost the United States $550 billion in health spending between now and 2030.[58]



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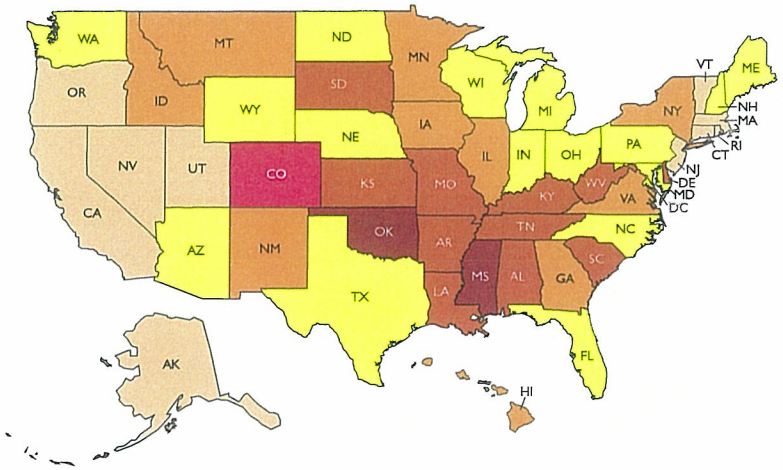
# A. KEY FINDINGS

## Obesity in 2030

If obesity rates continue on their current track, in 2030, more than 60 percent of adults in America could be obese in 13 states; more than half of adults could be obese in 39 states; and more than 44 percent could be obese in all 50 states.

However, if states could reduce average adult BMIs by 5 percent, no state would have an obesity rate above 60 percent. More than half of Americans would be obese in 24 states; two states would have rates under 40 percent (Alaska at 39.4 percent and Colorado at 39 percent); and Washington, D.C. would be below 30 percent (29.1 percent).

**2030: Adult Obesity Rates if the Current Trajectory Continues**




≤35%
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≥40% & <45%
≥45% & <50%
≥50% & <55%
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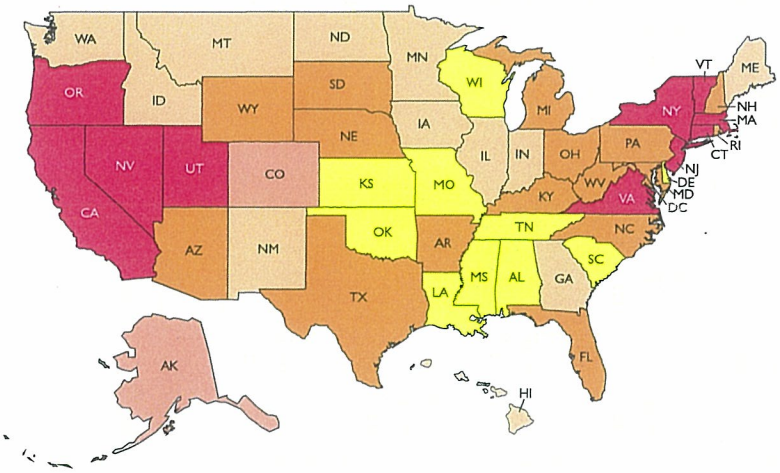
≥65%

**2030: Adult Obesity Rates if Average BMI is Reduced by 5 Percent**

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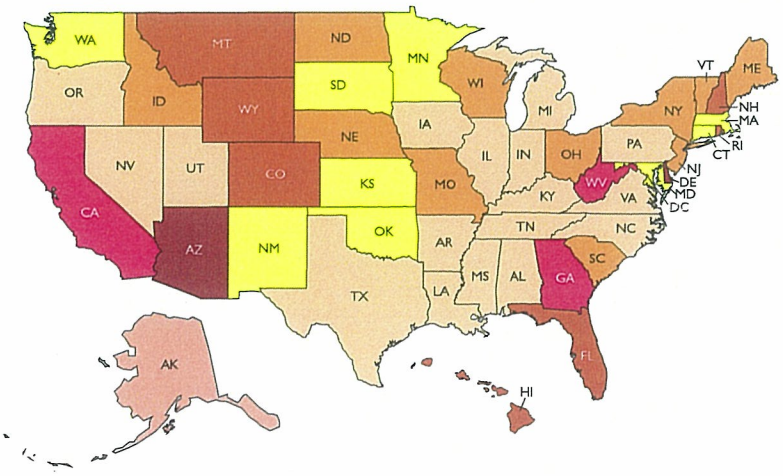
**Potential Percent Increase in Obesity Rates 2010-2030**




<80%
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≥90% & <100%
≥100% & <110%
≥110% & <120%
≥120% & <130%
≥130%



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| RATES AND RANKINGS 2030 | | | | |
|---|---|---|---|---|
| State | Obesity rates in 2030 on current track | Rank | Obesity rates in 2030 if states reduce average adult BMI by 5% | Rank |
| Alabama | 62.6% | 6 | 55.1% | 8 |
| Alaska | 45.6% | 49 | 39.4% | 49 |
| Arizona | 58.8% | 16 | 51.8% | 17 |
| Arkansas | 60.6% | 10 | 53.4% | 11 |
| California | 46.6% | 46 | 40.5% | 47 |
| Colorado | 44.8% | 50 | 39.0% | 50 |
| Connecticut | 46.5% | 47 | 40.5% | 47 |
| Delaware | 64.7% | 3 | 56.4% | 4 |
| DC | 32.6% | 51 | 29.1% | 51 |
| Florida | 58.6% | 18 | 51.1% | 19 |
| Georgia | 53.6% | 35 | 47.5% | 33 |
| Hawaii | 51.8% | 38 | 45.5% | 38 |
| Idaho | 53.0% | 37 | 46.9% | 37 |
| Illinois | 53.7% | 34 | 47.5% | 33 |
| Indiana | 56.0% | 27 | 49.5% | 25 |
| Iowa | 54.4% | 31 | 47.6% | 32 |
| Kansas | 62.1% | 7 | 55.1% | 8 |
| Kentucky | 60.1% | 13 | 53.2% | 15 |
| Louisiana | 62.1% | 7 | 55.4% | 7 |
| Maine | 55.2% | 29 | 49.0% | 29 |
| Maryland | 58.8% | 16 | 52.2% | 16 |
| Massachusetts | 48.7% | 43 | 42.4% | 43 |
| Michigan | 59.4% | 15 | 53.4% | 11 |
| Minnesota | 54.7% | 30 | 47.5% | 33 |
| Mississippi | 66.7% | 1 | 59.9% | 1 |
| Missouri | 61.9% | 9 | 55.5% | 5 |
| Montana | 53.6% | 35 | 47.4% | 36 |
| Nebraska | 56.9% | 23 | 50.6% | 21 |
| Nevada | 49.6% | 41 | 43.8% | 41 |
| New Hampshire | 57.7% | 20 | 50.8% | 20 |
| New Jersey | 48.6% | 44 | 42.3% | 44 |
| New Mexico | 54.2% | 32 | 48.8% | 30 |
| New York | 50.9% | 39 | 44.5% | 40 |
| North Carolina | 58.0% | 19 | 51.4% | 18 |
| North Dakota | 57.1% | 22 | 49.4% | 26 |
| Ohio | 59.8% | 14 | 53.5% | 10 |
| Oklahoma | 66.4% | 2 | 58.6% | 2 |
| Oregon | 48.8% | 42 | 43.4% | 42 |
| Pennsylvania | 56.7% | 24 | 50.4% | 23 |
| Rhode Island | 53.8% | 33 | 48.4% | 31 |
| South Carolina | 62.9% | 5 | 55.5% | 5 |
| South Dakota | 60.4% | 11 | 53.3% | 14 |
| Tennessee | 63.4% | 4 | 57.4% | 3 |
| Texas | 57.2% | 21 | 50.4% | 23 |
| Utah | 46.4% | 48 | 40.6% | 46 |
| Vermont | 47.7% | 45 | 42.1% | 45 |
| Virginia | 49.7% | 40 | 44.7% | 39 |
| Washington | 55.5% | 28 | 49.1% | 28 |
| West Virginia | 60.2% | 12 | 53.4% | 11 |
| Wisconsin | 56.3% | 26 | 49.4% | 26 |
| Wyoming | 56.6% | 25 | 50.5% | 22 |

## DISEASE RATES

Nationally, obesity could contribute to more than 6 million cases of type 2 diabetes, 5 million cases of coronary heart disease and stroke, and more than 400,000 cases of cancer in the next two decades, according to *The Lancet* study's conservative estimates.[59]

As the number of obese individuals grows, the segment of the population that is currently at risk for the highest incidence of health problems related to obesity exponentially increases their risk of developing those conditions. This report examined the potential growth of five of the highest-cost and highest-incidence health problems related to obesity — type 2 diabetes, coronary heart disease and stroke, hypertension, arthritis and obesity-related cancer. For instance, approximately 33 percent of Americans (79 million people) are currently pre-diabetic, which means they have prolonged or uncontrolled elevated blood sugar levels that can contribute to the development of diabetes. These 79 million Americans are at a tipping point. As more Americans become obese, more people who are currently maintaining blood sugar levels below the level of full-blown diabetes will cross over that line. Twenty years ago, only 7.8 million Americans had been diagnosed with diabetes. Currently, around 25.8 million Americans have diabetes, and if trends continue on their current track, in 2030, more than 31 million Americans will have diabetes.

The analysis found that if we continue on current trajectories by 2030, for every 100,000 Americans, the number of additional individuals that could develop the top five obesity-related health conditions (new cases) range from:

- **Type 2 Diabetes:** Between 8,658 in Utah to 15,208 in West Virginia (average for all states: 12,127)
- **Coronary Heart Disease and Stroke:** Between 16,730 in Utah to 35,519 in West Virginia (average for all states: 26,573)
- **Hypertension:** Between 17,790 in Utah to 30,508 in Maine (average for all states: 24,923)
- **Arthritis:** Between 12,504 in Utah to 18,725 in Maine (average for all states: 16,152)
- **Obesity-Related Cancer:** Between 2,468 in Utah to 4,897 in Maine (average for all states: 3,781)

However, if states could reduce the average BMI by 5 percent by 2030, thousands of cases of type 2 diabetes, coronary heart disease, stroke, hypertension and arthritis (except Alaska and Utah) could be prevented per 100,000 people in nearly each state, and more than 100 cases of obesity-related cancer per 100,000 people could be prevented per state.

For every 100,000 Americans, the number of **individuals who could avoid these serious health problems** range from:

- **Type 2 Diabetes:** Between 1,810 in Utah to 3,216 in West Virginia
- **Coronary Heart Disease and Stroke:** Between 1,339 in Utah to 2,898 in West Virginia
- **Hypertension:** Between 1,427 in Utah to 2,512 in Maine
- **Arthritis:** Between 849 in Utah to 1,382 in Maine
- **Obesity-Related Cancer:** Between 101 in Utah to 277 in Maine

More information about these five top obesity-related health problems is provided in the following section.



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## Health Care Costs

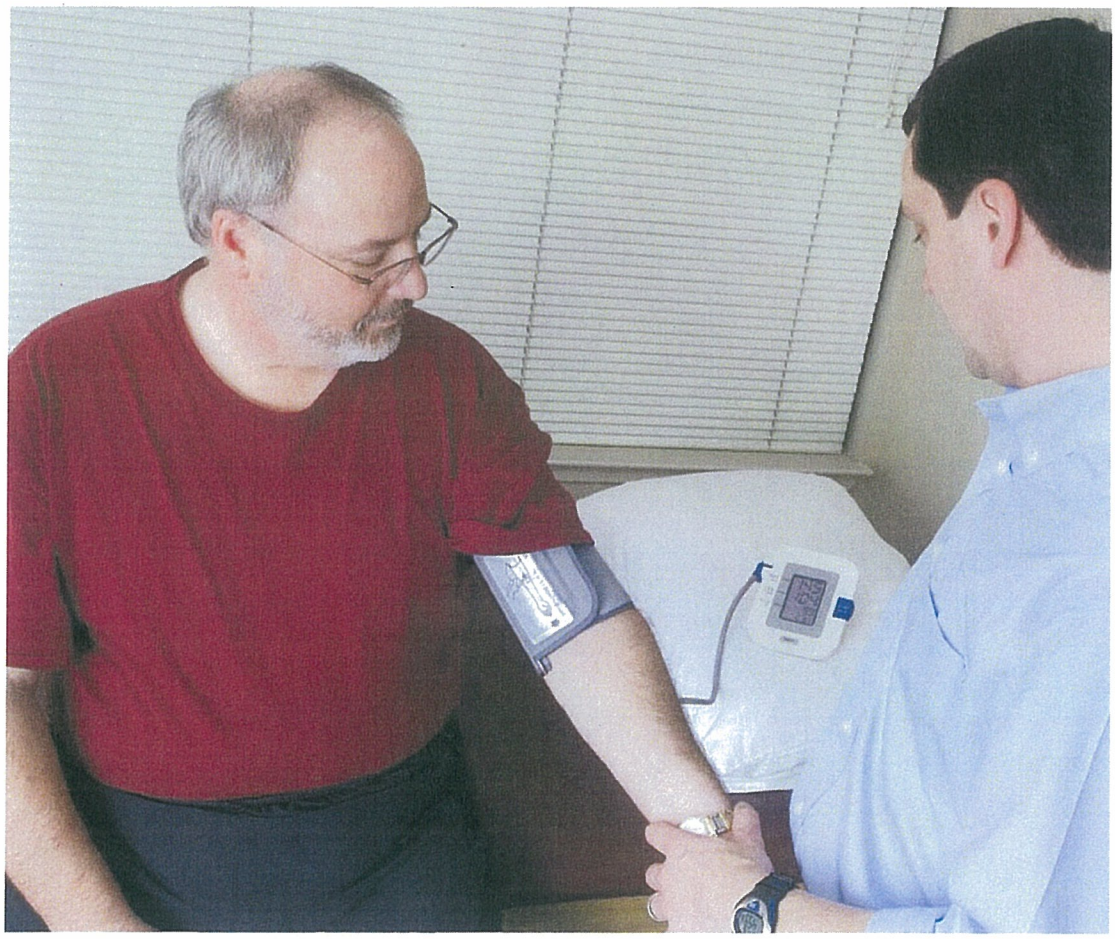
The national analysis found combined medical costs associated with treating preventable obesity-related diseases are estimated to increase by between $48 billion and $66 billion per year in the United States by 2030 — while the loss in economic productivity could be between $390 billion and $580 billion annually by 2030.[60]

In the state-by-state review, the analysis found that if obesity rates continue on their current track, obesity-related health care costs are on a course to increase significantly in most states:

- New Jersey could see an increase of more than a third (34.5 percent);
- Eight states could see increases between 20 percent and 30 percent — New Hampshire (28.7 percent), Colorado (28.5 percent), Alaska (25.7 percent), Georgia (24.3 percent), Virginia (23.8 percent), Washington (21.6 percent), Maryland (21.3 percent) and Vermont (20.3 percent);
- 16 states and Washington, D.C., could expect increases between 15 percent and 20 percent;
- 18 states could expect increases between 10 percent and 15 percent; and
- Only seven states could have increases lower than 10 percent.

Many states that currently have lower obesity rates, such as Colorado and New Hampshire, stand to see the largest increases in obesity-related costs if obesity continues to grow on its current trajectory.

Reducing average BMI by 5 percent by 2030 could significantly reduce health care costs around the country. Every state except Florida would save between 6.5 percent and 7.8 percent in obesity-related health costs. (The impact on Florida, which could see a 2.1 percent reduction, would likely be less significant because of the older demographics in the state.)



| New Cases by 2030 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| State | New Diabetes Cases by 2030 (per 100,000) | Rank (per 100,000) | New Cancer Cases by 2030 (per 100,000) | Rank (per 100,000) | New CHD & Stroke Cases by 2030 (per 100,000) | Rank (per 100,000) | New Hypertension Cases by 2030 (per 100,000) | Rank (per 100,000) | New Arthritis Cases by 2030 (per 100,000) | Rank (per 100,000) |
| Alabama | 13,777 | 9 | 4,169 | 9 | 30,376 | 8 | 26,782 | 10 | 17,039 | 13 |
| Alaska | 9,648 | 49 | 3,034 | 50 | 20,785 | 50 | 21,258 | 50 | 14,501 | 50 |
| Arizona | 11,239 | 42 | 3,358 | 45 | 23,405 | 44 | 22,356 | 47 | 14,942 | 45 |
| Arkansas | 13,000 | 18 | 3,950 | 20 | 28,548 | 18 | 25,512 | 26 | 16,484 | 25 |
| California | 10,078 | 48 | 3,320 | 46 | 22,365 | 47 | 22,360 | 46 | 14,783 | 49 |
| Colorado | 10,146 | 47 | 3,443 | 43 | 22,979 | 46 | 23,592 | 43 | 15,371 | 44 |
| Connecticut | 11,524 | 37 | 4,130 | 12 | 28,320 | 20 | 26,281 | 17 | 16,677 | 20 |
| Delaware | 13,360 | 13 | 4,217 | 8 | 29,936 | 9 | 27,039 | 8 | 16,922 | 14 |
| DC | 9,346 | 50 | 3,288 | 48 | 21,229 | 49 | 21,989 | 49 | 14,892 | 47 |
| Florida | 12,816 | 19 | 4,561 | 3 | 32,471 | 3 | 27,611 | 5 | 17,138 | 9 |
| Georgia | 11,405 | 40 | 3,311 | 47 | 23,032 | 45 | 23,286 | 44 | 15,519 | 42 |
| Hawaii | 11,031 | 45 | 3,791 | 31 | 26,121 | 38 | 24,174 | 42 | 15,486 | 43 |
| Idaho | 11,156 | 43 | 3,400 | 44 | 23,845 | 42 | 22,605 | 45 | 14,894 | 46 |
| Illinois | 11,856 | 34 | 3,639 | 41 | 25,304 | 41 | 24,420 | 38 | 15,975 | 36 |
| Indiana | 12,497 | 25 | 3,737 | 33 | 26,801 | 32 | 24,925 | 31 | 16,181 | 31 |
| Iowa | 12,007 | 33 | 3,933 | 21 | 28,018 | 21 | 24,996 | 29 | 16,150 | 32 |
| Kansas | 12,809 | 20 | 3,703 | 38 | 26,803 | 31 | 24,838 | 34 | 16,022 | 35 |
| Kentucky | 13,596 | 10 | 4,034 | 16 | 29,257 | 14 | 26,909 | 9 | 17,132 | 10 |
| Louisiana | 13,238 | 14 | 3,718 | 36 | 26,723 | 34 | 24,870 | 33 | 16,267 | 30 |
| Maine | 14,507 | 3 | 4,897 | 1 | 34,833 | 2 | 30,508 | 1 | 18,725 | 1 |
| Maryland | 12,720 | 21 | 3,825 | 30 | 26,433 | 37 | 25,538 | 25 | 16,617 | 24 |
| Massachusetts | 11,313 | 41 | 4,045 | 15 | 27,214 | 27 | 25,858 | 21 | 16,639 | 22 |
| Michigan | 13,997 | 5 | 4,002 | 19 | 28,941 | 15 | 26,450 | 15 | 17,249 | 8 |
| Minnesota | 11,411 | 39 | 3,642 | 40 | 25,550 | 40 | 24,549 | 36 | 15,808 | 39 |
| Mississippi | 13,945 | 6 | 3,729 | 35 | 27,346 | 24 | 25,233 | 28 | 16,372 | 27 |
| Missouri | 14,032 | 4 | 4,016 | 18 | 29,291 | 13 | 26,373 | 16 | 16,918 | 15 |
| Montana | 12,639 | 22 | 4,287 | 7 | 30,542 | 6 | 27,080 | 7 | 17,063 | 11 |
| Nebraska | 12,225 | 30 | 3,706 | 37 | 26,672 | 35 | 24,211 | 41 | 15,741 | 41 |
| Nevada | 11,443 | 38 | 3,670 | 39 | 25,796 | 39 | 24,361 | 39 | 15,806 | 40 |
| New Hampshire | 13,850 | 8 | 4,363 | 5 | 30,933 | 5 | 28,959 | 3 | 18,146 | 3 |
| New Jersey | 11,012 | 46 | 3,492 | 42 | 23,661 | 43 | 24,687 | 35 | 16,078 | 34 |
| New Mexico | 12,146 | 31 | 3,850 | 28 | 26,875 | 29 | 24,515 | 37 | 15,972 | 37 |
| New York | 11,612 | 36 | 3,915 | 23 | 26,806 | 30 | 25,450 | 27 | 16,332 | 28 |
| North Carolina | 12,604 | 24 | 3,759 | 32 | 26,638 | 36 | 24,994 | 30 | 16,289 | 29 |
| North Dakota | 11,641 | 35 | 3,913 | 25 | 27,836 | 22 | 24,925 | 31 | 16,098 | 33 |
| Ohio | 13,851 | 7 | 4,079 | 13 | 29,441 | 12 | 26,742 | 13 | 17,058 | 12 |
| Oklahoma | 13,525 | 12 | 3,879 | 27 | 28,516 | 19 | 25,579 | 23 | 16,373 | 26 |
| Oregon | 12,078 | 32 | 3,922 | 22 | 27,245 | 26 | 25,555 | 24 | 16,666 | 21 |
| Pennsylvania | 13,586 | 11 | 4,340 | 6 | 31,110 | 4 | 27,338 | 6 | 17,376 | 7 |
| Rhode Island | 13,215 | 15 | 4,149 | 10 | 28,655 | 17 | 26,754 | 12 | 17,497 | 5 |
| South Carolina | 13,156 | 16 | 4,023 | 17 | 28,886 | 16 | 25,993 | 18 | 16,687 | 19 |
| South Dakota | 12,278 | 29 | 3,737 | 33 | 27,013 | 28 | 24,317 | 40 | 15,844 | 38 |
| Tennessee | 14,673 | 2 | 4,066 | 14 | 29,625 | 10 | 26,778 | 11 | 17,449 | 6 |
| Texas | 11,107 | 44 | 3,158 | 49 | 22,156 | 48 | 22,160 | 48 | 14,791 | 48 |
| Utah | 8,658 | 51 | 2,468 | 51 | 16,730 | 51 | 17,790 | 51 | 12,504 | 51 |
| Vermont | 12,322 | 28 | 4,430 | 4 | 30,429 | 7 | 27,823 | 4 | 17,608 | 4 |
| Virginia | 12,607 | 23 | 3,890 | 26 | 27,309 | 25 | 25,976 | 19 | 16,780 | 18 |
| Washington | 12,366 | 27 | 3,829 | 29 | 26,758 | 33 | 25,769 | 22 | 16,639 | 22 |
| West Virginia | 15,208 | 1 | 4,796 | 2 | 35,519 | 1 | 30,092 | 2 | 18,720 | 2 |
| Wisconsin | 12,408 | 26 | 3,914 | 24 | 27,658 | 23 | 25,880 | 20 | 16,785 | 17 |
| Wyoming | 13,005 | 17 | 4,149 | 10 | 29,564 | 11 | 26,632 | 14 | 16,892 | 16 |



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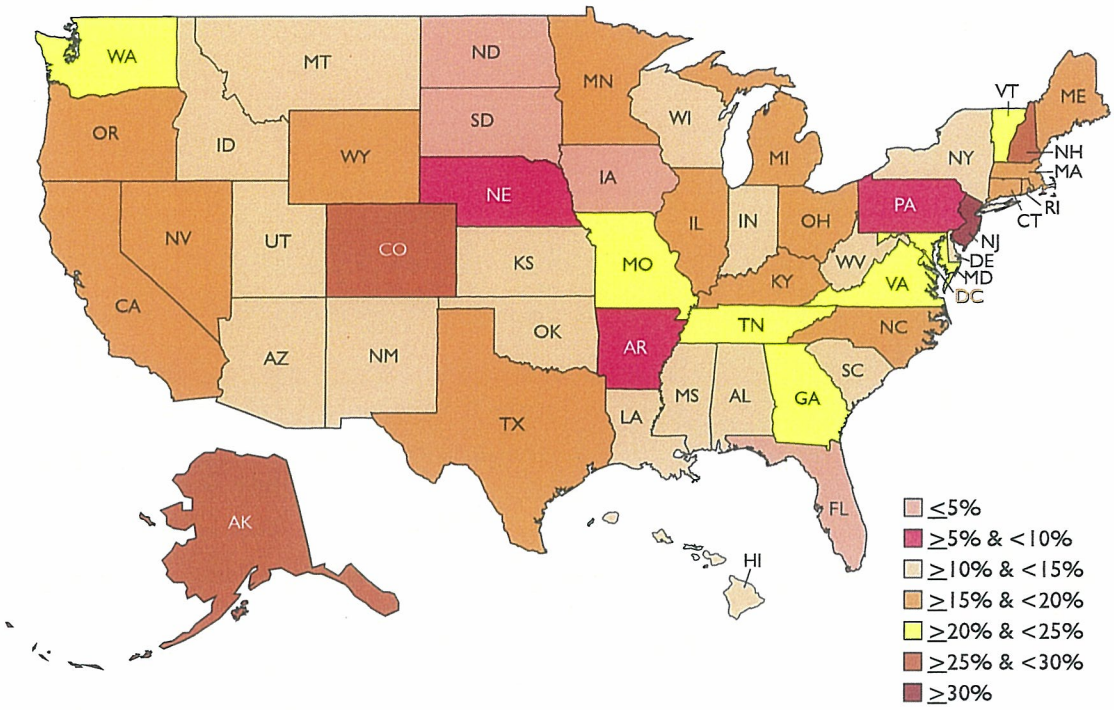
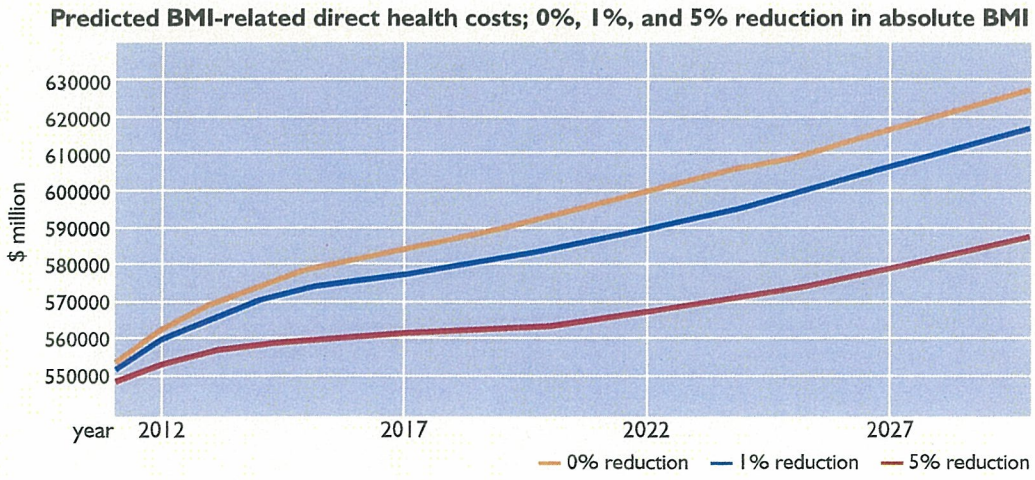
| TOTAL HEALTH CARE COSTS 2030 | | | | | |
|---|---|---|---|---|---|
| State | Percentage of Potential Increase in Obesity-Related Health Care Costs by 2030 on Current Course | Rank for Potential Increase in Obesity-Related Health Care Costs by 2030 | Potential Savings by 2020 if State Reduced Average BMI by 5% (cumulative) | Potential Savings by 2030 if State Reduced Average BMI by 5% (cumulative) | Percentage of Potential Savings by 2030 if State Reduced Average BMI by 5% |
| Alabama | 12% | 34th | $3,381,000,000 | $9,481,000,000 | 7.1% |
| Alaska | 25.7% | 4th | $573,000,000 | $1,530,000,000 | 6.5% |
| Arizona | 11.1% | 41st | $4,775,000,000 | $13,642,000,000 | 7.5% |
| Arkansas | 9.6% | 45th | $2,157,000,000 | $6,054,000,000 | 7.6% |
| California | 15.7% | 22nd | $28,886,000,000 | $81,702,000,000 | 7.6% |
| Colorado | 28.5% | 3rd | $3,792,000,000 | $10,794,000,000 | 7.1% |
| Connecticut | 15.7% | 22nd | $2,626,000,000 | $7,370,000,000 | 7.0% |
| Delaware | 14.0% | 28th | $701,000,000 | $1,912,000,000 | 7.3% |
| DC | 18.8% | 15th | $364,000,000 | $1,026,000,000 | 6.7% |
| Florida | 3.3% | 50th | $12,541,000,000 | $34,436,000,000 | 2.1% |
| Georgia | 24.3% | 5th | $7,963,000,000 | $22,743,000,000 | 7.7% |
| Hawaii | 12.3% | 38th | $976,000,000 | $2,704,000,000 | 7.1% |
| Idaho | 12.0% | 36th | $1,195,000,000 | $3,280,000,000 | 7.3% |
| Illinois | 16.1% | 21st | $9,852,000,000 | $28,185,000,000 | 7.5% |
| Indiana | 13.0% | 32nd | $5,020,000,000 | $13,400,000,000 | 7.1% |
| Iowa | 3.7% | 49th | $2,059,000,000 | $5,702,000,000 | 7.1% |
| Kansas | 11.2% | 43rd | $2,188,000,000 | $5,979,000,000 | 7.7% |
| Kentucky | 17.6% | 17th | $3,376,000,000 | $9,437,000,000 | 7.3% |
| Louisiana | 12.8% | 39th | $3,657,000,000 | $9,839,000,000 | 7.3% |
| Maine | 19.0% | 12th | $1,019,000,000 | $2,870,000,000 | 7.1% |
| Maryland | 21.3% | 7th | $4,935,000,000 | $13,836,000,000 | 7.6% |
| Massachusetts | 19.1% | 10th | $5,045,000,000 | $14,055,000,000 | 7.2% |
| Michigan | 19.0% | 12th | $8,710,000,000 | $24,187,000,000 | 7.7% |
| Minnesota | 15.7% | 26th | $4,189,000,000 | $11,630,000,000 | 7.3% |
| Mississippi | 11.7% | 40th | $2,270,000,000 | $6,120,000,000 | 6.9% |
| Missouri | 13.9% | 31st | $4,718,000,000 | $13,368,000,000 | 7.9% |
| Montana | 13.0% | 32nd | $715,000,000 | $1,939,000,000 | 6.9% |
| Nebraska | 6.7% | 47th | $1,334,000,000 | $3,686,000,000 | 7.5% |
| Nevada | 18.2% | 14th | $2,095,000,000 | $5,921,000,000 | 7.3% |
| New Hampshire | 28.7% | 2nd | $1,158,000,000 | $3,257,000,000 | 7.1% |
| New Jersey | 34.5% | 1st | $471,000,000 | $1,391,000,000 | 7.4% |
| New Mexico | 11.8% | 42nd | $1,483,000,000 | $4,095,000,000 | 7.3% |
| New York | 14.8% | 29th | $14,097,000,000 | $40,017,000,000 | 7.2% |
| North Carolina | 17.6% | 17th | $7,633,000,000 | $21,101,000,000 | 7.5% |
| North Dakota | 1.9% | 51st | $413,000,000 | $1,177,000,000 | 7.2% |
| Ohio | 15.2% | 25th | $9,628,000,000 | $26,328,000,000 | 7.6% |
| Oklahoma | 10.8% | 44th | $2,755,000,000 | $7,444,000,000 | 7.2% |
| Oregon | 17.3% | 16th | $2,791,000,000 | $7,938,000,000 | 7.3% |
| Pennsylvania | 9.1% | 46th | $8,774,000,000 | $24,498,000,000 | 7.1% |
| Rhode Island | 19.9% | 11th | $855,000,000 | $2,478,000,000 | 7.6% |
| South Carolina | 12.6% | 35th | $3,319,000,000 | $9,309,000,000 | 7.4% |
| South Dakota | 3.6% | 48th | $569,000,000 | $1,553,000,000 | 7.6% |
| Tennessee | 17.8% | 20th | $4,928,000,000 | $13,827,000,000 | 7.6% |
| Texas | 17.1% | 19th | $19,386,000,000 | $54,194,000,000 | 7.7% |
| Utah | 13.7% | 30th | $2,122,000,000 | $5,843,000,000 | 7.8% |
| Vermont | 20.3% | 9th | $487,000,000 | $1,376,000,000 | 7.3% |
| Virginia | 23.8% | 6th | $6,266,000,000 | $18,114,000,000 | 7.4% |
| Washington | 21.6% | 8th | $5,201,000,000 | $14,729,000,000 | 7.4% |
| West Virginia | 12.0% | 36th | $1,346,000,000 | $3,638,000,000 | 6.8% |
| Wisconsin | 14.7% | 27th | $4,148,000,000 | $11,962,000,000 | 7.4% |
| Wyoming | 15.6% | 24th | $389,000,000 | $1,088,000,000 | 7.3% |

## Potential Percent Growth in Obesity-Related Health Care Costs by 2030 if the Current Trajectory Continues (By Percent)




## Projected Obesity-Related Health Care Costs 2010 to 2030



## CURRENT ECONOMIC COSTS OF OBESITY

### Health Care Costs

- The medical cost of adult obesity in the United States is difficult to calculate but estimates range from $147 billion to nearly $210 billion per year.[61] The bulk of the spending is generated from treating obesity-related diseases such as diabetes.[62]
  - ▲ Of the $147 billion, Medicare and Medicaid are responsible for $61.8 billion. Medicare and Medicaid spending would be 8.5 percent and 11.8 percent lower, respectively, in the absence of obesity.[63]
  - ▲ Obese people spend 42 percent more on health care costs than healthy-weight people.[64]
- Childhood obesity alone is responsible for $14.1 billion in direct costs.[65]
- Annually, the average total health expenses for a child treated for obesity under Medicaid is $6,730, while the average health cost for all children covered by Medicaid is $2,446. The average total health expenses for a child treated for obesity under private insurance is $3,743, while the average health cost for all children covered by private insurance is $1,108.[66]
- Hospitalizations of children and youths with a diagnosis of obesity nearly doubled between 1999 and 2005, while total costs for children and youth with obesity-related hospitalizations increased from $125.9 million in 2001 to $237.6 million in 2005, measured in 2005 dollars.[67]
- In California alone, the economic costs of overweight, obesity and physical inactivity are estimated at $41 billion a year.[68]

### Decreased Worker Productivity and Increased Absenteeism

- Obesity-related job absenteeism costs $4.3 billion annually.[69]
- Obesity is associated with lower productivity while at work (presenteeism), which costs employers $506 per obese worker per year.[70]
- As a person's BMI increases, so do the number of sick days, medical claims and health care costs associated with that person.[71]

### Higher Workers' Compensation Claims

- A number of studies have shown obese workers have higher workers' compensation claims.[72, 73, 74, 75, 76, 77]
- Obese employees had $51,091 in medical claims costs per 100 full-time employees, compared with only $7,503 in medical claims costs for healthy-weight workers. And obese workers had $59,178 in indemnity claims costs per 100 full-time employees, compared with only $5,396 in indemnity claims costs for healthy-weight employees.[78] Indemnity claims are those where an insurer agrees to cover the cost of losses suffered by the insured and can include medical payments and payment for lost time by the injured worker.

### Occupational Health and Safety Costs

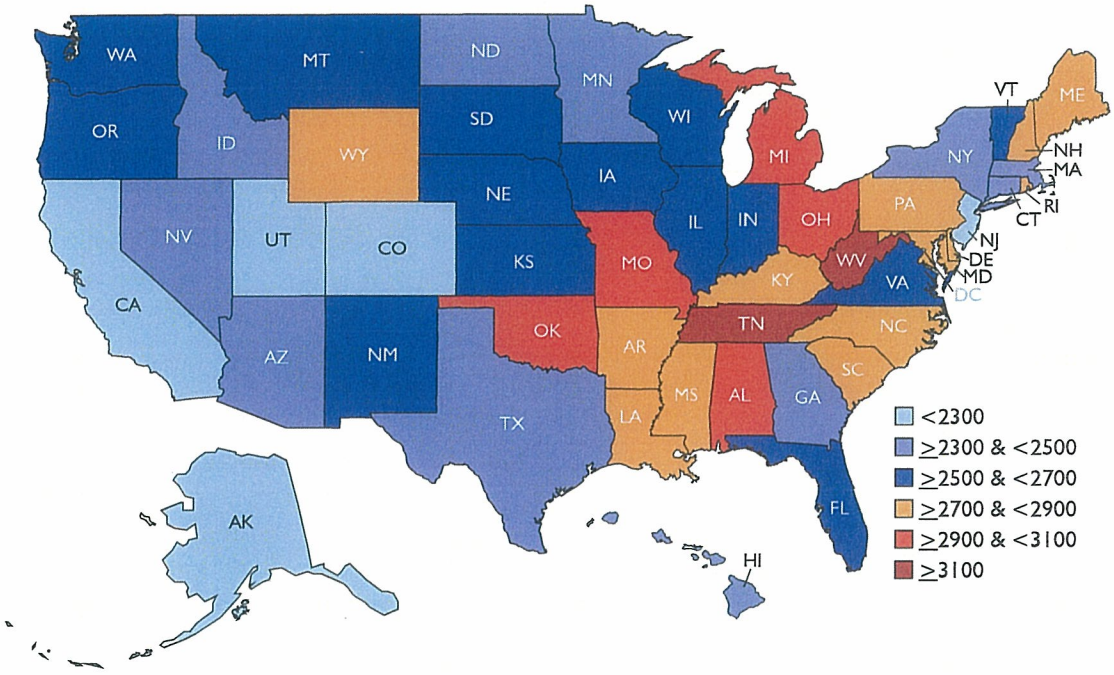
- Emergency responders and health care providers face unique challenges in transporting and treating the heaviest patients. According to one study, the number of severely obese (BMI $\geq$ 40) patients quadrupled between 1986 and 2000 from one in 200 to one in 50. The number of super-obese (BMI $\geq$ 50) patients grew by a factor of five, from one in 2,000 to one in 400.[79]
- A typical ambulance outfitted with equipment and two emergency medical technicians (EMTs) that can transport a 400-pound patient costs $70,000. A specially outfitted bariatric ambulance that can transport patients weighing up to 1,000 pounds costs $110,000.[80]
- A standard hospital bed can hold 500 pounds and costs $1,000. A bariatric hospital bed that can hold up to 1,000 pounds costs $4,000.[81]

## B. FIVE TOP OBESITY-RELATED HEALTH ISSUES

The NHF study commissioned by RWJF and TFAH examined the potential future rates — and related costs — of five of the leading health problems related to obesity if trends continue on their current track versus if average adult BMI was reduced by 5 percent in every state.

### 1. TYPE 2 DIABETES AND OBESITY

**Potential Diabetes Cases Avoided by 2030 if BMI is Reduced by 5 Percent (cases per 100,000 population)**




Diabetes is the seventh leading cause of death in the United States and accounts for $174 billion in total U.S. health care costs.[82]

More than 25 million adult Americans have diabetes.[83] Another 79 million Americans are pre-diabetic, which means they have elevated blood sugar levels that can contribute to the development of diabetes.[84] CDC projects that as many as one in three U.S. adults could have diabetes by 2050, and the analysis in this report shows the numbers could top 31 percent by 2030.[85]

Over a 10-year period, the number of adults in the United States ages 18–79 with newly diagnosed diabetes more than tripled from 493,000 in 1980 to more than 1.7 million in 2010.[86] About 1.9 million people aged 20 years or older were newly diagnosed with diabetes in 2010.[87]

Approximately 215,000 individuals under the age of 20 have diabetes.[88] Two million adolescents ages 12–19 have pre-diabetes.[89]

Being overweight or obese significantly increases an individual's risk of type 2 diabetes. More than 80 percent of people with type 2 diabetes are overweight.[90] Excess weight decreases the effectiveness of insulin, a hormone that transports sugar from blood to cells. When insulin doesn't work correctly, too much sugar stays in the bloodstream. To make up for this, the cells that produce insulin must produce more of the hormone. This process may lead the cells to deteriorate more quickly, exacerbating the development of diabetes.[91, 92]

People with type 2 diabetes have higher-than-normal levels of glucose, a source of sugar that humans produce by metabolizing carbohydrates, in their blood. High blood sugar contributes to a range of serious health problems, including heart disease, stroke, kidney disease, circulatory problems, neurological problems and eye damage.

### Nutrition, Physical Activity, Weight Loss and Diabetes

The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) found that a 7 percent weight loss together with moderate levels of physical activity (walking 30 minutes a day, five days a week) decreased the number of new type 2 diabetes cases by 58 percent among people at risk for diabetes.[93] While the lifestyle changes in nutrition and activity through the Diabetes Prevention Program (DPP) reduced the incidence of type 2 diabetes by 58 percent, drug therapy reduced the incidence by only 31 percent.[94]

Physical activity and weight loss both increase insulin sensitivity, which increases the body's ability to transport sugar from the bloodstream to cells. A healthy diet, with recommended levels of fruits, vegetables and grains and a limited amount of saturated fats and sweets, can also help reduce the severity of the illness.[95, 96, 97]

## DIABETES MANAGEMENT AND TEENS: STUDY FINDS DISCOURAGING RESULTS

Because type 2 diabetes previously was considered to be an adult condition, there are few studies evaluating how to treat young people with the disease. New research in the *New England Journal of Medicine* examined various treatments for controlling blood sugar in teens. Results showed that nearly half of participants failed in controlling the disease, and one in five suffered serious complications within a few years of diagnosis.[98] The results highlight the importance of preventing type 2 diabetes in the first place.

The research focused on nearly 700 overweight and obese teens recently diagnosed with type 2 diabetes. Teens were placed in one of three treatment groups and followed for four years. One group took metformin, another took metformin plus diet and exercise counseling, and the final group was given metformin plus a second drug, Avandia. Results showed that half in the metformin group failed to maintain blood sugar control, but the outcomes for the other two groups were not much better.[99]

## WHERE YOU LIVE MATTERS: MOVING TO HIGHER-INCOME AREAS REDUCES RISK OF OBESITY AND DIABETES FOR POOR WOMEN

Between 1994 and 1998 the U.S. Department of Housing and Urban Development (HUD) randomly assigned families living in public housing projects in high-poverty neighborhoods into an experimental and control group. The experimental group was given vouchers to move to higher-income neighborhoods, and the control group did not receive vouchers. Findings of the study, which were released in the *New England Journal of Medicine*, revealed that having the option to move to lower-poverty neighborhoods lowered the risk of obesity and diabetes among poor women.[100] Women who were given the vouchers were almost one-fifth less likely to become extremely obese and were one-fifth less likely to develop diabetes compared with women who were not offered the housing voucher.[101]



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## Diabetes Costs and Cases

| State | 2010 Number of Cases | New Diabetes Cases by 2030 | New Diabetes Cases by 2030 (per 100,000) | Rank New Cases by 2030 (per 100,000) | Potential Cases Avoided by 2020 if Average BMI Reduced by 5% (cumulative) | Potential Cost Savings by 2020, if Average BMI Reduced by 5% (cumulative) | Potential Cases Avoided by 2030, if Average BMI Reduced by 5% (cumulative) | Potential Cost Savings by 2030, if Average BMI Reduced by 5% (cumulative) |
|---|---|---|---|---|---|---|---|---|
| Alabama | 448,912 | 661,673 | 13,777 | 9 | 72,185 | $1,152,000,000 | 141,297 | $3,672,000,000 |
| Alaska | 50,843 | 69,728 | 9,648 | 49 | 7,892 | $176,000,000 | 14,389 | $546,000,000 |
| Arizona | 496,106 | 728,569 | 11,239 | 42 | 79,411 | $1,739,000,000 | 154,737 | $5,781,000,000 |
| Arkansas | 265,417 | 381,937 | 13,000 | 18 | 41,337 | $722,000,000 | 80,530 | $2,324,000,000 |
| California | 2,694,595 | 3,798,591 | 10,078 | 48 | 420,642 | $9,747,000,000 | 796,430 | $31,087,000,000 |
| Colorado | 333,206 | 519,150 | 10,146 | 47 | 54,596 | $1,247,000,000 | 108,067 | $4,043,000,000 |
| Connecticut | 267,944 | 412,641 | 11,524 | 37 | 42,682 | $887,000,000 | 83,932 | $2,824,000,000 |
| Delaware | 79,275 | 121,193 | 13,360 | 13 | 13,017 | $228,000,000 | 25,427 | $721,000,000 |
| DC | 40,312 | 57,758 | 9,346 | 50 | 6,155 | $133,000,000 | 11,705 | $433,000,000 |
| Florida | 1,722,611 | 2,442,415 | 12,816 | 19 | 260,135 | $4,459,000,000 | 501,976 | $14,074,000,000 |
| Georgia | 754,593 | 1,119,425 | 11,405 | 40 | 123,475 | $2,563,000,000 | 238,019 | $8,324,000,000 |
| Hawaii | 105,063 | 151,655 | 11,031 | 45 | 15,879 | $319,000,000 | 31,634 | $1,051,000,000 |
| Idaho | 119,270 | 176,821 | 11,156 | 43 | 19,384 | $404,000,000 | 36,677 | $1,274,000,000 |
| Illinois | 1,014,097 | 1,525,779 | 11,856 | 34 | 167,300 | $3,434,000,000 | 325,721 | $11,141,000,000 |
| Indiana | 544,815 | 814,420 | 12,497 | 25 | 89,021 | $1,635,000,000 | 170,743 | $5,160,000,000 |
| Iowa | 262,746 | 367,691 | 12,007 | 33 | 40,851 | $726,000,000 | 77,783 | $2,287,000,000 |
| Kansas | 239,691 | 367,777 | 12,809 | 20 | 39,537 | $741,000,000 | 77,294 | $2,390,000,000 |
| Kentucky | 394,029 | 594,058 | 13,596 | 10 | 63,793 | $1,104,000,000 | 124,701 | $3,503,000,000 |
| Louisiana | 398,422 | 605,617 | 13,238 | 14 | 66,884 | $1,212,000,000 | 127,455 | $3,882,000,000 |
| Maine | 120,878 | 192,680 | 14,507 | 3 | 19,949 | $344,000,000 | 40,550 | $1,114,000,000 |
| Maryland | 469,294 | 741,358 | 12,720 | 21 | 79,731 | $1,580,000,000 | 158,413 | $5,211,000,000 |
| Massachusetts | 483,855 | 745,248 | 11,313 | 41 | 77,206 | $1,656,000,000 | 155,532 | $5,436,000,000 |
| Michigan | 861,006 | 1,382,370 | 13,997 | 5 | 147,056 | $2,777,000,000 | 294,113 | $9,067,000,000 |
| Minnesota | 410,004 | 609,902 | 11,411 | 39 | 65,368 | $1,350,000,000 | 127,368 | $4,367,000,000 |
| Mississippi | 284,269 | 415,353 | 13,945 | 6 | 45,988 | $774,000,000 | 86,347 | $2,472,000,000 |
| Missouri | 535,793 | 843,420 | 14,032 | 4 | 90,942 | $1,575,000,000 | 179,659 | $5,084,000,000 |
| Montana | 83,849 | 126,162 | 12,639 | 22 | 13,156 | $234,000,000 | 26,522 | $758,000,000 |
| Nebraska | 152,276 | 225,263 | 12,225 | 30 | 24,784 | $458,000,000 | 47,577 | $1,456,000,000 |
| Nevada | 214,217 | 311,630 | 11,443 | 38 | 34,232 | $690,000,000 | 65,087 | $2,172,000,000 |
| New Hampshire | 108,764 | 182,570 | 13,850 | 8 | 18,692 | $385,000,000 | 38,425 | $1,239,000,000 |
| New Jersey | 607,689 | 971,386 | 11,012 | 46 | 103,119 | $158,000,000 | 202,357 | $520,000,000 |
| New Mexico | 173,054 | 252,907 | 12,146 | 31 | 26,569 | $486,000,000 | 52,597 | $1,599,000,000 |
| New York | 1,516,923 | 2,260,299 | 11,612 | 36 | 241,952 | $4,774,000,000 | 473,588 | $15,726,000,000 |
| North Carolina | 820,118 | 1,217,093 | 12,604 | 24 | 134,610 | $2,363,000,000 | 261,785 | $7,746,000,000 |
| North Dakota | 58,887 | 79,617 | 11,641 | 35 | 8,809 | $150,000,000 | 16,873 | $491,000,000 |
| Ohio | 1,012,377 | 1,599,091 | 13,851 | 7 | 174,329 | $3,075,000,000 | 342,192 | $9,899,000,000 |
| Oklahoma | 337,823 | 512,801 | 13,525 | 12 | 56,835 | $912,000,000 | 110,522 | $2,950,000,000 |
| Oregon | 313,737 | 467,643 | 12,078 | 32 | 49,676 | $936,000,000 | 98,578 | $3,089,000,000 |
| Pennsylvania | 1,135,646 | 1,731,248 | 13,586 | 11 | 185,919 | $3,208,000,000 | 366,995 | $10,318,000,000 |
| Rhode Island | 82,811 | 138,930 | 13,215 | 15 | 14,308 | $297,000,000 | 29,889 | $1,018,000,000 |
| South Carolina | 429,273 | 615,599 | 13,156 | 16 | 68,972 | $1,099,000,000 | 133,498 | $3,548,000,000 |
| South Dakota | 70,269 | 101,181 | 12,278 | 29 | 11,166 | $196,000,000 | 21,780 | $638,000,000 |
| Tennessee | 594,871 | 939,564 | 14,673 | 2 | 102,390 | $1,676,000,000 | 201,257 | $5,505,000,000 |
| Texas | 1,962,059 | 2,851,687 | 11,107 | 44 | 321,447 | $6,597,000,000 | 605,152 | $21,338,000,000 |
| Utah | 164,385 | 243,915 | 8,658 | 51 | 27,327 | $718,000,000 | 50,992 | $2,289,000,000 |
| Vermont | 50,472 | 77,189 | 12,322 | 28 | 8,000 | $160,000,000 | 16,193 | $526,000,000 |
| Virginia | 644,975 | 1,020,739 | 12,607 | 23 | 106,956 | $2,122,000,000 | 209,621 | $6,837,000,000 |
| Washington | 550,296 | 844,602 | 12,366 | 27 | 90,361 | $1,680,000,000 | 178,401 | $5,534,000,000 |
| West Virginia | 191,529 | 282,164 | 15,208 | 1 | 29,964 | $430,000,000 | 59,669 | $1,391,000,000 |
| Wisconsin | 470,136 | 708,716 | 12,408 | 26 | 74,310 | $1,442,000,000 | 147,935 | $4,733,000,000 |
| Wyoming | 48,566 | 73,889 | 13,005 | 17 | 7,750 | $127,000,000 | 15,596 | $421,000,000 |



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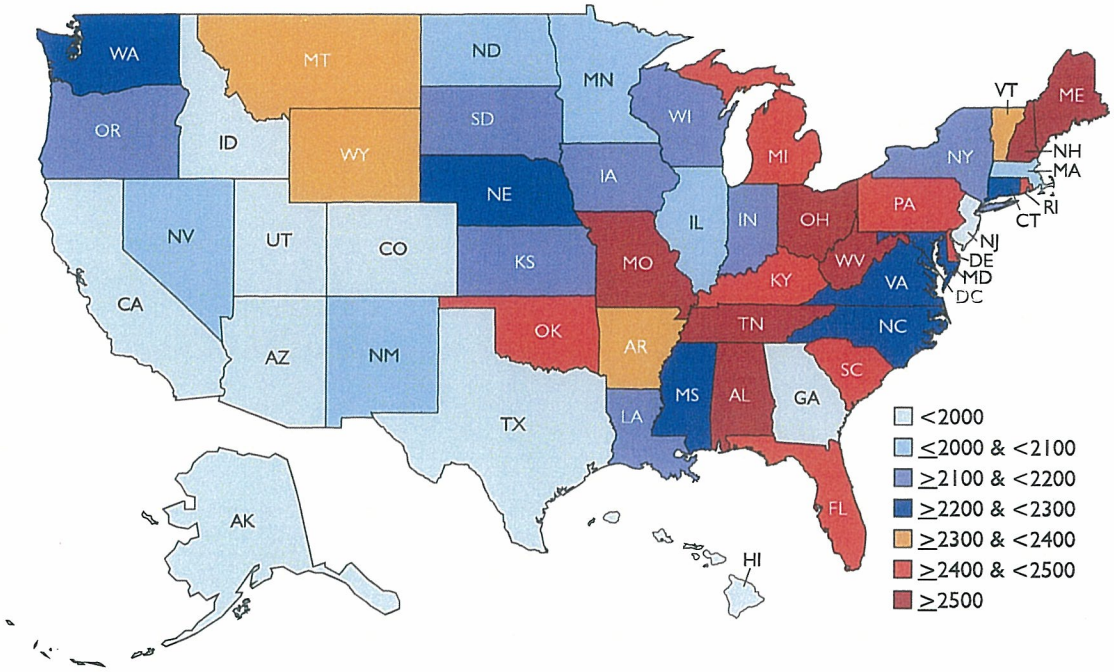
## 2. HEART DISEASE, STROKE AND OBESITY

### Potential Chronic Heart Disease & Stroke Cases Avoided by 2030 if BMI is Reduced by 5 Percent (cases per 100,000 population)




Being overweight or obese raises the risk of having high blood pressure, having high levels of harmful blood fats known as triglycerides and high levels of low-density lipoprotein (LDL), also known as "bad cholesterol." And, it can lead to lower levels of high-density lipoprotein (HDL), also known as "good cholesterol." These conditions can raise the long-term risk of heart disease or stroke. Excess body fat can also produce chemicals in the body that trigger inflammation. Chronic inflammation throughout the body, and especially in blood vessels, may increase the risk of heart disease.[102]

Most cardiovascular disease can be prevented or at least delayed until old age through a combination of direct medical care and community-based prevention programs and policies, particularly those focusing on physical activity and nutrition, according to a review of more than 200 articles by the American Heart Association.[103]

## Weight Loss, Physical Activity, Nutrition and Heart Disease and Stroke

For individuals who are overweight or obese, evidence indicates that losing as little as 5 percent to 10 percent of total weight can reduce the risk of heart disease and stroke. For someone who weighs 220 pounds, 5 percent of total weight is 11 pounds. Weight loss may cut risks of heart disease and stroke by decreasing hypertension, lowering levels of triglycerides and bad cholesterol, and reducing inflammation, which may decrease cardiovascular risk. It also reduces the production of inflammatory chemicals in the body, and, as a result, reduces cardiovascular inflammation. In addition, exercise can help by strengthening the heart and improving blood flow. A healthy diet also can protect against heart disease and stroke.[104, 105]

## Coronary Heart Disease & Stroke Costs and Cases

| State | 2010 Number of Cases | New CHD & Stroke Cases by 2030 | New CHD & Stroke Cases by 2030 (per 100,000) | Rank New CHD & Stroke Cases by 2030 (per 100,000) | Potential Cases Avoided by 2020 if Average BMI Reduced by 5% (cumulative) | Potential Cost Savings by 2020, if Average BMI Reduced by 5% (cumulative) | Potential Cases Avoided by 2030, if Average BMI Reduced by 5% (cumulative) | Potential Cost Savings by 2030, if Average BMI Reduced by 5% (cumulative) |
|---|---|---|---|---|---|---|---|---|
| Alabama | 311,842 | 1,458,880 | 30,376 | 8 | 59,122 | $1,627,000,000 | 121,749 | $4,235,000,000 |
| Alaska | 29,747 | 150,217 | 20,785 | 50 | 6,273 | $281,000,000 | 11,889 | $692,000,000 |
| Arizona | 348,694 | 1,517,230 | 23,405 | 44 | 58,537 | $2,148,000,000 | 114,546 | $5,467,000,000 |
| Arkansas | 187,061 | 838,734 | 28,548 | 18 | 32,935 | $1,027,000,000 | 67,867 | $2,642,000,000 |
| California | 1,876,680 | 8,429,796 | 22,365 | 47 | 321,512 | $13,923,000,000 | 656,970 | $35,571,000,000 |
| Colorado | 231,944 | 1,175,789 | 22,979 | 46 | 45,232 | $1,761,000,000 | 95,428 | $4,735,000,000 |
| Connecticut | 214,986 | 1,014,057 | 28,320 | 20 | 37,776 | $1,296,000,000 | 79,528 | $3,316,000,000 |
| Delaware | 57,340 | 271,560 | 29,936 | 9 | 10,786 | $344,000,000 | 22,261 | $871,000,000 |
| DC | 29,219 | 131,194 | 21,229 | 49 | 4,721 | $165,000,000 | 9,295 | $406,000,000 |
| Florida | 1,412,354 | 6,188,174 | 32,471 | 3 | 234,408 | $5,913,000,000 | 465,385 | $14,684,000,000 |
| Georgia | 465,535 | 2,260,639 | 23,032 | 45 | 87,846 | $3,735,000,000 | 185,409 | $9,928,000,000 |
| Hawaii | 78,240 | 359,114 | 26,121 | 38 | 13,363 | $482,000,000 | 26,286 | $1,153,000,000 |
| Idaho | 85,114 | 377,940 | 23,845 | 42 | 15,232 | $585,000,000 | 30,146 | $1,454,000,000 |
| Illinois | 719,649 | 3,256,437 | 25,304 | 41 | 129,207 | $4,649,000,000 | 268,967 | $12,073,000,000 |
| Indiana | 386,193 | 1,746,600 | 26,801 | 32 | 72,338 | $2,499,000,000 | 140,700 | $5,922,000,000 |
| Iowa | 206,491 | 857,998 | 28,018 | 21 | 33,808 | $940,000,000 | 67,065 | $2,373,000,000 |
| Kansas | 176,438 | 769,578 | 26,803 | 31 | 31,727 | $1,051,000,000 | 63,052 | $2,560,000,000 |
| Kentucky | 264,958 | 1,278,342 | 29,257 | 14 | 52,389 | $1,656,000,000 | 107,355 | $4,298,000,000 |
| Louisiana | 274,399 | 1,222,533 | 26,723 | 34 | 50,964 | $1,723,000,000 | 99,640 | $4,120,000,000 |
| Maine | 91,512 | 462,648 | 34,833 | 2 | 17,970 | $491,000,000 | 38,398 | $1,265,000,000 |
| Maryland | 320,731 | 1,540,592 | 26,433 | 37 | 63,295 | $2,408,000,000 | 129,330 | $6,099,000,000 |
| Massachusetts | 375,028 | 1,792,732 | 27,214 | 27 | 65,085 | $2,358,000,000 | 138,075 | $5,918,000,000 |
| Michigan | 601,065 | 2,858,267 | 28,941 | 15 | 117,033 | $4,401,000,000 | 241,967 | $10,943,000,000 |
| Minnesota | 298,457 | 1,365,612 | 25,550 | 40 | 54,304 | $2,071,000,000 | 111,066 | $5,242,000,000 |
| Mississippi | 183,417 | 814,504 | 27,346 | 24 | 35,444 | $1,122,000,000 | 66,897 | $2,681,000,000 |
| Missouri | 383,542 | 1,760,591 | 29,291 | 13 | 73,330 | $2,290,000,000 | 152,070 | $5,935,000,000 |
| Montana | 64,244 | 304,870 | 30,542 | 6 | 12,018 | $358,000,000 | 23,617 | $847,000,000 |
| Nebraska | 116,013 | 491,469 | 26,672 | 35 | 20,435 | $629,000,000 | 40,796 | $1,593,000,000 |
| Nevada | 144,554 | 702,508 | 25,796 | 39 | 26,144 | $989,000,000 | 55,556 | $2,653,000,000 |
| New Hampshire | 76,996 | 407,757 | 30,933 | 5 | 16,082 | $561,000,000 | 35,077 | $1,467,000,000 |
| New Jersey | 398,981 | 2,087,173 | 23,661 | 43 | 77,009 | $220,000,000 | 168,660 | $610,000,000 |
| New Mexico | 123,330 | 559,598 | 26,875 | 29 | 21,384 | $730,000,000 | 43,102 | $1,782,000,000 |
| New York | 1,140,661 | 5,217,841 | 26,806 | 30 | 194,652 | $6,777,000,000 | 410,326 | $17,296,000,000 |
| North Carolina | 543,752 | 2,572,272 | 26,638 | 36 | 106,510 | $3,733,000,000 | 213,310 | $9,360,000,000 |
| North Dakota | 46,993 | 190,379 | 27,836 | 22 | 7,222 | $183,000,000 | 14,116 | $467,000,000 |
| Ohio | 732,181 | 3,398,949 | 29,441 | 12 | 145,120 | $4,726,000,000 | 293,011 | $11,718,000,000 |
| Oklahoma | 239,699 | 1,081,186 | 28,516 | 19 | 46,484 | $1,345,000,000 | 92,323 | $3,281,000,000 |
| Oregon | 225,575 | 1,054,888 | 27,245 | 26 | 40,229 | $1,330,000,000 | 82,200 | $3,388,000,000 |
| Pennsylvania | 892,129 | 3,964,312 | 31,110 | 4 | 150,111 | $3,956,000,000 | 312,456 | $9,867,000,000 |
| Rhode Island | 64,087 | 301,251 | 28,655 | 17 | 11,722 | $394,000,000 | 25,063 | $1,009,000,000 |
| South Carolina | 289,176 | 1,351,642 | 28,886 | 16 | 56,853 | $1,682,000,000 | 114,735 | $4,297,000,000 |
| South Dakota | 54,373 | 222,609 | 27,013 | 28 | 9,246 | $277,000,000 | 17,899 | $660,000,000 |
| Tennessee | 396,752 | 1,896,993 | 29,625 | 10 | 79,145 | $2,380,000,000 | 162,325 | $6,034,000,000 |
| Texas | 1,261,654 | 5,688,482 | 22,156 | 48 | 230,559 | $9,169,000,000 | 465,739 | $23,124,000,000 |
| Utah | 113,478 | 471,321 | 16,730 | 51 | 20,030 | $1,026,000,000 | 37,723 | $2,530,000,000 |
| Vermont | 38,031 | 190,617 | 30,429 | 7 | 6,978 | $243,000,000 | 14,702 | $618,000,000 |
| Virginia | 442,803 | 2,211,102 | 27,309 | 25 | 86,796 | $3,041,000,000 | 183,631 | $8,114,000,000 |
| Washington | 378,316 | 1,827,582 | 26,758 | 33 | 74,379 | $2,575,000,000 | 151,285 | $6,592,000,000 |
| West Virginia | 137,761 | 659,007 | 35,519 | 1 | 26,420 | $685,000,000 | 53,768 | $1,658,000,000 |
| Wisconsin | 347,847 | 1,579,761 | 27,658 | 23 | 59,574 | $1,968,000,000 | 123,717 | $5,171,000,000 |
| Wyoming | 35,021 | 167,970 | 29,564 | 11 | 6,619 | $189,000,000 | 13,403 | $474,000,000 |



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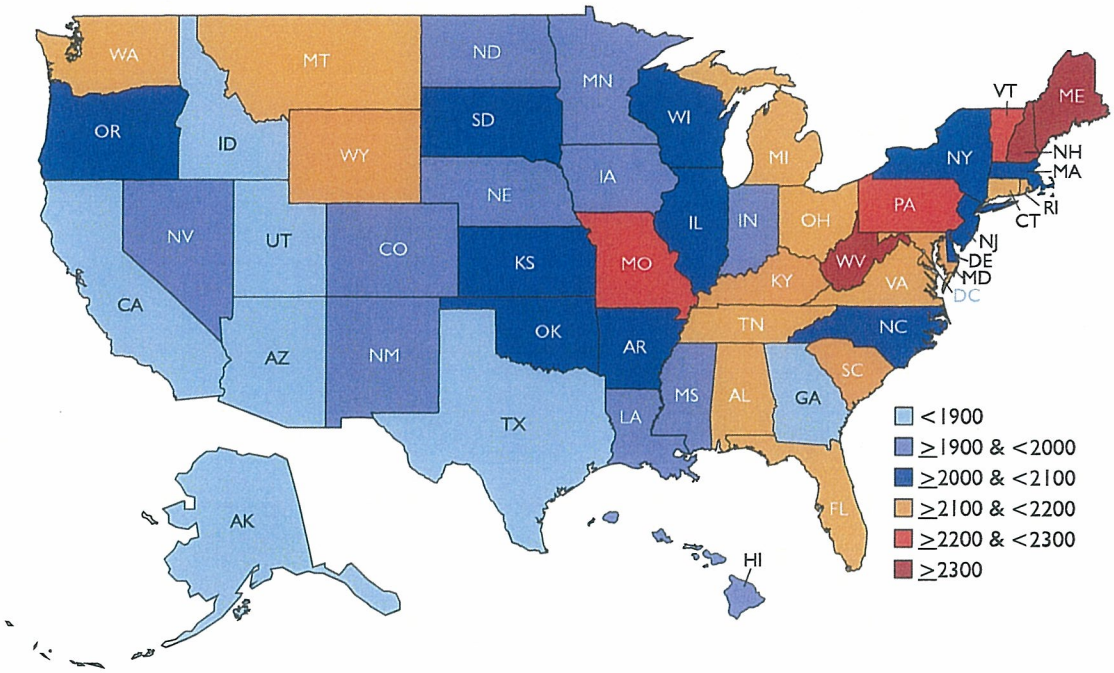
## 3. HYPERTENSION AND OBESITY

### Potential Hypertension Cases Avoided by 2030 if BMI is Reduced by 5 Percent (cases per 100,000 population)




Hypertension, often known as high blood pressure, can cause damage to an individual's arteries, heart, brain, kidneys, eyes and other body functions and can increase an individual's risk for heart disease, stroke, kidney damage and other health problems.[106] About 1 in 3 U.S. adults—an estimated 68 million—have high blood pressure.[107]

Being overweight or obese can increase risk for hypertension in a number of ways:

- Increased activity of the sympathetic nervous system, which controls some automatic bodily functions, including blood pressure;
- Increased salt retention and insulin resistance, both of which can increase blood pressure;
- Increased levels of systemic inflammation, which can damage blood vessels and lead to hypertension; and
- Increased risk of sleep apnea, which raises the risk of high blood pressure.[108]

### Nutrition, Physical Activity and Hypertension

A range of studies have found that reducing obesity can reduce high blood pressure. Losing as little as five pounds can reduce hypertension and may allow people to reduce the amount of blood pressure medicine they take. Reducing sodium intake may also reduce the amount of blood pressure medicine needed. Getting at least 30 minutes of physical activity several times a week and eating a healthy, lower sodium diet also can help to lower high blood pressure. Losing weight lowers blood pressure through a combination of changes: reduced activity in the sympathetic nervous system, reduced sodium intake, reduced systemic inflammation, and a lowered risk of sleep apnea.[109,110]



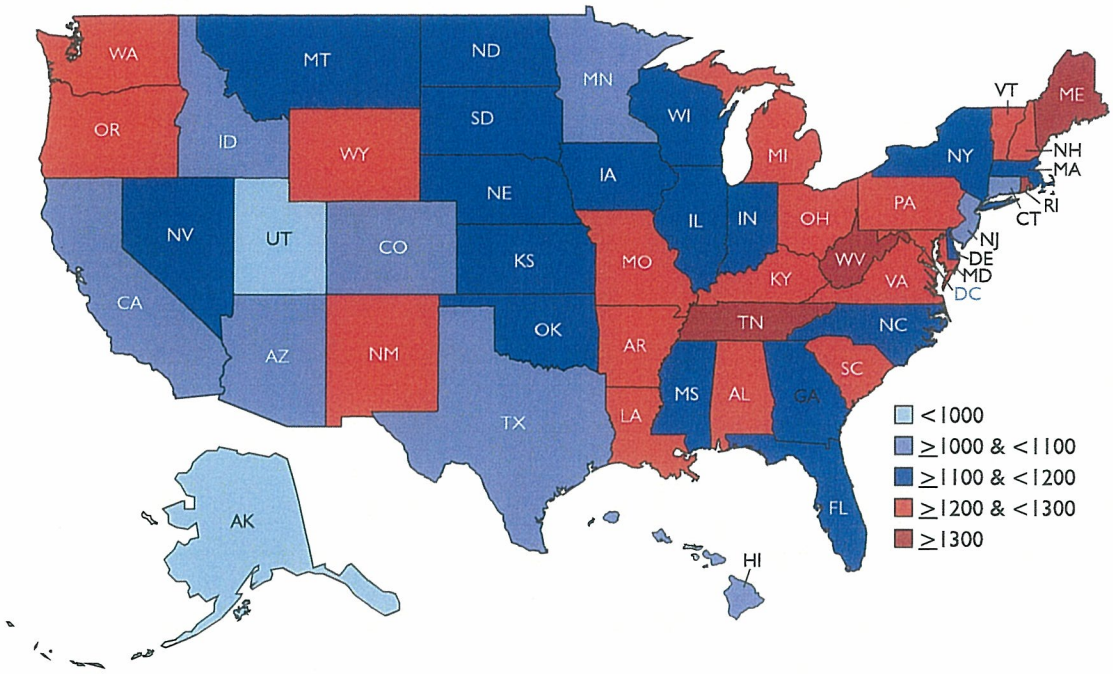
000237

## Hypertension Costs and Cases

| State | 2010 Number of Cases | New Hypertension Cases by 2030 | New Hypertension Cases by 2030 (per 100,000) | Rank New Hypertension Cases by 2030 (per 100,000) | Potential Cases Avoided by 2020 if Average BMI Reduced by 5% (cumulative) | Potential Cost Savings by 2020, if Average BMI Reduced by 5% (cumulative) | Potential Cases Avoided by 2030, if Average BMI Reduced by 5% (cumulative) | Potential Cost Savings by 2030, if Average BMI Reduced by 5% (cumulative) |
|---|---|---|---|---|---|---|---|---|
| Alabama | 1,006,222 | 1,286,270 | 26,782 | 10 | 60,370 | $214,000,000 | 102,683 | $570,000,000 |
| Alaska | 113,936 | 153,635 | 21,258 | 50 | 6,562 | $36,000,000 | 10,826 | $94,000,000 |
| Arizona | 1,176,899 | 1,449,229 | 22,356 | 47 | 67,742 | $327,000,000 | 112,018 | $876,000,000 |
| Arkansas | 606,605 | 749,537 | 25,512 | 26 | 34,933 | $148,000,000 | 60,434 | $391,000,000 |
| California | 6,478,109 | 8,427,912 | 22,360 | 46 | 364,104 | $1,773,000,000 | 698,431 | $5,422,000,000 |
| Colorado | 847,137 | 1,207,155 | 23,592 | 43 | 55,978 | $274,000,000 | 97,935 | $759,000,000 |
| Connecticut | 708,945 | 941,046 | 26,281 | 17 | 43,219 | $184,000,000 | 75,911 | $506,000,000 |
| Delaware | 187,986 | 245,280 | 27,039 | 8 | 11,575 | $47,000,000 | 18,887 | $119,000,000 |
| DC | 98,237 | 135,891 | 21,989 | 49 | 5,296 | $26,000,000 | 9,665 | $72,000,000 |
| Florida | 4,372,562 | 5,261,978 | 27,611 | 5 | 235,932 | $827,000,000 | 401,924 | $2,175,000,000 |
| Georgia | 1,649,642 | 2,285,570 | 23,286 | 44 | 106,004 | $535,000,000 | 184,624 | $1,492,000,000 |
| Hawaii | 264,816 | 332,347 | 24,174 | 42 | 14,587 | $64,000,000 | 26,740 | $184,000,000 |
| Idaho | 283,475 | 358,286 | 22,605 | 45 | 17,276 | $77,000,000 | 29,084 | $213,000,000 |
| Illinois | 2,369,745 | 3,142,673 | 24,420 | 38 | 145,937 | $680,000,000 | 258,801 | $1,889,000,000 |
| Indiana | 1,249,620 | 1,624,343 | 24,925 | 31 | 77,095 | $334,000,000 | 128,579 | $864,000,000 |
| Iowa | 636,409 | 765,455 | 24,996 | 29 | 34,573 | $135,000,000 | 60,940 | $369,000,000 |
| Kansas | 558,427 | 713,158 | 24,838 | 34 | 34,943 | $144,000,000 | 57,769 | $379,000,000 |
| Kentucky | 881,343 | 1,175,750 | 26,909 | 9 | 54,617 | $219,000,000 | 93,198 | $576,000,000 |
| Louisiana | 882,898 | 1,137,762 | 24,870 | 33 | 55,539 | $241,000,000 | 91,451 | $618,000,000 |
| Maine | 296,784 | 405,204 | 30,508 | 1 | 19,113 | $73,000,000 | 33,364 | $196,000,000 |
| Maryland | 1,083,304 | 1,488,428 | 25,538 | 25 | 71,397 | $338,000,000 | 126,707 | $930,000,000 |
| Massachusetts | 1,258,549 | 1,703,405 | 25,858 | 21 | 75,888 | $340,000,000 | 135,308 | $952,000,000 |
| Michigan | 1,934,745 | 2,612,251 | 26,450 | 15 | 122,761 | $559,000,000 | 211,548 | $1,480,000,000 |
| Minnesota | 990,242 | 1,312,110 | 24,549 | 36 | 60,985 | $286,000,000 | 105,240 | $783,000,000 |
| Mississippi | 595,822 | 751,568 | 25,233 | 28 | 35,861 | $145,000,000 | 56,741 | $357,000,000 |
| Missouri | 1,221,011 | 1,585,199 | 26,373 | 16 | 77,117 | $295,000,000 | 133,798 | $823,000,000 |
| Montana | 212,207 | 270,312 | 27,080 | 7 | 12,428 | $49,000,000 | 21,391 | $126,000,000 |
| Nebraska | 364,659 | 446,122 | 24,211 | 41 | 21,872 | $91,000,000 | 36,005 | $238,000,000 |
| Nevada | 511,848 | 663,428 | 24,361 | 39 | 31,999 | $149,000,000 | 53,677 | $401,000,000 |
| New Hampshire | 263,771 | 381,736 | 28,959 | 3 | 18,455 | $83,000,000 | 31,320 | $217,000,000 |
| New Jersey | 1,438,554 | 2,177,679 | 24,687 | 35 | 100,473 | $37,000,000 | 177,570 | $104,000,000 |
| New Mexico | 419,506 | 510,457 | 24,515 | 37 | 23,821 | $95,000,000 | 40,458 | $251,000,000 |
| New York | 3,749,386 | 4,953,893 | 25,450 | 27 | 219,567 | $992,000,000 | 395,338 | $2,793,000,000 |
| North Carolina | 1,831,530 | 2,413,521 | 24,994 | 30 | 113,366 | $486,000,000 | 195,735 | $1,311,000,000 |
| North Dakota | 145,630 | 170,470 | 24,925 | 31 | 7,667 | $26,000,000 | 13,248 | $75,000,000 |
| Ohio | 2,336,929 | 3,087,351 | 26,742 | 13 | 150,084 | $621,000,000 | 249,255 | $1,602,000,000 |
| Oklahoma | 765,126 | 969,830 | 25,579 | 23 | 46,939 | $176,000,000 | 77,423 | $451,000,000 |
| Oregon | 749,127 | 989,454 | 25,555 | 24 | 43,442 | $182,000,000 | 77,631 | $503,000,000 |
| Pennsylvania | 2,752,209 | 3,483,650 | 27,338 | 6 | 163,109 | $609,000,000 | 284,931 | $1,656,000,000 |
| Rhode Island | 207,285 | 281,265 | 26,754 | 12 | 12,973 | $57,000,000 | 23,602 | $155,000,000 |
| South Carolina | 961,722 | 1,216,272 | 25,993 | 18 | 56,291 | $202,000,000 | 101,446 | $568,000,000 |
| South Dakota | 169,415 | 200,392 | 24,317 | 40 | 9,724 | $38,000,000 | 16,721 | $103,000,000 |
| Tennessee | 1,299,689 | 1,714,690 | 26,778 | 11 | 83,372 | $321,000,000 | 139,977 | $842,000,000 |
| Texas | 4,300,252 | 5,689,509 | 22,160 | 48 | 271,638 | $1,352,000,000 | 472,671 | $3,777,000,000 |
| Utah | 390,890 | 501,184 | 17,790 | 51 | 24,341 | $141,000,000 | 40,202 | $393,000,000 |
| Vermont | 128,688 | 174,292 | 27,823 | 4 | 7,605 | $34,000,000 | 13,976 | $95,000,000 |
| Virginia | 1,512,608 | 2,103,174 | 25,976 | 19 | 96,997 | $434,000,000 | 175,777 | $1,219,000,000 |
| Washington | 1,282,066 | 1,760,032 | 25,769 | 22 | 83,258 | $358,000,000 | 145,002 | $987,000,000 |
| West Virginia | 433,914 | 558,316 | 30,092 | 2 | 25,474 | $86,000,000 | 42,840 | $220,000,000 |
| Wisconsin | 1,130,359 | 1,478,205 | 25,880 | 20 | 65,742 | $286,000,000 | 114,692 | $777,000,000 |
| Wyoming | 118,620 | 151,312 | 26,632 | 14 | 7,085 | $23,000,000 | 12,119 | $68,000,000 |

## 4. ARTHRITIS AND OBESITY

### Potential Arthritis Cases Avoided by 2030 if BMI is Reduced by 5 Percent (cases per 100,000 population)




Obesity is a known risk factor for the development and progression of osteoarthritis of the knee and possibly of other joints. Obese adults are up to four times more likely to develop osteoarthritis of the knee than healthy-weight adults.[111]

Among individuals who have received a doctor's diagnosis of arthritis, 68.8 percent are overweight or obese.[112] Obesity prevalence is 54 percent higher among adults with arthritis compared with adults without arthritis.[113]

Being overweight or obese puts more stress on joints and cartilage, and leads to increased deterioration. Increased body fat also triggers the production of inflammatory chemicals, which may accelerate the arthritic process.[114, 115]

Adults with arthritis are significantly less likely to participate in leisure time physical activity compared with those without arthritis.[116]

### Arthritis and Weight Loss

For those who are overweight or obese, losing weight can make a significant difference for arthritis symptoms and for the overall progression of the disease. Losing as little as 5 percent of total body weight can reduce the pounding on knees, hips and lower back, and can reduce the production of inflammatory chemicals that can worsen pain and speed deterioration.[117, 118]

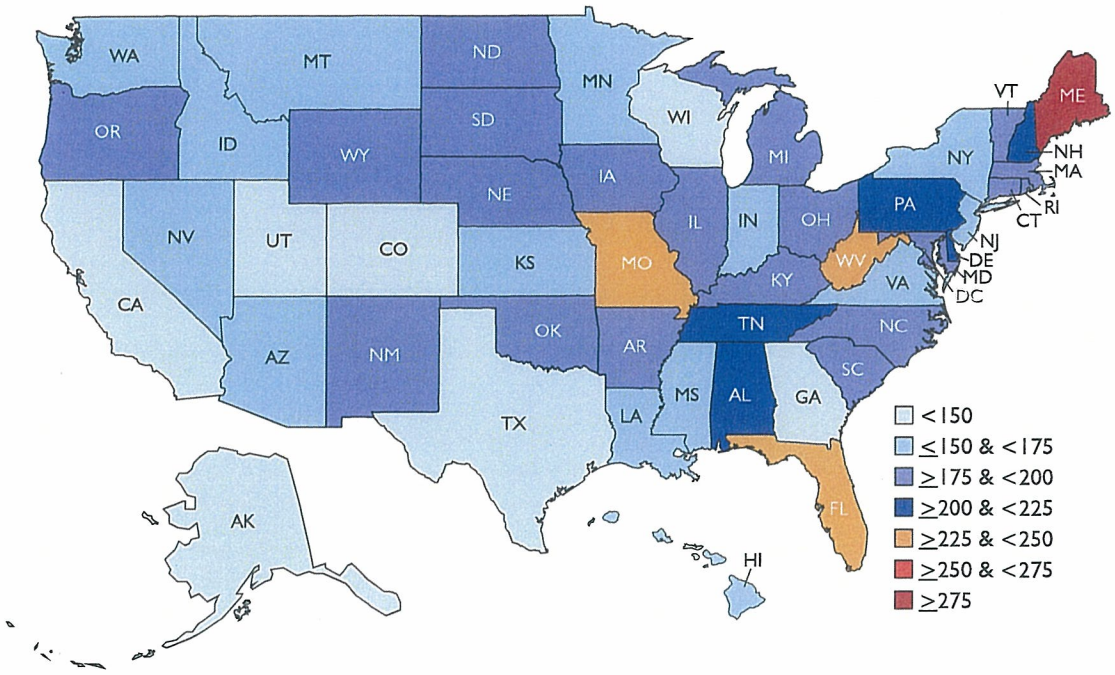
For every pound of body weight lost, there is a 4 percent reduction in knee joint stress among overweight and obese people with osteoarthritis of the knee.[119]

## Arthritis Costs and Cases

| State | 2010 Number of Cases | New Arthritis Cases by 2030 | New Arthritis Cases by 2030 (per 100,000) | Rank New Arthritis Cases by 2030 (per 100,000) | Potential Cases Avoided by 2020 if Average BMI Reduced by 5% (cumulative) | Potential Cost Savings by 2020, if Average BMI Reduced by 5% (cumulative) | Potential Cases Avoided by 2030, if Average BMI Reduced by 5% (cumulative) | Potential Cost Savings by 2030, if Average BMI Reduced by 5% (cumulative) |
|---|---|---|---|---|---|---|---|---|
| Alabama | 988,452 | 818,339 | 17,039 | 13 | 31,890 | $295,000,000 | 59,554 | $791,000,000 |
| Alaska | 117,391 | 104,801 | 14,501 | 50 | 3,845 | $55,000,000 | 6,895 | $151,000,000 |
| Arizona | 1,179,621 | 968,616 | 14,942 | 45 | 37,145 | $436,000,000 | 68,326 | $1,269,000,000 |
| Arkansas | 598,760 | 484,296 | 16,484 | 25 | 19,067 | $193,000,000 | 36,343 | $561,000,000 |
| California | 6,631,138 | 5,571,995 | 14,783 | 49 | 209,567 | $2,758,000,000 | 387,850 | $7,865,000,000 |
| Colorado | 875,842 | 786,503 | 15,371 | 44 | 29,984 | $347,000,000 | 52,652 | $949,000,000 |
| Connecticut | 710,198 | 597,155 | 16,677 | 20 | 20,911 | $220,000,000 | 38,564 | $608,000,000 |
| Delaware | 184,829 | 153,505 | 16,922 | 14 | 5,633 | $54,000,000 | 10,341 | $143,000,000 |
| DC | 103,440 | 92,032 | 14,892 | 47 | 3,424 | $38,000,000 | 6,582 | $118,000,000 |
| Florida | 4,225,438 | 3,266,082 | 17,138 | 9 | 117,776 | $1,013,000,000 | 218,399 | $2,849,000,000 |
| Georgia | 1,707,454 | 1,523,222 | 15,519 | 42 | 58,793 | $752,000,000 | 108,753 | $2,196,000,000 |
| Hawaii | 265,338 | 212,903 | 15,486 | 43 | 8,084 | $84,000,000 | 14,834 | $249,000,000 |
| Idaho | 285,313 | 236,068 | 14,894 | 46 | 8,828 | $101,000,000 | 16,151 | $286,000,000 |
| Illinois | 2,387,762 | 2,055,864 | 15,975 | 36 | 78,116 | $923,000,000 | 149,927 | $2,730,000,000 |
| Indiana | 1,243,233 | 1,054,503 | 16,181 | 31 | 40,079 | $430,000,000 | 74,684 | $1,200,000,000 |
| Iowa | 628,692 | 494,563 | 16,150 | 32 | 18,527 | $176,000,000 | 34,635 | $513,000,000 |
| Kansas | 555,211 | 460,030 | 16,022 | 35 | 17,199 | $189,000,000 | 33,105 | $515,000,000 |
| Kentucky | 876,143 | 748,558 | 17,132 | 10 | 29,187 | $286,000,000 | 53,350 | $790,000,000 |
| Louisiana | 877,591 | 744,189 | 16,267 | 30 | 29,645 | $327,000,000 | 55,676 | $915,000,000 |
| Maine | 290,329 | 248,703 | 18,725 | 1 | 9,457 | $86,000,000 | 18,356 | $249,000,000 |
| Maryland | 1,098,166 | 968,487 | 16,617 | 24 | 37,884 | $458,000,000 | 70,406 | $1,262,000,000 |
| Massachusetts | 1,270,472 | 1,096,100 | 16,639 | 22 | 40,777 | $439,000,000 | 76,086 | $1,257,000,000 |
| Michigan | 1,929,807 | 1,703,543 | 17,249 | 8 | 67,553 | $771,000,000 | 126,613 | $2,161,000,000 |
| Minnesota | 998,206 | 844,916 | 15,808 | 39 | 31,481 | $365,000,000 | 56,923 | $1,013,000,000 |
| Mississippi | 589,477 | 487,642 | 16,372 | 27 | 19,509 | $191,000,000 | 35,176 | $521,000,000 |
| Missouri | 1,207,427 | 1,016,888 | 16,918 | 15 | 40,031 | $369,000,000 | 75,434 | $1,082,000,000 |
| Montana | 207,585 | 170,323 | 17,063 | 11 | 6,418 | $64,000,000 | 11,948 | $175,000,000 |
| Nebraska | 361,250 | 290,050 | 15,741 | 41 | 11,093 | $116,000,000 | 20,601 | $321,000,000 |
| Nevada | 512,502 | 430,448 | 15,806 | 40 | 16,667 | $191,000,000 | 30,746 | $540,000,000 |
| New Hampshire | 262,518 | 239,199 | 18,146 | 3 | 8,806 | $97,000,000 | 16,807 | $265,000,000 |
| New Jersey | 1,504,360 | 1,418,265 | 16,078 | 34 | 48,075 | $40,000,000 | 93,945 | $119,000,000 |
| New Mexico | 413,967 | 332,573 | 15,972 | 37 | 13,701 | $135,000,000 | 25,757 | $391,000,000 |
| New York | 3,752,890 | 3,179,056 | 16,332 | 28 | 115,429 | $1,347,000,000 | 220,151 | $3,718,000,000 |
| North Carolina | 1,843,890 | 1,572,931 | 16,289 | 29 | 62,284 | $679,000,000 | 115,491 | $1,942,000,000 |
| North Dakota | 141,984 | 110,099 | 16,098 | 33 | 4,001 | $39,000,000 | 7,585 | $110,000,000 |
| Ohio | 2,316,148 | 1,969,338 | 17,058 | 12 | 75,273 | $730,000,000 | 144,774 | $2,131,000,000 |
| Oklahoma | 752,463 | 620,784 | 16,373 | 26 | 23,697 | $233,000,000 | 44,816 | $629,000,000 |
| Oregon | 751,876 | 645,284 | 16,666 | 21 | 24,122 | $251,000,000 | 47,508 | $754,000,000 |
| Pennsylvania | 2,691,043 | 2,214,204 | 17,376 | 7 | 84,103 | $788,000,000 | 163,746 | $2,267,000,000 |
| Rhode Island | 208,610 | 183,946 | 17,497 | 5 | 7,170 | $79,000,000 | 13,856 | $229,000,000 |
| South Carolina | 947,357 | 780,823 | 16,687 | 19 | 29,432 | $278,000,000 | 58,678 | $803,000,000 |
| South Dakota | 166,267 | 130,568 | 15,844 | 38 | 4,928 | $52,000,000 | 9,625 | $145,000,000 |
| Tennessee | 1,289,571 | 1,117,321 | 17,449 | 6 | 44,119 | $428,000,000 | 84,332 | $1,201,000,000 |
| Texas | 4,426,828 | 3,797,542 | 14,791 | 48 | 149,683 | $1,704,000,000 | 270,868 | $4,891,000,000 |
| Utah | 410,666 | 352,265 | 12,504 | 51 | 13,382 | $190,000,000 | 23,918 | $541,000,000 |
| Vermont | 127,660 | 110,302 | 17,608 | 4 | 4,228 | $44,000,000 | 8,062 | $129,000,000 |
| Virginia | 1,519,490 | 1,358,610 | 16,780 | 18 | 51,899 | $579,000,000 | 104,689 | $1,750,000,000 |
| Washington | 1,294,975 | 1,136,450 | 16,639 | 22 | 43,507 | $477,000,000 | 82,370 | $1,371,000,000 |
| West Virginia | 418,737 | 347,324 | 18,720 | 2 | 13,099 | $111,000,000 | 25,307 | $308,000,000 |
| Wisconsin | 1,124,133 | 958,720 | 16,785 | 17 | 34,499 | $377,000,000 | 66,542 | $1,091,000,000 |
| Wyoming | 116,541 | 95,973 | 16,892 | 16 | 3,744 | $37,000,000 | 6,858 | $100,000,000 |

## 5. CANCER AND OBESITY

### Potential Obesity-Related Cancer Cases Avoided by 2030 if BMI is Reduced by 5 Percent (cases per 100,000 population)




Cancer death rates have declined in the United States in recent years, but the rise in obesity could change that trend.

Being overweight, obese or physically inactive can significantly increase a person's risk of cancer. Approximately one-third of cancer deaths are linked to obesity or lack of physical activity, according to the American Cancer Society.[120] A review of 7,000 studies has shown links between obesity and cancer.[121]

- Approximately 20 percent of cancer in women and 15 percent of cancer in men is attributable to obesity.[122]
- Cancer is the second-leading cause of death in the United States.[123]

Research has found that obesity may increase the risk for many types of cancers through increased levels of some types of hormones (including estrogen, insulin and other tumor growth regulators), chronic hypertension and/or damage caused by chronic low-level inflammation.[124]

| Obesity Increases Risk for Some Types of Cancer | |
|---|---|
| **Type of Cancer** | **Estimated Percentage Cancer Cases Caused by Obesity** |
| Endometrial (lining of the uterus) | 39 percent |
| Esophageal | 37 percent |
| Kidney | 25 percent |
| Colon | 11 percent |
| Postmenopausal Breast | 9 percent |

## Physical Activity and Cancer

On the other hand, physical activity can reduce a person's risk for a variety of cancers, including:[126]

- Colon cancer by 30 percent to 40 percent;
- Breast cancer by at least 20 percent;
- Endometrial (uterine) cancer by 20 percent to 40 percent; and
- Lung cancer by approximately 20 percent.

Increased activity could prevent nearly 100,000 cases of breast and colon cancer in the United States each year, according to one analysis of more than 200 current studies.[127]

There is also increasing evidence that limiting the amount of time a person spends sitting during the day, independent of physical activity, can also decrease the likelihood of developing obesity, type 2 diabetes, cardiovascular disease and some forms of cancer.[128]

And, physical activity also has been shown to improve survival rates for individuals with colon and breast cancer and slow the progression of prostate cancer.[129]

## Nutrition and Cancer

According to the American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention, individuals who maintain a healthy diet are at lower risk for cancer. According to a review of the research, individuals who eat more processed and red meats, potatoes, refined grains and sugar-sweetened beverages and foods are at a higher risk for developing some forms of cancer, while consuming a diet that contains a variety of vegetables and fruits, whole grains and fish or poultry or is lower in red and processed meats is associated with lower risks of developing certain types of cancers.[130]

Evidence also suggests that weight loss, through calorie reduction with or without exercise, can produce a significant reduction in various breast cancer biomarkers.[131] Results from a recent study showed that weight loss of greater than 5 percent could be associated with a 22 percent decrease in breast cancer risk.

### BREAST CANCER AND WEIGHT LOSS

A randomized 12-month intervention published in the Journal of Clinical Oncology reveals that biomarkers associated with postmenopausal breast cancer can be improved through weight loss, with or without exercise.[132] The study compared estrogen and androgen levels, which are both positively associated with risk for breast cancer,[133] between women assigned to one of four study groups: diet, exercise, diet and exercise or control group. Results showed that women in the experimental groups experienced large and statistically significant reductions in sex hormones and an increase in sex-hormone binding globulin (SHBG), which reduces bioactivity of the hormones.[134]



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## Obesity Related Cancer Costs and Cases

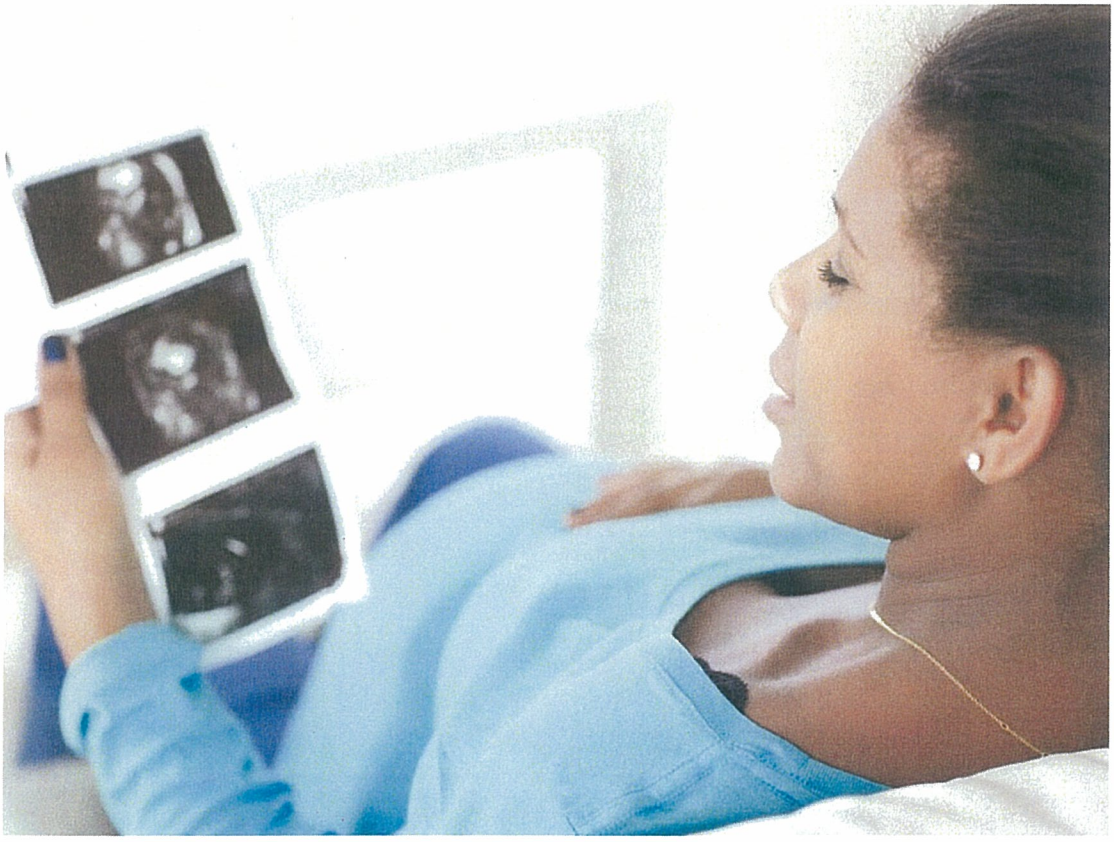
| State | 2010 Number of Cases | New Cancer Cases by 2030 | New Cancer Cases by 2030 (per 100,000) | Rank New Cancer Cases by 2030 (per 100,000) | Potential Cases Avoided by 2020 if Average BMI Reduced by 5% (cumulative) | Potential Cost Savings by 2020, if Average BMI Reduced by 5% (cumulative) | Potential Cases Avoided by 2030, if Average BMI Reduced by 5% (cumulative) | Potential Cost Savings by 2030, if Average BMI Reduced by 5% (cumulative) |
|---|---|---|---|---|---|---|---|---|
| Alabama | 79,581 | 200,226 | 4,169 | 9 | 4,947 | $95,000,000 | 9,846 | $213,000,000 |
| Alaska | 7,892 | 21,927 | 3,034 | 50 | 434 | $26,000,000 | 809 | $51,000,000 |
| Arizona | 87,125 | 217,683 | 3,358 | 45 | 6,223 | $123,000,000 | 9,983 | $249,000,000 |
| Arkansas | 47,390 | 116,050 | 3,950 | 20 | 2,732 | $76,000,000 | 5,347 | $145,000,000 |
| California | 505,825 | 1,251,371 | 3,320 | 46 | 29,023 | $689,000,000 | 52,769 | $1,766,000,000 |
| Colorado | 64,932 | 176,171 | 3,443 | 43 | 3,684 | $160,000,000 | 7,624 | $313,000,000 |
| Connecticut | 58,115 | 147,883 | 4,130 | 12 | 2,900 | $37,000,000 | 6,374 | $118,000,000 |
| Delaware | 14,714 | 38,254 | 4,217 | 8 | 1,125 | $23,000,000 | 1,923 | $47,000,000 |
| DC | 8,417 | 20,320 | 3,288 | 48 | 371 | $6,000,000 | 667 | $7,000,000 |
| Florida | 352,183 | 869,214 | 4,561 | 3 | 24,965 | $328,000,000 | 43,451 | $656,000,000 |
| Georgia | 126,027 | 324,982 | 3,311 | 47 | 6,380 | $382,000,000 | 12,073 | $812,000,000 |
| Hawaii | 21,062 | 52,119 | 3,791 | 31 | 1,210 | $27,000,000 | 2,323 | $74,000,000 |
| Idaho | 21,778 | 53,889 | 3,400 | 44 | 1,474 | $29,000,000 | 2,710 | $51,000,000 |
| Illinois | 189,693 | 468,312 | 3,639 | 41 | 11,325 | $163,000,000 | 23,036 | $353,000,000 |
| Indiana | 99,188 | 243,537 | 3,737 | 33 | 6,387 | $122,000,000 | 10,883 | $256,000,000 |
| Iowa | 51,477 | 120,441 | 3,933 | 21 | 3,460 | $84,000,000 | 5,849 | $160,000,000 |
| Kansas | 44,590 | 106,322 | 3,703 | 38 | 2,527 | $62,000,000 | 4,939 | $132,000,000 |
| Kentucky | 68,075 | 176,260 | 4,034 | 16 | 4,151 | $118,000,000 | 8,651 | $277,000,000 |
| Louisiana | 69,400 | 170,092 | 3,718 | 36 | 3,934 | $156,000,000 | 7,640 | $302,000,000 |
| Maine | 23,721 | 65,041 | 4,897 | 1 | 1,886 | $27,000,000 | 3,679 | $53,000,000 |
| Maryland | 86,375 | 222,932 | 3,825 | 30 | 5,537 | $156,000,000 | 10,841 | $339,000,000 |
| Massachusetts | 102,436 | 266,466 | 4,045 | 15 | 6,851 | $250,000,000 | 13,109 | $489,000,000 |
| Michigan | 150,809 | 395,245 | 4,002 | 19 | 9,382 | $203,000,000 | 18,370 | $540,000,000 |
| Minnesota | 77,233 | 194,660 | 3,642 | 40 | 5,024 | $118,000,000 | 8,338 | $230,000,000 |
| Mississippi | 46,018 | 111,069 | 3,729 | 35 | 2,591 | $34,000,000 | 4,795 | $79,000,000 |
| Missouri | 96,772 | 241,389 | 4,016 | 18 | 6,852 | $186,000,000 | 13,704 | $438,000,000 |
| Montana | 16,490 | 42,793 | 4,287 | 7 | 868 | $17,000,000 | 1,637 | $46,000,000 |
| Nebraska | 29,132 | 68,288 | 3,706 | 37 | 1,935 | $41,000,000 | 3,243 | $79,000,000 |
| Nevada | 37,310 | 99,946 | 3,670 | 39 | 2,369 | $82,000,000 | 4,521 | $164,000,000 |
| New Hampshire | 20,353 | 57,513 | 4,363 | 5 | 1,318 | $31,000,000 | 2,715 | $65,000,000 |
| New Jersey | 110,882 | 308,035 | 3,492 | 42 | 6,616 | $13,000,000 | 13,232 | $31,000,000 |
| New Mexico | 32,920 | 80,166 | 3,850 | 28 | 1,978 | $39,000,000 | 3,665 | $72,000,000 |
| New York | 306,188 | 762,062 | 3,915 | 23 | 14,794 | $206,000,000 | 29,392 | $481,000,000 |
| North Carolina | 142,818 | 362,984 | 3,759 | 32 | 9,174 | $371,000,000 | 17,382 | $742,000,000 |
| North Dakota | 11,572 | 26,762 | 3,913 | 25 | 739 | $19,000,000 | 1,272 | $38,000,000 |
| Ohio | 185,989 | 470,919 | 4,079 | 13 | 12,469 | $475,000,000 | 22,974 | $977,000,000 |
| Oklahoma | 59,906 | 147,073 | 3,879 | 27 | 3,981 | $83,000,000 | 7,128 | $126,000,000 |
| Oregon | 58,349 | 151,854 | 3,922 | 22 | 3,678 | $89,000,000 | 7,240 | $200,000,000 |
| Pennsylvania | 227,588 | 553,041 | 4,340 | 6 | 15,674 | $217,000,000 | 28,162 | $393,000,000 |
| Rhode Island | 17,094 | 43,619 | 4,149 | 10 | 1,041 | $29,000,000 | 2,092 | $68,000,000 |
| South Carolina | 75,148 | 188,245 | 4,023 | 17 | 5,007 | $52,000,000 | 9,124 | $88,000,000 |
| South Dakota | 13,490 | 30,796 | 3,737 | 33 | 832 | $8,000,000 | 1,467 | $8,000,000 |
| Tennessee | 101,301 | 260,360 | 4,066 | 14 | 7,236 | $124,000,000 | 14,151 | $246,000,000 |
| Texas | 328,379 | 810,806 | 3,158 | 49 | 20,540 | $560,000,000 | 34,918 | $1,061,000,000 |
| Utah | 29,834 | 69,529 | 2,468 | 51 | 1,747 | $47,000,000 | 2,845 | $92,000,000 |
| Vermont | 10,273 | 27,751 | 4,430 | 4 | 614 | $9,000,000 | 1,222 | $12,000,000 |
| Virginia | 118,372 | 314,958 | 3,890 | 26 | 5,506 | $89,000,000 | 13,764 | $195,000,000 |
| Washington | 99,240 | 261,522 | 3,829 | 29 | 5,669 | $107,000,000 | 11,748 | $239,000,000 |
| West Virginia | 33,990 | 88,983 | 4,796 | 2 | 2,375 | $33,000,000 | 4,379 | $57,000,000 |
| Wisconsin | 89,046 | 223,559 | 3,914 | 24 | 4,341 | $75,000,000 | 7,882 | $187,000,000 |
| Wyoming | 9,068 | 23,573 | 4,149 | 10 | 574 | $11,000,000 | 1,068 | $21,000,000 |

## C. ADDITIONAL HEALTH AND OBESITY ISSUES

In addition to the five health issues examined in the NHF analysis, obesity increases the risk for a number of other health problems. Some key areas reviewed in the following section include: children and maternal health with a special focus on breastfeeding, mental health and neurological conditions with a special focus on dementia, kidney and liver diseases and HIV/AIDS.

### 1. MATERNAL HEALTH AND OBESITY

- There is a growing body of evidence documenting the links between maternal health conditions, including obesity and chronic diseases, and increased risks before, during and after birth.[135]
- Children born to obese mothers are twice as likely to be obese and to develop type 2 diabetes later in life.[136]
- Many pregnant women are overweight, obese, or have diabetes, all of which can have negative effects on the fetus as well as the mother. According to CDC, approximately 50 percent of women of child-bearing age (between 18 and 44) were either overweight or obese in 2002 and 9 percent had diabetes.[137]
- Teenage mothers who are obese before pregnancy are four times more likely than their healthy-weight counterparts to develop gestational diabetes, a form of diabetes that arises during pregnancy and increases a woman's risk of developing type 2 diabetes later on.[138]
- CDC and the Kaiser Permanente Northwest Center for Health Research found in a recent study that obesity during pregnancy is associated with an increased use of health care services and longer hospital stays.[139] The study of more than 13,000 pregnancies found that obese women required more outpatient medications, were given more obstetrical ultrasounds, and were less likely to see nurse midwives or nurse practitioners in favor of physicians. Cesarean delivery rates were 45.2 percent for extremely obese women, compared with 21.3 percent for healthy-weight women.[140]



## Only Two States Meet Breastfeeding Goals

Children who are breastfed have lower rates of obesity; this is especially true for those who are breastfed exclusively, without formula supplementation.[141] Breastfeeding also is associated with a range of other benefits, and the American Academy of Pediatrics (AAP), the American Academy of Family Physicians, the Academy of Breastfeeding Medicine, the World Health Organization, the United Nations Children's Fund and many other health organizations recommend exclusive breastfeeding for the first six months of life.

However, according to CDC's 2012 Breastfeeding Report Card, only 16.3 percent of mothers in the United States are breastfeeding exclusively through six months, which is well below the *Healthy People 2020* goal of 25.5 percent.[142] Only two states, Colorado and Oregon, meet this goal.

**States with the Highest Rates of Exclusive Breastfeeding at 6 Months**

| Rank | State | Percentage Breastfeeding Exclusively at 6 Months (2009) | Obesity Ranking |
|---|---|---|---|
| 1 | Colorado | 26.6% | 51 |
| 2 | Oregon | 26.3% | 31 |
| 3 | Utah | 24.8% | 45 |
| 4 | New Hampshire | 24.7% | 35 |
| 5 | Vermont | 23.3% | 37 |
| 6 | Idaho | 23.2% | 30 |
| 7 | New Mexico | 22.8% | 34 |
| 8 | South Dakota | 22.1% | 23 |
| 9 | California | 21.7% | 46 |
| 10 | Alaska | 21.0% | 28 |

*Note: For rankings, 1 = Highest rate of breastfeeding.

**States with the Lowest Rates of Exclusive Breastfeeding at 6 Months**

| Rank | State | Percentage Breastfeeding Exclusively at 6 Months (2009) | Obesity Ranking |
|---|---|---|---|
| 51 | Mississippi | 7.6% | 1 |
| 49 (tie) | Alabama | 9.1% | 4 |
| 49 (tie) | West Virginia | 9.1% | 3 |
| 47 (tie) | Kentucky | 9.6% | 10 |
| 47 (tie) | Louisiana | 9.6% | 2 |
| 46 | Oklahoma | 10.4% | 6 |
| 45 | Arkansas | 10.6% | 7 |
| 44 | Ohio | 11.0% | 13 |
| 43 | Nevada | 11.7% | 42 |
| 42 | Montana | 12.5% | 41 |

*Note: For rankings, 51 = Lowest rate of breastfeeding.

Evidence from a comprehensive review of existing breastfeeding research found that breastfeeding has the following effects:[143]

- For the child: reduced risk of ear, skin, stomach and respiratory infections, diarrhea, sudden infant death syndrome, necrotizing enterocolitis, and other bacterial and viral infections; and in the longer term, reduced risk of obesity, type 1 and 2 diabetes, asthma, celiac disease, inflammatory bowel disease and childhood leukemia.[144]
- For the mother: quicker loss of pregnancy weight, prevention of postpartum bleeding and reduced risk of breast cancer, ovarian cancer, type 2 diabetes and postpartum depression.[145]

The AAP recommends that babies are breastfed through the first year of life.[146]

Breast milk provides a baby with food that is nutritious and easy for the baby to digest. It also gives the baby the ability to decide when to eat and when to stop eating, allowing for the baby to develop healthy eating patterns. Keeping a baby at a healthy weight from infancy is important because recent studies have shown that overweight babies are more at risk for being overweight or obese throughout childhood.[147]

A recent study at Children's Hospital in Boston and Harvard Medical School found that feeding an infant solid food before 4 months of age may increase the baby's risk of becoming obese as a toddler.[148] The study included almost 900 infants; about two-thirds were breastfed for at least four months.[149] Follow-up at age 3 revealed that 9 percent of the toddlers were obese.[150] Results showed that among formula-fed babies, those that were introduced to solid foods before 4 months of age were six times more likely to be obese by age 3, but timing of solid food introduction was not associated with obesity among the breastfed babies.[151]

In conjunction with the release of the Let's Move campaign in 2010, the U.S. Breastfeeding Committee (USBC) released a statement highlighting the importance of including breastfeeding as part of the national strategy to reduce childhood obesity.[152]

Data from the National Immunization Survey shows that approximately 75 percent of new mothers begin breastfeeding, but only 43 percent are still breastfeeding at all at six months.[153] According to USBC chair, Dr. Joan Younger Meek, "The duration of breastfeeding has been shown to be inversely related to overweight—meaning that the longer the duration of breastfeeding, the lower the odds of overweight. And although further research is needed, exclusive breastfeeding appears to have a stronger protective effect than breastfeeding combined with formula feeding."[154]

## SURGEON GENERAL'S CALL TO ACTION TO SUPPORT BREASTFEEDING

In an effort to make breastfeeding easier for women, the U.S. Surgeon General has identified 20 key actions to improve support for breastfeeding.[155]

Some key barriers to breastfeeding include:[156]

- Lack of Knowledge
- Lactation Problems
- Poor Family and Social Support
- Social Norms
- Embarrassment
- Employment and Child Care
- Health Services

In order to address some of the barriers to breastfeeding the Surgeon General suggests the following actions by various key stakeholders:[157]

### Mothers and Families

- Give mothers the support they need to breastfeed.
- Develop programs to educate fathers and grandmothers about breastfeeding.

### Communities

- Strengthen programs that provide mother-to-mother support and peer counseling.
- Use community-based organizations to support and promote breastfeeding.
- Create a national campaign to promote breastfeeding.
- Ensure that the marketing of infant formula is conducted in a way that minimizes its negative impacts on exclusive breastfeeding.

### Health Care

- Ensure that maternity care practices around the United States are fully supportive of breastfeeding.
- Develop systems to guarantee continuity of skilled support for lactation between hospitals and health care settings in the community.
- Provide education and training in breastfeeding for all health professionals who care for women and children.
- Include basic support for breastfeeding as a standard of care for midwives, obstetricians, family physicians, nurse practitioners and pediatricians.
- Ensure access to services provided by International Board Certified Lactation Consultants.
- Identify and address obstacles to greater availability of safe banked donor milk for fragile infants.

### Employment

- Work toward establishing paid maternity leave for all employed mothers.
- Ensure that employers establish and maintain comprehensive, high-quality lactation support programs for their employees.
- Expand the use of programs in the workplace that allow lactating mothers to have direct access to their babies.
- Ensure that all child care providers accommodate the needs of breastfeeding mothers and infants.

### Research and Surveillance

- Increase funding of high-quality research on breastfeeding.
- Strengthen existing capacity and develop future capacity for conducting research on breastfeeding.
- Develop a national monitoring system to improve the tracking of breastfeeding rates as well as the policies and environmental factors that affect breastfeeding.

### Public Health Infrastructure

- Improve national leadership on the promotion and support of breastfeeding.

CHAPTER 5

# Ambulatory surgical center services

## RECOMMENDATION

**5** The Congress should eliminate the update to the payment rates for ambulatory surgical centers for calendar year 2014. The Congress should also require ambulatory surgical centers to submit cost data.

**COMMISSIONER VOTES: YES 16 • NO 0 • NOT VOTING 0 • ABSENT 1**

CHAPTER 5

# Ambulatory surgical center services

## Chapter summary

Ambulatory surgical centers (ASCs) provide outpatient surgical services to patients who do not require an overnight stay after surgery. In 2011,

- ASCs served 3.4 million fee-for-service (FFS) Medicare beneficiaries, an increase of 0.9 percent from 2010;
- there were 5,344 Medicare-certified ASCs, an increase of 1.8 percent (92 ASCs) from 2010; and
- Medicare combined program and beneficiary spending on ASC services was $3.4 billion, an increase of 2.2 percent per FFS beneficiary from 2010.

### Assessment of payment adequacy

Our results indicate that beneficiaries' access to ASC services is at least adequate, as most of the available indicators of payment adequacy for ASC services, discussed below, are positive. However, our results also indicate slower growth in the number of ASCs and volume of services in 2011 than in previous years.

***Beneficiaries' access to care***—Our analysis of facility supply and volume of services indicates that beneficiaries' access to ASC care has generally been adequate.

## In this chapter


- Are Medicare payments adequate in 2013?
- How should Medicare payments change in 2014?

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- ***Capacity and supply of providers***—From 2006 through 2010, the number of Medicare-certified ASCs grew by an average annual rate of 3.6 percent. However, the growth slowed to 1.8 percent in 2011. The relatively slow growth may reflect the substantial revision of the ASC payment system in 2008 (see online Appendix A from Chapter 2C of our March 2010 report at http://www.medpac.gov/chapters/Mar10_Ch02C_APPENDIX.pdf), and investors may have been responding to the large changes in payment rates that occurred under that revision. In addition, Medicare payment rates for most ambulatory surgical services have become much higher in hospital outpatient departments (HOPDs) than in ASCs—for 2013, the Medicare rates are 78 percent higher in HOPDs than in ASCs. This payment difference may have led some ASC owners to sell their facilities to hospitals. Finally, physicians have increasingly been selling their practices to hospitals and becoming hospital employees. Physicians who are hospital employees may be more inclined to provide surgical services at hospitals than at ASCs.
- ***Volume of services***—From 2006 through 2010, the volume of services per beneficiary grew by an average annual rate of 5.7 percent; in 2011, volume increased by 1.9 percent.

***Quality of care***—Although CMS has established a program for ASCs to submit quality data, ASCs did not begin doing so until October 2012. Consequently, we do not have sufficient data to assess ASCs' quality of care.

***Providers' access to capital***—Because the number of ASCs has continued to increase, they appear to have adequate access to capital.

***Medicare payments and providers' costs***—From 2006 through 2010, Medicare payments per FFS beneficiary increased at an average annual rate of 5.1 percent but slowed to 2.2 percent in 2011. ASCs do not submit data on the cost of services they provide to Medicare beneficiaries. Therefore, we cannot calculate a Medicare margin as we do for other provider types to assist in assessing payment adequacy. ■



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## Background

An ambulatory surgical center (ASC) is a distinct entity that primarily provides outpatient surgical procedures to patients who do not require an overnight stay after the procedure. Most ASCs are freestanding facilities rather than part of a larger facility, such as a hospital. About one-quarter of ASCs in 2008 were jointly owned by physicians and hospitals (Medical Group Management Association 2009). In addition to ASCs, hospital outpatient departments (HOPDs) and, in some cases, physicians' offices perform outpatient surgical procedures.

Since 1982, Medicare has covered and paid for surgical procedures provided in ASCs. Medicare covers about 3,600 surgical procedures under the ASC payment system. Physicians who perform procedures in ASCs or other facilities receive separate payment for their professional services under the physician fee schedule (PFS). About 90 percent of ASCs have at least one physician owner (Medical Group Management Association 2009). Physicians who perform surgeries in ASCs they own receive a share of the ASC's facility fees in addition to their professional fees. To receive payments from Medicare, ASCs must meet Medicare's conditions of coverage, which specify standards for administration of anesthesia, quality evaluation, operating and recovery rooms, medical staff, nursing services, and other areas.

Medicare pays for a bundle of facility services provided by ASCs—such as nursing, recovery care, anesthetics, and supplies—through a system that is primarily linked to the outpatient prospective payment system (OPPS), which Medicare uses to set payments for most services provided in HOPDs (a more detailed description of the ASC payment system can be found online at http://www.medpac.gov/documents/MedPAC_Payment_Basics_12_ASC.pdf). The ASC payment system is also partially linked to the PFS. The ASC system underwent substantial revisions in 2008 (see online Appendix A from Chapter 2C of our March 2010 report at http://www.medpac.gov/chapters/Mar10_Ch02C_APPENDIX.pdf). The most significant changes included a substantial increase in the number of surgical procedures covered under the ASC payment system, allowing ASCs to bill separately for certain ancillary services, and large changes in payment rates for many procedures.

For most covered procedures, the ASC relative weight, which indicates the relative resource intensity of the procedure, is based on its relative weight under the OPPS (the standard ASC method). This link to the OPPS is consistent with a previous Commission recommendation to align the relative weights in the OPPS with the ASC payment system (Medicare Payment Advisory Commission 2004).

Although the ASC payment system is linked to the OPPS, payment rates for all services covered under both systems are lower in the ASC system for two reasons. First, the relative weights have been lower in the ASC system because CMS makes proportional adjustments to the relative weights from the OPPS to maintain budget neutrality in the ASC system. Thus, ASC spending does not change over time because of changes in the OPPS relative weights. In 2013, this adjustment reduced the ASC relative weights by 6.8 percent below the relative weights in the OPPS. Second, for most procedures covered under the ASC system, the payment rate is the product of its relative weight and a conversion factor, set at $42.92 in 2013. The ASC conversion factor is lower than the OPPS conversion factor ($71.31 in 2013).

The ASC conversion factor is less than the OPPS conversion factor for two reasons. First, CMS set the initial ASC conversion factor for 2008 so that total ASC payments under the revised payment system would equal what they would have been under the previous payment system. By comparison, the initial OPPS conversion factor was based on total payments for hospital outpatient services in 2000. Second, CMS updates the ASC conversion factor based on the consumer price index for all urban consumers (CPI–U), whereas it uses the hospital market basket as the basis for updating the OPPS conversion factor. We are concerned that the CPI–U may not reflect ASCs' cost structure, and the Commission has recommended that CMS collect ASC cost data. These data should be used to examine whether an alternative input price index would be an appropriate proxy for ASC costs or an ASC-specific market basket should be developed (Medicare Payment Advisory Commission 2010b).

CMS uses a method different from the standard ASC method to determine payment rates for procedures that are predominantly performed in physicians' offices and that were first covered under the ASC payment system in 2008 or later (under the standard ASC method, ASC rates are based on OPPS relative weights). Payment for these "office-based" procedures is the lesser of the amount derived from the standard ASC method or the practice



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expense portion of the PFS rate that applies when the service is provided in a physician's office (this amount covers the equipment, supplies, nonphysician staff, and overhead costs of a service). CMS set this limit on the rate for certain office-based procedures to prevent migration of these services from physicians' offices to ASCs for financial reasons.[1] The Commission has been investigating payment rate differences across multiple ambulatory settings, including ASCs, HOPDs, and physicians' offices (Medicare Payment Advisory Commission 2012).

The ASC payment system generally parallels the OPPS in terms of which ancillary services are paid separately and which are packaged into the payment of the associated surgical procedure. Starting in 2008, ASCs receive separate payment for the following ancillary services:

- radiology services that are integral to a covered surgical procedure if separate payment is made for the radiology service in the OPPS,
- brachytherapy sources implanted during a surgical procedure,
- all pass-through and non–pass-through drugs that are paid for separately under the OPPS when provided as part of a covered surgical procedure, and
- devices with pass-through status under the OPPS.[2]

Because Medicare pays ASCs less than HOPDs for procedures, movement of surgical services from HOPDs to ASCs can reduce aggregate program spending and beneficiary cost sharing. If, however, the growth of ASCs results in an increase in the overall number of surgical services, this increase could partially offset reduced spending and cost sharing.

Although we do not have recent ASC cost data that would allow us to quantify the cost difference between settings, some evidence suggests that ASCs are a lower cost setting than HOPDs. The Government Accountability Office (GAO) compared ASC cost data from 2004 with HOPD costs and found that ASC costs are, on average, lower than HOPD costs (Government Accountability Office 2006).[3] In addition, data from the National Survey of Ambulatory Surgery indicate that the average time for ambulatory surgical visits was 50 percent higher in HOPDs than ASCs (147 minutes vs. 98 minutes) (Cullen et al. 2009).[4] Average times were also higher in HOPDs than in ASCs for specific diagnoses, such as cataract, benign neoplasm of the colon, and intervertebral disc disorders.

## Are Medicare payments adequate in 2013?

To address whether payments for the current year (2013) are adequate to cover the costs of efficient providers and how much payments should change in the coming year (2014), we examine several measures of payment adequacy. We assess beneficiaries' access to care by examining the supply of ASC facilities and changes over time in the volume of services provided, providers' access to capital, and changes in revenue from the Medicare program. Unlike our assessments of other provider types, we could not use quality data in our analysis because ASCs have only recently begun to submit information on quality measures. Moreover, we cannot examine Medicare payments relative to providers' costs because CMS does not require ASCs to submit cost data.[5] Finally, we caution that the effect of Medicare payments on the financial health of ASCs is limited because, on average, Medicare spending accounts for only about 17 percent of an ASC's overall revenue (Medical Group Management Association 2009).[6]

Our results show that beneficiaries have at least adequate access to care in ASCs, although there is some variation among subgroups of beneficiaries (see text box). In addition, ASCs have adequate access to capital, and Medicare payments to ASCs have continued to grow. Together, these measures suggest that payment rates are at least adequate.

### Beneficiaries' access to care: Supply of ASCs and volume growth indicate adequate access

Increases in the number of Medicare-certified facilities and volume of services provided to Medicare beneficiaries suggest growing access to ASCs. This growth may be beneficial to patients and providers because ASCs can offer them convenience and efficiency relative to HOPDs—the provider type with the greatest overlap of services with ASCs. For patients, ASCs can offer more convenient locations, shorter waiting times, and easier scheduling relative to HOPDs; for physicians, ASCs may offer more control over their work environment, customized surgical environments, and specialized staff. In addition, Medicare has lower payment rates and beneficiaries generally have lower copayments in ASCs than in HOPDs. However, the growth in ASCs may lead to an increase in the overall volume of surgical procedures (see discussion on pp. 113–115).


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## Differences in types of patients treated in ambulatory surgical centers and hospital outpatient departments

There is evidence that ambulatory surgical centers (ASCs) treat different types of patients than hospital outpatient departments (HOPDs). Our analysis of Medicare claims from 2011 found that the following groups are less likely to receive care in ASCs than in HOPDs: Medicare beneficiaries who also have Medicaid coverage (dual eligibles), African Americans (who are more likely to be dual eligible), beneficiaries who are eligible because of disability (under age 65), and beneficiaries who are age 85 or older (Table 5-1).[7] The smaller share of disabled and older beneficiaries treated in ASCs may reflect the healthier average profile of ASC patients relative to HOPD patients. In addition, the smaller share of African American patients in ASCs relative to HOPDs may be linked to differences in the geographic locations of ASCs and hospitals, the lower rate of supplemental coverage among African Americans, and the relatively high percentage of African Americans who have HOPDs or emergency departments as their usual source of care (Centers for Medicare & Medicaid Services 2012a).

In addition, we found that patients treated in HOPDs were, on average, more medically complex than patients treated in ASCs, as measured by differences in average patient risk scores. We used risk scores from the CMS-hierarchical condition categories (CMS–HCC) risk-adjustment model used in Medicare Advantage to measure patient severity.[8] CMS–HCC risk scores predict beneficiaries' relative costliness based on their diagnoses from the prior year and their demographic information (e.g., age and sex). We used 100 percent of Medicare claims from 2010 to maximize the number of cases and combined services into ambulatory payment classification (APC) groups. The average risk score for HOPD patients across all procedures in 2010 was 1.64, compared with 1.23 for ASC patients. This difference is statistically significant ($p < 0.05$). Beneficiaries who have higher risk scores are likely to be sicker and may require more time and resources to treat. Sicker patients may be referred to HOPDs instead of ASCs because hospitals offer emergency services and access to onsite specialists if complications arise.

**TABLE 5-1**

**Medicare patients treated in ASCs differ from patients treated in HOPDs, 2011**

| | Percent of beneficiaries | |
|---|---|---|
| **Characteristic** | **ASC** | **HOPD** |
| Medicaid status | | |
| Not Medicaid | 85.8% | 76.6% |
| Medicaid | 14.2 | 23.4 |
| Race/ethnicity | | |
| White | 87.9 | 83.9 |
| African American | 6.9 | 10.4 |
| Other | 5.2 | 5.7 |
| Age | | |
| Under 65 | 14.5 | 22.0 |
| 65 to 84 | 78.4 | 67.3 |
| 85 or older | 7.1 | 10.7 |
| Sex | | |
| Male | 42.3 | 44.0 |
| Female | 57.7 | 56.0 |

Note: ASC (ambulatory surgical center), HOPD (hospital outpatient department). All of the differences between ASC and HOPD beneficiaries are statistically significant ($p < 0.05$). The analysis excludes beneficiaries who received services that are not covered in the ASC payment system.

Source: MedPAC analysis of 5 percent carrier and outpatient standard analytic files, 2011.

We also compared average patient risk scores within each APC.[9] For 46 percent of the APCs in our analysis (representing 30 percent of ASC volume), the average HOPD risk score was significantly higher than the average ASC risk score ($p < 0.05$). However, for the remaining 54 percent of APCs (representing 70 percent of ASC volume), the severity of patients in HOPDs was similar to or less than the severity of patients in ASCs. Table 5-2 (p. 110) shows the average risk scores in each setting for the 10 APCs with the highest ASC volume in

*(continued next page)*



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## Differences in types of patients treated in ambulatory surgical centers and hospital outpatient departments (cont.)

2011. Risk scores were significantly higher in HOPDs than in ASCs for 3 of the top 10 APCs (Table 5-2).

There is a limitation to using risk scores to predict the relative cost of providing a specific service: Risk scores predict patients' relative costliness across the full range of health care services, but they do not necessarily indicate that a patient who has a high risk score will be more costly for a specific service. Despite this limitation, we use CMS–HCC risk scores as a proxy for patient severity because we do not have comparable cost data for HOPDs and ASCs that would allow us to directly evaluate the impact of patient severity on the cost of individual services. In prior work, the Commission has used risk scores from the full HCC model to compare patient severity in HOPDs and ASCs (Medicare Payment Advisory Commission 2003).

Other data sources also suggest that ASCs treat patients who are different from those treated by HOPDs. According to data from Pennsylvania on Medicare and non-Medicare patients, ASCs are less likely than HOPDs to serve Medicaid patients (Pennsylvania Health Care Cost Containment Council 2012). In Pennsylvania, Medicaid patients accounted for 4.7 percent of ASCs' diagnostic and surgical procedures in 2011, compared with 12.0 percent of HOPDs' procedures.[10] Commercially insured and Medicare patients represented a higher share of ASC procedures than HOPD procedures (87.3 percent vs. 78.2 percent). Although Pennsylvania data may not be nationally representative, national estimates from the National Survey of Ambulatory Surgery (NSAS), conducted by the Centers for Disease Control and Prevention, also show that ASCs treat a smaller share of Medicaid patients than hospitals. According to the NSAS data, ambulatory surgery visits by Medicaid patients accounted for 3.9 percent of total visits to freestanding ASCs in 2006, compared with 8.1 percent of total visits to hospital-based surgery centers.[11]

*(continued next page)*

**TABLE 5-2**

**Comparison of average patient risk scores in HOPDs and ASCs for 10 most frequently provided ASC procedure groups, 2010**

| Procedure group (APC) | Average patient risk score | | Percent of total ASC volume |
|---|---|---|---|
| | HOPD | ASC | |
| Cataract procedure with IOL insert | 1.24 | 1.19 | 19.8% |
| Lower GI endoscopy | 1.22* | 1.08 | 15.7 |
| Level III nerve injections | 1.34 | 1.33 | 13.9 |
| Level I upper GI procedures | 1.54 | 1.36 | 11.0 |
| Laser eye procedures | 1.33 | 1.28 | 5.5 |
| Level I nerve injections | 1.37 | 1.35 | 4.8 |
| Colorectal cancer screening: Colonoscopy | 1.00* | 0.90 | 2.7 |
| Level II nerve injections | 1.37 | 1.28 | 2.2 |
| Level I arthroscopy | 1.00* | 0.89 | 1.5 |
| Level III repair and plastic eye procedures | 1.37 | 1.30 | 1.5 |
| Total | | | 78.7 |

Note: HOPD (hospital outpatient department), ASC (ambulatory surgical center), APC (ambulatory payment classification), IOL (intraocular lens), GI (gastrointestinal). Services are combined into APC groups.
*Difference between average HOPD risk score and average ASC risk score is statistically significant ($p < 0.05$). Risk scores were calculated using the CMS–hierarchical condition categories risk-adjustment model used in Medicare Advantage to measure patient severity. These risk scores predict beneficiaries' relative costliness based on diagnoses from the prior year and demographic information.

Source: MedPAC analysis of 100 percent carrier standard analytic file, 2010.



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## Differences in types of patients treated in ambulatory surgical centers and hospital outpatient departments (cont.)

Several factors could explain why ASCs treat a smaller share of Medicaid patients (including dual eligibles) than HOPDs. A study by Gabel and colleagues suggests that insurance coverage influences a physician's decision to refer a patient to an ASC or to a hospital (Gabel et al. 2008). This study examined referral patterns for physicians in Pennsylvania who sent most of their patients to physician-owned ASCs rather than HOPDs. These physicians were much more likely to refer their commercially insured and Medicare patients than their Medicaid patients to a physician-owned ASC. They sent more than 90 percent of their commercial and Medicare patients—but only 55 percent of their Medicaid patients—to an ASC instead of a hospital.

The location of ASCs may also lead to a smaller share of Medicaid patients; for example, ASC owners may choose to locate in areas with a high proportion of commercially insured patients. In addition, many state Medicaid programs do not pay Medicare's cost sharing for dual eligibles if the Medicare rate for a service minus the cost sharing is higher than the Medicaid rate for the service (Medicare Payment Advisory Commission 2010a). In states that do not pay the cost sharing for ASC services used by dual eligibles, ASCs could be discouraged from treating these patients. Finally, dual-eligible beneficiaries are more likely to report that their usual source of care is an HOPD or hospital emergency department (ED) than are Medicare beneficiaries who have other types of supplemental coverage (Centers for Medicare & Medicaid Services 2012a). If a patient has an HOPD or ED as his usual source of care, physicians may be more likely to refer the patient to an HOPD for surgical care than they would patients who have a usual source of care in another setting. ■

### Capacity and supply of providers: Number of ASCs has increased, but growth has slowed

The number of Medicare-certified ASCs increased substantially from 2006 through 2008 but has grown more slowly since then. From 2006 through 2008, the number of Medicare-certified ASCs increased by 5.1 percent per year on average. During this period, an average of 318 new facilities entered the program each year, while an average of 79 closed or merged with other facilities. However, the growth rate decelerated to 2.2 percent in 2009 and 1.8 percent in both 2010 and 2011 (Table 5-3). This slower growth continued into 2012, as the number of ASCs increased by 0.3 percent to 5,359 during the first three quarters of 2012 (an annual growth rate of 0.4 percent).

Several factors might explain the relatively slow growth from 2009 through the first three quarters of 2012:

- The economy is experiencing a sluggish recovery after the economic downturn that began in the fall of 2008, which has dampened demand for physicians' services

**TABLE 5-3** **Number of Medicare-certified ASCs grew by 17 percent, 2006–2011**

| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|
| Number of centers | 4,567 | 4,838 | 5,045 | 5,157 | 5,252 | 5,344 |
| New centers | 328 | 345 | 281 | 218 | 189 | 153 |
| Exiting centers | 89 | 74 | 74 | 106 | 94 | 61 |
| Net percent growth in number of centers from previous year | 5.5% | 5.9% | 4.3% | 2.2% | 1.8% | 1.8% |

Note: ASC (ambulatory surgical center).

Source: MedPAC analysis of Provider of Services file from CMS, 2011.



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**TABLE 5-4** **Most Medicare-certified ASCs are urban and for profit**

| ASC type | 2006 | 2011 |
|---|---|---|
| Urban | 91% | 91% |
| Rural | 9 | 9 |
| For profit | 96 | 97 |
| Nonprofit | 4 | 3 |

Note: ASC (ambulatory surgical center).

Source: MedPAC analysis of Provider of Services file from CMS, 2011.

and elective surgeries (Deutsche Bank 2012b, Kaiser Family Foundation 2011, Keehan et al. 2012).

- The ASC payment system underwent a substantial revision in 2008, and investors may be responding to the large changes in payment rates that occurred under that revision.
- Payment rates for most ambulatory surgical services are 78 percent higher in the OPPS than in the ASC payment system, which has influenced some ASC owners to sell their facilities to hospitals and caused some health care systems to expand their HOPDs rather than establish new ASCs (North Carolina Department of Health and Human Services 2008, State of Connecticut 2011).
- There may be limited opportunities to develop new facilities because most physicians who perform procedures in ASCs are already affiliated with an ASC (Cain Brothers 2011).
- Physicians are increasingly choosing to be employed by hospitals rather than work in an independent practice (Berenson et al. 2012, Mathews 2012, Pettypiece 2012). Physicians employed by hospitals are more likely to provide ambulatory surgical services in their HOPDs than in a freestanding ASC.

To provide a more complete picture of capacity in ASCs, we also examined the change in the number of ASC operating rooms. From 2006 through 2011, the number of ASC operating rooms increased at almost the same rate as the number of ASCs (3.0 percent per year vs. 3.2 percent per year). The mean number of operating rooms per ASC decreased slightly from 2.8 to 2.7, although the median number of operating rooms per facility was 2 in both years.

ASCs are concentrated geographically. As of 2011, Maryland had the most ASCs per fee-for-service (FFS) beneficiary, followed by Idaho, Washington, and Georgia; each state had more than 30 ASCs per 100,000 FFS beneficiaries with Part B coverage. Vermont had the fewest ASCs per FFS beneficiary, followed by West Virginia, Kentucky, and New York; each state had fewer than 6 per 100,000 FFS beneficiaries.[12] In addition, in 2011, most Medicare-certified ASCs were for profit and located in urban areas, a pattern that has not changed over time (Table 5-4). Beneficiaries who do not live near an ASC can obtain ambulatory surgical services in HOPDs and, in some cases, physicians' offices. In addition, beneficiaries who live in rural areas may travel to urban areas to receive care in ASCs.

Continued growth in the number of Medicare-certified ASCs suggests that Medicare's payment rates have been at least adequate. However, Medicare payments are not a substantial source of revenue for ASCs, on average (Medical Group Management Association 2009). Other factors have also likely influenced the long-term growth in the number of Medicare-certified ASCs:

- Changes in clinical practice and health care technology have expanded the provision of surgical procedures in ambulatory settings.
- ASCs may offer patients greater convenience than HOPDs in terms of better locations, the ability to schedule surgery more quickly, and shorter waiting times.
- For most procedures covered under the ASC payment system, beneficiaries' copayments are lower in ASCs than in HOPDs.[13]
- Physicians have greater autonomy in ASCs than in HOPDs, which enables them to design customized surgical environments and hire specialized staff.
- Unlike physicians who perform surgery in HOPDs, physicians who invest in ASCs and perform surgery there can increase their revenue by receiving a share of ASC facility payments. The federal anti-self-referral law (also known as the Stark Law) does not apply to surgical services in ASCs.
- Because physicians can probably perform more procedures in ASCs than in HOPDs in the same amount of time, they can earn more professional fees.



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### Number of services grew from 2006 to 2011

We examined growth in the number of ASC surgical services provided per FFS beneficiary. From 2006 through 2010, the volume of surgical services per FFS beneficiary increased by an average of 5.7 percent per year and by 1.9 percent in 2011 (Table 5-5).

The 2008 revision of the ASC payment system substantially increased the number of covered services. We evaluated the effect of the increase by breaking down the growth in service volume from 2010 through 2011 into two parts: the portion due to surgical services newly covered after 2007 and the portion due to surgical services covered in both 2007 and 2011. Our analysis indicates that services newly covered after 2007 grew by 3.9 percent in 2011, and services covered in both 2007 and 2011 grew by 1.7 percent in 2011 (Table 5-5).[14] The most commonly provided services that were newly covered after 2007—which also showed strong growth in other ambulatory settings—include trabeculoplasty by laser eye surgery, arthrocentesis by aspiration or injection of a major joint or bursa, and intravitreal injection of a pharmacological agent.

Although newly covered services had strong growth in 2011, the services that have historically contributed the most to overall volume continued to constitute a large share of the total in 2011. For example, cataract removal with intraocular lens insertion had the highest volume in both 2007 and 2011, accounting for 20 percent of volume in 2007 and 18 percent in 2011. Moreover, 19 of the 20 most frequently provided services in 2007 were among the 20 most frequently provided in 2011 (Table 5-6, p. 114). For these 20 services, volume per FFS beneficiary increased by an average of 1.7 percent per year from 2007 through 2011. However, these 20 services accounted for a smaller share of total ASC volume in 2011 than in 2007 (67.8 percent vs. 74.6 percent), which indicates that ASCs are providing an increasingly diverse set of procedures.

### Surgical services migrated from HOPDs to ASCs between 2006 and 2010, but trend has stalled

Although the growth of services provided in ASCs from 2006 to 2010 may reflect the migration of procedures from HOPDs to ASCs, this trend appears to have stalled. We compared volume growth from 2006 through 2011 for services provided in ASCs with the growth of ASC-covered services provided in HOPDs. We limited this analysis to services that were covered in the ASC payment system in 2006, as the inclusion of services covered in the OPPS in 2006 that became covered in the ASC payment system after 2006 would have biased the results.

**TABLE 5-5** **Volume of ASC services per FFS beneficiary has continued to grow**

| Time period | Average annual volume growth per FFS beneficiary |
|---|---|
| 2006 through 2010 | 5.7% |
| 2010 through 2011 | 1.9 |
| Services covered in both 2007 and 2011 | 1.7 |
| Services newly covered after 2007 | 3.9 |

Note: ASC (ambulatory surgical center), FFS (fee-for-service).

Source: MedPAC analysis of 5 percent carrier standard analytic files, 2006, 2007, 2010, and 2011.

From 2006 through 2010, the number of ASC-covered surgical services per FFS beneficiary grew by 5.8 percent per year in ASCs and by 0.1 percent in HOPDs, which suggests that these surgical services may have migrated from HOPDs to ASCs during that period. In 2011, however, surgical services increased at a lower rate in ASCs than in HOPDs (1.8 percent vs. 3.8 percent).

Although surgical volume growth was higher in HOPDs than ASCs in 2011, there is no strong evidence of a shift of services from ASCs to HOPDs. For example, the 22 most frequently provided ASC services—represented by Healthcare Procedure Coding System codes—constitute about 70 percent of ASC volume. None of these services shows strong evidence of a shift from ASCs to HOPDs in 2011, such as a large decline in the volume provided in ASCs and a large increase in HOPDs. Outside of the 22 most frequently provided ASC services, some services have declined in ASCs but increased in HOPDs. For example, nerve procedures decreased by 3.7 percent in ASCs in 2011 and increased by 10.1 percent in HOPDs.[15] However, other types of procedures increased in ASCs and decreased in HOPDs. For example, the category of services that includes Level II through Level V repair and plastic eye surgeries increased by 5.1 percent in ASCs in 2011 and decreased by 7.0 percent in HOPDs.[16] A factor that may have contributed to the higher volume growth of procedures in HOPDs in 2011 is a shift of services from physicians' offices to HOPDs, as hospital employment of physicians has increased.

Other data also suggest that the migration of services from HOPDs to ASCs has stalled. In Pennsylvania, ASCs' share



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**TABLE 5-6** **Most frequently provided ASC services in 2011 were similar in 2007**

| Surgical service | 2007 Percent of volume | 2007 Rank | 2011 Percent of volume | 2011 Rank |
|---|---|---|---|---|
| Cataract surgery w/ IOL insert, 1 stage | 19.9% | 1 | 17.0% | 1 |
| Upper GI endoscopy, biopsy | 7.9 | 2 | 8.0 | 2 |
| Diagnostic colonoscopy | 5.9 | 3 | 3.6 | 8 |
| Colonoscopy and biopsy | 5.5 | 4 | 5.7 | 3 |
| After cataract laser surgery | 5.4 | 5 | 3.9 | 6 |
| Lesion removal colonoscopy, snare technique | 4.8 | 6 | 4.4 | 4 |
| Injection spine: lumbar, sacral (caudal) | 4.3 | 7 | 3.6 | 7 |
| Injection foramen epidural: lumbar, sacral | 3.1 | 8 | 4.1 | 5 |
| Injection paravertebral: lumbar, sacral add on* | 2.9 | 9 | 1.9 | 11 |
| Injection paravertebral: lumbar, sacral* | 1.9 | 10 | 2.2 | 9 |
| Lesion removal colonoscopy, biopsy forceps or bipolar cautery | 1.7 | 11 | 1.0 | 19 |
| Colon cancer screen, not high-risk individual | 1.7 | 12 | 1.4 | 14 |
| Injection foramen epidural add on | 1.6 | 13 | 2.1 | 10 |
| Upper GI endoscopy, diagnosis | 1.5 | 14 | 1.2 | 16 |
| Colorectal screen, high-risk individual | 1.4 | 15 | 1.8 | 12 |
| Cystoscopy | 1.3 | 16 | 1.1 | 18 |
| Destruction paravertebral nerve, add on | 1.1 | 17 | 1.6 | 13 |
| Revision of upper eyelid | 0.9 | 18 | 0.9 | 20 |
| Cataract surgery, complex | 0.9 | 19 | 1.3 | 15 |
| Injection spine: cervical or thoracic | 0.9 | 20 | 0.9 | 21 |
| Total | 74.6 | | 67.8 | |

Note: ASC (ambulatory surgical center), IOL (intraocular lens), GI (gastrointestinal).
*The description of these services changed in 2010 to include imaging guidance.

Source: MedPAC analysis of 5 percent carrier standard analytic claims files, 2007 and 2011.

of outpatient diagnostic and surgical procedures performed on all patients increased dramatically between 2000 and 2009, from 10.2 percent to 32.5 percent, but did not change between 2009 and 2011 (Pennsylvania Health Care Cost Containment Council 2012).

We believe it is desirable to maintain beneficiaries' access to ASCs because services provided there are less costly to Medicare and beneficiaries than services delivered in HOPDs. Our comparison of the number of cataract surgeries with intraocular lens insertion provided in ASCs with those in HOPDs illustrates this point. We found that, from 2006 through 2011, the proportion of these procedures provided in ASCs increased from 65 percent to 71 percent. Meanwhile, the payment rate for these procedures in 2011 was $951 in ASCs compared with $1,691 in HOPDs. Medicare's portion of this payment was $761 in ASCs and $1,195 in HOPDs, while the beneficiary's copayment was $190 in ASCs and $496 in HOPDs. Moreover, ASCs offer patients additional advantages over HOPDs, such as more convenient locations and shorter waiting times.

However, we must be attentive to the fact that most ASCs have some degree of physician ownership, and this ownership could give physicians an incentive to perform more surgical services than they would if they provided outpatient surgery only in HOPDs. This additional volume could partially offset the effect of lower rates in ASCs on Medicare spending. Recent studies offer limited evidence that physicians with an ownership stake in an ASC perform a higher volume of certain procedures than nonowning physicians (Hollingsworth et al. 2010, Mitchell 2010, Strope et al. 2009). One study, using a proxy measure of physician ownership of ASCs in Florida, found that physicians who invested in ASCs increased their volume of four common surgical procedures in all settings more


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**TABLE 5-7** **Medicare payments to ASCs have grown, 2006–2011**

| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|
| Medicare payments (billions of dollars) | $2.8 | $2.9 | $3.1 | $3.2 | $3.3 | $3.4 |
| Medicare payments per FFS beneficiary | $85 | $89 | $97 | $102 | $104 | $106 |
| Percent change per FFS beneficiary from previous year | 8.6% | 5.0% | 8.1% | 5.3% | 2.0% | 2.2% |

Note: ASC (ambulatory surgical center), FFS (fee-for-service). Medicare payments include program spending and beneficiary cost sharing for ASC facility services. Payments include new technology intraocular lenses.

Source: MedPAC analysis of data from the Office of the Actuary at CMS.

rapidly than nonowning physicians (Hollingsworth et al. 2010).[17] Although this study had limitations (it was based on a single state, used a proxy measure of physician ownership, and did not examine whether the additional procedures were inappropriate), it suggests that physician ownership of ASCs is associated with greater overall volume of surgical procedures.

Two studies found that the growth of ASCs in a market is associated with higher overall volume of certain procedures (Hollingsworth et al. 2011, Koenig and Gu 2013). The first study, which was limited to Florida, found that the volume of colonoscopy and upper gastrointestinal endoscopy in ambulatory settings increased at faster rates in health care markets after ASCs entered the markets compared with markets that had no ASC entry (Hollingsworth et al. 2011). The authors found no significant relationship between ASC entry and the growth of cataract surgery or cancer-directed breast surgery. The second study examined national Medicare data and found that an increase in the number of ASC operating rooms in a state was associated with additional colonoscopy procedures in all outpatient settings (Koenig and Gu 2013). However, there was no significant relationship between growth in the number of ASC operating rooms and the volume of cataract surgery, upper gastrointestinal procedures, or arthroscopy. Based on the results of these studies, it is plausible that reductions in Medicare spending due to lower payment rates for ASCs could be partially offset by a higher overall number of certain procedures.

## Providers' access to capital: Growth in number of ASCs suggests adequate access

Owners of ASCs require capital to establish new facilities and upgrade existing ones. The change in the number of ASCs is the best available indicator of ASCs' ability to obtain capital. The number of ASCs continued to increase in 2011, although at a slower rate than in previous years (Table 5-3, p. 111). This slowing growth may reflect the sluggish pace of recovery from the downturn in the economy that began in the fall of 2008, the widening difference between payment rates in the ASC payment system and the OPPS, and the increase in physician employment by hospitals. In 2008, the average payment rate for most services provided in ASCs was 62.6 percent of what would have been paid in HOPDs. This percentage fell to 56.5 in 2011. However, Medicare accounts for a relatively small share of ASCs' overall revenue on average, so factors other than Medicare payments may have a larger effect on access to capital for this sector.

In addition, the only publicly traded ASC chain—Amsurg—continues to acquire new ASCs, which indicates that it has sufficient access to capital. During the third quarter of 2012, for example, the company announced its intention to acquire 15 new facilities (it currently has over 220 facilities) (Deutsche Bank 2012a). We caution, however, that this chain represents only 4 percent of all Medicare-certified ASCs, so its experience may not represent the entire ASC sector.

## Medicare payments: Payments have increased rapidly

In 2011, ASCs received about $3.4 billion in Medicare payments and beneficiaries' cost sharing (Table 5-7). Spending per FFS beneficiary increased by an average of 5.1 percent per year from 2006 through 2010 and by 2.2 percent in 2011. CMS increased the ASC conversion factor by 0.2 percent in 2011. Annual changes in spending on ASC services can be affected by the amount of spending on new technology intraocular lenses (NTIOLs) because the number of NTIOLs that are eligible for



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## Creating a value-based purchasing program for ambulatory surgical centers

To improve the quality of care provided to beneficiaries in ambulatory surgical centers (ASCs), the Commission previously recommended that CMS implement a value-based purchasing (VBP) program to reward high-performing providers and penalize low-performing providers (Medicare Payment Advisory Commission 2012). CMS should also publicly report quality measurement results to help consumers compare quality among facilities. CMS established a Quality Reporting Program for ASCs that requires them to submit quality data beginning in October 2012; ASCs that do not submit data will have their annual update reduced by 2 percentage points in 2014. However, Medicare payments to ASCs would not be adjusted based on the provider's actual performance on quality measures. CMS currently lacks the statutory authority to implement a VBP program for ASCs.

The Commission supports the quality data reporting program for ASCs but believes that, eventually, high-performing ASCs should be rewarded and low-performing facilities should be penalized through the payment system. In our March 2012 report, the Commission made the following recommendation:

**The Congress should direct the Secretary to implement a value-based purchasing program for ambulatory surgical center services no later than 2016.**

The current quality reporting program could lay the foundation for a VBP program. Consistent with the Commission's overall position on VBP (also known as pay-for-performance) programs in Medicare, an ASC VBP program should include a relatively small set of measures to reduce the administrative burden on ASCs and CMS, and the measure set should primarily focus on clinical outcomes, as Medicare's central concern should be improving outcomes across all ASCs and over time. The program should also include some clinical process, structural, and patient experience measures. Several of these indicators are already being reported through the ASC Quality Reporting Program, but other measures need to be developed, such as a surgical site infection (SSI) indicator and a patient experience measure. An ASC VBP program should reward ASCs for improving care and exceeding quality benchmarks. In addition, funding for the VBP incentive payments should come from existing Medicare spending for ASC services. Initially, funding for the incentive payments should be set at 1 percent to 2 percent of aggregate ASC payments. The size of this pool should be expanded gradually as more measures are developed and ASCs become more familiar with the program.

CMS should consider incorporating the following outcome measures into an ASC VBP program:

- patient fall in the ASC;
- patient burn;
- wrong site, wrong side, wrong patient, wrong procedure, wrong implant;

*(continued next page)*

separate payment changes from year to year. Therefore, we also examined the change in Medicare spending on surgical services provided in ASCs excluding spending on NTIOLs. In 2011, per capita spending on surgical services increased 2.6 percent. Per capita spending on surgical services newly covered after 2007 increased 4.5 percent, and spending on surgical services covered in both 2007 and 2011 increased 2.6 percent.

## How should Medicare payments change in 2014?

Our payment adequacy analysis indicates that the number of Medicare-certified ASCs has increased, beneficiaries' use of ASCs has increased, and access to capital has been adequate. However, our information for assessing payment adequacy is limited because, unlike other types of

## Creating a value-based purchasing program for ambulatory surgical centers (cont.)

- hospital transfer or admission after an ASC procedure, whether the patient is transferred directly to the hospital from the ASC or admitted to the hospital after returning home from an ASC procedure; and
- SSI rate.

The first three outcome measures listed above are patient safety indicators identified by the National Quality Forum as "serious reportable events," which are defined as errors in medical care that are clearly identifiable and measurable, usually preventable, serious in their consequences for patients, and indicate a problem in a health care facility's safety systems. ASCs have begun reporting these claims-based measures under the ASC Quality Reporting Program. Because these indicators represent errors that are usually preventable, they could be measured against an absolute national benchmark that starts very low and is reduced over time to a rate that approaches zero.

By contrast, the last two outcome measures listed above (hospital transfer or admission after an ASC procedure and SSI rate) may occur at low rates even in the highest quality facilities. Therefore, an ASC's performance on these indicators should be measured against the performance of other ASCs rather than an absolute benchmark. Because certain ASCs may report small numbers of cases for the calculation of these measures, the rates reported for these providers could vary substantially from one observation period to the next, due solely to random statistical variation. To address this issue, CMS could consider using a composite measure that would aggregate the rates for several measures of rare events into a single rate or using data from multiple years for a single measure.

Because measures of patient experience provide information on patients' perceptions of access to care and how well their providers communicate with them, the Commission supports the development of a survey to measure patients' perceptions of their ASC care. We recognize that scores on a patient experience measure may be similar across facilities because ASCs usually provide low-risk procedures to patients who tend to be less complex than patients treated in hospital outpatient departments. If patient experience scores turn out to be similar across all ASCs, CMS could assign this measure less weight in determining an ASC's overall performance. ■

facilities, Medicare does not require ASCs to submit cost data. We also do not yet have information on the quality of care in ASCs because they did not begin submitting quality data to CMS until October 2012. The Commission has recommended that Medicare develop a value-based purchasing program that would use ASC quality data to reward high-performing and penalize low-performing providers, but CMS does not have the statutory authority to implement such a program (see text box).

Cost data would enable the Commission to examine the growth of ASCs' costs over time and analyze Medicare payments relative to the costs of efficient providers, which would help inform decisions about the ASC update. Cost data are also needed to examine whether an alternative input price index would be an appropriate proxy for ASC costs or an ASC-specific market basket should be developed. As discussed in the text box on pp. 118–119, the Commission previously expressed concern that the price index that CMS uses to update ASC payments (the CPI–U) may not reflect ASCs' cost structure (Medicare Payment Advisory Commission 2010b). CMS has also concluded that it needs data on ASC costs to determine whether there is a better alternative than the CPI–U to measure changes in ASCs' input costs (Centers for Medicare & Medicaid Services 2012b).

Although CMS and ASCs have expressed concern that requiring ASCs to submit cost data may impose a burden on these facilities, we believe it is feasible for ASCs to provide a limited amount of cost information (Centers for Medicare & Medicaid Services 2011). Even though ASCs are generally small facilities that may have limited resources for collecting cost data, such businesses typically keep records of their costs for filing taxes and other purposes. To minimize the burden on CMS and ASCs, CMS should create a streamlined process for ASCs to track and submit a limited amount of cost data. One such



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## Revisiting the ambulatory surgical center market basket

CMS uses the consumer price index for all urban consumers (CPI–U) as the market basket to update ambulatory surgical center (ASC) payments. Because of our concern that the CPI–U may not reflect ASCs' cost structure, the Commission examined in 2010 whether an alternative market basket index would better measure changes in ASCs' input costs (Medicare Payment Advisory Commission 2010b). Using data from a Government Accountability Office (GAO) survey of ASC costs in 2004, we compared the distribution of ASC costs with the distribution of hospital and physician practice costs. We found that ASCs' cost structure is different from that of hospitals and physicians' offices.

Although CMS has historically used the CPI–U as the basis for Medicare's annual updates to ASC payments, the mix of goods and services in this price index probably does not reflect ASC inputs. The CPI–U is based on a sample of prices for a broad mix of goods and services, including food, housing, apparel, transportation, medical care, recreation, personal care, education, and energy (IHS Global Insight 2009). The weight of each item is based on spending for that item by a sample of urban consumers during the survey period. Although some of these items are probably used by ASCs, their share of spending on each item is likely very different from the CPI–U weight. For example, housing accounts for 43.4 percent of the entire CPI–U (Bureau of Labor Statistics 2009).

We explored whether one of two existing Medicare indexes would be an appropriate proxy for ASC input costs: the hospital market basket, which is used to update payments for inpatient and outpatient hospital services, or the practice expense component of the Medicare Economic Index (MEI), which measures changes in physicians' practice expenses. It is reasonable to expect that ASCs have many of the same types of costs as hospitals and physicians' offices, such as medical equipment, medical supplies, building-related expenses, clinical staff, administrative staff, and malpractice insurance.

We used ASC cost data from the GAO survey to compare the distribution of ASC costs with the distribution of hospital costs (derived from the hospital market basket) and physician practice expenses (derived from the practice expense portion of the MEI). Our March 2010 report has more details on the method (Medicare Payment Advisory Commission 2010b). Although the GAO data are not sufficient for comparing

*(continued next page)*

mechanism could be annual surveys of a random sample of ASCs with mandatory response. CMS conducted cost surveys of a sample of ASCs in 1986 and 1994, and the Government Accountability Office conducted a survey of ASC costs in 2004. Another approach would be to require all ASCs to submit streamlined cost reports on an annual basis.

To enable the Commission and other analysts to determine the relationship between Medicare payments and the costs of efficient ASCs, ASCs would probably need to submit the following information:

- total costs for the facility;
- Medicare unallowable costs (e.g., entertainment, promotion, and bad debt);
- costs of clinical staff that bill Medicare separately, such as anesthesiologists and clinical nurse anesthetists (these costs would be excluded from the facility's costs because these clinicians are paid separately under Medicare);
- total charges across all payers and charges for Medicare patients (CMS could allocate total facility costs to Medicare based on Medicare's proportion of total charges);
- total Medicare payments; and
- total Medicare visits (this information would enable CMS to validate the cost data with Medicare claims data).



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## Revisiting the ambulatory surgical center market basket (cont.)

each category of costs across settings, they suggest that ASCs have a different cost structure from hospitals and physicians' offices. ASCs appear to have a much higher share of expenses related to medical supplies and drugs than the other two settings, a much smaller share of employee compensation costs than hospitals, and a smaller share of all other costs (such as rent and capital costs) than physicians' offices. ASCs' larger share of costs for medical supplies and drugs could be related to their high volume of cataract removal and lens insertion procedures. These procedures use intraocular lenses, which are included in the medical supplies category and are relatively expensive. Another factor could be that ASCs primarily perform surgical procedures, whereas hospitals and physicians' offices provide a significant number of imaging, tests, and evaluation and management services, which probably have lower supply costs than surgical procedures.

Since our 2010 analysis, CMS also considered whether the hospital market basket or the practice expense component of the MEI is a better proxy for ASC costs than the CPI–U (Centers for Medicare & Medicaid Services 2012b). However, CMS believes that the hospital market basket does not align with the cost structure of ASCs because hospitals provide a much wider range of services than ASCs, such as room and board and emergency care. Therefore, the agency concluded that it needs data on the cost inputs of ASCs to determine whether there is a better alternative than the CPI–U to measure changes in ASC input costs. CMS asked for public comment on the feasibility of collecting cost information from ASCs but did not propose a plan to collect cost data.

The ASC cost data from GAO used in our comparative analysis are nine years old and do not contain information on several types of costs. Therefore, the Commission has recommended several times that the Congress require ASCs to submit new cost data to CMS (Medicare Payment Advisory Commission 2010b, Medicare Payment Advisory Commission 2011, Medicare Payment Advisory Commission 2012). CMS should use this information to examine whether an existing Medicare price index is an appropriate proxy for ASC costs or an ASC-specific market basket should be developed. A new ASC market basket could include the same types of costs that appear in the hospital market basket or MEI but with different cost weights that reflect the unique cost structure of ASCs. ■

In addition to the information described above, CMS would need to collect data on specific cost categories to determine an appropriate input price index for ASCs. For example, CMS would need data on the share of ASCs' costs related to employee compensation, medical supplies, medical equipment, building expenses, and other professional expenses (e.g., legal, accounting, and billing services). CMS should use this information to examine the cost structure of ASCs and determine whether an existing Medicare price index is an appropriate proxy for ASC costs or an ASC-specific market basket should be developed.

CMS increased the ASC conversion factor by 0.2 percent in 2011, 1.6 percent in 2012, and 0.6 percent in 2013. The update for 2013 was based on a projected 1.4 percent increase in the CPI–U, minus a 0.8 percent deduction for multifactor productivity growth, as mandated by the Patient Protection and Affordable Care Act of 2010 (PPACA).[18]

### Update recommendation

In recommending an update to the ASC conversion factor for 2014, the Commission balanced the following objectives:

- maintain beneficiaries' access to ASC services;
- pay providers adequately;
- hold down the burden on the beneficiaries, workers, and firms who finance Medicare;
- maintain the sustainability of the Medicare program by appropriately restraining spending on ASC services;



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- keep providers under financial pressure to constrain costs; and
- require ASCs to submit cost data.

In balancing these goals, the Commission concludes that the ASC update for 2014 should be eliminated and that the Congress should require ASCs to submit cost data.

## RECOMMENDATION 5

**The Congress should eliminate the update to the payment rates for ambulatory surgical centers for calendar year 2014. The Congress should also require ambulatory surgical centers to submit cost data.**

## RATIONALE 5

On the basis of our payment adequacy indicators, the importance of maintaining financial pressure on providers to constrain costs, and the lack of ASC cost and quality data, we believe that ASC payment rates should not be increased for 2014. The indicators of payment adequacy for which we have information are positive: The number of Medicare-certified ASCs continues to grow, as does beneficiaries' use of ASC services, and ASCs have adequate access to capital. Therefore, although we do not have cost and quality data, the indicators we have suggest that payments have been at least adequate.

As we have stated in prior reports, it is vital that CMS begin collecting cost data from ASCs without further delay. The lack of such data for ASCs is one reason why our recommended update for ASCs is lower than that for HOPDs (1.0 percent for 2014) (Chapter 3 of this report). Cost data would enable the Commission to examine the growth of ASCs' costs over time and evaluate Medicare payments relative to the costs of efficient providers, which would help inform decisions about the ASC update. Such data are also needed to analyze whether an alternative input price index would be an appropriate proxy for ASC costs or an ASC-specific market basket should be developed.

## IMPLICATIONS 5

### Spending

- CMS has decided to increase ASC payment rates by the change in the CPI–U (Centers for Medicare & Medicaid Services 2007). PPACA requires that the update factor be reduced by a multifactor productivity measure. The currently projected CPI–U increase for 2014 is 1.9 percent, and the forecast of productivity growth for 2014 is 0.4 percent, resulting in a projected update of 1.5 percent for 2014 (IHS Global Insight 2012). However, we recommend that the update be eliminated. Therefore, relative to the statutory update, our recommendation would decrease federal spending by less than $50 million in the first year and by less than $1 billion over five years.

### Beneficiary and provider

- Because of the growth in the number of Medicare-certified ASCs and the volume of ASC services, we do not anticipate that this recommendation would diminish beneficiaries' access to ASC services or providers' willingness or ability to provide those services.
- ASCs would incur some administrative costs to track and submit cost data. ■

## Endnotes

1 Because CMS updates payment rates in the OPPS and the PFS independently of each other, it is possible for the ASC payment rate for an office-based procedure to be based on the OPPS relative weight in one year and the PFS rate the next year (or vice versa).

2 ASCs and HOPDs receive the same amount for drugs that are paid for separately under the OPPS and for pass-through devices.

3 GAO surveyed a random sample of 600 ASCs to obtain cost data from 2004; they received reliable cost data from 290 facilities.

4 The average time includes time spent by the patient in the operating room and postoperative recovery room.

5 The Medicare Prescription Drug, Improvement, and Modernization Act of 2003 eliminated a requirement that the Secretary collect cost data from ASCs every five years.

6 Medicare's share of total ASC revenue varies by type of ASC, ranging from 7 percent for ASCs that specialize in orthopedic procedures to 43 percent for ASCs that specialize in ophthalmology cases (Medical Group Management Association 2009).

7 Because some states have a disproportionately high number of ASCs per beneficiary (Maryland, Idaho, Washington, and Georgia), we weighted beneficiaries so that in each state the percentage of beneficiaries receiving care in ASCs matched the national percentage. This process prevented idiosyncrasies in states that have high concentrations of ASCs from biasing the results. The analysis excluded beneficiaries who received services that Medicare does not cover in ASCs.

8 The CMS–HCC model is an abbreviated version of the full HCC model. The full HCC model includes 189 disease categories, while the CMS–HCC includes 70. We excluded beneficiaries who had missing risk scores and beneficiaries who were new Medicare enrollees in 2010 because those beneficiaries' risk scores were not based on diagnosis data. Our analysis included only surgical procedures that were covered in the ASC payment system in 2010.

9 We dropped APCs that did not have any ASC volume.

10 These data are based on 266 ASCs and 165 hospitals.

11 The sample of freestanding ASCs in the NSAS includes facilities listed in the 2005 Verispan Freestanding Outpatient Surgery Center Database and Medicare-certified ASCs from CMS's Provider of Services file (Cullen et al. 2009).

12 Whether a state has certificate-of-need (CON) laws for ASCs appears to affect the number of ASCs in the state. Twenty-six states and the District of Columbia have CON laws for ASCs. The 12 states with the lowest number of ASCs per FFS beneficiary all have CON laws, while only 4 of the 10 states that have the highest number of ASCs per beneficiary have CON laws. Among these four states, Maryland and Georgia have exceptions in their CON requirements for ASCs that make it easier to establish new ASCs.

13 By statute, the copayment for a service paid under the OPPS cannot exceed the hospital inpatient deductible ($1,184 in 2013). The ASC payment system does not have the same limitation on copayments, and for a few services the ASC copayment exceeds the inpatient deductible. In these instances, the ASC copayment exceeds the OPPS copayment.

14 Our analysis of service volume in 2011 included surgical procedures only, as nearly all these procedures had Current Procedural Terminology codes in the range 10000–69999. Our analysis did not include nonsurgical services, such as radiology services, brachytherapy sources, drugs, and pass-through devices. In addition, it did not include services that were packaged in 2011.

15 Nerve procedures are represented by APCs 220 and 221.

16 This group of services is represented by APCs 239 through 242.

17 This study assumed that physicians who performed at least 30 percent of their outpatient surgeries at a given ASC within a year were ASC owners. The four procedures for which there was a significant relationship between ASC ownership and volume were carpal tunnel release, cataract excision, colonoscopy, and knee arthroscopy. There was no significant relationship for myringotomy with tube placement.

18 Unlike update factors for other providers, such as the hospital market basket, the CPI–U is an output price index that already accounts for productivity changes (Centers for Medicare & Medicaid Services 2012b). Nevertheless, CMS is mandated to subtract multifactor productivity growth from the increase in the CPI–U.



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# Outpatient Pulse Report 2008

## Patient Perspectives on American Health Care

PRESS GANEY®

# Executive Summary

Outpatient services, including outpatient surgery, continue to grow rapidly as technological and clinical advancements reduce the need for customary overnight hospital stays. Outpatient care centers can be a financially sound business decision for health care organizations and can enhance patient satisfaction by reducing their time away from home. As outpatient services have a lower barrier to entry and significant profit potential, hospitals face competition from independent and doctor-owned facilities. Maintaining a high standard of care is essential to maintaining market viability.

Outpatient services traditionally include diagnostic testing, laboratory testing, radiology, therapies, and other similar services that do not require anesthesia. Outpatient surgery services, in contrast, consist of tests and treatments that require some form of sedation.

Outpatient services and surgery providers are meeting patients' needs by improving the quality of patient care and service. Press Ganey research has found a slow and steady improvement in overall patient satisfaction over the past five years. Challenges do exist however; including registration, facility environment, attention to patient-specific needs, and offering room for continuous improvement.

Patients have expectations for outpatient services, anticipating short wait times and high-quality care. With the total wait time at an average of 24.5 minutes, increases in the time spent waiting can have a negative impact on a patient's overall perception.



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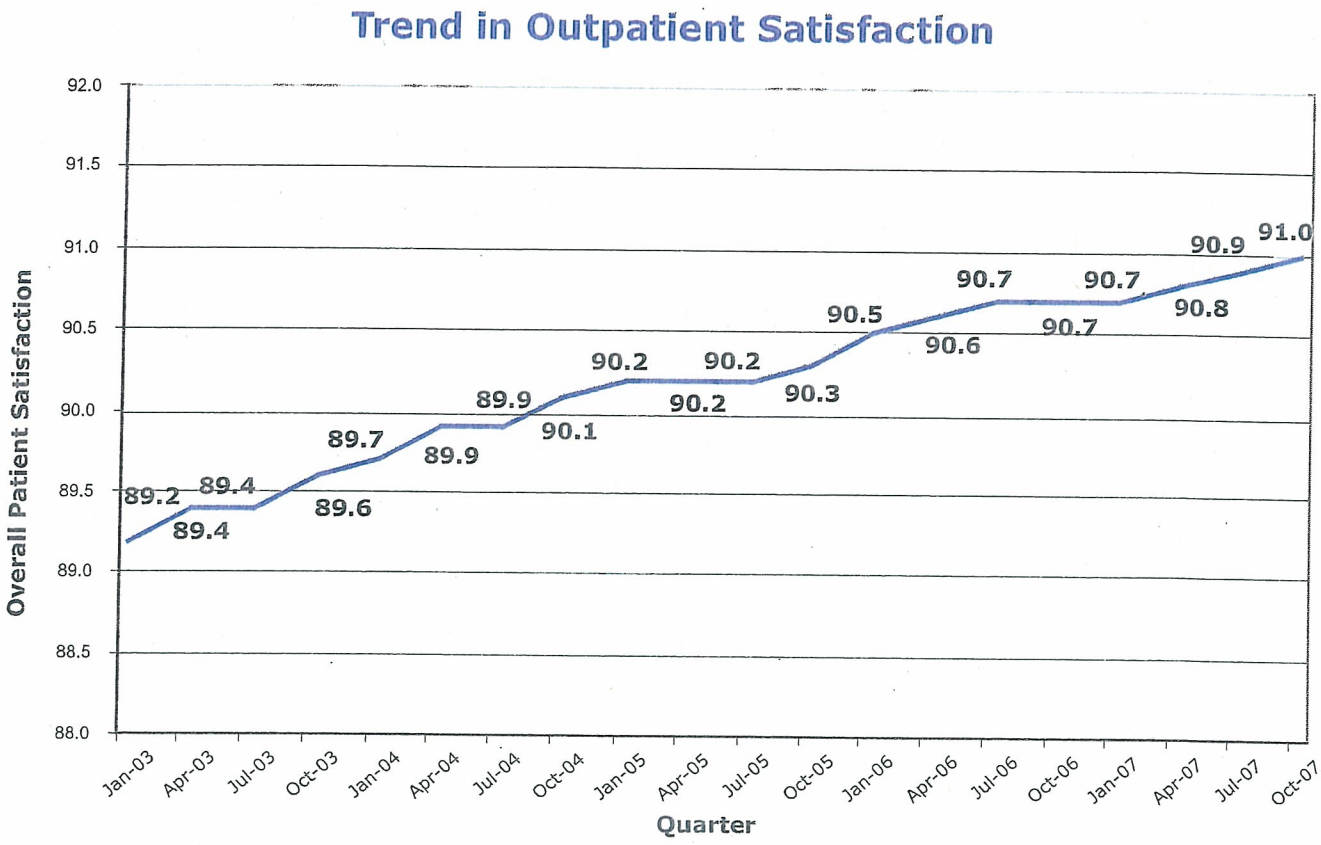
# Section I
# Outpatient Services

# Trend in Outpatient Satisfaction



Outpatient satisfaction is gradually but steadily climbing. As the overall performance of the industry continues to improve, facilities face greater expectations from patients. Patients are looking for comfortable, fast, and compassionate care. Outpatient services commonly include laboratory tests, therapy, diagnostic testing, and many other tests or treatments that typically do not require anesthesia or an inpatient visit. As hospitals have expanded their outpatient services, they have faced stiff competition from freestanding and independent facilities. Many facilities nationwide are leading the way to better service, evidenced by the continued upward trend in satisfaction. To remain competitive, outpatient facilities must continue to improve the patient care experience.



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# Priorities for Improvement in Outpatient Care



Unlike hospitals, outpatient service providers have a short time to create a positive experience for patients. Most patients are highly satisfied with their outpatient services, but small errors in service can have a negative impact on the patient's overall perception. The National Outpatient Priority Index identifies the service areas in greatest need of improvement. Interestingly, four out of the five top priorities relate to how frontline staff responds to patient needs. Whereas, in the hospital setting a staff member may have several opportunities to attend to an unmet need, outpatients may make their concern or complaint known only once—if at all. All caregivers have a limited window of opportunity to make a positive impression on the patient.

## National Outpatient Priority Index

| Survey Item | Priority Rank |
|---|---|
| Response to concerns/complaints made during your visit | 1 |
| Our sensitivity to your needs | 2 |
| How well staff worked together to provide care | 3 |
| Staff's concern for your questions and worries | 4 |
| Waiting time in registration | 5 |

*Represents the experiences of 2,110,415 patients treated at 1,215 facilities nationwide between January 1 and December 31, 2007*

*Survey items are correlated to patient ratings of "Likelihood of your recommending our facility to others"*

## Service Standards—Set the Expectations for Care Delivery

Service standards are a common tool to provide practical guidance to staff members regarding patient interactions. Standards include items such as "Ask before touching a patient," and "Always introduce yourself to the patient."

*Developing service standards is only the first step in their implementation. After the standards are chosen and shared, accountability is essential. Baptist Mammography Center at Macy's, The Falls, Miami, Florida, a Press Ganey Summit Award Winner, includes service standards in its employee evaluations as a tool to require direct accountability for staff actions. Through this form of accountability, service standards become an expectation, not a suggestion.*



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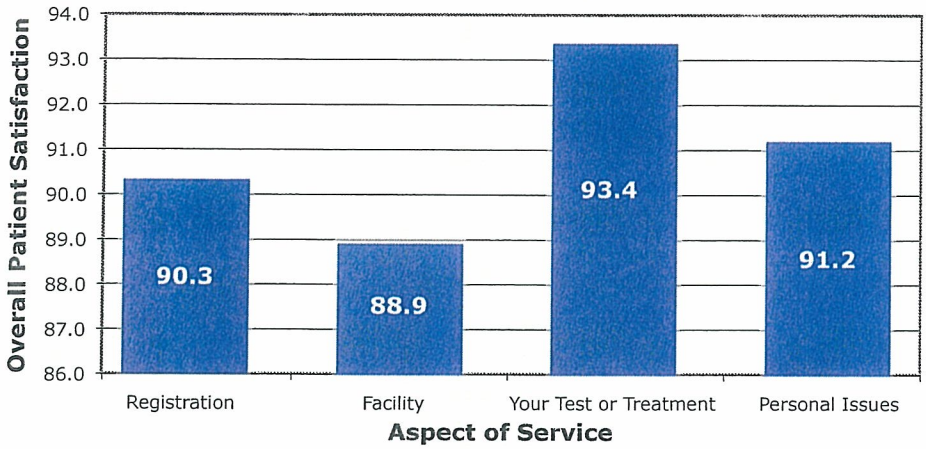
# Patient Satisfaction with Outpatient Service Operations



Patients are very satisfied with the experience of the actual test/treatment and the personal care they receive. These areas all score around 90, so the bar is very high for an outpatient services provider. Despite the high scores, opportunities still exist to improve the efficiency and ease of registration and to improve the overall facility environment. Overall, the performance of American outpatient service providers is strong.

## Outpatient Satisfaction by Aspect of Service

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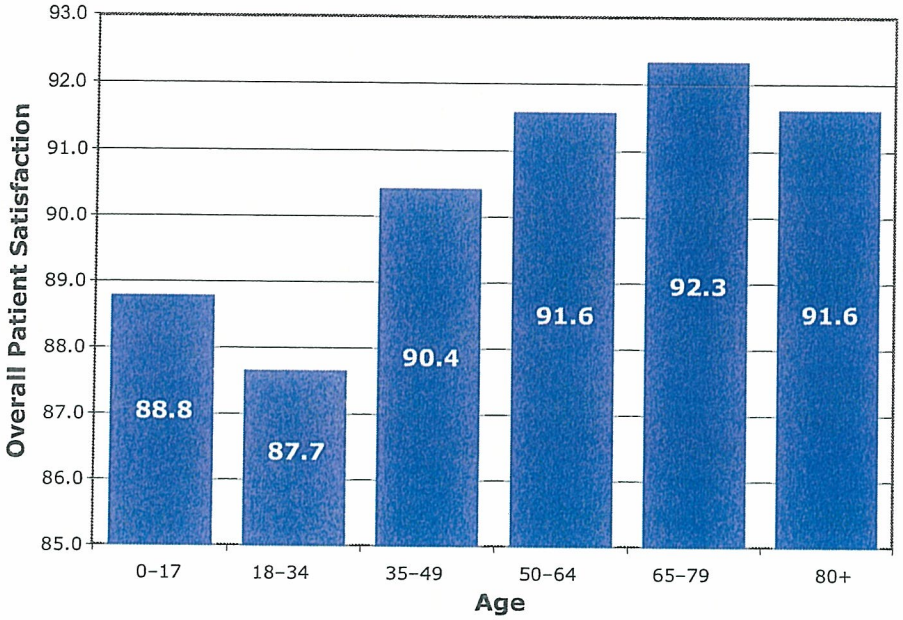
# Age and Patient Satisfaction



Patient satisfaction with outpatient services generally increases with age. Outpatient services have improved dramatically in frequency and quality compared to thirty years ago. Older patients may remember more frequent inpatient stays and fewer outpatient options compared to today's services, and thus may have a greater appreciation for these advances than do their younger counterparts. Younger patients have come to expect faster service and may hold outpatient providers to a higher standard.

## Outpatient Satisfaction by Age

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*Survey items are correlated to patient ratings of "Likelihood of your recommending our facility to others"*



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# Outpatient Satisfaction by Service Type



Patients receiving radiation treatments report the highest overall satisfaction with outpatient services, followed by patients receiving cardiac rehabilitation. Both of these services typically see patients on multiple occasions, providing more opportunities to establish a positive relationship. Establishing such a relationship is a more notable challenge for services such as mammography, when the patient visit is a single instance and very short. Facilities can better connect with these patients by providing patient education information and similar services. This list is limited to the top ten outpatient specialties; specialties below the 10th position were not included.

## Top Ten Outpatient Specialties

| Service | Mean | Rank |
|---|---|---|
| Radiation Oncology/Therapy | 93.9 | 1 |
| Cardiac Rehabilitation | 93.5 | 2 |
| Mammography | 93.1 | 3 |
| Bone Densitometry | 92.9 | 4 |
| Infusion Clinic | 92.8 | 5 |
| Cardiac Catheterization | 92.6 | 6 |
| Physical Therapy | 92.4 | 7 |
| PET Scan | 92.2 | 8 |
| Sleep Disorders | 92.0 | 9 |
| Rehab Services | 92.0 | 10 |

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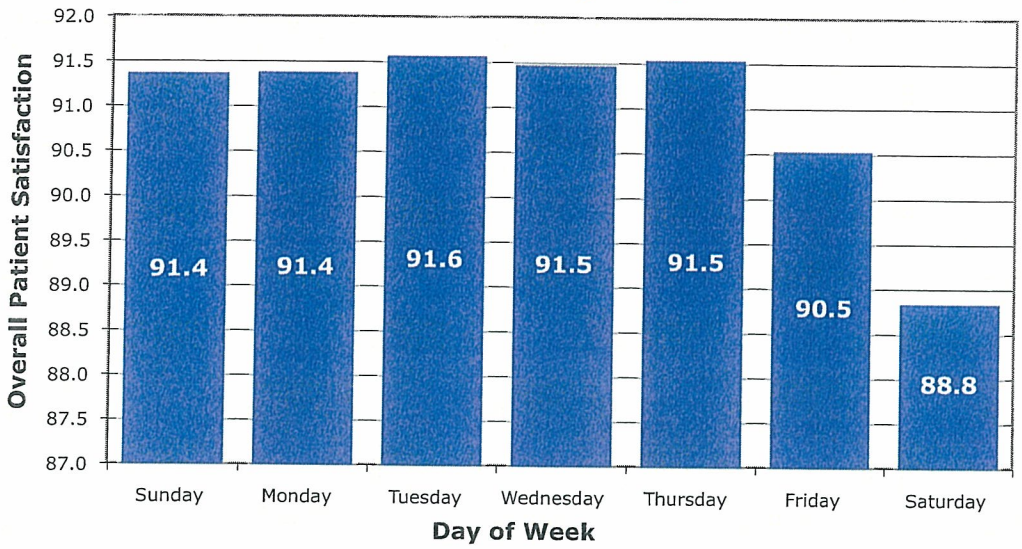
# Best Time for an Appointment



Patients report little difference in overall outpatient satisfaction during the work week, but report lower overall satisfaction when receiving care on Saturday.

## Outpatient Satisfaction by Day of Treatment

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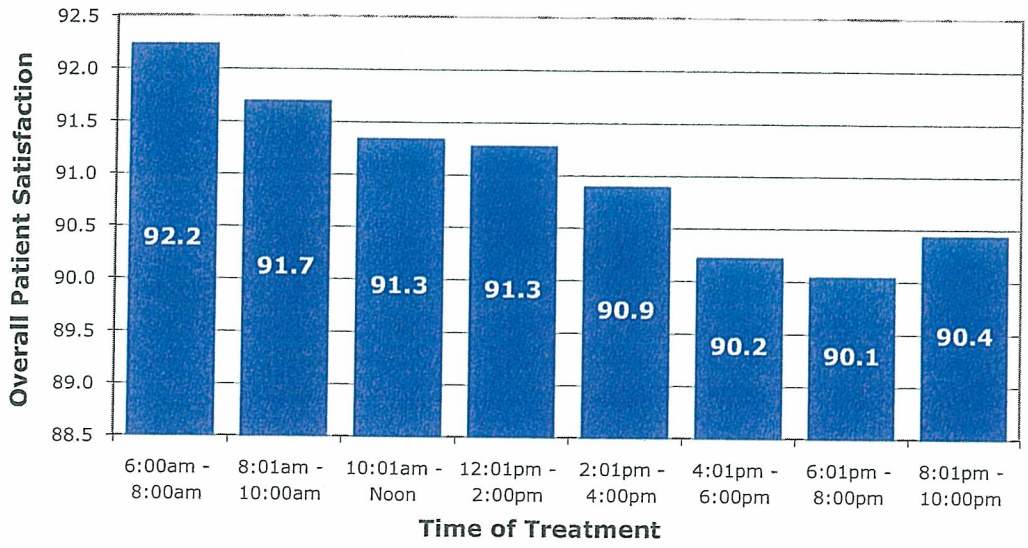
Overall satisfaction continues to decline as the workday wears on. Patients with appointments during the 6–8 AM time slot report the greatest satisfaction. Satisfaction declines considerably from that time period, though there is a slight rebound for patients who receive care after 8 PM. Patients who receive care earlier in the day may be more satisfied partly due to the lack of disruption their test/treatment may have been to their day. Patients who receive care during the middle of the day make a greater sacrifice to the day's overall productivity.

## Outpatient Satisfaction by Time of Treatment

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# Satisfaction and Wait Time

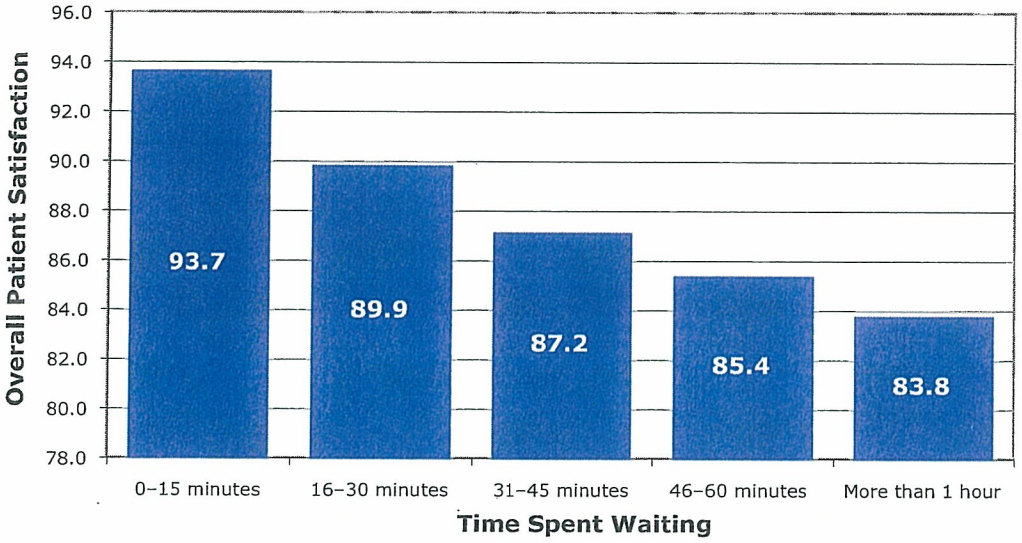


In our fast-paced world, most Americans consider waiting to be an inconvenience. Patients appreciate prompt, courteous care to ease the stress of tests or treatments.

The average patient waits a total of 24.5 minutes to receive outpatient care—11 minutes in the waiting room and more than 13 minutes in the treatment area.

Overall patient satisfaction steadily declines as the wait time increases. Ninety-three percent of outpatient procedures occur between 6 a.m. and 4 p.m., requiring patients to take time away from work and family. Wait time is a critical factor in patients' overall perception. A long time spent waiting can seem disrespectful of the patient's time and is inconvenient for patients.

## Outpatient Overall Satisfaction by Time Spent Waiting

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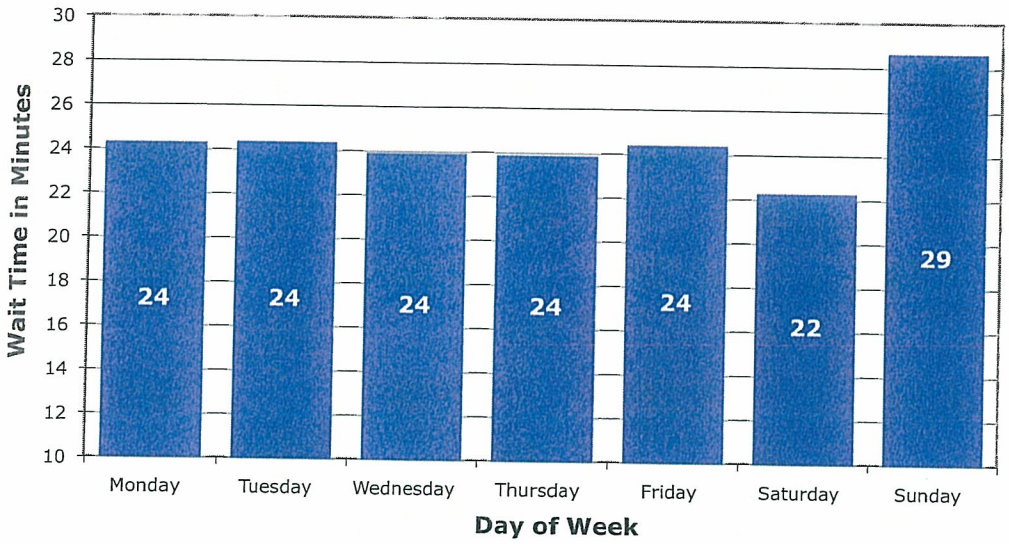
# When Patients Wait



Patients receiving outpatient care during the work week are likely to wait the same amount of time regardless of the day of the week. The average wait time for outpatient care is consistently 24 minutes, Monday through Friday, when most outpatient services are received.

The weekends vary—on Saturday there is a below-average wait of 22 minutes, but on Sunday the wait jumps to 29 minutes. This increase likely reflects the limited staff and availability of weekend outpatient services.

## Outpatient Time Spent Waiting by Day of Week

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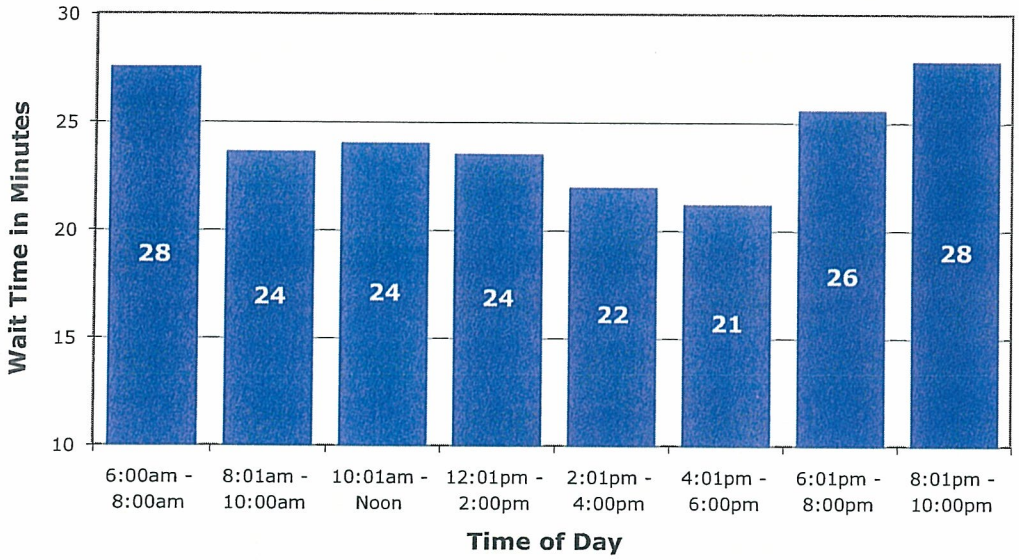
# When Patients Wait (continued)



Patients want to schedule appointments that will require the least amount of waiting. Conventional wisdom says that receiving treatment earlier in the day is preferable because there is less of a chance that the facility is running behind schedule. But Press Ganey data reveal that earlier appointments do not always offer the shortest wait.

At an average of 28 minutes, the 6–8 AM time slot has one of the longest wait times compared to the rest of the workday. At an average of 21–22 minutes, the 2–6 PM time slot has the shortest wait time compared to the rest of the day.

## Outpatient Wait Time by Time of Appointment

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# Waiting Patiently

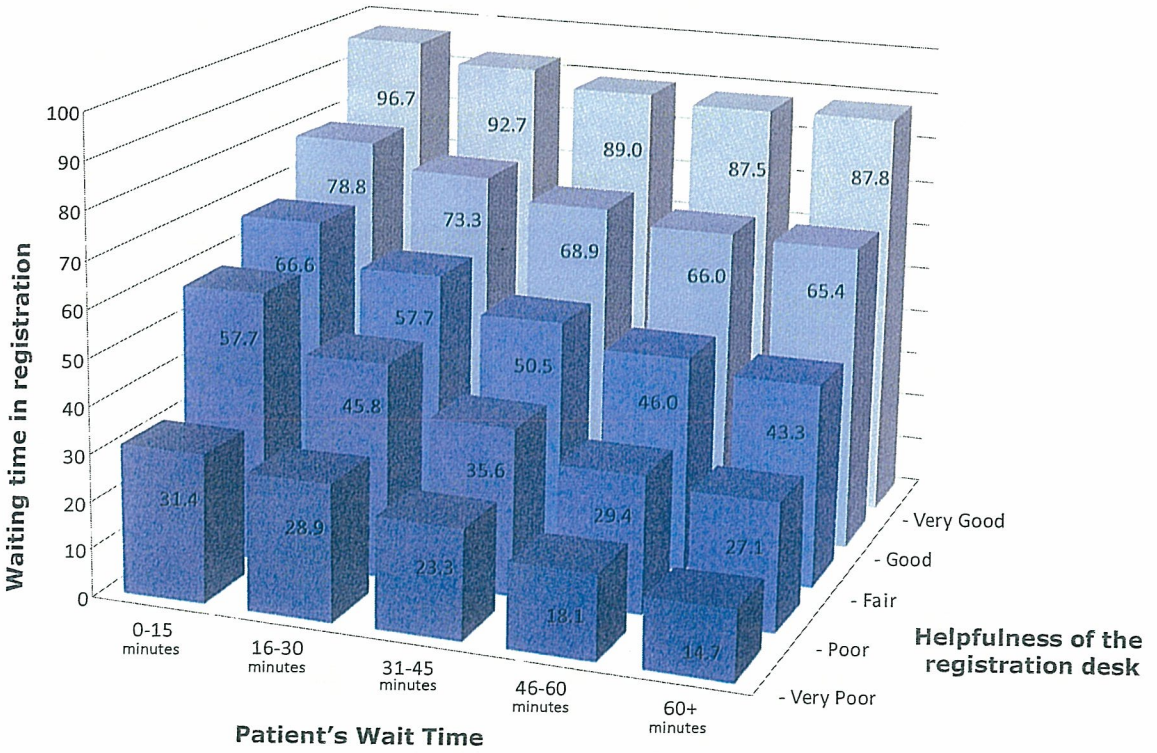


Reducing the time patients spend waiting for an outpatient test or treatment is an effective strategy to improve overall patient satisfaction. There are, however, occasions when patients will have to wait for services. The negative impact of a long wait can be mitigated by the helpfulness of the staff at the registration desk.

Staff members who first greet patients when registering are critical to making the wait more manageable. The graph below shows that the scores of those who found the person at the registration desk to be very helpful were less influenced by a long wait. On the opposite point, those who waited just a short time but found the registration staff unhelpful reported a more negative impression.

Facilities should equip the employees at the registration desk with the tools that they need to provide patients with accurate information. Registration staff should be informed of all potential delays so they may relay this information to patients as appropriate. Staff should also be educated on the location of other commonly requested services, the typical turnaround time for results, and other common patient questions. The staff member at the registration desk has the first opportunity to form a positive relationship between the facility and the patient.

## Waiting Time in Registration by Time Spent in Waiting and Helpfulness of the Registration Desk

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# What Patients Are Saying



Patient comments add life and vitality to patient satisfaction data. Patient comments help explain the specific thoughts that patients use to determine their ratings. Given the short amount of time a patient typically spends in an outpatient visit, comments provide an invaluable opportunity to hear the patient's voice.

Positive, negative, mixed, and neutral comments appeared with similar frequencies in all sections of the patient surveys used for this report. This is true for all survey sections. This even distribution indicates that there are as many opportunities for improvement as there are reasons to celebrate success.

The following are sample comments from organizations across the country:

- Response to concerns and complaints is the greatest opportunity for improvement nationwide. Patient comments can provide insight into issues that were not resolved during the patient's visit.
  - » **I wanted to see if my doctor could get the results any faster. They didn't seem to think that was important.**
- Sensitivity to needs and concern for questions and worries are two of the top priorities for improvement. Patients may be experiencing nervousness about the results of a test or even the test itself. Patients undergoing treatments are also likely to experience some anxiety. Things that are routine to caregivers are often new and frightening experiences for patients.
  - » **I told the person who drew my blood that I really am afraid of needles. She just nodded.**
  - » **I didn't know what was going on. The person running the machine didn't even speak to me, except to tell me when to move.**
- Given the short duration of the visit, staff members have to be especially aware of the patient's words and body language in order to recognize these concerns. Staff members who are attuned have a profound impact on the patient's experience.
  - » **Betty could tell I was nervous about the MRI. She let me take it slow when getting in the machine and was very reassuring.**



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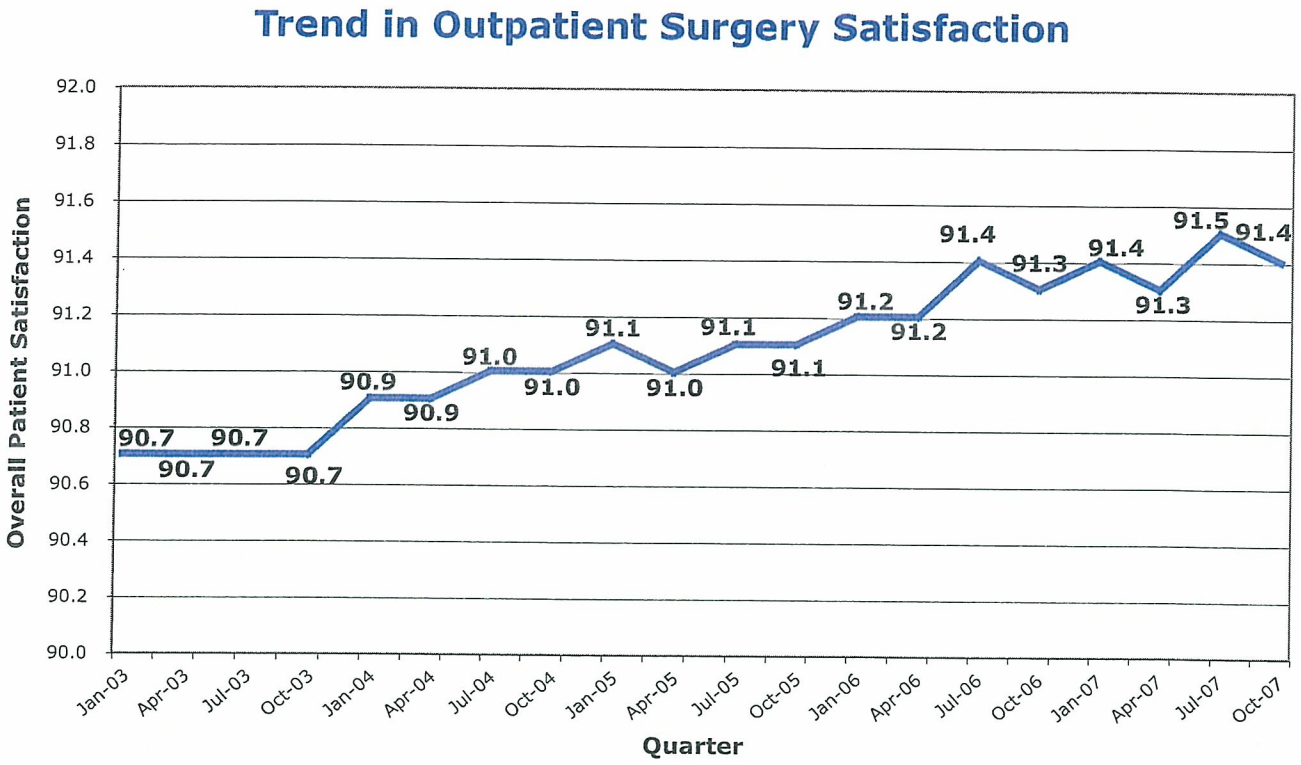
# Section II
# Outpatient Surgery

# Trend in Outpatient Surgery Satisfaction



Patients report very high satisfaction with the care they receive in outpatient surgical facilities. Over the past three years, the national mean score has continued to climb, making it increasingly competitive for facilities to remain in the top percentiles in comparative benchmarking. Same-day surgery facilities face continued high patient expectations for service, timeliness, and response to patients' individual needs.



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# Priorities for Improvement in Outpatient Surgery



As technology continues to advance, many surgical procedures that previously required an overnight stay are now completed in the outpatient setting. Outpatient surgery facilities are likely to experience steady growth as technology continues to improve. Since patients may be able to select from several different facilities within their community for these outpatient procedures, a high level of service excellence is necessary to remain competitive in this environment. Communication issues are an opportunity for improvement as shown in the National Outpatient Surgery Priority Index.

## National Outpatient Surgery Priority Index

| Survey Item | Priority Rank |
|---|---|
| Response to concerns/complaints made during your visit | 1 |
| Information provided about delays | 2 |
| Our concern for your privacy | 3 |
| Attractiveness of the surgery center | 4 |
| Comfort of your room or resting area in the center | 5 |

*Represents the experiences of 1,039,289 patients treated at 1,218 facilities nationwide between January 1 and December 31, 2007*

*Survey items are correlated to patient ratings of "Likelihood of your recommending our facility to others"*

## Keeping Patients and Families Updated About Delays

*After responding to concerns and complaints, information about delays is the next opportunity for improvement. Americans expect timely service when having outpatient surgery. With patient anxiety already high, unexpected delays can cause greater stress in an already tense situation.*

*The Service Excellence Team at Avera Dell Rapids Area Health Center, Dell Rapids, South Dakota, has worked diligently to improve the communication between the facility and patients regarding delays. Nurses and surgical staff are responsible for informing patient families about delays, surgery progress, and the patient's status following surgery. This is in addition to the meeting the surgeon has with the patient's family.*



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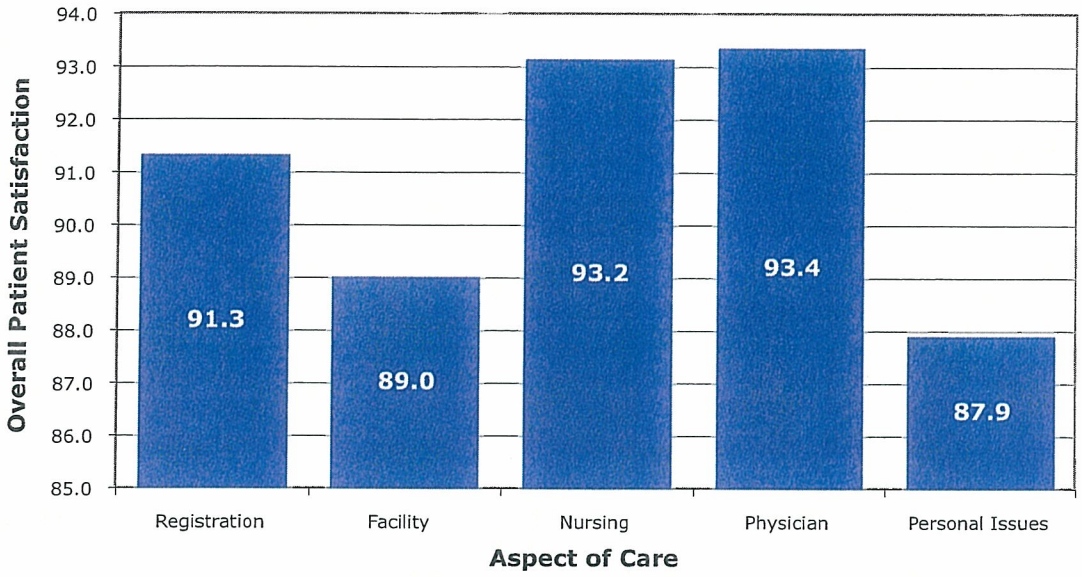
# Satisfaction with Outpatient Surgery Operations



'Staff response to personal needs' received the lowest patient satisfaction score for aspect of care. High satisfaction was reported for individual nurses and physicians. These scores may indicate larger system issues that prevent staff from delivering the high-quality care patients desire. Patients may feel the compassion and courtesy from individual care providers but may be put off by institutional barriers.

## Outpatient Satisfaction by Aspect of Care

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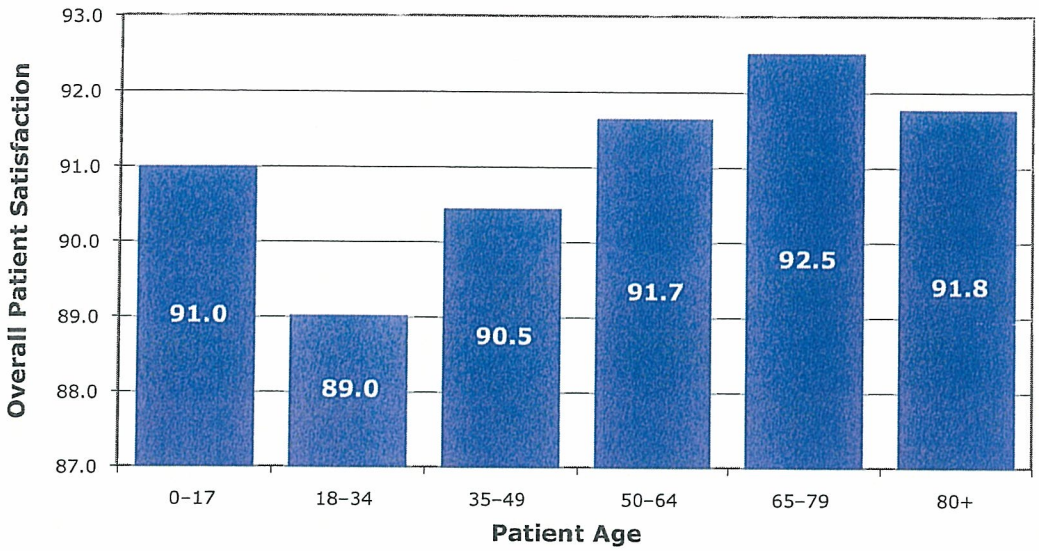
# Overall Satisfaction by Age of the Patient



Patient satisfaction with outpatient surgery steadily increases with age except for a slight decline for patients over age 80. Outpatient surgery has increased dramatically in frequency and quality compared to health care thirty years ago. Older patients may remember more frequent inpatient stays and fewer outpatient options and may have a greater appreciation for these advances compared to their younger counterparts.

## Outpatient Surgery Satisfaction by Age

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# Services Leading the Way in High Patient Satisfaction



Patients who have outpatient surgery for podiatry conditions report the highest overall satisfaction with their surgery, followed by ophthalmology patients. These services are typically less invasive compared to other services on the top ten list, which may contribute to the slightly higher scores. Enhancing the patient's comfort and responding to her/his needs is critical to improving patient satisfaction.

## Top Ten Outpatient Surgery Services According to Patient Satisfaction

| Specialty | Mean | Rank |
|---|---|---|
| Podiatry | 93.1 | 1 |
| Ophthalmology | 92.7 | 2 |
| Cosmetic Surgery | 92.3 | 3 |
| Colonoscopy | 92.1 | 4 |
| Orthopedics | 91.6 | 5 |
| Cardiac Catheterization | 91.6 | 6 |
| Endoscopy | 91.5 | 7 |
| Gynecology | 91.2 | 8 |
| Ear Nose Throat | 91.1 | 9 |
| Urology | 90.6 | 10 |

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# Where Patients Go

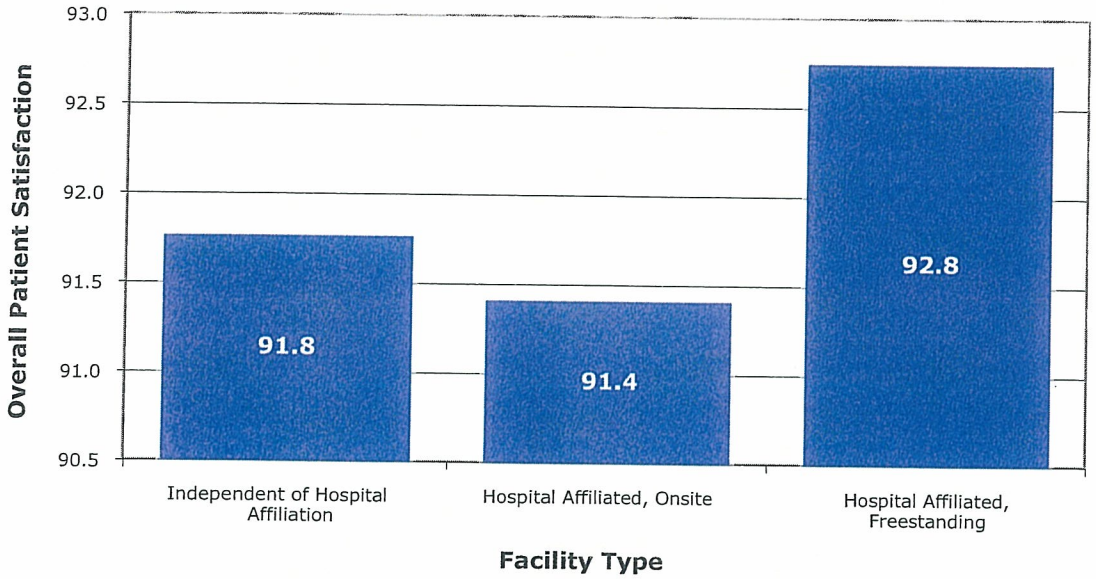


Press Ganey compared overall patient satisfaction among three facility types:

Independent of hospital affiliation
Hospital affiliated, onsite
Hospital affiliated, freestanding

Patients reported the highest level of satisfaction with freestanding, hospital-affiliated outpatient surgery facilities.

## Outpatient Surgery Satisfaction by Facility Type

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# What Patients Are Saying



Patient comments add life and vitality to patient satisfaction data. Patient comments help explain the specific thoughts patients used to determine their ratings. The distribution of comments was evenly spread among the categories of positive, negative, mixed, and neutral categories for all sections of the survey.

No one comment type is more prevalent, nor does any one area of the survey receive more positive or negative comments. This even distribution indicates that there are as many opportunities for improvement as there are reasons to celebrate success. The following are sample comments from organizations across the country:

- Response to concerns and complaints is the greatest opportunity for improvement nationwide. Patient comments can provide insight into issues that were not resolved during the patient's visit.
  - **I tried to tell the nurse how cold I was but she never did anything to help it. I don't think she realized I was shivering.**
  - **The people next to us had their TV really loud. I mentioned something but I never heard them ask the next family to be quieter.**
  - **I was so frustrated that we had to wait for five hours for my surgery. Nobody apologized for our delay.**
- Similarly, patients sometimes recognize those who go out of their way to provide high-quality service.
  - **Jan was so nice to me. She found me some different crackers when I told her I didn't really care for saltines.**
  - **Robert was so kind when I had to get my IV. He had my husband hold a magazine over the area so I wouldn't have to watch.**
- Delays, and the lack of information regarding them, is another area that receives comments.
  - **My surgery was scheduled for 9 a.m. but I didn't get in until almost 2. I still have no idea what the problem was.**
  - **We arrived promptly at 6 a.m. only to find out I wasn't going until 3 that afternoon. I could have stayed home where it is far more comfortable.**



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# Journey of Improvement Case Study: Parkridge Surgery Center



In an effort to improve the patient experience and develop a culture focused on quality improvement, the Parkridge Surgery Center in Columbia, South Carolina, began measuring patient satisfaction with the Press Ganey tool. Parkridge was able to find opportunities for improvement and develop processes to address priority items. IV starts and communication about delays were identified as the two areas having the greatest impact on patient satisfaction.

## The Journey

To begin the improvement process, Parkridge recognized that achieving employee buy-in was critical to its success. The goal was to develop a culture where trust, excellence, and fairness served as the guiding principles. The administrators wanted a culture that encourages and respects staff input. As the organization struggled in its improvement efforts, the leaders actively sought the opinions of staff members. The staff members were continually updated about scores and current improvement efforts during staff meetings. This regular exchange of information and ideas helped build a culture where staff recognized that their individual contributions make a difference in the lives of patients.

To effectively engage the physicians, the center first set up its Press Ganey reports to include physician identifiers. This allowed physicians to receive individualized reports from their patient population on a monthly basis. There was considerable variation from physician to physician for both ratings of skill and friendliness. The individualized reports helped physicians who were struggling to identify ways they could improve. Physician-specific data eliminated the mindset of "it isn't my patients who feel this way."

## Skill of the Nurse Starting the IV

As most outpatient surgery patients require some form of an IV, the staff recognized improving this particular question was important to each patient experience. Having an IV inserted can cause a lot of anxiety for patients. One Parkridge anesthesiologist recommended the staff undergo training for IV starts. As part of their training, each of Parkridge's nurses spent one shift starting IVs in a partner-hospital's outpatient department. Despite some initial resistance, every nurse completed the training. The nurses refined their technique and identified tools to help improve IV starts. The effort resulted in a great improvement in patient satisfaction.

## Information About Delays

To keep patients informed about delays, the staff at Parkridge Surgery Center initially hired a waiting room liaison to help improve communication with patients. The staff implemented a script to inform patients about delays. Yet the scores continued to decline. It was soon realized that the people who were being informed about delays were the family members in the waiting room, not the patients who would be filling out the survey. Many of the patients who experienced delays did so in the pre-op holding area. The nurses from that area were then asked to make a concerted effort to keep patients informed about delays. As a result of this finding, the other initiatives were eliminated since they were not affecting patient satisfaction. Parkridge Surgery Center used its data effectively to monitor improvement efforts and ensure its efforts were yielding the desired results.

## Results

Parkridge's efforts to improve patient satisfaction have produced many positive results. The "skill of the nurse starting the IV" survey item began in the 10th percentile; after extensive training, the center was able to reach



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the 99th percentile in one quarter. The physician score has moved from the 26th percentile to scores in the 80th and 90th percentiles. The center's overall score has improved from a low in the 47th percentile to the 96th percentile.

Positive results have occurred in other metrics beyond patient satisfaction. The center's patient volume has grown 400 percent in recent years, the medical staff has increased from 10 to 39 physicians, employee turnover is low, and overall employee satisfaction is stable.

These results were achieved by developing a culture that focuses on continuous quality improvement.



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# Methodology



Press Ganey's outpatient services and surgery surveys give patients who have been treated in various outpatient settings the opportunity to provide feedback about their experiences. The surveys are used by medical practices, ambulatory surgery centers, and outpatient facilities across the United States to improve the quality of the service and care they deliver.

Highly valid and reliable, each Press Ganey survey consists of a set of standard questions organized into sections. The outpatient services survey contains seventeen standard questions within five sections: Registration, Test or Treatment, Facility, Personal Issues, and Overall Assessment. The Outpatient Surgery survey contains 29 standard questions within six sections: Registration, Nursing, Physicians, Facility, Personal Issues, and Overall Assessment.

## Distribution of Surveys

Surveys are mailed to patients soon after discharge, while their experiences are still fresh in mind. Upon receipt by Press Ganey, completed surveys are processed and added to a national database. Press Ganey complies with the Health Insurance Portability and Accountability Act (HIPAA), which establishes national standards for the security and privacy of health data.

## Definition and Calculation of Overall Mean Score

Once surveys are returned to Press Ganey, surveys are processed and added to the client's electronic data storage area. Processing of surveys takes place immediately so that clients can have up-to-the-minute information about their service quality. Responses to survey questions are converted to a series of 100-point maximum scales so that clients can compare different aspects of their performance on a common yardstick. First, for each person who took the survey, responses to the survey questions are translated from a 5-point scale to the 100-point scale. Items rated "Very Good" are awarded 100 points; those rated "Good," 75 points; items rated "Fair," 50 points; "Poor," 25 points; and any items rated "Very Poor" are awarded zero points. Next, each respondent's individual item scores within a survey section (see above) are averaged to become scores for each section. Finally, section scores are averaged to become that respondent's overall satisfaction score. The average of all respondents' overall satisfaction scores is called the client's Overall Mean Score, and is stored electronically and made available to the client.

## Priority Index Calculation

The Priority Index is an ordered list of survey items that shows the areas needing the most improvement. In the Priority Index, survey items are arranged from the "first item to work on" to the "last item to work on." The Priority Index reflects service issues that clients are performing relatively poorly on that are important to their patients. The index is calculated by looking at two aspects of each survey item's data: its average score, and how well it mirrors the respondent's overall satisfaction score, as determined above. Survey items that have low average scores (indicating that the facility's quality for that aspect of care is lacking relative to other care aspects) and faithfully mirror the respondent's overall satisfaction score will have high Priority Index scores.



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With more than 11 million surveys processed annually, Press Ganey has the most extensive data and resources for improving patient satisfaction, employee engagement, physician engagement, and patient safety. Press Ganey's tools and services—measurement tools, consulting services, networking opportunities, and solutions for improvement—use patient, employee, and physician feedback to drive health care improvement initiatives.

All data and findings represent surveys returned by patients, physicians, and employees to Press Ganey clients.

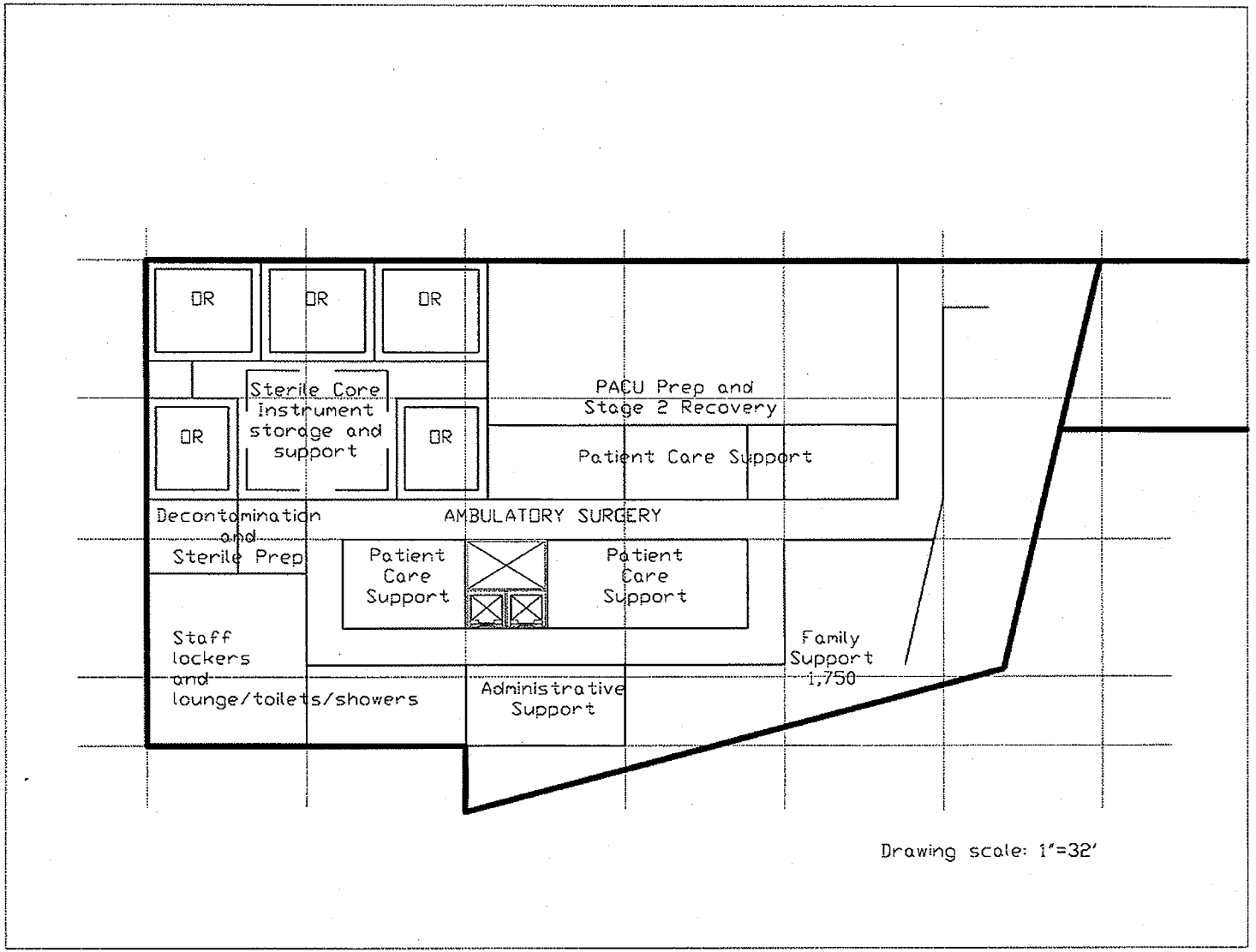
Contact information for questions or concerns:
Abby Szklarek
Public Relations Manager
Press Ganey Associates, Inc.
404 Columbia Place
South Bend, IN 46601
(574) 309-7961
aszklarek@pressganey.com
www.pressganey.com

Press Ganey gives acknowledgement and thanks to the following individuals who contributed data analysis to this report:

Paul Davis, Research Analyst
Deanna Garcia, Research Assistant
Jessica Langager, Custom Research Supervisor
Kelly Leddy, Senior Research Analyst
Dana Schrader, Research Assistant

Copy Editor: Cathi Kennedy

Editors: Laura Lindberg
Stefoni Bavin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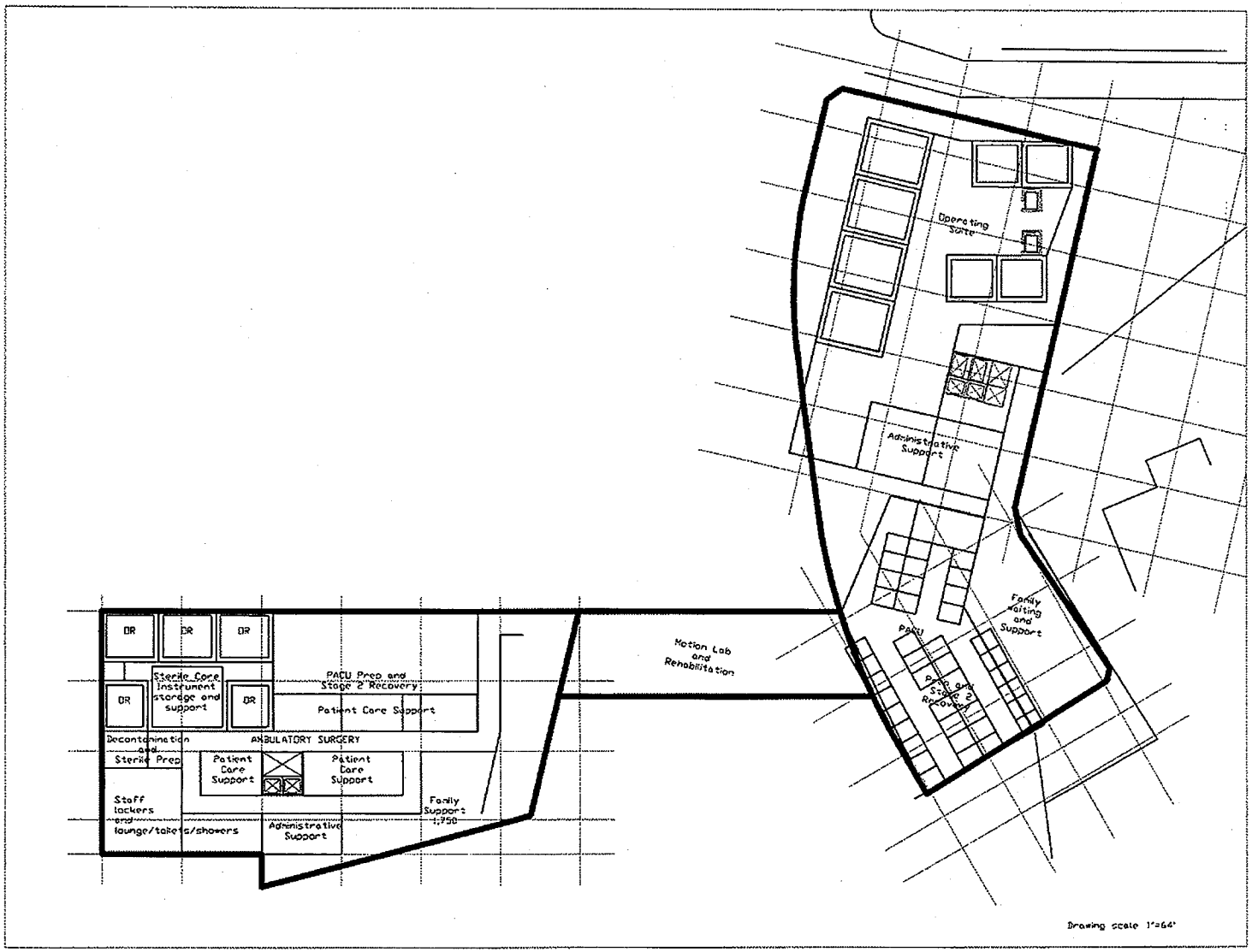
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Decontamination and Sterile Prep
AMBULATORY SURGERY
Patient Care Support
Patient Care Support
Staff lockers and lounge/toilets/showers
Administrative Support
Family Support 1,950
Motion Lab and Rehabilitation
Operating Suite
Administrative Support
PACU
Family Waiting and Support
Prep and Stage 2 Recovery
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RECYCLED

# *Jeffrey A. Flaks*

*75 Westland Road*
*Avon, CT 06001*
*(H) 860-673-2590 (W) 860-545-2349 (E) jflaks@harthosp.org*


## Professional Experience

**Hartford Healthcare Corporation - Hartford Hospital** **2007 to present**

Hartford Hospital, founded in 1854, is one of the largest teaching hospitals and tertiary care centers in New England. It has been training physicians for nearly 130 years, primarily in collaboration with the University of Connecticut School of Medicine. The hospital is an 867-bed regional referral center that provides high-quality care in all clinical disciplines, enhanced by robust research endeavors. Among its divisions is The Institute of Living, a 114-bed mental health facility and the Jefferson House, a 104-bed long-term care facility. The hospital's active medical staff includes over 1000 physicians and dentists.

***President & Chief Executive Officer*** **2011 to present**

***Executive Vice President & Chief Operating Officer*** **2007 to 2011**

Reporting to the President/CEO, responsible for the overall operations of the hospital.

**Hartford Healthcare Corporation - MidState Medical Center** **2004 to 2007**

MidState Medical Center is a 144 bed acute care hospital located in Central Connecticut with $165 million in net operating revenue. The hospital was recognized in 2005 as one of the top 50 small and medium size companies to work for in America.

***Executive Vice President & Chief Operating Officer***

Responsible for the overall operations of the hospital. Direct oversight of all clinical and non-clinical departments, managed care contracting, strategic planning, business development, physician relations, community outreach, as well as the MidState Medical Group, MidState VNA & Hospice and Meriden Imaging Partners.

- Created and developed new clinical programs including the Heart Center, Sleep Center, Wound Care Center, Thoracic and Vascular Surgery Program, Orthopedic Spine & Pain Institute and the Stroke Center.
- Led the development and implementation of a master facility planning process, resulting in the expansion of the main hospital campus and medical office building, the development of two off-site outpatient and imaging centers, the sale of the MidState Medical Center East Campus and a decrease in facility operating costs of ten percent.
- Restructured the MidState Medical Center pension plan and negotiated acceptance with Connecticut Healthcare Associates, AFSCME that resulted in an 18% annual reduction in pension expense.
- Developed the hospital ambulatory and physician development strategy through the establishment of two subsidiary for-profit corporations, including the MidState Medical Group, MidState MSO, MidState Physician Walk-In Center and the community based MidState Medical and Diagnostic Centers network resulting in 50,000 annual patient visits.

- Increased hospital operating margin by 2 percent, while achieving Press Ganey patient satisfaction ranking within the top five percent in the nation and Press Ganey Physician Satisfaction in the 98 percentile.



**Saint Vincent Catholic Medical Centers of New York** **2000 to 2004**

Saint Vincent Catholic Medical Centers of New York is one of the New York metropolitan area's most comprehensive health care systems, serving 600,000 people annually and is the academic medical center of New York Medical College in New York City.

***Vice President for Support Services & Strategic Initiatives***

Reporting to the System CEO, responsible for executive leadership of corporate support services and system-wide strategic initiatives. Direct oversight for corporate functions, including supply chain, real estate and construction, master facility planning, pharmacy, dietary and performance management. Serving as the first full time employee of newly merged health system, responsible for the overall planning, direction and implementation of strategic initiatives across the organization, including integration and business development.

- Developed and led a twenty four month system-wide turn around management process that resulted in an annualized $65M improvement from a broad range of revenue and cost containment activities that covered all aspects of the System's operations.
- Developed the Master Facility Plan resulting in the termination of 30 leases, sale of 6 properties and centralization of 565 staff members to a single location, achieving a recurring savings of $3.2M and one time cash benefit of $25M.
- Led comprehensive system-wide supply chain reorganization, resulting in a decrease in total spending from $240M to $226M, through contract/product standardization and price leveling initiatives.
- Led the recruitment of a ten person orthopedic group practice, producing 700 inpatient procedures, 1,700 ambulatory cases and the appointment of a new chair in the academic department.

**Continuum Health Partners, Inc., New York, NY** **1999 to 2000**

A health care system in New York City, Continuum Health Partners is a partnership of four prestigious academic medical centers. The health system is comprised of 3,400 licensed beds, 5,200 physicians, and operating revenue of $1.8 billion.

***System Director for Physician Enterprise Development***

Responsible for clinical program development and expansion and integration of the physician network across the health system. Reporting to the Senior Vice President for Network Development, accountable for all strategic planning and operational aspects of a 110 musculoskeletal physician network.

- Identified, recruited and operationalized prominent clinical faculty and private physician practices to support health system program development in primary and specialty care.
- Developed a 110 member musculoskeletal physician network with geographic coverage spanning the five boroughs of New York City, Long Island and Westchester County, resulting in over 2,000 new surgical cases for the health system.
- Performed operational assessments of key physician practices resulting in the re-engineering of the practice infrastructure model, including management, billing and information systems.

**The Detroit Medical Center (DMC), Detroit MI** **1995 to 1999**

An integrated delivery system in Southeastern Michigan, The Detroit Medical Center operates eight hospitals, two nursing centers and 130 outpatient facilities. The system has 3,000 affiliated physicians, 2,000 licensed beds and serves as the teaching and clinical research site for Wayne State University, the nation's fourth largest medical school.

***Director for Health Care Initiatives and Network Services, DMC Corporate*** **1998 to 1999**

Responsible for planning, organizing and implementing ambulatory facilities and practice management services for faculty, employed and private physicians. Operational management for a network of three multi-specialty ambulatory centers consisting of 30 physicians and net revenues of $17 million.

- Planned and operationalized a 30,000 square foot regional ambulatory specialty center with a $45 million capital budget; including business planning, facility design/construction, staff recruitment/training, go-live planning /implementation, and technology identification/implementation, resulting in 55,000 annual visits.
- Recruited and structured a 20 member "virtual group practice", integrated through information systems and management services, resulting in common operations and operating systems amongst physician participants.
- Selected, led purchase negotiation and managed implementation process for system-wide physician practice management information system, including electronic medical record functionality.
- Developed affiliation and managed relationship with community based 100 member multi-specialty IPA.

***Administrator, Professional & Support Services, DMC/Hutzel Hospital*** **1996 to 1997**

Line management responsibility for the division of Professional & Support Services, representing an operating budget of $15 million with 300 employees. Directed daily operations for the community health center, ambulatory surgery center, employed orthopedic group practice, real estate, facility planning, marketing and planning, public affairs, nutrition and food services, pharmacy, infection control and accreditation/regulatory compliance.

- Senior administrator responsible for hospital wide JCAHO survey resulting in successful accreditation.
- Led hospital-wide initiative for the redesign and implementation of the patient focused care model.
- Achieved $800,000 annual cost reduction through staff restructuring and the elimination of outside contracting costs.
- Re-engineered the Hutzel Community Health Center through the recruitment, negotiation and implementation of ophthalmology, urology, and orthopedic physician practices, increasing visits by 30,000 annually.
- Led an $8 million facility renovation, encompassing hospital and ambulatory services, successfully maintaining budget, client satisfaction and time objectives.

***Administrative Resident, DMC/Hutzel Hospital*** **1995**

**Governance Appointments**

- Director, Connecticut Association of Healthcare Executives (2012 to present)
- Director, Connecticut Science Center (2012 to present)
- Director, Association of University Programs in Health Administration (2011 to present)

- Director, University of Hartford, College of Education, Nursing & Health Professions (2010 to present)
- Director, Connecticut Hospital Association, Diversified Network Services, Inc. (2006 to present)
- Director, The George Washington University Alumni Association (2004 to present)



## Professional Affiliations

- Member, The George Washington University President's Advisory Council, 2010 – to present
- Trustee, The Children's Museum, 2008 – 2011
- Trustee, The Urban League of Greater Hartford, 2008 - 2011
- 1892 Club of Greater Hartford, 2008 to present
- Fellow, American College of Healthcare Executives, 1995 to present
- Chairman, The George Washington University HSMP Alumni Association, 1996 - 2012
  - Preceptor and Professional Lecturer
- Trustee, The George Washington University Board of Trustees, 2001 -2004
  - Vice Chairman, Student Affairs Committee
  - Trustee Representative, Medical Center Committee
- Member, Healthcare Executive Editorial Board, 2002 – 2005
  - Chairman, 2004-2005
- Preceptor, Institute of Diversity in Health Care Management, Summer Enrichment Program, 2001 - 2004
- Trustee, The State of Michigan Arthritis Foundation Board of Governors, 1996 - 1999
  - Chairman, Southeast Michigan Board of Advisors

## Text Books

Flaks, JA, "Careers in Acute Care Hospitals" interviewed by authors, Friedman, L and Kovner, A: in 101 Careers in Healthcare Management, Springer Publishing Co., NY, November 2012, pp. 66-68

Flaks, JA and Ruben, PJ: "Information Systems – The Tie That Binds" Reinventing the Integrated Delivery System, (ed. Persily, Gotlieb), McGraw Hill Healthcare, NY, October 1999, pp. 59-79

## Journal Publications

Flaks JA, Weisberg JA, Federman MJ: A Flexible Approach to Working with Physicians. Health Forum Journal (43)2:60-63, 2000.

Flaks JA, Porter AT: Community Health Information Networks: A Strategic View. The Journal of Oncology Management (7)6:18-20, 1998.

Horak BJ, Campbell DJ, Flaks JA: Strategic Positioning: A Case Study in Governance and Management. The Journal of Healthcare Management 43(6):471-484, 1998.

Porter AT, Lighter D, Flaks JA: Intangibles in Mergers and Acquisitions – A Critical Success Factor in Modern Day Health Care. The Journal of Oncology Management (7)4:24-25, 1998.

## Presentations

Invited Guest Faculty/Speaker

The American College of Healthcare Executives, Congress on Healthcare Leadership, Chicago, Ill, 3/13
- Addressing Care Disparities: A Partnership of Three Community Hospitals

Press Ganey Executive Leadership Conference, National Harbor, Maryland, 11/12
- Transforming the Patient Experience

Premier Breakthroughs Conference, Nashville, Tennessee, 6/11
- Hard-Wiring a Culture of Excellence



## Presentations

The New England Heath Information Management System Society, Leveraging IT to Impact the Patient Experience, Farmington, CT, 1/08
- How the Patient Experience Affects Strategic Direction

The American College of Healthcare Executives, Congress on Healthcare Leadership, Chicago, Ill, 3/06
- How to Create a Great Place to Work: A Strategy for Business Success

Columbia University, Mailman School of Public Health, New York, NY, 4/04
- Preparing for Success: How to Create a Winning Formula in Today's Healthcare Marketplace

The Healthcare Financial Management Association, Business Transformation Seminar, New York, NY, 4/03
- How to Manage A Turnaround Engagement

The American College of Healthcare Executives, CHA Annual Meeting, Wallingford, CT, 6/02
- Saint Vincent Catholic Medical Centers Response to the World Trade Center

The Healthcare Public Relations & Marketing Society, New York NY, 2/02
- Strategies for Building Physician Referrals

The 12th Annual National Managed Health Care Congress, Atlanta GA, 4/00
- An Entrepreneurial Approach: How to Develop New Payment Systems for Physicians

IBC Group, Effective Tools to Redesign the MSO Infrastructure, Lake Buena Vista FL, 12/98
- Strategies to Utilize the MSO as a Physician Integration Tool

American Academy of Medical Administrators, 41st Annual Conference and Convocation, Dallas TX, 11/98
- Integration "Tools of the Trade" – Emerging Innovations for Physician Enterprises

The Outpatient Care Institute, Integrated Network Development Conference, Washington DC, 9/98
- Development of the Ambulatory Care Center of the "Present" – A Case Study

## Awards/Honors

- 2013 Omega Psi Phi Fraternity, Citizen of the Year Award
- 2012 Catalyst Award, The Conference of Churches
- 2012 *Hartford Magazine*, 50 Most Influential People
- 2012 Honorary-president, Quilu Hospital of Shandong University, China
- 2010 Inducted in the Hall of Honor, Amity Regional School District, Woodbridge, CT
- 2009 Distinguished Alumni Service Award, George Washington University (highest honor given to an alumnus by University President)
- 2008 *Hartford Business Journal* "Up and Coming Executives"
- 2006 Alumni Service Award from the George Washington University (highest alumni recognition bestowed by the University, presented by the President)

- 2003 New York City Regent's Award from the American College of Healthcare Executives
- Appointed as the Recent Trustee and Member of the Board of Trustees of The George Washington University (2001-2004)
- 2001 *Modern Healthcare* "Up & Comer"
- 2001 *Crain's New York Business* "New York's Rising Stars: 40 Under 40"



## Education

Master of Health Services Administration, The George Washington University, Washington, DC, 1996
- Volunteer Internship, The White House, Washington, DC, 1994

Bachelor of Science, Health Services Administration, Ithaca College, Ithaca, NY, 1993
- Administrative Internship, Hospital of St. Raphael, New Haven, CT, 1992
- Administrative Internship, Yale New Haven Hospital, New Haven, CT, 1991

# GERALD J. BOISVERT, CPA, FHFMA
## 18 Alexander Place
## South Windsor, CT 06074
## 860-644-6491 (Home)
## 860-545-0585 (Work)


Work Experience

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|---|---|
| **April 2013** | **Vice President & Chief Financial Officer** |
| **To present** | **Harford Hospital, Hartford, Connecticut** |

Chief Financial Officer for 867 bed tertiary care academic medical center.

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| **May 1997** | **Executive Vice President & Chief Financial Officer** |
| **To April 2013** | **Connecticut Children's Medical Center, Hartford, Connecticut** |

Executive Vice President & Chief Financial Officer for Connecticut's only independent Children's Hospital, and related entities (Faculty Practice Plan, School, and Foundation). Significant operational experience includes active financial oversight of 100 plus physician practice plan. Current responsibilities include Finance and Accounting, Revenue Cycle, Strategic Planning/Project Management/Process Improvement, Purchasing/Materials Management, Environmental Services, Facilities, Food Service, and Safety/Security. Previous responsibilities included oversight of IS, Community Relations, Rehabilitation Services, Pharmacy, Radiology and other ancillary services.

| | |
|---|---|
| **April 1996** | **Vice President, Finance and Chief Financial Officer** |
| **To May 1997** | **US HomeCare Corp., Hartford, Connecticut** |

Chief Financial Officer, reporting directly to the Chairman of the Board for publicly traded home care company. Responsibilities included direct supervision of accounting department, MIS department, and human resources department. Also responsible for investor relations, corporate secretary functions, SEC reporting, Medicare cost reporting, treasury and banking relationships. Worked in a turnaround/restructuring mode with crises management team and banks to stabilize and prepare company for sale.

| | |
|---|---|
| **August 1992** | **Senior Vice President, Finance** |
| **To April 1996** | **Windham Community Memorial Hospital Willimantic, Connecticut** |

Chief Financial Officer of 130-bed, acute care hospital, reporting to the President & CEO. Responsible for the following functions: Finance, Billing, Admitting/Registration, MIS, Medical Records, Personnel and Purchasing departments. Significant focus and

involvement with third party reimbursement, regulatory issues, banking/financing matters and union negotiations.

**April 1988 To August 1992** — **Executive Vice President – Finance and Administration, Alden Design, Inc., Glastonbury, Connecticut**

Chief Financial and Administrative Officer of multi-location, full service communications company providing communications, consulting and production services to Fortune 1000 companies. Specific areas of responsibility included cash management, accounting, strategic planning, budgeting, human resources administration and company marketing/advertising.

**September 1980 To April 1988** — **Senior Manager, Ernst & Whinney, Hartford, Connecticut**

Certified Public Accountant. Responsible for audit and special project consulting engagements for companies involved in manufacturing, banking, health care, education and non-profit services.

**July 1979 To September 1980** — **Advanced Staff Accountant, Wolf & Company, Boston, Massachusetts**

Staff accountant for regional accounting firm located in Massachusetts. Served as staff accountant and in-charge accountant on savings bank, construction and small business audit engagements.

## Education

Boston University School of Management
B.S. in Business Administration

## Professional

Certified Public Accountant
Fellow, Health Care Financial Management Association

Member: American Institute of Certified Public Accountants; Connecticut Society of Certified Public Accountants; Health Care Financial Management Association; American College of Healthcare Executives

## Community Service

Former Board Member and Finance Committee Chair of University of St. Joseph; Treasurer and member of the Board of Directors of the Capital Area Health Consortium; member of Committee of Hospital Finance for The Connecticut Hospital Association;

**Community Service - continued**

Former President and former Treasurer of Southside Institution Neighborhood Alliance (SINA) and former Chairman of the Board of The Learning Corridor Corporation; former Finance Chairman and Personnel Chairman of Canon Greater Hartford Open (PGA Tournament); former member of Vernon, Connecticut Economic Development Commission; and former Treasurer and Director of Sunshine Project, Inc. (a non-profit organization involved in housing and support services for the psychiatrically disabled).

Recognized as CFO of the year by Hartford Business Journal - 2011

**Other Interests:** Enjoy sailing, skiing, running, tennis and golf.

# KRISTIAN M. MINEAU II

47 Highridge Road - Simsbury, CT 06092
*Home: (860)651-3290* **KrisMineau@CSCus.net** *Cell: (860)833-2507*

## PROFESSIONAL EXPERIENCE

CONSTITUTION SURGERY CENTERS, Newington, Connecticut
2000-Present
***President & Chief Executive Officer***

- CSC is the largest operator of outpatient surgery centers in New England with 15 locations performing 80,000 surgical cases annually
- Over 400 employees and a medical staff of more than 300 surgeons

CONSTITUTION EYE SURGERY CENTER, Newington, Connecticut
1997-2000
***Administrator***

- Organized and managed the largest eye surgery center in the Northeast
- Marketed ASC to new partner physicians; growing the medical staff from 10 to 40 physicians

## MILITARY EXPERIENCE

UNITED STATES AIR FORCE
1988-1997
***U.S. Air Force Pilot / Officer***
*Commanded several different types of aircraft flying a variety of missions worldwide*

- C-5 Pilot: Involved in worldwide strategic airlift, 337th Airlift Squadron, Westover MA
- C-27 Aircraft Commander: Flew drug interdiction and search/rescue missions throughout Central and South America, 310th Airlift Squadron, Howard AFB, Panama
- T-37 Instructor / Evaluator Pilot: Taught instrument, formation, low-level navigation, instructor training and basic pilot training, 64th Flying Training Wing, Reese AFB, TX

## EDUCATION

UNITED STATES AIR FORCE ACADEMY, Colorado Springs, CO
1984-1988
***Bachelor of Science***

## MEMBERSHIPS & AFFILIATIONS

YOUNG PRESIDENTS ORGANIZATION — 2009-Present
***Member, Connecticut Chapter***

HARTFORD GOLF CLUB — 2010-Present
***Member***

CT ASSOCIATION OF AMBULATORY SURGERY CENTERS
***Founding President*** — 1998
***Chapter Member*** — 1999-Present

Curriculum Vitae

# COURTLAND GILLETT LEWIS, M.D.

## PROFESSIONAL

**Affiliation:**

July 3, 2000 - present
Clinical Professor
Department of Orthopaedic Surgery
University of Connecticut Health Center, Farmington, CT

July 3, 2000 – present
Orthopaedic Associates of Hartford, PC
Hartford, CT

August 1, 2007 – present
Connecticut Joint Replacement Institute
Director of Research & Quality Improvement

September 1, 1998 – June 30, 2000
Professor
Department of Orthopaedic Surgery
University of Connecticut Health Center, Farmington, CT

September 1, 1993 to August 31, 1998
Associate Professor of Clinical Orthopaedic Surgery
University of Connecticut Health Center, Farmington, CT

July, 1985 to August 31, 1993
Assistant Professor
Department of Orthopaedic Surgery,
University of Connecticut Health Center, Farmington, CT

July, 1990 to June 2000
Program Director
University of Connecticut Orthopaedic Residency Program

July 1990 to June 2007:
Director of Orthopaedic Education
Hartford Hospital

July, 1990 to August 1992
Acting Chairman
Department of Orthopaedic Surgery,
University of Connecticut Health Center,
School of Medicine, Farmington, CT

**Sabbatical:**

September to November, 1992
Istituti Ortopedici Rizzoli
Bologna, Italy

| | |
|---|---|
| **Fellowship:** | July, 1984 to June, 1985:<br>Assistant in Orthopaedic Surgery, Division of Arthritis Surgery<br>Johns Hopkins University, Baltimore, MD |
| **Residency:** | July, 1979 – June, 1980: general surgery internship; University of Maryland<br>July, 1980 – June, 1984: orthopaedic surgery residency; University of Maryland Hospital |
| **Medical School:** | University of Vermont, College of Medicine, Burlington, Vermont:<br>M.D. degree, 1979 |
| **College:** | Bates College, Lewiston, Maine: B.S. degree in Chemistry, 1974 |

**Memberships**

| | |
|---|---|
| Hartford County Medical Association | 1985 |
| Orthopaedic Research Society | 1986 |
| American Academy of Orthopaedic Surgeons, | 1989 |
| Academic Orthopaedic Society | 1990 |
| Association for Arthritic Hip and Knee Surgery | 1991 |
| Connecticut State Medical Society | 1993 |
| American Orthopaedic Association | 1997 |
| Twentieth Century Orthopaedic Association | 1997 |

**Abstracts**

Edwards, C.C., Lewis, C.G., Browner, B.D. & Catanzariti, F.J., Treatment of open femoral and tibial shaft fractures with external fixation, Orthop. Transactions, 6:407, 1982

Edwards, C.C., Browner, B.D., Catanzaritta, F.J. & Lewis, C.G., Reconstruction of 44 Severly Injured Open Femurs Using Hoffman External Fixation. Orthopaedic Transactions, 7:522-3, 1983

Sothoron, W.H., Lewis, C.G., Abrams, R.C. & Morrow, D.A., Evaluation at skeletal maturity of varus derotational osteotomy in the treatment of Legg-Calve-Perthes disease, Orthop. Transactions, 9:148, 1985

Lewis, C.G., Malinow, K.L., Jones, L.C., Krackow, K.A., Lennox, D.W. & Hungerford, D.S. Prospective psychological evaluation of total joint arthroplasty patients. Orthop.Transactions, 10:472, 1986

Lewis, C.G., Jones, L.C., Connar, K., Lennox, D.W. & Hungerford, D.S.: An evaluation of grafting materials in cementless arthroplasty. Trans. ORS 12:319, 1987; 11:365, 1987

Jones, L.C., Lewis, C.G., Lennox, D.W., Schofield, B.H.,and Hungerford,D.S. Evaluation of bone grafting materials in an animal model of revision arthroplasty. Orthop. Transactions, 12(2):405, 1988

Belniak, R.M., Lewis, C.G., Hopfer, S.M. and Sunderman, F.W. Cobalt gradients adjacent to failed total hip arthroplasties and their relationship to serum measurements. Orthopaedic Transactions, 14(2):467, 1990

Lewis, C.G., Leone, D.J., Nowak, M.D., Davis, P.A. and Huang, S.J. Experimental Validation of Three Dimensional Finite Element Analysis in Total Hip Arthroplasty, Transactions of Orthopaedic Research Society, 16 (2):515, 1991

Diemente, S., Lewis, C.Gl., Nowak, M.D., Leone, D.J. "Finite Element Modeling from CT Scan Data", Proceedings of the 1991 IEEE Sevententh Annual Northeast Bioengineering Conference, April 4-5, 1991, Hartford Graduate Center, Hartford Connecticut

Lewis, C.G., Pillsbury, S. "Thin-Needle Biopsy in Osteonecrosis: Correlation with Core Specimens of the Femoral Head", Arthritis and Rheumatism, 33 (9):S116, September 1990

Nowak, M.N., Lewis, C.G., Leone, D.J. "Analysis of Hip Implant Stem Modifications via a Validated Orthotropic Finite Element Model", Advances in Bioengineering, BED-Vol. 22, ASME 1992

Lewis, C.G., Beauchesne, R., Adams, J., Gossling, H.R. and Pasternak, H.R. "Survivorship of the TrapeZoidal-28 Hip Arthroplasty: Minimum 18 Year Follow-up", Presented at Annual Meeting of American Association of Hip and Knee Surgeons, November 1996, Dallas, TX.

Heck, D., Reuben, J., Stiehl, J., Mekso, J.W. and Lewis, C.G. "The Association of Knee Prosthetic Classification on Re-operation", Accepted for presentation at the 65th Annual Meeting of the American Academy of Orthopaedic Surgeons, March 1998, New Orleans, LA.

**Publications**

Lewis, C.G., Moreland, M.S. & Pope, M.H., Moire fringe topography in gait analysis: A methodologic evaluation, in Moreland, M.S. et al (eds.), Moire Fringe Topography and Spinal Deformity, Pergamon Press, New York, 1981

Freedman, M., Gamble, J.G. & Lewis, C.G., Intrauterine fractures simulating a unilateral clavicular pseudoarthrosis, *J. Can. Assoc. Radiol.*, 33:37-38, 1982

Lewis, C.G., Guest Editorial, Patellar Pitfalls, *Complications in Orthopedics*, 3(6):147 November/December, 1988

Zizic, T.M., Lewis, C.G., Marcoux, C., & Hungerford, D.S., The Predictive Value of Hemodynamic Studies in Preclinical Ischemic Necrosis of Bone, *J Rheumatol* , 16: 1559-1564, 1989

Lewis, C.G., Belniak, R.M., Hopfer, S.M. & Sunderman, F.W., Jr., Cobalt in Periprosthetic Soft Tissue: Observations in Six Revision Cases, *Acta Orthopaedica Scandinavia*, 62: 447-450, 1991

Lewis, C.G., Judge, J. "Hip Fractures" Chapter in The Practice of Geriatrics, Second Edition, Calkins, Ford, Katz. W.B. Saunders Company, 1991

Reisine, S., Lewis, C.G., Tibbles, L., Donald, M., Rippey, R., "Self-Administered Patient Questionnaire for Assessing Knowledge About Joint Arthroplasty Prior to Surgery". *Arthritis Care and Research,* 5(1): 8-12, March 1992

Nowak, M.D., Lewis, C.G., Leone, D.J. "Analysis of Hip Implant Stem Modification via a Validated Orthotropic Finite Element Mode", 1992 *Advances in Bioengineering*, p. 163-166, June 1992

Toni, A., Lewis, C.G., Sudanese, A., Stea, S., Calista, F., Savarino, L., Pizzoferrato, A., Guinti, A. "Bone Demineralization Induced By Cementless Alumina Coated Femoral Stems", *The Journal of Arthroplasty* , 9 (4):435-444, August 1994

Lewis, C.G., Belniak, R.M., Plowman, M.C., Hopfer, S.M., Knight, J.A., Sunderman, F.W. Jr. "Intraarticular Carcinogenesis Bioassays of CoCrMo and TiA1V Alloys in Rats", *The Journal of Arthroplasty* , 10 (1):75-82, February 1995

Zizic, T.M., Hofman, K.C., Holt, P.A., Hungerford, D.S., O'Dell, J.R., Jacobs, M.A., Lewis, C.G., Deal, C.L., Caldwell, J.R., Cholewczynski, J.D., et.al. "The Treatment of Osteoarthritis of the Knee with Pulsed Electrical Stimulation", *J. Rheumatol*, 22 (9): 1757-1761, September 1995

Heck, D.A., Partridge, C.M., Reuben, J.D., Lanzer, W.L., Lewis, C.G. and Keating, E.M. "Prosthetic Component Failures in Hip Arthroplasty Surgery", *The Journal of Arthroplasty*, 10 (5):575-580, October 1995

Harrington, R.D., Lewis, C.G., Aslanzadeh, J, Stelmach, P. and Woolfrey, A.E. "*Oerskovia xanthineolytica* Infection of a Prosthetic Joint: Case Report and Review". *Journal of Clinical Microbiology*, 34 (7):1821-1824, April 1996

Lewis, C.G. and Sunderman, F.W. "Metal Carcinogenesis in Total Joint Arthroplasty". *Clinical Orthopaedics and Related Research*, 329S:S264-S268, 1996

Soni, M.K., Shetty, D., Leone, D.J., Nowak, M.D. and Lewis, C.G. "Investigation Into a Miniaturized Sensing Device For Angular Measurement in Hip Implants", Accepted for publication, *Advances in Bioengineering*, 1996

Lewis, C.G., Jones, L.C., Hungerford, D.S. "The Effects of Grafting on Porous Metal Ingrowth: A Canine Model". *The Journal of Arthroplasty*, 12(4):451-460, 1997

Livingston, K., Horbatuck, A., Lewis, C.G. "Case Study in Total Hip Arthroplasty: A Patient-Centered Model of Care" in Interdisciplinary Case Studies in Health Care Redesign, Parsons, M.L. et al (eds.), Aspen Publication, Maryland. Chapter 12: 209-221, 1998

Benson, E.R., Resine, S.T., Lewis, C.G. "Functional Outcome of Arthrodesis for Failed Total Knee Arthroplasty". *Orthopedics*, 21 (8); 875-879, August 1998

## BOOKS AND CHAPTERS

"General Orthopaedics" section editor in Orthopaedics, Malkani, A., Kaufer, H. and R. Fitzgerald (ed), Harcourt Press, New York, 2001.

"Orthopaedic Pocket Procedures" (series editor), McGraw-Hill, New York, 2002/2003
General Orthopaedics, (volume editor), 2002.
Pediatric Orthopaedics, Blasier, DL & J Drennen (ed) 2003
Foot and Ankle, Kelikian, A. (ed) 2003
Sports Medicine, Arciero, R. (ed) 2003

## GRANTS/FUNDED RESEARCH

"Total Joint Arthroplasty: Patient Education and Monitoring", N.I.H. (#AR 20621) Project grant for Multipurpose Arthritis Center. R. Rippey, Co-P.I.: 1987-1992. $292,800

"Parametric Model of Uncemented Total Hip Implants", (Faculty Research Grant): 1986-1989. $14,447

"Parametric Modelling of Uncemented Total Hip Implants", (OREF Research Grant): 1989-1990. $38,388

"Use of Bionicare System in the Treatment of Arthritis":, (Murray Electronics), 1988-1990. $22,746

"Intraarticular Metal Carcinogenesis: Effects of Commonly Used Implant Biomaterials in a Rat Knee Model", (American Cancer Society): 1989-1990. $7,538

"Finite Element Analysis in Uncemented Total Hip Arthroplasty", (OREF Research Grant): 1990-1991. $34,649

"Comparison of the Safety and Efficacy of Patient Controlled Analgesia Delivered by Fentanyl HCL Transdermal System Versus Morphine IV Pump for Pain Management after Primary Unilateral Total Hip Replacement" (Ortho-McNeil), 2005. $262,000

"Patients A Multi-Center, Double-Blind, Placebo-Controlled, Randomized Study of the Analgesic Efficacy and Safety of Valdecoxib 20mg QD and Valdecoxib 20mg BID Compared to Placebo Over Multiple Days for Management of Acute Post-Surgical pain in Patients Undergoing Anterior Cruciate Ligament Reconstruction" (Pfizer) 2006. $69,250

"A Phase 2, Randomized, Double-Blinded (BMS-562247 and enoxaparin), Active-Controlled (enoxaparin and warfarin), Parallel-Arm, Dose-Response Study of the Oral Factor Xa Inhibitor BMS-562247 in Subjects Undergoing Elective Total Knee Replacement Surgery" 2006. (Bristol-Myers-Squibb) $8,400

"Morbidity and Mortality of Uncemented vs Cemented Hemiarthroplasty in Subcapital Hip Fractures." 2005 (Zimmer). $175,000

"A Multi-Center, Randomized, Double-Blind, Placebo-Controlled, Parallel Design, 2-Arm Study to Investigate the Effect of Aprotinin on Transfusion Requirements and Blood Loss in Patients Undergoing Elective Primary Total Hip Replacement Surgery" 2007 (Bayer) $42,855

"A Randomized, Double-Blind, Active and Placebo-Controlled, Parallel-Group, Multicenter Study to Evaluate the Efficacy and Safety of Multiple Doses of CG5503 Immediate-Release (IR) Formulation in the Treatment of Acute Pain From Total hip Replacement Surgery Followed by a Voluntary Open-Label Extension" 2006. (Johnson & Johnson) $85,913

"A Phase 3 Randomized, Double-Blind, Active-Controlled (Enoxaparin), Parallel group, Multi-Center Study to Evaluate the Safety and Efficacy of Oral, Once-daily Apixaban in Subjects Undergoing Elective Total Knee Replacement Surgery" 2006. (Bristol-Myers-Squibb) $172,860

"Transfusion Trigger Trial for Functional Outcomes in Cardiovascular Patients Undergoing Surgical Hip Fracture Repair (FOCUS)" 2008. Jeffrey Carson, P.I., $109,000

"Phase IV Study of Vitamin-E Impregnated Polyethylene versus Low Dose Radiation in Total Hip Arthroplasty" 2009. (Biomet) $47,000

**COMMITTEES**

**National**

AAOS Committee on Evaluation — January 1990 - January 1995

| | |
|---|---|
| AAOS Committee on Educational Programming | October 1993 - 2003 |
| AAOS Subcommittee on Hip, Knee and Adult Reconstruction Evaluation, Chairman | January 1995 – March 2001 |
| AAOS "Task Force on Distance Learning" | January 2000 |
| AAOS Orthopaedic Grand Rounds, Case Developer | February 1996 – March 1998 |
| University Hospital Consortium Clinical Evaluative Sciences Council Representative | August 1993 - November 1997 |
| University Hospital Consortium Clinician Coordinating Committee - | |
| Total Hip Arthroplasty Benchmarking | March 1995 – September 1995 |
| Total Joint Implant Purchasing Task Force | March 1995 – March 1998 |
| AAHKS Research Committee | January 1994 - October 1997 |
| AAHKS Communications Committee | January 1997 – October 2000 |
| AAHKS Alternate AMA Delegate | June 2008 – present |
| AAHKS Health Policy Committee | November 2009 - present |
| AOS Committee on Graduate Medical Education | February 1997 – February 1999<br>Chair November 2002 – June 2003 |
| AOS Undergraduate Medical Education Committee | January 1999 – June 2003 |
| AOA Ethics Committee, Chair | July 1999 – June 2000 |
| AOA Graduate & Medical Education Committee | June 2000 – present |
| Novation Orthopaedic Advisory Council | September 2000 – 2006 |
| Vice-Chair | May 2003 - 2006 |
| Medicare Evidence Development & Carrier Advisory Committee | October 2010 - present |

**State**

| | |
|---|---|
| Connecticut Lupus Chapter, Medical Advisory Board | January 1993 - present |
| Connecticut State Medical Society | |
| House of Delegates | January 1998 – present |
| Medicare Committee | September 2006 – present |
| CAC Representative | September 2008 – present |
| Legislative Committee | September 2009 - present |
| Chair | September 2011 - present |
| Vice Speaker | September 2010 - present |
| Executive Committee | September 2010 - present |

**Hartford County Medical Association**

| | |
|---|---|
| Committee on Communications | January 1992 - December 1997 |
| Board of Directors | January 1999 – present |
| Secretary/Treasurer | October 2005 – October 2006 |
| Vice President | October 2006 – October 2007 |
| President | October 2007 – October 2008 |
| Executive Committee | October 2005 - present |

**University of Connecticut School of Medicine**

| | |
|---|---|
| Committee on Graduate Medical Education | January 1990 – May 2000 |
| CGME Program Review Subcommittee, Chair | December 1996 – May 2000 |
| Associate Vice President for Information Technologies Search Committee, Chair | 1994 |
| Department of Anesthesiology Review, Chair | April 1994 |
| Department of Medicine Review | December 1996 - February 1997 |

Clinical Faculty Governance Steering Committee,
Chair — August 1995 - May 1996

**John Dempsey Hospital**

| | |
|---|---|
| Transfusion Committee | October 1987 - July 1996 |
| Hospital Director's Advisory Committee | July 1990 - August 1992 |
| Joint Conference Committee | July 1990 - August 1992 |
| Medical Board | July 1990 - August 1992 |
| Operating Room Committee | October 1990 - December 1992 |

**University Physicians**

| | |
|---|---|
| Medical Records Committee | July 1988 - December 1988 |
| Medical Records - Format Subcommittee | October 1989 - March 1990 |
| Medical Records Committee | August 1990 - December 1993 |
| Executive Committee | July 1990 - December 1993 |
| Medical Records/Quality Assurance Committee Chairman | May 1991 - December 1993 |
| UCHC/HH Alliance Task Force on Physician Practice | August 1996 - March 1998 |

**University of Connecticut HealthSystem**

| | |
|---|---|
| Clinical Governance Committee Vice Chair | May 1996 – June 1999 |
| Clinical Practice Subcommittee Chairman | May 1996 – June 1999 |
| Patient Focused Redesign Task Force | July 1995 - June 1997 |
| Electronic Medical Record Committee | September 1995 - September 1996 |
| Chancellor's Advisory Council | September 1998 – May 2000 |

**UConn Orthopaedic Residency**

| | |
|---|---|
| Residency Program Director | July 1990 – August 2000 |
| Residency Education Committee | July 1986 – June 2007 |
| Residency Research Committee | July 1993 – June 2007 |

**Other Professional Activities**

| | |
|---|---|
| Deputy Editor-in-Chief - *Complications in Orthopaedics* | 1987-1992 |
| Expert Analyst - *Advances in Orthopaedic Surgery* | 1990-1996 |
| Associate Editor - *Journal of Arthroplasty* | 1991-present |
| Expert Reviewer - *Medscape Orthopaedics & Sports Medicine* | 1997 - 1999 |
| University of Connecticut Health Center Hemophilia Treatment Center - Staff Orthopaedist | 1985 - 1994 |

**Community Activities**

First Church of Christ Congregational, West Hartford, Connecticut

| | |
|---|---|
| Christian Education Board | 1996-1997 |
| Vice Moderator | 1998-1999 |
| Personnel Committee, Chair | 1998-1999 |
| Moderator | 1999 –2001 |
| Deacon | 2004- 2009 |
| Long range Planning, Chair | 2006-2007 |
| Leadership Ministry, Chair | 2008-2011 |

Treasurer — 2011-present
Medicins sans Frontieres (Doctors without Borders)
North West Frontier Province, Pakistan — December 2005

# 2013 Accreditation Handbook

## For Ambulatory Health Care

AAAHC
ACCREDITATION ASSOCIATION
*for* AMBULATORY HEALTH CARE, INC.

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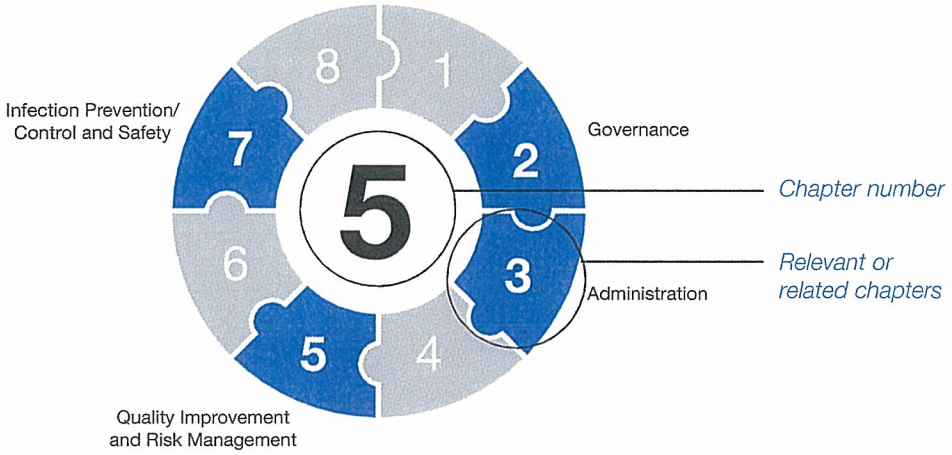
# Core Chapters

Standards in the core chapters will be applied to all organizations seeking accreditation.

All of the AAAHC Standards were developed and designed to help organizations improve. Individually and collectively, they help organizations drive toward one mission: patient safety through the provision of high-quality care. For this reason, Standards are both inextricably interrelated, and appropriately located in different chapters.



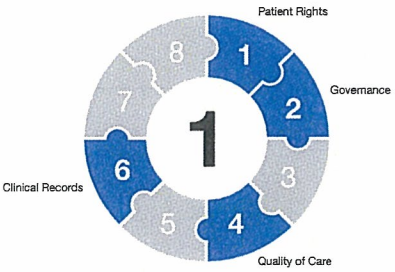

At the beginning of each core chapter, you will see the symbol above. The current chapter number is in the center, surrounded by eight connected segments, representing the core chapters:

1. **Patient Rights and Responsibilities**
2. **Governance**
3. **Administration**
4. **Quality of Care Provided**
5. **Quality Management and Improvement**
6. **Clinical Records and Health Information**
7. **Infection Prevention and Control and Safety**
8. **Facilities and Environment**

All of these chapters are connected to one another, and one or more of them also may be highlighted in color. The highlights are our suggestions about chapters that may be particularly relevant and should be consulted for Standards that are closely related.

Consider the Standards as a system of connected principles, rather than a list of discrete requirements.

# 01. Patient Rights and Responsibilities




An accreditable organization recognizes the basic human rights of patients. Such an organization has the following characteristics:

| | | Compliance SC | PC | NC |
|---|---|---|---|---|
| A. | Patients are treated with respect, consideration, and dignity. | A. ☐ | ☐ | ☐ |
| B. | Patients are provided appropriate privacy. | B. ☐ | ☐ | ☐ |
| C. | When the need arises, reasonable attempts are made for health care professionals and other staff to communicate in the language or manner primarily used by patients. | C. ☐ | ☐ | ☐ |
| D. | Patients are provided, to the degree known, information concerning their diagnosis, evaluation, treatment, and prognosis. When it is medically inadvisable to give such information to a patient, the information is provided to a person designated by the patient or to a legally authorized person. | D. ☐ | ☐ | ☐ |
| E. | Patients are given the opportunity to participate in decisions involving their health care, except when such participation is contraindicated for medical reasons. | E. ☐ | ☐ | ☐ |
| F. | Information is available to patients and staff concerning: | F. ☐ | ☐ | ☐ |
| 1. | Patient rights, including those specified in A, B, C, D, and E above. | 1. ☐ | ☐ | ☐ |
| 2. | Patient conduct, responsibilities, and participation. | 2. ☐ | ☐ | ☐ |
| 3. | Services available at the organization. | 3. ☐ | ☐ | ☐ |
| 4. | Provisions for after-hours and emergency care. | 4. ☐ | ☐ | ☐ |
| 5. | Fees for services. | 5. ☐ | ☐ | ☐ |
| 6. | Payment policies. | 6. ☐ | ☐ | ☐ |
| 7. | Patient's right to refuse to participate in research. | 7. ☐ | ☐ | ☐ |
| 8. | Advance directives, as required by state or federal law and regulations. | 8. ☐ | ☐ | ☐ |
| 9. | The credentials of health care professionals. | 9. ☐ | ☐ | ☐ |
| 10. | The absence of malpractice coverage if applicable. | 10. ☐ | ☐ | ☐ |
| 11. | How to voice grievances regarding treatment or care that is (or fails to be) furnished. | 11. ☐ | ☐ | ☐ |
| 12. | Methods for providing feedback, including complaints. | 12. ☐ | ☐ | ☐ |
| G. | Prior to receiving care, patients are informed of patient responsibilities. These responsibilities require the patient to: | G. ☐ | ☐ | ☐ |
| 1. | Provide complete and accurate information to the best of his/her ability about his/her health, any medications, including over-the-counter products and dietary supplements, and any allergies or sensitivities. | 1. ☐ | ☐ | ☐ |

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| | | Compliance | | |
|---|---|---|---|---|
| | | SC | PC | NC |
| 2. | Follow the treatment plan prescribed by his/her provider and participate in his/her care. | ☐ | ☐ | ☐ |
| 3. | Provide a responsible adult to transport him/her home from the facility and remain with him/her for 24 hours, if required by his/her provider. | ☐ | ☐ | ☐ |
| 4. | Accept personal financial responsibility for any charges not covered by his/her insurance. | ☐ | ☐ | ☐ |
| 5. | Be respectful of all the health care professionals and staff, as well as other patients. | ☐ | ☐ | ☐ |
| H. | Patients are informed of their right to change providers if other qualified providers are available. | ☐ | ☐ | ☐ |

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# 02. Governance

An accreditable organization has a governing body that sets policy and is responsible for the organization. Such an organization has the following characteristics:

| | | Compliance SC | PC | NC |
|---|---|---|---|---|
| **Subchapter I — General Requirements:** This subchapter describes general requirements for an organization and its governing body. | I. | ☐ | ☐ | ☐ |
| A. The organization is a legally constituted entity, or an organized sub-unit of a legally constituted entity, or is a sole proprietorship in the state(s) in which it is located and provides services. | A. | ☐ | ☐ | ☐ |
| 1. The names and addresses of all owners or controlling parties (whether individuals, partnerships, trusts, corporate bodies, or subdivisions of other bodies, such as public agencies or religious, fraternal, or other philanthropic organizations) are available upon request and furnished to the Accreditation Association for Ambulatory Health Care (AAAHC). | 1. | ☐ | ☐ | ☐ |
| 2. A legally constituted entity is documented by at least one of the following: articles of organization, articles of incorporation, partnership agreement, operating agreement, legislative or executive act, or bylaws, unless the organization is a sole proprietorship. | 2. | ☐ | ☐ | ☐ |
| B. The governing body addresses and is fully and legally responsible, either directly or by appropriate professional delegation, for the operation and performance of the organization. Governing body responsibilities include, but are not limited to: | B. | ☐ | ☐ | ☐ |
| 1. Determining the mission, goals, and objectives of the organization. | 1. | ☐ | ☐ | ☐ |
| 2. Ensuring that facilities and personnel are adequate and appropriate to carry out the mission. | 2. | ☐ | ☐ | ☐ |
| 3. Establishing an organizational structure and specifying functional relationships among the various components of the organization. | 3. | ☐ | ☐ | ☐ |
| 4. Adopting bylaws or similar rules and regulations for the orderly development and management of the organization. | 4. | ☐ | ☐ | ☐ |
| 5. Adopting policies and procedures necessary for the orderly conduct of the organization, including the organization's scope of clinical activities. | 5. | ☐ | ☐ | ☐ |
| a. The organization defines pediatric patients and develops and maintains a written policy defining the care of pediatric patients, if relevant. Specific components of perioperative care are listed in Standard 10.I.AA. | a. | ☐ | ☐ | ☐ |
| 6. Ensuring that the quality of care is evaluated and that identified problems are appropriately addressed. | 6. | ☐ | ☐ | ☐ |
| 7. Reviewing all legal and ethical matters concerning the organization and its staff and, when necessary, responding appropriately. | 7. | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC |
|---|---|---|---|
| 8. Maintaining effective communication throughout the organization, including ensuring links between quality management and improvement activities and other management functions of the organization. | 8. ☐ | ☐ | ☐ |
| 9. Establishing a system of financial management and accountability appropriate to the organization. | 9. ☐ | ☐ | ☐ |
| 10. Determining a policy on the rights and responsibilities of patients. | 10. ☐ | ☐ | ☐ |
| 11. Approving and assuring compliance of all major contracts or arrangements affecting the medical and dental care provided under its auspices and ensuring that services are provided in a safe and effective manner, including, but not limited to, those concerning: | 11. ☐ | ☐ | ☐ |
| a. The employment or contracting of health care professionals. | a. ☐ | ☐ | ☐ |
| b. The provision of external services for radiology, pathology, medical laboratory, and housekeeping services. | b. ☐ | ☐ | ☐ |
| c. The provision of care by other health care organizations, such as hospitals. | c. ☐ | ☐ | ☐ |
| d. The provision of education to students and postgraduate trainees. | d. ☐ | ☐ | ☐ |
| e. The provision of after-hours patient information or telephone triage services, including the review of protocols. | e. ☐ | ☐ | ☐ |
| f. The Centers for Medicare & Medicaid Services (CMS) requirements, if the organization participates in the Medicare/Medicaid program. | f. ☐ | ☐ | ☐ |
| g. The activities or services delegated to another entity. | g. ☐ | ☐ | ☐ |
| 12. Formulating long-range plans in accordance with the mission, goals, and objectives of the organization. | 12. ☐ | ☐ | ☐ |
| 13. Fulfilling all applicable obligations under local, state, and federal laws and regulations, such as those addressing disabilities, medical privacy, grievances, fraud and abuse, self-referral, anti-trust, reporting to the National Practitioner Data Bank (NPDB)[1], etc. | 13. ☐ | ☐ | ☐ |
| 14. Ensuring that none of the marketing and advertising regarding the competence and capabilities of the organization is misleading. | 14. ☐ | ☐ | ☐ |
| 15. Developing a program of risk management appropriate to the organization that includes review of risk management activities. | 15. ☐ | ☐ | ☐ |
| 16. Determining a policy on continuing education for personnel and/or patient education for members/enrollees, if applicable. | 16. ☐ | ☐ | ☐ |
| 17. Development, implementation, and oversight of the organization's infection control and safety programs to ensure a safe environment of care. | 17. ☐ | ☐ | ☐ |

[1] *For information on the National Practitioner Data Bank, see http://www.npdb-hipdb.hrsa.gov.*

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| | Compliance SC | PC | NC |
|---|---|---|---|
| C. Accredited organizations must notify AAAHC in writing within 15 calendar days of significant organizational, ownership, operational, or quality of care events, including criminal indictment, guilty plea or verdict in a criminal proceeding (other than a traffic violation) directly or indirectly involving the organization or any of its officers, administrators, physicians/health care professionals, or staff within their role in the organization. Any such change/event that negatively affects public perception of the accredited organization or AAAHC, as the accrediting body, must also be reported. An organization's duty to provide this information continues during the entire accreditation term. | C. ☐ | ☐ | ☐ |
| D. Representation of accreditation to the public must accurately reflect the AAAHC-accredited entity. | D. ☐ | ☐ | ☐ |
| E. The governing body meets at least annually, or more frequently as determined by the governing body, and keeps such minutes or other records as may be necessary for the orderly conduct of the organization. | E. ☐ | ☐ | ☐ |
| 1. Items to be reviewed should include, but are not limited to: | 1. ☐ | ☐ | ☐ |
| a. Rights of patients. | a. ☐ | ☐ | ☐ |
| b. Delegated administrative responsibilities. | b. ☐ | ☐ | ☐ |
| c. Quality of care. | c. ☐ | ☐ | ☐ |
| d. The quality management and improvement program. | d. ☐ | ☐ | ☐ |
| e. The organization's policies and procedures. | e. ☐ | ☐ | ☐ |
| f. The appointment/reappointment process. | f. ☐ | ☐ | ☐ |
| g. The infection control program. | g. ☐ | ☐ | ☐ |
| h. The safety program. | h. ☐ | ☐ | ☐ |
| i. Compliance with all other applicable Standards. | i. ☐ | ☐ | ☐ |
| F. If the governing body elects, appoints, or employs officers and administrators to carry out its directives, the authority, responsibility, and functions of all such positions are defined. | F. ☐ | ☐ | ☐ |

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**Subchapter II — Credentialing and Privileging:** This subchapter describes the requirements for credentialing and privileging of health care professionals to provide patient care in an accreditable organization. Organizations may find the *Worksheets and Forms* located in the back of this *Handbook* helpful in creating medical staff applications and in measuring compliance with credentials verification processes.

***Credentialing*** is a three-phase process of assessing and validating the qualifications of an individual to provide services. The objective of credentialing is to establish that the applicant has the specialized professional background that he or she claims and that the position requires. An accreditable organization: 1) establishes minimum training, experience, and other requirements (i.e., credentials) for physicians and other health care professionals; 2) establishes a process to review, assess, and validate an individual's qualifications, including education, training, experience, certification, licensure, and any other competence-enhancing activities against the organization's established minimum requirements; and 3) carries out the review, assessment, and validation as outlined in the organization's description of the process. II. ☐ ☐ ☐

A. The medical staff must be accountable to the governing body. The governing body establishes and is responsible for a credentialing and reappointment process, applying criteria in a uniform manner to appoint individuals to provide patient care for the organization. The governing body approves mechanisms for credentialing, reappointment, the granting of privileges, and suspending or terminating clinical privileges, including provisions for appeal of such decisions. A. ☐ ☐ ☐

B. The governing body, either directly or by delegation, makes (in a manner consistent with state law) initial appointment, reappointment, and assignment or curtailment of clinical privileges of medical staff members based on professional peer evaluation. This process has the following characteristics: B. ☐ ☐ ☐

1. The governing body has specific criteria for the initial appointment and reappointment of physicians and dentists. 1. ☐ ☐ ☐

2. Provisions are made for the expeditious processing of applications for clinical privileges. 2. ☐ ☐ ☐

3. On an application for initial credentialing and privileges, the applicant is required to provide sufficient evidence of training, experience, and current documented competence in performance of the procedures for which privileges are requested. At a minimum, the following credentialing and privileging information shall be provided for evaluation of the candidate: 3. ☐ ☐ ☐

   a. Education, training, and experience: Relevant education and training are verified at the time of appointment and initial granting of clinical privileges; the applicant's experience is reviewed for continuity, relevance, and documentation of any interruptions in that experience. a. ☐ ☐ ☐

   b. Peer evaluation: Current competence is verified and documented. b. ☐ ☐ ☐

   c. Current state license: Current licensure is verified and documented at the time of appointment. c. ☐ ☐ ☐

   d. Drug Enforcement Administration (DEA) registration, if applicable. d. ☐ ☐ ☐

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| e. | Proof of current medical liability coverage meeting governing body requirements, if any. | e. ☐ | ☐ | ☐ |
| f. | Information obtained from the National Practitioner Data Bank (NPDB)[1] **Note:** The NPDB Proactive Disclosure Services (PDS) is an acceptable service for meeting the requirement for querying the NPDB (see Resources). | f. ☐ | ☐ | ☐ |
| g. | The organization requires, at initial appointment and reappointment, written attestation from the applicant addressing other pertinent information which includes, but need not be limited to: | g. ☐ | ☐ | ☐ |
| i. | Professional liability claims history. | i. ☐ | ☐ | ☐ |
| ii. | Information on licensure revocation, suspension, voluntary relinquishment, licensure probationary status, or other licensure conditions or limitations. | ii. ☐ | ☐ | ☐ |
| iii. | Complaints or adverse action reports filed against the applicant with a local, state, or national professional society or licensure board. | iii. ☐ | ☐ | ☐ |
| iv. | Refusal or cancellation of professional liability coverage. | iv. ☐ | ☐ | ☐ |
| v. | Denial, suspension, limitation, termination, or nonrenewal of professional privileges at any hospital, health plan, medical group, or other health care entity. | v. ☐ | ☐ | ☐ |
| vi. | DEA and state license action. | vi. ☐ | ☐ | ☐ |
| vii. | Disclosure of any Medicare/Medicaid sanctions. | vii. ☐ | ☐ | ☐ |
| viii. | Conviction of a criminal offense (other than minor traffic violations). | viii. ☐ | ☐ | ☐ |
| ix. | Current physical, mental health, or chemical dependency problems that would interfere with an applicant's ability to provide high-quality patient care and professional services. | ix. ☐ | ☐ | ☐ |
| x. | Signed statement releasing the organization from liability and attesting to the correctness and completeness of the submitted information. | x. ☐ | ☐ | ☐ |

[1] *For information on the National Practitioner Data Bank, see http://www.npdb-hipdb.hrsa.gov.*

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| | Compliance SC | PC | NC |
|---|---|---|---|
| 4. Upon completion of the application, the credentials are verified according to procedures established in the organization's bylaws, rules and regulations, or policies. The organization has established procedures to obtain information necessary for primary or secondary source verification of the credentials and is responsible for obtaining this information. An accreditable organization may use information provided by a Credentials Verification Organization (CVO) after proper assessment of the capability and quality of the CVO. Alternatively, a CVO may demonstrate such capability and quality by becoming accredited or certified by a nationally recognized accreditation organization. Primary or acceptable secondary source verification is required for items listed in 2.II.B.3.a-f, unless a CVO or an organization performing primary source verification that is accredited or certified by a nationally recognized body is used. If the organization utilizes a CVO or another organization to verify credentials, those entities must perform primary source verification unless such sources do not exist or are impossible to verify. | 4. ☐ | ☐ | ☐ |
| 5. Medical staff must apply for reappointment every three years, or more frequently if state law or organizational policies so stipulate. At reappointment, the organization requires completion of a reappointment application and verifies items listed in Standards 2.II.B.3.c-g and peer review activities as described in Chapter 2.III. | 5. ☐ | ☐ | ☐ |
| 6. The organization shall monitor and document the currency of date-sensitive information such as licensure, professional liability insurance (if required), certifications, DEA registrations, and other such items, where applicable, on an ongoing basis (at expiration, appointment, and re-appointment, at minimum.) | 6. ☐ | ☐ | ☐ |
| 7. In a solo medical or dental practice, the provider's credentials file shall be reviewed by an outside physician (for a medical practice) or an outside dentist (for a dental practice) at least every three years, or more frequently, if state law or organizational policies so stipulate, to ensure currency, accuracy, and completeness of credentials. The provider is required to complete an application or reapplication, and the documentation identified in Standard 2.II.B.3 must be present in the credentials file, including a list of procedures that will be performed by the provider in the organization/practice setting and evidence of appropriate education, training, and experience to perform the privileged procedures. Applications are available for other providers requesting credentialing and privileges to perform procedures in the solo provider's organization, including any anesthesia providers. In a solo provider's practice, the granting of privileges shall be reviewed by an outside physician (for medical practices) or dentist (for dental practices) with documentation provided to the organization. | 7. ☐ | ☐ | ☐ |

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| ***Privileging*** is a three-phase process. The objective of privileging is to determine the specific procedures and treatments that a health care professional may perform. An accreditable organization: 1) determines the clinical procedures and treatments that are offered to patients; 2) determines the qualifications related to training and experience that are required to authorize an applicant to obtain each privilege; and 3) establishes a process for evaluating the applicant's qualifications using appropriate criteria and approving, modifying, or denying any or all of the requested privileges in a non-arbitrary manner. | | | |
| C. The scope of procedures must be periodically reviewed by the governing body and amended as appropriate. | C. ☐ | ☐ | ☐ |
| D. Privileges to carry out specified procedures are granted by the organization to the health care professional to practice for a specified period of time. The health care professional must be legally and professionally qualified for the privileges granted. These privileges are granted based on an applicant's qualifications within the services provided by the organization and recommendations from qualified medical personnel. | D. ☐ | ☐ | ☐ |
| E. The organization has its own independent process of credentialing and privileging. The approval of credentials or the granting of privileges requires review and approval by the organization's governing body. Credentials may not be approved, nor privileges granted, solely on the basis that another organization, such as a hospital, approved credentials or granted privileges, without further review. Such status at another organization may be included in the governing body's consideration of the application. | E. ☐ | ☐ | ☐ |
| F. The governing body provides a process (in a manner consistent with state law and based on evidence of education, training, experience, and current competence) for the initial appointment, reappointment, and assignment or curtailment of privileges and practice for allied health care professionals. | F. ☐ | ☐ | ☐ |

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| **Subchapter III — Peer Review:** An accreditable organization maintains an active and organized process for peer review that is integrated into the quality management and improvement program and is evidenced by the following characteristics: | III. | ☐ | ☐ | ☐ |
| A. The health care professionals understand, support, and participate in a peer review program through organized mechanisms that are consistent with the organization's policies and procedures, and are responsible to the governing body. The peer review activities are evidenced in the quality improvement program. | A. | ☐ | ☐ | ☐ |
| B. At least two physicians (or dentists in dental practices) are involved to provide peer-based review. (In solo physician or dental organizations, such as office-based surgical practices, independent practice associations, and dental practices, an outside physician or dentist is involved to provide peer-based review.) | B. | ☐ | ☐ | ☐ |
| 1. At least two health care professionals, one of whom may be a physician or dentist, are involved to provide peer-based review within their scope of practice for professionals such as nurse practitioners, certified registered nurse anesthetists, and physician assistants. Peer review as part of an employee's performance evaluation is acceptable. | 1. | ☐ | ☐ | ☐ |
| C. The organization provides ongoing monitoring of important aspects of the care provided by physicians, dentists, and other health care professionals. Monitoring important aspects of care is necessary for monitoring performance and establishing internal benchmarks. | C. | ☐ | ☐ | ☐ |
| D. Health care professionals participate in the development and application of the criteria used to evaluate the care they provide. | D. | ☐ | ☐ | ☐ |
| E. Data related to established criteria is collected in an ongoing manner and are periodically evaluated to identify acceptable or unacceptable trends or occurrences that affect patient outcomes. | E. | ☐ | ☐ | ☐ |
| F. The results of peer review activities are reported to the governing body. | F. | ☐ | ☐ | ☐ |
| G. The results of peer review are used as part of the process for granting continuation of clinical privileges, as described in Chapter 2.II. | G. | ☐ | ☐ | ☐ |
| H. To improve the professional competence and skill, as well as the quality of performance, of the health care professionals and other professional personnel it employs, the organization: | H. | ☐ | ☐ | ☐ |
| 1. Provides convenient access to reliable, up-to-date information pertinent to the clinical, educational, administrative, and research services provided by the organization. | 1. | ☐ | ☐ | ☐ |
| 2. Encourages health care professionals to participate in educational programs and activities, as demonstrated in the organization's policies or procedures; these educational programs may be internal or external, and are consistent with the organization's mission, goals, and objectives. | 2. | ☐ | ☐ | ☐ |

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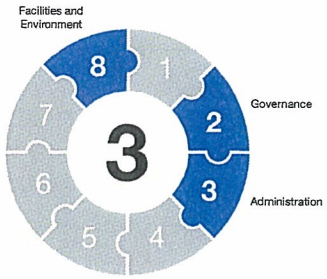
# 03. Administration




An accreditable organization is administered in a manner that ensures the provision of high-quality health services and that fulfills the organization's mission, goals, and objectives. Organizations may find it helpful to use the *Personnel Records Worksheet* to evaluate compliance with some Standards found in this chapter. The *Worksheets and Forms* section is located in the back of this *Handbook*.

| | Compliance SC | PC | NC |
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| A. Administrative policies, procedures and controls are established and implemented to ensure the orderly and efficient management of the organization. Administrative responsibilities include, but are not limited to: | A. ☐ | ☐ | ☐ |
| 1. Enforcing policies delegated by the governing body. | 1. ☐ | ☐ | ☐ |
| 2. Employing qualified management personnel. | 2. ☐ | ☐ | ☐ |
| 3. Taking all reasonable steps to comply with applicable laws and regulations. | 3. ☐ | ☐ | ☐ |
| 4. Protecting the assets of the organization. | 4. ☐ | ☐ | ☐ |
| 5. Implementing fiscal controls, including, but not limited to: | 5. ☐ | ☐ | ☐ |
| a. Authorization and record procedures that are adequate to provide accounting controls over assets, liabilities, revenues, and expenses. | a. ☐ | ☐ | ☐ |
| b. Policies and procedures for controlling accounts receivable and accounts payable and for handling cash and credit arrangements. | b. ☐ | ☐ | ☐ |
| c. Rates and charges for services provided by the organization. | c. ☐ | ☐ | ☐ |
| d. Methods of collection of unpaid accounts that are reviewed before referral to a collection agency. | d. ☐ | ☐ | ☐ |
| 6. Using methods of communicating and reporting designed to ensure the orderly flow of information within the organization. | 6. ☐ | ☐ | ☐ |
| 7. Controlling the purchase, maintenance, and distribution of the equipment, materials, and facilities of the organization. | 7. ☐ | ☐ | ☐ |
| 8. Operating based on established lines of authority. | 8. ☐ | ☐ | ☐ |
| 9. Establishing controls relating to the custody of the official documents of the organization. | 9. ☐ | ☐ | ☐ |
| 10. Maintaining the confidentiality, security, and physical safety of data on patients and staff. | 10. ☐ | ☐ | ☐ |
| 11. Maintaining a health information system that supports the collection, integration, and analysis of data and allows reporting as necessary. | 11. ☐ | ☐ | ☐ |
| 12. Dealing with inquiries from governmental agencies, attorneys, consumer advocate groups, and the media. | 12. ☐ | ☐ | ☐ |

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| B. Personnel policies are established and implemented to facilitate attainment of the mission, goals, and objectives of the organization. Personnel policies: | B. ☐ | ☐ | ☐ |
| 1. Define and delineate functional responsibilities and authority. | 1. ☐ | ☐ | ☐ |
| 2. Require the employment of personnel with qualifications commensurate with job responsibilities and authority, including appropriate licensure or certification. | 2. ☐ | ☐ | ☐ |
| 3. Specify privileges and responsibilities of employment, including compliance with an adverse incident reporting system, as described in Standard 5.II.E.2-4. | 3. ☐ | ☐ | ☐ |
| 4. Reflect the requirement for documentation of initial orientation and training according to position description. Initial orientation and training shall be: | 4. ☐ | ☐ | ☐ |
| a. Completed within 30 days of commencement of employment. | a. ☐ | ☐ | ☐ |
| b. Provided annually thereafter and when there is an identified need. | b. ☐ | ☐ | ☐ |
| 5. Require periodic appraisal of each person's job performance, including current competence. | 5. ☐ | ☐ | ☐ |
| 6. Describe incentives and rewards, if any exist. | 6. ☐ | ☐ | ☐ |
| 7. Require periodic review of employee compensation. | 7. ☐ | ☐ | ☐ |
| 8. Are made known to employees at the time of employment. | 8. ☐ | ☐ | ☐ |
| 9. Comply with federal and state laws and regulations regarding verification of eligibility for employment, such as I-9 (Immigration and Naturalization form) and visas, as required. | 9. ☐ | ☐ | ☐ |
| C. Health care workers are protected from biologic hazards, consistent with state, federal, and CDC guidelines. The organization has: | C. ☐ | ☐ | ☐ |
| 1. Approved and implemented policies that comply with all applicable occupational health and safety regulations for health care workers, such as the Occupational Safety and Health Administration (OSHA) rules on Occupational Exposure to Bloodborne Pathogens (Title 29 CFR 1910.1030) designed to eliminate and/or minimize employee exposures. | 1. ☐ | ☐ | ☐ |
| 2. The organization has a written exposure control plan that is reviewed and updated at least annually, including an evaluation for the availability of safer medical devices and changes in technology. | 2. ☐ | ☐ | ☐ |
| 3. The exposure control plan is made a part of employee initial orientation and retraining that is conducted within one year of their last training. | 3. ☐ | ☐ | ☐ |
| 4. The organization has an effective program addressing bloodborne pathogens, including: | 4. ☐ | ☐ | ☐ |
| a. Hepatitis B vaccination program. | a. ☐ | ☐ | ☐ |
| b. Post-exposure evaluation and treatment. | b. ☐ | ☐ | ☐ |
| c. Appropriate training in and communication of hazards to employees. | c. ☐ | ☐ | ☐ |
| d. Appropriate record keeping and management. | d. ☐ | ☐ | ☐ |

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| 5. An immunization program for other infectious agents of risk to health care workers and their patients. | 5. ☐ | ☐ | ☐ |
| 6. A tuberculosis respiratory protection program. | 6. ☐ | ☐ | ☐ |
| 7. Programs that address other relevant biological hazards, such as bioterrorism, as needed for employee safety and health. | 7. ☐ | ☐ | ☐ |
| D. A program is maintained to assess and reduce risks associated with occupational chemical exposures, including: | D. ☐ | ☐ | ☐ |
| 1. Hazard assessment of chemicals used in the workplace. | 1. ☐ | ☐ | ☐ |
| 2. Engineering measures to reduce the risk of chemical exposure. | 2. ☐ | ☐ | ☐ |
| 3. Worker training programs. | 3. ☐ | ☐ | ☐ |
| E. A program is maintained to assess and, where necessary, reduce risks associated with physical hazards, such as ergonomic exposures, violence at the workplace, and external physical threats such as terrorism. | E. ☐ | ☐ | ☐ |
| F. Records of work injuries and illnesses are maintained, consistent with reporting requirements, and employee health records are managed appropriately. | F. ☐ | ☐ | ☐ |
| G. The organization periodically assesses patient satisfaction with services and facilities provided by the organization. The findings are reviewed by the governing body and, when appropriate, corrective actions are taken. | G. ☐ | ☐ | ☐ |
| H. When students and postgraduate trainees are present, their status is defined in the organization's written policies and procedures. | H. ☐ | ☐ | ☐ |

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# 04. Quality of Care Provided

An accreditable organization provides high-quality health care services in accordance with the principles of professional practice and ethical conduct, and with concern for the costs of care and for improving the community's health status. Such an organization has the following characteristics:

| | Compliance SC | PC | NC |
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| A. All health care professionals have the necessary and appropriate training and skills to deliver the services provided by the organization. | A. ☐ | ☐ | ☐ |
| B. Health care professionals practice their professions in an ethical and legal manner. | B. ☐ | ☐ | ☐ |
| C. All personnel assisting in the provision of health care services are appropriately qualified and supervised and are available in sufficient numbers for the care provided. | C. ☐ | ☐ | ☐ |
| D. The organization has a current and comprehensive written quality management and improvement program. | D. ☐ | ☐ | ☐ |
| E. The organization facilitates the provision of high-quality health care as demonstrated by the following: | E. ☐ | ☐ | ☐ |
| 1. Health care provided is consistent with current standard of care. | 1. ☐ | ☐ | ☐ |
| 2. Education of and effective communication with patients served concerning the diagnosis and treatment of their conditions, appropriate preventive measures, and use of the health care system. | 2. ☐ | ☐ | ☐ |
| 3. Appropriate and timely diagnosis based on findings of the current history and physical examination. | 3. ☐ | ☐ | ☐ |
| 4. Medication reconciliation is performed. | 4. ☐ | ☐ | ☐ |
| 5. Treatment that is consistent with clinical impression or working diagnosis. | 5. ☐ | ☐ | ☐ |
| 6. Appropriate and timely consultation and referrals. | 6. ☐ | ☐ | ☐ |
| 7. When clinically indicated, patients are contacted as quickly as possible for follow-up regarding significant problems and/or abnormal findings. | 7. ☐ | ☐ | ☐ |
| 8. Continuity of care and patient follow-up. | 8. ☐ | ☐ | ☐ |
| 9. Assessing patient satisfaction and taking corrective actions, when indicated. | 9. ☐ | ☐ | ☐ |
| 10. The use of performance measures to improve outcomes. | 10. ☐ | ☐ | ☐ |

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| F. Health services available at the organization are accessible to patients and ensure patient safety by at least the following: | F. ☐ | ☐ | ☐ |
| 1. Provision for and information about services when the organization's facilities are not open. | 1. ☐ | ☐ | ☐ |
| 2. Adequate and timely transfer of information when patients are transferred to other health care professionals. | 2. ☐ | ☐ | ☐ |
| G. The organization has policies and procedures for identifying, storing, and transporting laboratory specimens and biological products. The policies and procedures include logging and tracking to ensure that results for each specimen are obtained and have been reported to the ordering physician in a timely manner. | G. ☐ | ☐ | ☐ |
| H. When the need arises, the organization assists patients with the transfer of their care from one health care professional to another. | H. ☐ | ☐ | ☐ |
| 1. Adequate specialty consultation services are available by prior arrangement. | 1. ☐ | ☐ | ☐ |
| 2. Referral to another health care professional is clearly outlined to the patient and arranged with the accepting health care professional. | 2. ☐ | ☐ | ☐ |
| I. When emergencies or unplanned outcomes occur, and hospitalization is indicated for the evaluation and stabilization of the patient, the organization shall have **one** of the following in place: | I. ☐ | ☐ | ☐ |
| 1. A written transfer agreement for transferring patients to a nearby hospital. | 1. ☐ | ☐ | ☐ |
| 2. A written policy of credentialing and privileging physicians and dentists who have admitting and similar privileges at a nearby hospital. | 2. ☐ | ☐ | ☐ |
| 3. Written agreement with a physician or provider group with admitting privileges at a nearby hospital. | 3. ☐ | ☐ | ☐ |
| 4. A detailed written procedural plan for handling medical emergencies. | 4. ☐ | ☐ | ☐ |
| J. Concern for the costs of care is present throughout the organization. | J. ☐ | ☐ | ☐ |

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# 05. Quality Management and Improvement

In striving to improve the quality of care and to promote more effective and efficient utilization of facilities and services, an accreditable organization maintains an active, integrated, organized, ongoing, data-driven, peer-based program of quality management and improvement that links peer review, quality improvement activities, and risk management in an organized, systematic way.

Organizations may also find it useful to refer to *Analyzing Your Quality Management Program and Creating Meaningful Studies* in the *Worksheets and Forms* section in the back of this *Handbook*.

*Note: The intent of this chapter is that administrative and clinical personnel be involved in the quality management and improvement activities of the organization.*

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| **Subchapter I — Quality Improvement Program:** An accreditable organization maintains an active, integrated, organized, and peer-based quality improvement (QI) program as evidenced by the following characteristics: | I. ☐ | ☐ | ☐ |
| A. The organization has a written quality improvement program for ensuring ongoing quality and improving performance when needed. The program is broad in scope in order to address clinical, administrative, and cost-of-care performance issues, as well as actual patient outcomes, i.e., results of care, including safety of patients. At a minimum, the written program: | A. ☐ | ☐ | ☐ |
| 1. Addresses the full scope of the organization's health care delivery services and describes how these services are assessed for quality. | 1. ☐ | ☐ | ☐ |
| 2. Identifies the specific committee(s) or individuals responsible for development, implementation and oversight of the program. | 2. ☐ | ☐ | ☐ |
| 3. Ensures participation by health care professionals, one or more of whom is a physician or dentist. In organizations where a physician or a dentist is not on the medical staff, and the organization is therefore led by an advanced practice registered nurse or a physician assistant, or in a behavioral health setting led by a licensed clinical behavioral health professional, one or more of such licensed healthcare providers is a participant. | 3. ☐ | ☐ | ☐ |
| 4. Includes program purposes, as well as specific objectives that the program intends to achieve. | 4. ☐ | ☐ | ☐ |
| 5. Specifies the data collection processes used to ensure ongoing quality and identify quality-related problems or concerns (see Standard 5.I.B below). | 5. ☐ | ☐ | ☐ |
| 6. Implements activities to improve performance when opportunities for improvement are identified (see Standard 5.I.C below). | 6. ☐ | ☐ | ☐ |

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| 7. Describes how the organization integrates quality improvement activities, peer review, and the risk management program. | 7. ☐ | ☐ | ☐ |
| 8. Is evaluated at least annually for effectiveness and to determine if the program's purposes and objectives are continuing to be met. | 8. ☐ | ☐ | ☐ |
| 9. Describes processes used to ensure that the results of quality improvement activities, including the annual program evaluation, are reported to the governing body and throughout the organization, as appropriate. | 9. ☐ | ☐ | ☐ |
| B. The organization implements data collection processes to ensure ongoing quality and to identify quality-related problems or concerns. Such processes should include but are not limited to: | B. ☐ | ☐ | ☐ |
| 1. Analysis of the results of peer review activities. | 1. ☐ | ☐ | ☐ |
| 2. Periodic audits of critical processes, as appropriate for the services provided. (See "quality monitoring" in the Glossary.) | 2. ☐ | ☐ | ☐ |
| 3. Ongoing monitoring of important processes and outcomes of care, as appropriate for the services provided. (See "quality monitoring" in the Glossary.) | 3. ☐ | ☐ | ☐ |
| 4. Comparison of the organization's performance to internal and external benchmarks. | 4. ☐ | ☐ | ☐ |
| 5. Methods to systematically collect information from other sources such as, but not limited to, patient satisfaction surveys, financial data, medical/legal issues, and outcomes data. | 5. ☐ | ☐ | ☐ |
| 6. Evaluation of the information and data obtained through the above data collection activities to identify the existence of unacceptable variation or results that require improvement. | 6. ☐ | ☐ | ☐ |
| C. The organization demonstrates that ongoing improvement is occurring by conducting quality improvement studies when the data collection processes described in Standard 5.I.B indicate that improvement is or may be warranted. Written descriptions of QI studies document that each study includes the following elements as applicable[1]: | C. ☐ | ☐ | ☐ |
| 1. A statement of the purpose of the QI study that includes a description of the problem and an explanation of why it is significant to the organization. (See *Analyzing Your Quality Management Program and Creating Meaningful Studies* in the *Worksheets and Forms* section in the back of this *Handbook*.) | 1. ☐ | ☐ | ☐ |
| 2. Identification of the measurable performance goal against which the organization will compare its current performance in the area of study. | 2. ☐ | ☐ | ☐ |
| 3. A description of the data that will be collected in order to determine the organization's current performance (i.e., study methodology). | 3. ☐ | ☐ | ☐ |

[1] *At least one completed quality improvement study demonstrating that improvement has occurred, i.e., including Standards 5.I.C.1 - 8, 9 (if applicable) and 10 must be present in order for Standard 5.I.C. to be considered for a rating of Substantially Compliant (SC). This does not imply that conducting only one complete study per accreditation cycle is adequate or appropriate for all organizations, nor does conducting one complete study automatically result in a rating of SC for Standard 5.I.C.*

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| 4. Evidence of data collection. | 4. ☐ | ☐ | ☐ |
| 5. Data analysis that describes findings about the frequency, severity, and source(s) of the problem(s). | 5. ☐ | ☐ | ☐ |
| 6. A comparison of the organization's current performance in the area of study against the previously identified performance goal. | 6. ☐ | ☐ | ☐ |
| 7. Implementation of corrective action(s) to resolve identified problem(s). | 7. ☐ | ☐ | ☐ |
| 8. Re-measurement (a second round of data collection and analysis as described in Standard 5.I.C.4-6) to objectively determine whether the corrective actions have achieved and sustained demonstrable improvement. | 8. ☐ | ☐ | ☐ |
| 9. If the initial corrective action(s) did not achieve and/or sustain the desired improved performance, implementation of additional corrective action(s) and continued re-measurement until the problem is resolved or is no longer relevant. | 9. ☐ | ☐ | ☐ |
| 10. Communication of the findings of the quality improvement activities to the governing body and throughout the organization, as appropriate, and incorporation of such findings into the organization's educational activities ("closing the QI loop"). | 10. ☐ | ☐ | ☐ |
| D. The organization participates in external benchmarking activities that compare key performance measures with other similar organizations, or with recognized best practices of national or professional targets or goals. | D. ☐ | ☐ | ☐ |
| 1. The organization's benchmarking activities include, but are not limited to: | 1. ☐ | ☐ | ☐ |
| a. The use of selected performance measures that are appropriate for improving the processes or outcomes of care relevant to the patients served. | a. ☐ | ☐ | ☐ |
| b. Systematically collecting and analyzing data related to the selected performance measures. | b. ☐ | ☐ | ☐ |
| c. Using benchmarks that are based on valid and reliable local, state, national, or published data. | c. ☐ | ☐ | ☐ |
| d. Measuring changes in the organization's performance on the selected performance measures. | d. ☐ | ☐ | ☐ |
| e. Demonstrating sustained performance improvement over time. | e. ☐ | ☐ | ☐ |
| 2. Results of benchmarking activities must be incorporated into other quality improvement activities of the organization. | 2. ☐ | ☐ | ☐ |
| 3. Results of benchmarking activities must be reported to the organization's governing body and throughout the organization, as appropriate. | 3. ☐ | ☐ | ☐ |

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| **Subchapter II — Risk Management:** An accreditable organization develops and maintains a program of risk management, appropriate to the organization, designed to protect the life and welfare of an organization's patients and employees. Such an organization has the following characteristics: | II. ☐ | ☐ | ☐ |
| A. The governing body of the organization is responsible for overseeing the program of risk management. | A. ☐ | ☐ | ☐ |
| B. The governing body designates a person or committee to be responsible for implementation and ongoing management of the risk management program. | B. ☐ | ☐ | ☐ |
| C. Education in risk management activities, and safety policies and processes, is provided to all staff within 30 days of commencement of employment, annually thereafter, and when there is an identified need. | C. ☐ | ☐ | ☐ |
| D. Documented education in infection control policies and processes is provided to all staff within 30 days of commencement of employment, annually thereafter, and when there is an identified need. | D. ☐ | ☐ | ☐ |
| E. Risk management program processes are consistently implemented throughout the organization, including all departments and service locations. These processes address patient safety and other important issues, including but not limited to: | E. ☐ | ☐ | ☐ |
| 1. A definition of an adverse incident, that includes, at a minimum, the events defined in Standard 5.II.F. | 1. ☐ | ☐ | ☐ |
| 2. The identification, reporting, and appropriate analysis of all adverse incidents. The analysis identifies the basic or causal factors underlying the incident, and identifies potential improvements in processes or systems, if any exist, to reduce the likelihood of such incidents in the future. | 2. ☐ | ☐ | ☐ |
| 3. Encouraging the reporting of near-miss events. | 3. ☐ | ☐ | ☐ |
| 4. The communication of reportable events as required by law and regulation. | 4. ☐ | ☐ | ☐ |
| 5. Periodic review of all litigation involving the organization and its staff and health care professionals. | 5. ☐ | ☐ | ☐ |
| 6. An ongoing review of patient complaints and grievances that includes defined response times, as required by law and regulation. | 6. ☐ | ☐ | ☐ |
| 7. Documentation of timely notification to the professional liability insurance carrier when adverse or reportable events occur. | 7. ☐ | ☐ | ☐ |
| 8. Periodic review of clinical records and clinical record policies. | 8. ☐ | ☐ | ☐ |
| F. The organization's risk management program includes the definition of an adverse incident that incorporates, at a minimum: | F. ☐ | ☐ | ☐ |
| 1. An unexpected occurrence during a health care encounter involving patient death or serious physical or psychological injury or illness, including loss of limb or function, not related to the natural course of the patient's illness or underlying condition. | 1. ☐ | ☐ | ☐ |
| 2. Any process variation for which a recurrence carries a significant chance of a serious adverse outcome. | 2. ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC |
|---|---|---|---|
| 3. Events such as actual breaches in medical care, administrative procedures, or other events resulting in an outcome that is not associated with the standard of care or acceptable risks associated with the provision of care and service for a patient. | 3. ☐ | ☐ | ☐ |
| 4. All events involving reactions to drugs and materials. | 4. ☐ | ☐ | ☐ |
| 5. Circumstances or events that could have resulted in an adverse event (near-miss events). | 5. ☐ | ☐ | ☐ |
| G. In addition, the risk management policies address: | G. ☐ | ☐ | ☐ |
| 1. Written methods by which a patient may be dismissed from care or refused care. | 1. ☐ | ☐ | ☐ |
| 2. A process for managing a situation in which a health care professional becomes incapacitated during a medical or surgical procedure. | 2. ☐ | ☐ | ☐ |
| 3. A process for communicating concerns regarding an impaired health care professional. | 3. ☐ | ☐ | ☐ |
| 4. Establishment of responsibility for, and documentation of, coverage after normal working hours. | 4. ☐ | ☐ | ☐ |
| 5. Written policies restricting observers in patient care areas and addressing those persons authorized by the governing body to perform or assist in the procedure area. | 5. ☐ | ☐ | ☐ |
| 6. A requirement for evidence of patient consent for all other persons allowed in patient care areas that are not authorized staff, including evidence of patient consent. Examples of unauthorized persons include students, interested physicians, health care industry representatives, surveyors, etc. | 6. ☐ | ☐ | ☐ |

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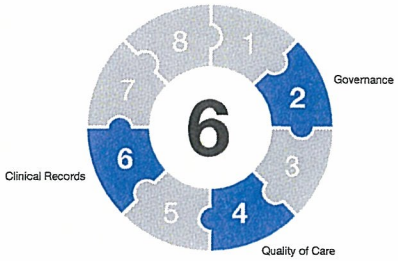
# 06. Clinical Records and Health Information




An accreditable organization maintains electronic and/or paper clinical records and a health information system from which information can be retrieved promptly. Clinical records are complete, comprehensive, legible, documented accurately in a timely manner, and readily accessible to health care professionals.

The *Clinical Records Worksheet*, found in the *Worksheets and Forms* section in the back of this *Handbook*, may be useful in assessing your organization's compliance with Chapter 6 Standards.

| | | Compliance | | |
|---|---|---|---|---|
| | | SC | PC | NC |
| A. | The organization develops and maintains a system for the proper collection, processing, maintenance, storage, retrieval, and distribution of clinical records. | ☐ | ☐ | ☐ |
| B. | A designated person is in charge of clinical records. This person's responsibilities include, but are not limited to: | ☐ | ☐ | ☐ |
| 1. | The confidentiality, security, and physical safety of records. | ☐ | ☐ | ☐ |
| 2. | The timely retrieval of individual records upon request. | ☐ | ☐ | ☐ |
| 3. | The supervision of the collection, processing, maintenance, storage, and appropriate access to and usage of records. | ☐ | ☐ | ☐ |
| 4. | Security of the clinical record including a method of tracking who accesses the record in order to block unauthorized access. | ☐ | ☐ | ☐ |
| C. | An individual clinical record is established for each person receiving care. Each record includes, but is not limited to: | ☐ | ☐ | ☐ |
| 1. | Name. | ☐ | ☐ | ☐ |
| 2. | Identification number (if appropriate). | ☐ | ☐ | ☐ |
| 3. | Date of birth. | ☐ | ☐ | ☐ |
| 4. | Gender. | ☐ | ☐ | ☐ |
| 5. | Responsible party, if applicable. | ☐ | ☐ | ☐ |
| D. | Clinical record entries are legible and easily accessible within the record by the organization's personnel. | ☐ | ☐ | ☐ |
| E. | If a patient has had three or more visits/admissions, or the clinical record is complex and lengthy, a summary of past and current diagnoses or problems, including past procedures, is documented in the patient's record to facilitate the continuity of care. | ☐ | ☐ | ☐ |
| F. | The presence or absence of allergies and untoward reactions to drugs and materials is recorded in a prominent and consistently defined location in all clinical records. This is verified at each patient encounter and updated whenever new allergies or sensitivities are identified. | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC |
|---|---|---|---|
| G. Except when otherwise required by law, the content and format of clinical records, including the sequence of information, are uniform. Records are organized in a consistent manner that facilitates continuity of care. | G. ☐ | ☐ | ☐ |
| H. Documentation regarding missed and canceled appointments must be added to the patient's clinical record. | H. ☐ | ☐ | ☐ |
| I. Entries in a patient's clinical record for each visit include, but are not limited to: | I. ☐ | ☐ | ☐ |
| 1. Date (and department, if departmentalized). | 1. ☐ | ☐ | ☐ |
| 2. Chief complaint or purpose of visit. | 2. ☐ | ☐ | ☐ |
| 3. Clinical findings. | 3. ☐ | ☐ | ☐ |
| 4. Studies ordered, such as laboratory or x-ray studies. | 4. ☐ | ☐ | ☐ |
| 5. Care rendered and therapies administered. | 5. ☐ | ☐ | ☐ |
| 6. Any changes in prescription and non-prescription medication with name and dosage, when available. | 6. ☐ | ☐ | ☐ |
| 7. Discharge diagnosis or impression. | 7. ☐ | ☐ | ☐ |
| 8. Disposition, recommendations, and instructions given to the patient. | 8. ☐ | ☐ | ☐ |
| 9. Verification of contents by health care professionals. | 9. ☐ | ☐ | ☐ |
| 10. Signature of, or authentication by, the health care professional on the clinical record entries. | 10. ☐ | ☐ | ☐ |
| J. Reports, histories and physicals, progress notes, and other patient information (such as laboratory reports, x-ray readings, operative reports, and consultations) are reviewed and incorporated into the record, as required by the organization's policies. | J. ☐ | ☐ | ☐ |
| 1. The date, with or without time of entry, of this information is documented in the patient's record. | 1. ☐ | ☐ | ☐ |
| K. Significant medical advice given to a patient by text, email, or telephone, including medical advice provided after-hours, is permanently entered in the patient's clinical record and appropriately signed or initialed. | K. ☐ | ☐ | ☐ |
| L. Any notation in a patient's clinical record indicating diagnostic or therapeutic intervention as part of clinical research is clearly contrasted with entries regarding the provision of non-research related care. | L. ☐ | ☐ | ☐ |
| M. Discussions with the patient concerning the necessity, appropriateness, and risks of the proposed care, surgery, or procedure, as well as discussions of treatment alternatives, as applicable, are incorporated into the patient's clinical record. | M. ☐ | ☐ | ☐ |
| N. The organization is responsible for ensuring a patient's continuity of care. If a patient's primary or specialty care provider(s) or health care organization is elsewhere, the organization ensures that timely summaries or pertinent records necessary for continuity of patient care are: | N. ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC |
|---|---|---|---|
| 1. Obtained from the other (external) provider(s) or organization and incorporated into the patient's clinical record. | 1. ☐ | ☐ | ☐ |
| 2. Provided to the other (external) health care professional(s) and, as appropriate, to the organization where future care will be provided. | 2. ☐ | ☐ | ☐ |
| O. Except when otherwise required by law, any record that contains clinical, social, financial, or other data on a patient is treated as strictly confidential and is protected from loss, tampering, alteration, destruction, and unauthorized or inadvertent disclosure. Patients are given the opportunity to approve or refuse release of records, except when release is permitted or required by law. | O. ☐ | ☐ | ☐ |
| P. All clinical information relevant to a patient is readily available to authorized personnel any time the organization is open to patients. | P. ☐ | ☐ | ☐ |
| Q. Written policies concerning clinical records address, but are not limited to: | Q. ☐ | ☐ | ☐ |
| 1. The retention of active records. | 1. ☐ | ☐ | ☐ |
| 2. The retirement of inactive records. | 2. ☐ | ☐ | ☐ |
| 3. The release and security of information including accountability for editing, deletion, and access of clinical record content is clearly defined. | 3. ☐ | ☐ | ☐ |

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# 07. Infection Prevention and Control and Safety

An accreditable organization provides health care services while adhering to safe practices for patients, staff, and all others. The organization maintains ongoing programs designed to (1) prevent and control infections and communicable diseases, and (2) provide a safe and sanitary environment of care.

| | Compliance | | |
|---|---|---|---|
| | SC | PC | NC |
| **Subchapter I — Infection Prevention and Control:** An accreditable organization maintains an active and ongoing infection prevention and control program as evidenced by the following characteristics: | I. ☐ | ☐ | ☐ |
| A. The organization must establish a program for identifying and preventing infections, maintaining a sanitary environment, and reporting the results to appropriate authorities. | A. ☐ | ☐ | ☐ |
| B. The infection prevention and control program includes documentation that the organization has considered, selected, and implemented nationally-recognized infection control guidelines. The program is: | B. ☐ | ☐ | ☐ |
| 1. Approved by the governing body. | 1. ☐ | ☐ | ☐ |
| 2. An integral part of the organization's quality improvement program. | 2. ☐ | ☐ | ☐ |
| 3. Under the direction of a designated and qualified health care professional who has training and current competence in infection control. | 3. ☐ | ☐ | ☐ |
| 4. Appropriate to the organization and meets all applicable state and federal requirements. | 4. ☐ | ☐ | ☐ |
| 5. Responsible for providing a plan of action for preventing, identifying, and managing infections and communicable diseases and for immediately implementing corrective and preventive measures that result in improvement. | 5. ☐ | ☐ | ☐ |
| 6. Clear to include direct intervention to prevent infection, as needed. | 6. ☐ | ☐ | ☐ |
| C. The infection control and prevention program reduces the risk of health care-acquired infection as evidenced by education and active surveillance, consistent with: | C. ☐ | ☐ | ☐ |
| 1. WHO, CDC, or other nationally-recognized guidelines for hand hygiene. | 1. ☐ | ☐ | ☐ |
| 2. CDC or other nationally-recognized guidelines for safe injection practices. | 2. ☐ | ☐ | ☐ |
| 3. Precautions to minimize communicable disease exposure to patients, health care staff, and others. | 3. ☐ | ☐ | ☐ |
| D. The organization provides a functional and sanitary environment for the provision of services. | D. ☐ | ☐ | ☐ |

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# Important addition to the 2013

# *Accreditation Handbook*

This addendum is to correct an omission. The following is a sub-element of Chapter 7, Subchapter I, Standard H.

| | SC | PC | NC |
|---|---|---|---|
| **7.I.H.1 A mechanism to notify public health authorities of reportable conditions.** | ☐ | ☐ | ☐ |

| | Compliance SC | PC | NC |
|---|---|---|---|
| E. The organization adheres to professionally accepted standards of practice, manufacturer's recommendations, and state and federal guidelines, including but not limited to those related to the cleaning, disinfection, and sterilization of instruments, equipment, supplies, and implants. | E. ☐ | ☐ | ☐ |
| F. A written sharps injury prevention program must be present in the organization. Such a program will include: | F. ☐ | ☐ | ☐ |
| 1. Documentation of new employee orientation, annual staff education, and additional education as needed. | 1. ☐ | ☐ | ☐ |
| 2. Disposal of intact needles and syringes into appropriate puncture-resistant sharps containers, in accordance with current state and federal guidelines. | 2. ☐ | ☐ | ☐ |
| 3. Placement of sharps containers in appropriate care areas, secured from tampering. | 3. ☐ | ☐ | ☐ |
| 4. Replacement of sharps containers when the fill line is reached. | 4. ☐ | ☐ | ☐ |
| 5. Handling, storage, and disposal of filled sharps containers in accordance with applicable regulations. | 5. ☐ | ☐ | ☐ |
| G. A safe environment for treating patients, including adequate safeguards to protect the patient from cross-infection, is assured through the provision of adequate space, equipment, supplies, and personnel. | G. ☐ | ☐ | ☐ |
| H. Policies are in place for the isolation or immediate transfer of patients with a communicable disease. | H. ☐ | ☐ | ☐ |
| I. Procedures must be available to minimize the sources and transmission of infections, including adequate surveillance techniques. | I. ☐ | ☐ | ☐ |
| J. A written process is in place for the monitoring and documentation of the cleaning, high-level disinfection, and sterilization of medical equipment, accessories, instruments, and implants. | J. ☐ | ☐ | ☐ |
| K. A written policy addresses the identification and processing of medical equipment and instruments that fail to meet high-level disinfection or sterilization parameters. | K. ☐ | ☐ | ☐ |
| L. Sterile packs of equipment and instruments are handled and stored in a manner that maintains their sterility. | L. ☐ | ☐ | ☐ |
| M. The organization's written policies address cleaning of patient treatment and care areas which, at a minimum, include: | M. ☐ | ☐ | ☐ |
| 1. Cleaning before use. | 1. ☐ | ☐ | ☐ |
| 2. Cleaning between patients. | 2. ☐ | ☐ | ☐ |
| 3. Terminal cleaning at the end of the day. | 3. ☐ | ☐ | ☐ |
| N. Medical devices for use with multiple patients are cleaned and disinfected between patients, following the manufacturer's recommended guidelines or nationally recognized guidelines, whichever are more stringent. | N. ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC |
|---|---|---|---|
| **Subchapter II — Safety:** An accreditable organization adheres to safe practices for patients, staff, and others as evidenced by the following characteristics: | II. ☐ | ☐ | ☐ |
| A. Elements of an organization's written safety program address the environment of care and the safety of patients, staff, and others, and must meet or exceed local, state, or federal safety requirements. The elements of the safety program include, but are not limited to: | A. ☐ | ☐ | ☐ |
| 1. Processes for the management of identified hazards, potential threats, near misses, and other safety concerns. | 1. ☐ | ☐ | ☐ |
| 2. An awareness of, and a process for, reporting known adverse incidents to appropriate state and federal agencies when required by law to do so. | 2. ☐ | ☐ | ☐ |
| 3. Processes to reduce and avoid medication errors. | 3. ☐ | ☐ | ☐ |
| 4. Policies addressing manufacturer or regulatory agency recalls related to medications, medical equipment and devices, and food products. | 4. ☐ | ☐ | ☐ |
| 5. Prevention of falls or physical injuries involving patients, staff, and others. As required by regulation or contract, the reporting of falls or physical injuries is accurate and timely. | 5. ☐ | ☐ | ☐ |
| B. There is a person or committee designated by the governing body who is responsible for the organization's safety program. | B. ☐ | ☐ | ☐ |
| C. Medical staff members, employees, volunteers, and others abide by the program, and receive education and training to include but not necessarily be limited to: | C. ☐ | ☐ | ☐ |
| 1. Infection prevention and control program. | 1. ☐ | ☐ | ☐ |
| 2. Safety program. | 2. ☐ | ☐ | ☐ |
| D. Unique patient identifiers are consistently used throughout care. | D. ☐ | ☐ | ☐ |
| E. The organization has a comprehensive written emergency and disaster preparedness plan to address internal and external emergencies, including participating in community health emergency or disaster preparedness, when applicable. The written plan must include a provision for the safe evacuation of individuals during an emergency, especially individuals who are at greater risk. | E. ☐ | ☐ | ☐ |
| F. Personnel trained in cardiopulmonary resuscitation and the uses of cardiac and all other emergency equipment are present in the facility to provide patient care during hours of operation. | F. ☐ | ☐ | ☐ |
| G. The organization adopts the appropriate policies and procedures to educate medical staff members, employees, volunteers, and other providers and personnel in fire prevention and fire hazard reduction. | G. ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC |
|---|---|---|---|
| H. Fire safety, fire prevention, and fire drills are included in the surveillance activities of personnel responsible for safety and risk management. | H. ☐ | ☐ | ☐ |
| I. Environmental hazards associated with safety are identified and safe practices are implemented. | I. ☐ | ☐ | ☐ |
| J. Measures are implemented to prevent skin and tissue injury from chemicals, cleaning solutions, and other hazardous exposure. | J. ☐ | ☐ | ☐ |
| K. Evidence of compliance with local, state, and federal guidelines is present and adhered to regarding preparing, serving, disposal, and storing of food and drink for patient use. | K. ☐ | ☐ | ☐ |
| L. Patients are educated about prescribed medical devices and associated protocols and guidelines. Patient competence with each device is verified before independent use. | L. ☐ | ☐ | ☐ |
| M. Written policies must require documentation of the pre-cleaning, transport, and handling of medical devices intended for external vendor reprocessing, inspection, or repair. | M. ☐ | ☐ | ☐ |
| N. Reprocessing of single-use devices must comply with FDA guidelines, and the devices must have been cleared under the FDA 510(k) process. | N. ☐ | ☐ | ☐ |
| O. The organization has a written policy and process that addresses the recall of items including drugs and vaccines, blood and blood products, medical devices, equipment and supplies, and food products. At a minimum, the policy addresses documentation of: | O. ☐ | ☐ | ☐ |
| 1. Sources of recall information (FDA, CDC, manufacturers, and other local, state, or federal sources). | 1. ☐ | ☐ | ☐ |
| 2. Methods for notification of staff that need to know. | 2. ☐ | ☐ | ☐ |
| 3. Methods to determine if a recalled product is present at the organization or has been given or administered to patients. | 3. ☐ | ☐ | ☐ |
| 4. Response to recalled products. | 4. ☐ | ☐ | ☐ |
| 5. Disposition or return of recalled items. | 5. ☐ | ☐ | ☐ |
| 6. Patient notification, as appropriate. | 6. ☐ | ☐ | ☐ |
| P. Products, including medications, reagents, and solutions, that carry an expiration date are monitored. The organization has a policy for disposal or return of expired medications and supplies that is in accordance with local, state, and federal guidelines. | P. ☐ | ☐ | ☐ |
| Q. Prior to use, appropriate education is provided to intended operators of newly-acquired devices or products to be used in the care of patients. | Q. ☐ | ☐ | ☐ |
| 1. The organization shall designate a person to be responsible for ensuring that appropriate clinical education occurs prior to allowing the use of the device in the care of a patient. Vendor representatives are not used as the sole source for clinical education. | 1. ☐ | ☐ | ☐ |

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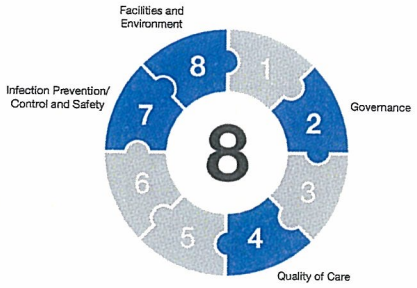
# 08. Facilities and Environment




An accreditable organization provides a functionally safe and sanitary environment for its patients, personnel, and visitors.

| | Compliance SC | PC | NC |
|---|---|---|---|
| A. The organization provides evidence of compliance with the following: | A. ☐ | ☐ | ☐ |
| 1. Applicable state and local building codes and regulations. | 1. ☐ | ☐ | ☐ |
| 2. Applicable state and local fire prevention regulations, such as the NFPA 101® *Life Safety Code*,® 2000 Edition, published by the National Fire Protection Association, Inc.[1] | 2. ☐ | ☐ | ☐ |
| 3. Applicable federal regulations. | 3. ☐ | ☐ | ☐ |
| 4. Periodic inspection by the local or state fire control agency, if this service is available in the community. | 4. ☐ | ☐ | ☐ |
| B. The organization ensures that its facilities: | B. ☐ | ☐ | ☐ |
| 1. Contain fire-fighting equipment to control a limited fire, including appropriately maintained and placed fire extinguishers of the proper type for each potential type of fire. | 1. ☐ | ☐ | ☐ |
| 2. Have prominently displayed illuminated signs with emergency power capability at all exits, including exits from each floor or hall. | 2. ☐ | ☐ | ☐ |
| 3. Have emergency lighting, as appropriate to the facility, to provide adequate illumination for evacuation of patients and staff, in case of an emergency. | 3. ☐ | ☐ | ☐ |
| 4. Have stairwells protected by fire doors, when applicable. | 4. ☐ | ☐ | ☐ |
| 5. Provide reception areas, toilets, and telephones in accordance with patient and visitor volume. | 5. ☐ | ☐ | ☐ |
| 6. Provide examination rooms, dressing rooms, and reception areas that are constructed and maintained in a manner that ensures patient privacy during interviews, examinations, treatment, and consultation. | 6. ☐ | ☐ | ☐ |
| 7. Are operated in a safe and secure manner, with written policy(ies) addressing safety and security practices. | 7. ☐ | ☐ | ☐ |
| C. The organization has the necessary personnel, equipment, and procedures to deliver safe care, and to handle medical and other emergencies that may arise. | C. ☐ | ☐ | ☐ |

[1] Life Safety Code *and* NFPA 101 *are registered trademarks of the National Fire Protection Association, Inc., Quincy, Massachusetts. For those organizations desiring assistance in reviewing applicable NFPA 101 code, a suitable reference is the* Physical Environment Checklist, *available from AAAHC.*

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| | Compliance SC | PC | NC |
|---|---|---|---|
| D. The organization provides documented periodic instruction of all personnel in the proper use of safety, emergency, and fire-extinguishing equipment. | D. ☐ | ☐ | ☐ |
| E. The organization conducts at least one drill each calendar quarter of the internal emergency and disaster preparedness plan.[2] One of the drills must be a documented cardiopulmonary resuscitation (CPR) technique drill, as appropriate to the organization. The organization must complete a written evaluation of each drill, and promptly implement any needed corrections or modifications to the plan. | E. ☐ | ☐ | ☐ |
| F. Smoking is prohibited within the facility. | F. ☐ | ☐ | ☐ |
| G. Hazards that might lead to slipping, falling, electrical shock, burns, poisoning, or other trauma are identified and addressed. | G. ☐ | ☐ | ☐ |
| H. Provisions are made to reasonably accommodate disabled individuals. | H. ☐ | ☐ | ☐ |
| I. Adequate lighting and ventilation are provided in all areas. | I. ☐ | ☐ | ☐ |
| J. Facilities are clean and properly maintained. | J. ☐ | ☐ | ☐ |
| K. A system exists for the proper identification, management, handling, transport, treatment, and disposal of hazardous materials and wastes, whether solid, liquid, or gas. | K. ☐ | ☐ | ☐ |
| L. The space allocated for a particular function or service is adequate for the activities performed therein. | L. ☐ | ☐ | ☐ |
| M. Appropriate emergency equipment and supplies are maintained and are readily accessible to all areas of each patient care service site. | M. ☐ | ☐ | ☐ |
| N. Policies and procedures regarding medical equipment include its standardized use, and documented evidence of periodic testing and scheduled preventive maintenance according to manufacturer's specifications. | N. ☐ | ☐ | ☐ |
| O. Testing of fire alarm and inspection of fire suppression systems, including verification of signal transmission, are performed and documented. | O. ☐ | ☐ | ☐ |
| P. When an organization undergoes demolition, construction, or renovation projects, the organization performs a proactive and ongoing risk assessment for existing or potential environmental hazards. | P. ☐ | ☐ | ☐ |
| Q. Ongoing temperature monitoring is performed for items that are frozen, refrigerated, and/or heated per product manufacturer's recommendations. Stated temperature ranges are readily available to staff performing the monitoring function. | Q. ☐ | ☐ | ☐ |

[2] *Appropriate to the facility's activities and environment. Examples include medical emergencies, building fires, surgical fires, tornados, hurricanes, earthquakes, bomb threats, violence, and chemical, biological, or nuclear threats.*

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# Adjunct Chapters

The adjunct chapters will be applied based on the services provided by the organization seeking accreditation.

# 09. Anesthesia Services

Anesthesia services in an accreditable organization are provided in a safe and sanitary environment by qualified health care professionals who have been granted privileges to provide those services by the governing body.

The provisions of this chapter apply to all care involving administration of sedation and anesthesia in all ambulatory settings, including office-based settings. The following definitions are used in determining application of this chapter and the Standards thereof depending on the level of anesthesia and sedation administered by an organization:

***Standards A through I of this chapter will be applied to organizations in which only local or topical anesthesia or only minimal sedation is administered.***

**Definitions:**

***Local or topical anesthesia*** is the application of local anesthetic agents, in appropriate doses adjusted for weight.

***Minimal sedation (anxiolysis)*** is a drug-induced state during which patients respond normally to verbal commands. Although cognitive function and coordination may be impaired, ventilatory and cardiovascular functions are unaffected. Inhaled nitrous oxide in low concentrations that would not reasonably be expected to result in loss of the patient's life-preserving protective reflexes would be considered minimal sedation.

***Standards A through W of this chapter will be applied to organizations that administer moderate sedation/analgesia, regional anesthesia, or deep sedation/analgesia.***

***Moderate sedation/analgesia (conscious sedation)*** is a drug-induced depression of consciousness during which patients respond purposefully[1] to verbal commands, either alone or accompanied by light tactile stimulation. No interventions are required to maintain a patent airway, and spontaneous ventilation is adequate. Cardiovascular function is usually maintained.

***Regional anesthesia*** is the application of anesthetic medication around the nerve or nerves in a major region of the body, which supply the area that is targeted for the abolition of painful neural impulses. No interventions are required to maintain a patent airway, and spontaneous ventilation is adequate. Cardiovascular function is usually maintained.

***Deep sedation/analgesia*** is a drug-induced depression of consciousness during which patients cannot be easily aroused but respond purposefully[1] following repeated or painful stimulation. The ability to independently maintain ventilatory function may be impaired. Patients may require assistance in maintaining a patent airway, and spontaneous ventilation may be inadequate. Cardiovascular function is usually maintained.

***All Standards of this chapter, A through X, will be applied to organizations that administer general anesthesia.***

***General anesthesia*** is a drug-induced loss of consciousness during which patients are not arousable, even by painful stimulation. The ability to independently maintain ventilatory function is often impaired. Patients often require assistance in maintaining a patent airway, and positive pressure ventilation may be required because of depressed spontaneous ventilation or drug-induced depression of neuromuscular function. Cardiovascular function may be impaired.

*Note: Because sedation is a continuum, it is not always possible to predict how an individual patient will respond. Individuals administering minimal or moderate sedation/analgesia or regional anesthesia should be able to support the respiratory and cardiovascular system of patients who enter a state of deep sedation/analgesia, while those administering deep sedation/analgesia should be able to support the respiratory and cardiovascular system of patients who enter a state of general anesthesia.*

[1] *Reflex withdrawal from a painful stimulus is NOT considered a purposeful response.*

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| ***Standards A through I will be applied at organizations involved in the administration of sedation and anesthesia as defined on page 45, including those where only local or topical anesthesia or only minimal sedation is administered.*** | | | | |
| A. Anesthesia services provided in the facilities owned or operated by the organization are limited to those techniques that are approved by the governing body upon the recommendation of qualified professional personnel. Anesthesia services are performed only by health care professionals who have been credentialed and granted clinical privileges by the organization in accordance with Chapter 2.II. | A. ☐ | ☐ | ☐ | ☐ |
| B. Adequate supervision of anesthesia services provided by the organization is the responsibility of one or more qualified physicians or dentists who are approved and have privileges for supervision granted by the governing body. | B. ☐ | ☐ | ☐ | ☐ |
| C. Policies and procedures are developed for anesthesia services which include, but are not limited to: | C. ☐ | ☐ | ☐ | ☐ |
| 1. Education, training, and supervision of personnel. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Responsibilities of non-physician anesthetists. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Responsibilities of supervising physicians and dentists. | 3. ☐ | ☐ | ☐ | ☐ |
| D. A physician, dentist, or qualified[2] health care professional supervised by a physician or dentist, and approved by the governing body, examines the patient immediately prior to administration of the anesthetic to evaluate the risks of anesthesia relative to the procedure to be performed and develops and documents a plan of anesthesia. | D. ☐ | ☐ | ☐ | ☐ |
| E. The informed consent of the patient or, if applicable, of the patient's representative, is obtained before the procedure is performed. One consent form may be used to satisfy the requirements of this Standard and Standard 10.I.U. | E. ☐ | ☐ | ☐ | ☐ |
| F. Anesthesia is administered by anesthesiologists, other qualified physicians, dentists, certified registered nurse anesthetists, or other qualified[2] health care professionals approved by the governing body pursuant to Chapter 2.II. Other qualified health care professionals must be directly supervised by a physician or dentist who has been privileged for such supervision. | F. ☐ | ☐ | ☐ | ☐ |

[2] *Other qualified health care professionals are qualified by virtue of education, experience, competence, professional licensure, and state laws, rules, and regulations. Other health care professionals must be approved for the administration of anesthesia by the governing body pursuant to Chapter 2.II.*

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| G. The facility must be established, constructed, equipped, and operated in accordance with applicable local, state, and federal laws and regulations. At a minimum, all settings in which sedation or anesthesia is administered should have the following equipment for resuscitation purposes: | G. ☐ | ☐ | ☐ | ☐ |
| 1. Reliable and adequate source of oxygen delivery. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. A device such as a self-inflating hand resuscitator bag capable of administering at least 90% oxygen. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Appropriate emergency drugs, supplies, and equipment. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Appropriate monitoring equipment for the intended anesthesia care. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. Reliable suction source and appropriate equipment to ensure a clear airway. | 5. ☐ | ☐ | ☐ | ☐ |
| H. All clinical support personnel with direct patient contact maintain at a minimum skills in basic cardiac life support (BCLS). | H. ☐ | ☐ | ☐ | ☐ |
| I. Clinical records include entries related to anesthesia administration. | I. ☐ | ☐ | ☐ | ☐ |

***Standards A through W will be applied at organizations that administer moderate sedation/analgesia, deep sedation/analgesia, regional anesthesia, or general anesthesia.***

| | | | | |
|---|---|---|---|---|
| J. A patient's oxygenation, ventilation, and circulation must be continually evaluated and documented. Intra-operative physiologic monitoring must include: continuous use of a pulse oximeter, blood pressure determination at frequent intervals, and electrocardiogram (EKG) monitoring for patients during moderate sedation, and for all patients during deep sedation/analgesia or general anesthesia. Monitoring for the presence of exhaled $CO_2$ is required during the administration of deep sedation/analgesia. Monitoring for end tidal $CO_2$ is required during the administration of general anesthesia. | J. ☐ | ☐ | ☐ | ☐ |
| K. The organization maintains a written policy with regard to assessment and management of acute pain. | K. ☐ | ☐ | ☐ | ☐ |
| L. The patient is observed and monitored in a post-anesthesia care unit or in an area that provides equivalent care by methods appropriate to the patient's medical condition and sedation or anesthesia. | L. ☐ | ☐ | ☐ | ☐ |
| M. 1. A physician or dentist is present until the medical discharge of the patient following clinical recovery from surgery/procedure and anesthesia. | M1. ☐ | ☐ | ☐ | ☐ |
| 2. Before medical discharge from the facility, each patient must be evaluated by a physician, dentist, or delegated, qualified[2] health care professional, supervised by a physician or dentist and approved by the governing body, to assess recovery. If medical discharge criteria have previously been set by the treating physician or dentist, and approved by the governing body, a delegated, qualified[2] health care professional may determine if the patient meets such discharge criteria, and if so, may discharge the patient when those criteria are met. | 2. ☐ | ☐ | ☐ | ☐ |

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| N. Health care professionals currently trained in advanced cardiac life support (ACLS), with documentation of successful completion and appropriate privileging to provide advanced resuscitative techniques, are present until all patients operated on that day have been physically discharged. When pediatric patients are served, health care professionals who are currently trained in PALS and age- and size-appropriate resuscitative equipment must be available at all times until pediatric patients operated on that day have been physically discharged. Initial ACLS and PALS training and subsequent retraining shall be obtained from the American Heart Association or another vendor that includes "hands-on" training and skills demonstration of airway management and automated external defibrillator (AED) use. | N. ☐ | ☐ | ☐ | ☐ |
| O. Patients who have received moderate sedation/analgesia, deep sedation/analgesia, regional anesthesia, or general anesthesia are discharged in the company of a responsible adult. | O. ☐ | ☐ | ☐ | ☐ |
| P. A safe environment for providing anesthesia services is assured through the provision of adequate space, equipment, supplies, medications, and appropriately trained personnel. Written policies must be in place for safe use of injectables and single-use syringes and needles. All equipment should be maintained, tested, and inspected according to the manufacturer's specifications. A log is kept of regular preventive maintenance. | P. ☐ | ☐ | ☐ | ☐ |
| Q. Alternate power adequate for the type of surgery/service being performed is available in operative and recovery areas. | Q. ☐ | ☐ | ☐ | ☐ |
| R. Education and training in the recognition and treatment of malignant hyperthermia must occur before triggering agents are made available within the organization. Education and malignant hyperthermia drills are conducted at least annually thereafter when triggering agents are present within the organization. Organizations that have anesthetic and resuscitative agents available that are known to trigger malignant hyperthermia must have written protocols to promote patient safety, such as the Malignant Hyperthermia Association of the United States (MHAUS) protocol. (See Appendix C, Malignant Hyperthermia Guidelines.) These treatment protocols must: | R. ☐ | ☐ | ☐ | ☐ |
| 1. Be posted and immediately available in each location where triggering agents might be used. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Include the use of dantrolene and other medications and methods of cooling and monitoring of the patient. | 2. ☐ | ☐ | ☐ | ☐ |
| S. The organization has a written protocol in place for the safe and timely transfer of patients to a predetermined alternate care facility when extended or emergency services are needed to protect the health or well-being of the patient. Standard 4.I addresses medical emergencies that arise in connection with surgical procedures. | S. ☐ | ☐ | ☐ | ☐ |
| ***Standard T will be applied to organizations that provide anesthesia services to children.*** | | | | |
| T. If anesthesia services are provided to infants and children, the required equipment, medication, and resuscitative capabilities appropriate to pediatric patients are on site. | T. ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
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| U. No patient shall receive moderate or deep sedation or general anesthesia unless a physician, dentist, or other qualified[2] individual supervised by a physician or dentist, in addition to the one performing the surgery, is present to monitor the patient. The operating physician or dentist may be the supervising physician or dentist. During moderate sedation, the additional individual may assist with minor, interruptible tasks. | U. ☐ | ☐ | ☐ | ☐ |
| V. Organizations that provide sedative, hypnotic, or analgesic drugs that do not have an antagonist medication (for example, propofol) will identify who in the organization, as noted in Standard 9.F, is privileged to administer these drugs. | V. ☐ | ☐ | ☐ | ☐ |
| W. In settings where anesthesia may be provided by other than an anesthesiologist, oral and maxillofacial surgeon, certified registered nurse anesthetist, or an anesthesiologist assistant within his/her scope of practice, the organization has a written protocol that explains how the organization will respond in the event that a deeper-than-intended level of sedation occurs. | W. ☐ | ☐ | ☐ | ☐ |
| ***Standards A through X will be applied at organizations that administer general anesthesia.*** | | | | |
| X. The administration of general anesthesia requires: | X. ☐ | ☐ | ☐ | ☐ |
| 1. End-tidal $CO_2$ monitoring. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. A readily available means of measuring body temperature. | 2. ☐ | ☐ | ☐ | ☐ |

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# 10. Surgical and Related Services

Surgical and related services in an accreditable organization are performed in a safe and sanitary environment by qualified health care professionals who have been granted privileges to perform those procedures by the governing body. The Standards in this chapter apply to organizations that provide any invasive procedures, such as pain management, endoscopy procedures, cardiac catheterization, lithotripsy, and in-vitro fertilization, as well as surgery. Such an organization has the following characteristics.

In this chapter and throughout this *Handbook*, the terms "surgery," "procedure," and "operation" are used interchangeably. The use of any of these terms is to reference any such skill, method, or technique that involves cutting, abrading, suturing, laser, or otherwise physically entering or changing body tissues and organs, including invasive pain management procedures.

*Note: Some Standards may not apply to organizations that only perform minor, superficial procedures without anesthesia or under local or topical anesthesia.*

| | Compliance | | | |
|---|---|---|---|---|
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| **Subchapter I — General Requirements:** This subchapter describes general requirements for an organization that provides surgical and related services. | I. ☐ | ☐ | ☐ | ☐ |
| A. Surgical procedures must be performed in a functional and sanitary environment and are limited to those procedures that are approved by the governing body upon the recommendation of qualified medical staff. | A. ☐ | ☐ | ☐ | ☐ |
| B. Adequate supervision of surgery conducted by the organization is a responsibility of the governing body. It is recommended that supervision be provided by an anesthesiologist or another physician or dentist. | B. ☐ | ☐ | ☐ | ☐ |
| C. Surgical procedures must be performed in a safe manner only by qualified providers who: | C. ☐ | ☐ | ☐ | ☐ |
| 1. Are licensed to perform such procedures within the state in which the organization is located. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Have been granted clinical privileges to perform those procedures by the governing body in accordance with Chapter 2.II. | 2. ☐ | ☐ | ☐ | ☐ |
| D. An appropriate and current health history must be completed, with a list of current prescription and non-prescription medications and dosages, when available; physical examination; and pertinent pre-operative diagnostic studies incorporated into the patient's clinical record within 30 days, or according to local or state requirement, prior to the scheduled surgery/procedure. | D. ☐ | ☐ | ☐ | ☐ |
| E. The use and timeliness of administration of appropriate pre-operative antibiotics is monitored to ensure maximum effectiveness. | E. ☐ | ☐ | ☐ | ☐ |
| F. A written policy is in place for the risk assessment and prevention practices relating to deep vein thrombosis, when appropriate. | F. ☐ | ☐ | ☐ | ☐ |

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| G. Specific instructions for discontinuation or resumption of medications prior to and after a procedure are provided to the patient. | G. ☐ | ☐ | ☐ | ☐ |
| H. The necessity or appropriateness of the proposed surgery, as well as any available alternative treatment techniques, have been discussed with the patient prior to scheduling for surgery. | H. ☐ | ☐ | ☐ | ☐ |
| I. Registered nurse(s) and other health care professionals assisting in the provision of surgical services are appropriately trained and supervised, and are available in sufficient numbers for the surgical and emergency care provided. | I. ☐ | ☐ | ☐ | ☐ |
| J. Each operating room is designed and equipped so that the types of surgery conducted can be performed in a manner that protects the lives and ensures the physical safety of all persons in the area. At least one operating room is available for surgery. Only nonflammable agents are present in an operating room, and the room is constructed and equipped in compliance with applicable state and local fire codes. | J. ☐ | ☐ | ☐ | ☐ |
| K. All clinical support staff with direct patient contact maintain at a minimum skills in basic life support (BLS). | K. ☐ | ☐ | ☐ | ☐ |
| 1. If moderate sedation/analgesia, deep sedation/analgesia, regional anesthesia, or general anesthesia is provided, health care professionals currently trained in advanced cardiac life support (ACLS), with documentation of successful completion and appropriate privileging to provide advanced resuscitative techniques, are present until all patients operated on that day have been physically discharged. When pediatric patients are served, health care professionals who are currently trained in PALS and age- and size-appropriate resuscitative equipment must be available at all times until all pediatric patients operated on that day have been physically discharged. Initial ACLS and PALS training and subsequent retraining shall be obtained from the American Heart Association or another vendor that includes "hands-on" training and skills demonstration of airway management and automated external defibrillator (AED) use. | 1. ☐ | ☐ | ☐ | ☐ |
| L. Health care professionals trained in the use of emergency equipment and BLS must be available whenever there is a patient in the facility. At least one physician or dentist is present or immediately available by telephone whenever patients are physically present in the facility. | L. ☐ | ☐ | ☐ | ☐ |
| M. With the exception of those tissues exempted by the governing body after medical review, tissues removed during surgery are examined by the pathologist, whose signed report of the examination is made a part of the patient's clinical record. | M. ☐ | ☐ | ☐ | ☐ |
| N. The findings and techniques of a procedure are accurately and completely documented immediately after the procedure by the health care professional who performed the procedure. This description is immediately available for patient care and becomes a part of the patient's clinical record. | N. ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
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| O. A safe environment for treating surgical patients, including adequate safeguards to protect the patient from cross-infection, is ensured through the provision of adequate space, equipment, supplies, and personnel. | O. ☐ | ☐ | ☐ | ☐ |
| 1. Provisions have been made for the isolation or immediate transfer of patients with a communicable disease. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. All persons entering operating or procedure rooms are properly attired as defined by the organization's written policy. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Acceptable aseptic techniques are used by all persons in the surgical area. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. A written policy outlines the appropriate and timely surgical hand antisepsis (scrub) using either an antimicrobial soap or an alcohol-based hand rub according to product manufacturer's recommended guidelines. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. Only authorized persons are allowed in the surgical or treatment areas, including laser rooms. | 5. ☐ | ☐ | ☐ | ☐ |
| 6. Environmental controls are implemented to ensure a safe and sanitary environment. | 6. ☐ | ☐ | ☐ | ☐ |
| 7. Suitable equipment is provided for the regular cleaning of all interior surfaces. | 7. ☐ | ☐ | ☐ | ☐ |
| 8. Operating/procedure rooms are appropriately cleaned before each procedure. | 8. ☐ | ☐ | ☐ | ☐ |
| 9. Freshly laundered attire is donned in an area inside of the organization prior to entry into areas designated as restricted. | 9. ☐ | ☐ | ☐ | ☐ |
| 10. Attire used for personal protective equipment (PPE) or attire contaminated with blood or body fluid is laundered by a laundry that adheres to CDC or other nationally recognized guidelines and is approved by the organization. | 10. ☐ | ☐ | ☐ | ☐ |
| 11. As needed to minimize the potential contamination of the surgical environment and surgical staff, patient clothing is removed or covered prior to the patient's entry into a surgical area. | 11. ☐ | ☐ | ☐ | ☐ |
| 12. Measures are implemented to prevent skin and tissue injury from chemicals, cleaning solutions, and other hazardous exposure, and to minimize the risk of fire. | 12. ☐ | ☐ | ☐ | ☐ |
| 13. Policies are in place for pre-procedure site antisepsis, as appropriate to service(s) provided and patient requirements and needs. | 13. ☐ | ☐ | ☐ | ☐ |
| P. Suitable equipment for immediate use and routine sterilization is available to ensure that operating room materials are sterile. Sterilized materials are packaged, labeled, and stored in a consistent manner to maintain sterility and identify sterility dates. | P. ☐ | ☐ | ☐ | ☐ |
| 1. The processes for cleaning and sterilization of supplies and equipment adhere to manufacturer's instructions and recommendations. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Internal and external indicators are used to demonstrate the safe processing of items undergoing high-level disinfection and sterilization. | 2. ☐ | ☐ | ☐ | ☐ |

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| Q. | Reprocessing of single-use devices must comply with FDA guidelines, and the devices must have been cleared under the FDA 510(k) process. | Q. ☐ | ☐ | ☐ | ☐ |
| R. | Organizations that perform procedures where blood loss and subsequent blood replacement is a potential have policies and procedures to address this type of situation and/or need. | R. ☐ | ☐ | ☐ | ☐ |
| S. | Alternate power adequate for the type of surgery performed is available in operative and recovery areas. | S. ☐ | ☐ | ☐ | ☐ |
| T. | Periodic calibration and/or preventive maintenance of equipment is provided. | T. ☐ | ☐ | ☐ | ☐ |
| U. | The informed consent of the patient or, if applicable, of the patient's representative, is obtained before the procedure is performed. | U. ☐ | ☐ | ☐ | ☐ |
| V. | The organization utilizes a process to identify and/or designate the surgical procedure to be performed and the surgical site, and involves the patient in that process. The person performing the procedure marks the site. For dental procedures, the operative tooth may be marked on a radiograph or a dental diagram. | V. ☐ | ☐ | ☐ | ☐ |
| W. | Immediately prior to beginning a procedure, the operating team verifies the patient's identification, intended procedure, and correct surgical site, and that all equipment routinely necessary for performing the scheduled procedure, along with any implantable devices to be used, are immediately available in the operating/procedure room. The provider performing the procedure is personally responsible for ensuring that all aspects of this verification have been satisfactorily completed immediately prior to beginning the procedure. | W. ☐ | ☐ | ☐ | ☐ |
| X. | The organization has a procedure to address when sponge, sharps, and instrument counts will occur, the items that will be counted, and the types of procedures requiring counts, when applicable. When appropriate, there is a process to ensure that counts are done before and after the procedure. | X. ☐ | ☐ | ☐ | ☐ |
| Y. | A process is in place for the observation, care, and communication of such care in all perioperative areas of the patient's facility experience. The organization must define and implement a process in which information about the patient's care is communicated consistently. The process must include means to educate the staff and medical care providers about the process and support implementation consistently throughout the organization. | Y. ☐ | ☐ | ☐ | ☐ |
| Z. | The organization follows established protocols for instructing patients in self-care after surgery, including the provision of written instructions to patients who receive moderate sedation/analgesia, deep sedation/ analgesia, regional anesthesia, or general anesthesia. | Z. ☐ | ☐ | ☐ | ☐ |

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# Important addition to the 2013

# *Accreditation Handbook*

This addendum is to correct omissions. The following are additional Standards of Chapter 10, Sub I.

| | SC | PC | NC |
|---|---|---|---|
| **10.I.AC The organization has written policies regarding procedures and treatments that are offered to patients, which include criteria for patient selection, the need for anesthesia support, and post-procedural care.** | ☐ | ☐ | ☐ |
| **10.I.AD Written policies must clearly require documentation of the pre-cleaning, transport, and handling of medical devices intended for external vendor reprocessing, inspection, or repair.** | ☐ | ☐ | ☐ |

| | Compliance SC | PC | NC | N/A |
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| ***Standard AA will be applied to organizations that provide surgical, diagnostic, and/or therapeutic services to children.*** | | | | |
| AA. The organization defines pediatric patients, and has policies addressing the care provided and ensuring a safe environment through the provision of adequate space, equipment, supplies, medications, and personnel. | AA. ☐ | ☐ | ☐ | ☐ |
| AB. Organizations that receive/store/issue blood and blood products for transfusion or human cells or tissues for transplantation must have written protocols for handling, maintenance, and storage, consistent with those of a nationally-recognized authority, such as the American Association of Tissue Banks (AATB) or the U.S. Food and Drug Administration (FDA). | AB. ☐ | ☐ | ☐ | ☐ |
| **Subchapter II — Laser, Light-Based Technologies, and Other Energy-Emitting Equipment:** This subchapter addresses surgery or procedures that involve laser, light-based technologies, or other energy-emitting equipment. | II. ☐ | ☐ | ☐ | ☐ |
| A. Policies and procedures should be established and implemented for these devices. Policies and procedures include, but are not limited to: | A. ☐ | ☐ | ☐ | ☐ |
| 1. Safety programs. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Education and training of personnel, including a requirement for all personnel working with these devices to be adequately trained in the safety and use of each type of device utilized in patient care. | 2. ☐ | ☐ | ☐ | ☐ |
| B. The organization ensures that its facility is a safe environment, including: | B. ☐ | ☐ | ☐ | ☐ |
| 1. Granting privileges for each specific device. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Ensuring that only authorized persons are allowed in treatment areas. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Utilization of door and window coverings, where appropriate. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Prominently displayed warning signs being present only during procedures at the entrance to treatment areas. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. When necessary, utilization of protective eyewear by personnel in treatment areas as recommended by the device manufacturer. | 5. ☐ | ☐ | ☐ | ☐ |
| 6. When appropriate, utilization of smoke evacuators and utilization of appropriate devices to control tissue debris, and high filtration masks and/or wall suction with filters to minimize laser plume inhalation. | 6. ☐ | ☐ | ☐ | ☐ |
| 7. Utilization of appropriate disinfectant or sterilization of components that have direct patient contact. | 7. ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
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| 8. Ensuring appropriate fire protection, including: | 8. ☐ | ☐ | ☐ | ☐ |
| a. The immediate availability of electrical-rated fire extinguishers for equipment fires. | a. ☐ | ☐ | ☐ | ☐ |
| b. The maintenance of a wet environment around the operative field and the immediate availability of an open container of saline or water where ignition of flammable materials is possible. | b. ☐ | ☐ | ☐ | ☐ |
| c. The use of safe equipment and/or techniques, especially for procedures in and around the airway. | c. ☐ | ☐ | ☐ | ☐ |
| d. The utilization of noncombustible materials, supplies, and solutions as appropriate. | d. ☐ | ☐ | ☐ | ☐ |
| e. That drape material is not positioned in front of the laser beam; drapes should be checked prior to use of laser to ensure that material has not shifted during the procedure. | e. ☐ | ☐ | ☐ | ☐ |
| 9. Documenting that maintenance logs are present that confirm the inspection and testing of these devices. | 9. ☐ | ☐ | ☐ | ☐ |
| C. The organization ensures patient safety, including: | C. ☐ | ☐ | ☐ | ☐ |
| 1. Assurance that procedures are done in accordance with device manufacturer's guidelines and are consistent with the current version of the ANSI Standard for Safe Use of Lasers in Health Care Facilities. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Protection of the patient's eyes, skin, hair, and other exposed areas. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. When available, the use of non-reflective surgical instruments and supplies. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Appropriate patient education regarding procedure risks and potential complications. | 4. ☐ | ☐ | ☐ | ☐ |
| **Subchapter III — Renal Lithotripsy Services:** Renal lithotripsy services made available by the organization meet the needs of the patients and are provided in accordance with ethical and professional practices as well as legal requirements. | III. ☐ | ☐ | ☐ | ☐ |
| A. Lithotripsy services provided by the organization are directed by a urologist who is qualified to assume clinical responsibility for the quality of services rendered. | A. ☐ | ☐ | ☐ | ☐ |
| B. Radiation safety and quality control policies and procedures are established, specifically as they relate to patients, staff exposure, and lithotripsy, and are reviewed periodically by a qualified individual. | B. ☐ | ☐ | ☐ | ☐ |
| C. The organization establishes its own written policies and procedures to provide trained and experienced allied health care personnel who are able to conduct duties necessary to assist in the provision of lithotripsy. These include, at a minimum: | C. ☐ | ☐ | ☐ | ☐ |
| 1. Meeting state and federal licensure requirements for operation of radiation equipment. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Staff education, including orientation. | 2. ☐ | ☐ | ☐ | ☐ |

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| D. The organization must have written policies and procedures providing guidelines, adequate supplies, and equipment to provide appropriate treatment in accordance with manufacturer's guidelines. The organization's written guidelines include: | D. ☐ | ☐ | ☐ | ☐ |
| 1. Indications. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Contraindications. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Maximum power setting. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Maximum number of shocks. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. Position of patient. | 5. ☐ | ☐ | ☐ | ☐ |
| 6. Patient size and weight. | 6. ☐ | ☐ | ☐ | ☐ |
| 7. Utilization of equipment. | 7. ☐ | ☐ | ☐ | ☐ |
| E. The organization has written policies addressing: | E. ☐ | ☐ | ☐ | ☐ |
| 1. A recognized methodology for diagnosis and treatment, including pre-procedure evaluation (lab work, x-rays, etc.). | 1. ☐ | ☐ | ☐ | ☐ |
| 2. That a provider shall perform the treatment and be present during treatment. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Criteria for patient selection. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. The requirement that signed consent forms be obtained prior to treatment. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. Administration of anesthesia/medication. (A wide choice of anesthetic methods is available and appropriate. Successful lithotripsy requires the appropriate administration of anesthesia/ medication for patient comfort and compliance. A patient's health, habits, and history must be such that he/she can safely undergo anesthesia/analgesia for lithotripsy.) | 5. ☐ | ☐ | ☐ | ☐ |
| 6. Appropriate monitoring during treatment must be provided using American Society of Anesthesiologists (ASA) guidelines. | 6. ☐ | ☐ | ☐ | ☐ |
| 7. Correction of medication-related and other medical conditions contributing to coagulopathy and the relationship to lithotripsy. | 7. ☐ | ☐ | ☐ | ☐ |
| 8. Pre- and post-procedure teaching. | 8. ☐ | ☐ | ☐ | ☐ |
| F. The organization has written policies addressing the safety aspects of the treatment, including: | F. ☐ | ☐ | ☐ | ☐ |
| 1. Log of daily lithotripter calibration/equipment checks on days when lithotripsy is provided. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Preventive maintenance logs and maintenance records including malfunctions and current documentation from the service contract provider that malfunctions have been corrected. | 2. ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| G. The organization has documentation from contracted vendors that perform calibration and equipment preventative maintenance that work has been completed according to the contract. | G. ☐ | ☐ | ☐ | ☐ |
| H. In addition to the applicable clinical record requirements in Chapter 6, the following elements must be included: | H. ☐ | ☐ | ☐ | ☐ |
| 1. History and physical indicate presence, location, size of urinary stone, and patient symptoms. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Method of determining location and confirmation of presence of stone immediately prior to treatment. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Operative treatment record. | 3. ☐ | ☐ | ☐ | ☐ |
| a. Selection of treatment modality. | a. ☐ | ☐ | ☐ | ☐ |
| b. Number of shocks. | b. ☐ | ☐ | ☐ | ☐ |
| c. Energy level. | c. ☐ | ☐ | ☐ | ☐ |
| d. Radiation exposure. | d. ☐ | ☐ | ☐ | ☐ |
| I. The organization confirms that outside providers of lithotripsy services ensure that their equipment and personnel are appropriate for the services provided. This includes the following: | I. ☐ | ☐ | ☐ | ☐ |
| 1. Equipment is properly maintained and maintenance records are available to the organization when the equipment is at the organization. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. The lithotripsy vendor provides the organization with documentation that the personnel provided are properly trained, licensed, and receive ongoing education and annual competency evaluation for the services they provide. | 2. ☐ | ☐ | ☐ | ☐ |

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# 11. Pharmaceutical Services

Pharmaceutical services provided or made available by an accreditable organization meet the needs of the patients and are provided in accordance with ethical and professional practices and legal requirements. Such an organization has the following characteristics.

*Note: This chapter applies to any organization that uses drugs or pharmaceutical medical supplies, regardless of the presence or absence of an on-site pharmacy.*

| | | Compliance | | | |
|---|---|---|---|---|---|
| | | SC | PC | NC | N/A |
| A. | Pharmaceutical services are provided or made available in a safe and effective manner, in accordance with accepted professional practice and under the direction of an individual designated responsible for pharmaceutical services in accordance with Standard 11.J. | A. ☐ | ☐ | ☐ | ☐ |
| B. | Pharmaceutical services are provided in accordance with ethical and professional practice and applicable federal and state laws. | B. ☐ | ☐ | ☐ | ☐ |
| C. | Staff demonstrates knowledge of applicable state and federal pharmaceutical laws. | C. ☐ | ☐ | ☐ | ☐ |
| D. | Records and security are maintained to ensure the control and safe dispensing of drugs, including samples, in compliance with federal and state laws. | D. ☐ | ☐ | ☐ | ☐ |
| E. | Staff informs patients concerning safe and effective use of medications consistent with legal requirements and patient needs. | E. ☐ | ☐ | ☐ | ☐ |
| F. | Measures have been implemented to ensure that prescription pads are controlled and secured from unauthorized patient access, and pre-signed and/or postdated prescription pads are prohibited. | F. ☐ | ☐ | ☐ | ☐ |
| G. | All medications, including vaccines and samples, are checked for expiration dates on a regular basis; expired items are disposed of in a manner that prevents unauthorized access, protects safety, and meets state and federal requirements. | G. ☐ | ☐ | ☐ | ☐ |
| H. | All injectable medications drawn into syringes and oral medications removed from the packaging identified by the original manufacturer must be appropriately labeled if not administered immediately. | H. ☐ | ☐ | ☐ | ☐ |
| I. | The organization must have policies in place for safe use of injectables and single-use syringes and needles that at minimum include the CDC or comparable guidelines for safe injection practices. | I. ☐ | ☐ | ☐ | ☐ |
| J. | Pharmaceutical services provided by the organization are directed by a licensed pharmacist or, when appropriate, by a physician or dentist who is qualified to assume professional, organizational, and administrative responsibility for the quality of services rendered. | J. ☐ | ☐ | ☐ | ☐ |
| K. | Providers or other health care professionals who prescribe, dispense, administer, and provide patient education on medications have easy access to current drug information and other decision support resources. | K. ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| L. If look-alike or sound-alike medications are present, the organization identifies and maintains a current list of these medications, and actions to prevent errors are evident. | L. ☐ | ☐ | ☐ | ☐ |
| M. Procedures are established by the organization for maintenance, cleaning, distribution, and use of devices such as nebulizer units, intravenous infusion pumps, or any other mechanical device used in the medication delivery process. | M. ☐ | ☐ | ☐ | ☐ |
| N. A pharmacy owned or operated by the organization is supervised by a licensed pharmacist. | N. ☐ | ☐ | ☐ | ☐ |
| O. Pharmaceutical services made available by the organization through a contractual agreement are provided in accordance with the same ethical and professional practices and legal requirements that would be required if such services were provided directly by the organization. | O. ☐ | ☐ | ☐ | ☐ |
| P. Patients are not required to use a pharmacy owned or operated by the organization. | P. ☐ | ☐ | ☐ | ☐ |

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# 12. Pathology and Medical Laboratory Services

Pathology and medical laboratory services provided or made available by an accreditable organization meet the needs of the patients and are provided in accordance with ethical and professional practices and legal requirements. Such an organization has the following characteristics.

| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| **Subchapter I — CLIA-Waived Tests:** This subchapter applies only to health care organizations providing services that meet the Clinical Laboratory Improvement Amendments (CLIA) of 1988 requirements for waived tests. | I. ☐ | ☐ | ☐ | ☐ |
| A. An accreditable organization: | A. ☐ | ☐ | ☐ | ☐ |
| 1. Meets the requirements for waived tests under CLIA (part 493 of Title 42 of the Code of Federal Regulations) if it performs its own laboratory services, performs only waived tests, and has obtained a certificate of waiver, and/or | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Has procedures for obtaining routine and emergency laboratory services from a certified laboratory in accordance with CLIA if it does not perform its own laboratory services. | 2. ☐ | ☐ | ☐ | ☐ |
| B. Pathology and medical laboratory services provided or made available are appropriate to the needs of the patients and adequately support the organization's clinical capabilities. | B. ☐ | ☐ | ☐ | ☐ |
| C. Pathology and medical laboratory services include, but are not limited to: | C. ☐ | ☐ | ☐ | ☐ |
| 1. Conducting laboratory procedures that are appropriate to the needs of the patients. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Performing tests in a timely manner. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Distributing test results after completion of a test and maintaining a copy of the results. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Performing and documenting appropriate quality control procedures, including, but not limited to, calibrating equipment periodically and validating test results. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. Ensuring that staff performing tests has adequate training and competence to perform the tests. | 5. ☐ | ☐ | ☐ | ☐ |
| D. The organization has a policy that ensures that test results are reviewed appropriately and that documents that test results are reviewed by the ordering physician or another privileged provider. | D. ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| **Subchapter II — CLIA Laboratories:** This subchapter applies only to health care organizations providing laboratory services that require certification under the Clinical Laboratory Improvement Amendments (CLIA) of 1988. | II. ☐ | ☐ | ☐ | ☐ |
| A. An accreditable organization providing laboratory services meets the requirements of CLIA (part 493 of Title 42 of the Code of Federal Regulations) and has obtained a CLIA certificate. | A. ☐ | ☐ | ☐ | ☐ |
| B. Pathology and medical laboratory services provided or made available are appropriate to the needs of the patients and adequately support the organization's clinical capabilities. | B. ☐ | ☐ | ☐ | ☐ |
| C. Pathology and medical laboratory services include, but are not limited to: | C. ☐ | ☐ | ☐ | ☐ |
| 1. Conducting laboratory procedures that are appropriate to the needs of the patients. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Performing tests in a timely manner. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Distributing test results after completion of a test and maintaining a copy of the results in the laboratory. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Performing and documenting appropriate quality assurance procedures, including, but not limited to, calibrating equipment periodically and validating test results through use of standardized control specimens or laboratories. | 4. ☐ | ☐ | ☐ | ☐ |
| D. The organization has a policy that ensures that test results are reviewed appropriately and that documents that test results are reviewed by the ordering physician or another privileged provider. | D. ☐ | ☐ | ☐ | ☐ |
| E. Pathology and medical laboratory services provided by the organization are directed by a pathologist or another physician who is qualified to assume professional, organizational, and administrative responsibility for the quality of services rendered. | E. ☐ | ☐ | ☐ | ☐ |
| F. Sufficient adequately trained and experienced personnel are available to supervise and conduct the work of the laboratory. | F. ☐ | ☐ | ☐ | ☐ |
| G. Established procedures are followed in obtaining, identifying, storing, and transporting specimens. | G. ☐ | ☐ | ☐ | ☐ |
| H. Complete descriptions are available of each test procedure performed by the laboratory, including sources of reagents, standards, and calibration procedures, and information concerning the basis for the listed "normal" ranges is also available. | H. ☐ | ☐ | ☐ | ☐ |
| I. Sufficient space, equipment, and supplies are provided to perform the volume of work with optimal accuracy, precision, efficiency, and safety. | I. ☐ | ☐ | ☐ | ☐ |
| J. Requirements of the Department of Health & Human Services (HHS) certification for medical review officer drug testing are met if the lab is testing for Department of Transportation (DOT) regulated industries or federal agency employees. | J. ☐ | ☐ | ☐ | ☐ |

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# 13. Diagnostic and Other Imaging Services

Imaging services, including those used for diagnosing, monitoring, or assisting with procedures provided or made available by an accreditable organization, meet the needs of the patients and are provided in accordance with ethical and professional practices and legal requirements. Such an organization has the following characteristics.

| | Compliance | | | |
|---|---|---|---|---|
| | SC | PC | NC | N/A |
| ***Standards A through F will be applied to organizations providing only diagnostic imaging services. Standards A through L will be applied to organizations that provide imaging services used for diagnosing, monitoring, or assisting with procedures.*** | | | | |
| A. Imaging services provided or made available by the organization are appropriate to the needs of the patient and adequately support the organization's capabilities. | ☐ | ☐ | ☐ | ☐ |
| B. Imaging services include, but are not limited to: | ☐ | ☐ | ☐ | ☐ |
| 1. Providing radiographic, fluoroscopic, ultrasonic, or other imaging services that are appropriate to the organization's function. | ☐ | ☐ | ☐ | ☐ |
| 2. Interpreting images and ensuring appropriate documentation in a timely manner. | ☐ | ☐ | ☐ | ☐ |
| 3. Maintaining appropriate records or reports of services provided. | ☐ | ☐ | ☐ | ☐ |
| 4. Providing adequate space, equipment, and supplies to ensure the provision of quality services. | ☐ | ☐ | ☐ | ☐ |
| C. Health care professionals providing imaging services and/or interpreting results: | ☐ | ☐ | ☐ | ☐ |
| 1. Have appropriate training and credentials. | ☐ | ☐ | ☐ | ☐ |
| 2. Have been granted privileges to provide these services. | ☐ | ☐ | ☐ | ☐ |
| 3. Have appropriate safety training and provide their services in a safe manner. | ☐ | ☐ | ☐ | ☐ |
| D. Policies that address the safety aspects of the imaging services include, but are not limited to: | ☐ | ☐ | ☐ | ☐ |
| 1. Regulation of the use, removal, handling, and storage of potentially hazardous materials. | ☐ | ☐ | ☐ | ☐ |
| 2. Precautions against electrical, mechanical, magnetic, ultrasonic, radiation, and other potential hazards. | ☐ | ☐ | ☐ | ☐ |
| 3. Proper shielding where radiation, magnetic field, and other potentially hazardous energy sources are used. | ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| 4. Acceptable monitoring devices or processes to ensure the safety of all personnel who might be exposed to radiation, magnetic fields, or otherwise harmful energy; if radiation exposure is not monitored, documentation exists within the organization to support this decision. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. Maintenance of appropriate exposure records. | 5. ☐ | ☐ | ☐ | ☐ |
| 6. Instructions to personnel in safety precautions and in dealing with accidental hazardous energy field exposure. | 6. ☐ | ☐ | ☐ | ☐ |
| 7. Periodic evaluation by qualified personnel of energy sources and of all safety measures followed, including calibration of equipment and testing the integrity of personal protective devices in compliance with federal, state, and local laws and regulations. | 7. ☐ | ☐ | ☐ | ☐ |
| E. Proper warning signs are in place, alerting the public and personnel to the presence of hazardous energy fields, emphasizing concern for particularly susceptible individuals, including: | E. ☐ | ☐ | ☐ | ☐ |
| 1. Pregnant females. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. In cases of magnetic resonance imaging: | 2. ☐ | ☐ | ☐ | ☐ |
| a. Patients with metal implantations. | a. ☐ | ☐ | ☐ | ☐ |
| b. Patients or personnel with magnetically inscribed credit cards, where appropriate. | b. ☐ | ☐ | ☐ | ☐ |
| c. Patients or personnel wearing metallic objects capable of potentially dangerous motion. | c. ☐ | ☐ | ☐ | ☐ |
| d. Patients with pacemakers or internal defibrillators. | d. ☐ | ☐ | ☐ | ☐ |
| F. The organization implements a process to identify the correct site and correct service that is to be performed and involves the patient in the process. | F. ☐ | ☐ | ☐ | ☐ |
| G. A radiologist authenticates all examination reports, except reports of specific procedures that may be authenticated by specialist physicians or dentists who have been granted privileges by the governing body or its designee to authenticate such reports. | G. ☐ | ☐ | ☐ | ☐ |
| H. Authenticated, dated reports of all examinations performed are made a part of the patient's clinical record. | H. ☐ | ☐ | ☐ | ☐ |
| I. Diagnostic imaging services provided by the organization are directed by a physician or dentist who is qualified to assume professional, organizational, and administrative responsibility for the quality of the services rendered. | I. ☐ | ☐ | ☐ | ☐ |
| J. Diagnostic imaging tests are performed only upon the order of a health care professional. Such orders are accompanied by a concise statement of the reason for the examination. | J. ☐ | ☐ | ☐ | ☐ |
| K. Diagnostic images are maintained in a readily accessible location for the time required by applicable laws and policies of the organization. | K. ☐ | ☐ | ☐ | ☐ |
| L. A policy addresses the storage and retention of diagnostic images. | L. ☐ | ☐ | ☐ | ☐ |

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# 14. Dental Services

Dental services provided or made available by an accreditable organization meet the needs of the patients and are provided in accordance with ethical and professional practices and legal requirements.

| | Compliance | | | |
|---|---|---|---|---|
| | SC | PC | NC | N/A |
| **Subchapter I — Dental Services:** This chapter will be applied to organizations that provide primary dental care and general dentistry and/or oral maxillofacial services. For multi-specialty ASCs in which dentistry and oral maxillofacial surgery are some of the specialties provided, this chapter will not be applicable. For those multi-specialty ASCs, Chapters 9 and 10 will be applied. | I. ☐ | ☐ | ☐ | ☐ |
| A. Dental services provided or made available are appropriate to the needs of the patients and are consistent with the definition of dentistry according to state regulation. | A. ☐ | ☐ | ☐ | ☐ |
| B. Dental services performed in the facilities owned and operated by the organization are limited to those procedures that are approved by the governing body upon the recommendation of qualified dental personnel. | B. ☐ | ☐ | ☐ | ☐ |
| C. Dental procedures are performed only by dental health professionals who: | C. ☐ | ☐ | ☐ | ☐ |
| 1. Are licensed to perform such procedures within the state or jurisdiction in which the organization is located. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Have been granted privileges to perform those procedures by the governing body of the organization, in accordance with Chapter 2.II. | 2. ☐ | ☐ | ☐ | ☐ |
| D. Personnel assisting in the provision of dental services are appropriately qualified and available in sufficient numbers for the dental procedures provided. | D. ☐ | ☐ | ☐ | ☐ |
| E. An appropriate history and physical is conducted and periodically updated, which includes an assessment of the hard and soft tissues of the mouth. | E. ☐ | ☐ | ☐ | ☐ |
| F. The organization develops policies and procedures related to the identification, treatment, and management of pain. | F. ☐ | ☐ | ☐ | ☐ |
| G. The necessity or appropriateness of the proposed dental procedure(s), as well as alternative treatments and the order of care, have been discussed with the patient prior to delivery of services. | G. ☐ | ☐ | ☐ | ☐ |
| H. The informed consent of the patient is obtained and incorporated into the dental record prior to the procedure(s). | H. ☐ | ☐ | ☐ | ☐ |
| I. Clinical records are maintained according to the requirements found in Chapter 6. | I. ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| J. The organization develops policies and procedures to evaluate dental laboratories to ensure that they meet the needs of the patient and adequately support the organization's clinical capabilities. | J. ☐ | ☐ | ☐ | ☐ |
| K. Anesthesia provided or made available meets the Standards contained in Chapter 9. | K. ☐ | ☐ | ☐ | ☐ |
| L. Surgical and related services provided or made available meet the Standards contained in Chapter 10. | L. ☐ | ☐ | ☐ | ☐ |
| M. Imaging services provided or made available meet the Standards contained in Chapter 13. | M. ☐ | ☐ | ☐ | ☐ |
| 1. The organization has guidelines to address the type, frequency, and indications for diagnostic radiographs. | 1. ☐ | ☐ | ☐ | ☐ |
| N. Health care professionals providing dental, surgical, or anesthesia services are prepared to evaluate, stabilize, and transfer medical emergencies that may occur or arise in conjunction with services provided by the organization. All clinical support staff with direct patient contact maintain at a minimum skills in basic life support (BLS). | N. ☐ | ☐ | ☐ | ☐ |
| O. The organization has a mechanism in place to evaluate and monitor dental products that the organization makes available for sale to patients to ensure that such practices are done in an ethical manner. | O. ☐ | ☐ | ☐ | ☐ |

**Subchapter II — Dental Home:** The Dental Home subchapter will apply to organizations that choose this subchapter in the *Application for Survey*.

The services provided by an accreditable Dental Home are patient-centered, dentist-directed, comprehensive, accessible, continuous, and organized to meet the needs of the individual patient served. The foundation of a Dental Home is the relationship between the patient, his/her family, as appropriate, and the Dental Home. As used in these Standards, a Dental Home is the primary point of care for the patient.

| | | | | |
|---|---|---|---|---|
| The Dental Home will be assessed from the perspective of the patient on the following characteristics as evidenced by: | II. ☐ | ☐ | ☐ | ☐ |
| A. Relationship – communication, understanding, and collaboration. (In this context, "dentist" refers to the dentist or the physician- or dentist-directed health care team.) | A. ☐ | ☐ | ☐ | ☐ |
| 1. The patient can identify his/her dentist and patient care team members. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. The dentist explains information in a manner that is easy to understand (to include Standard 1.D). | 2. ☐ | ☐ | ☐ | ☐ |
| 3. The dentist listens carefully to the patient and, when appropriate, the patient's personal caregiver(s). Caregivers may include a parent, legal guardian, or person with the patient's power of attorney. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. The dentist speaks to the patient about his/her health problems and concerns. | 4. ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| 5. The dentist provides easy-to-understand instructions about taking care of health concerns. | 5. ☐ | ☐ | ☐ | ☐ |
| 6. The dentist knows important facts about the patient's health history. | 6. ☐ | ☐ | ☐ | ☐ |
| 7. The dentist spends sufficient time with the patient. | 7. ☐ | ☐ | ☐ | ☐ |
| 8. The dentist is as thorough as the patient feels is needed. | 8. ☐ | ☐ | ☐ | ☐ |
| 9. The staff keeps the patient informed with regard to his/her appointment when delayed. | 9. ☐ | ☐ | ☐ | ☐ |
| 10. The dentist addresses specific principles to prevent dental-related diseases. | 10. ☐ | ☐ | ☐ | ☐ |
| 11. The dentist speaks with the patient about making lifestyle changes to help prevent dental-related disease. | 11. ☐ | ☐ | ☐ | ☐ |
| 12. The dentist inquires as to the patient's concerns/worries/stressors regarding his/her dental health. | 12. ☐ | ☐ | ☐ | ☐ |
| 13. The Dental Home provides services within a team framework, and that "team" provider concept has been conveyed to the patient. | 13. ☐ | ☐ | ☐ | ☐ |
| 14. The family is included, as appropriate, in patient care decisions, treatment, and education. | 14. ☐ | ☐ | ☐ | ☐ |
| 15. The Dental Home treats its patients with cultural sensitivity. | 15. ☐ | ☐ | ☐ | ☐ |
| B. Continuity of Care | B. ☐ | ☐ | ☐ | ☐ |
| 1. A significant number (more than 50%) of the Dental Home visits of any patient are with the same dentist/dental care team. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. If a consultation is ordered for the patient, it is documented in the clinical record. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Referrals for services (external to the Dental Home) are documented in the clinical record. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Consultations (medical or dental opinions obtained from other health care professionals) are recorded in the clinical record. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. Referrals are disease- or procedure-specific. | 5. ☐ | ☐ | ☐ | ☐ |
| 6. The patient's results of a referral are recorded in the clinical record. Follow-up procedures exist and the results of the referral are appropriately reported to the Dental Home as they are made available. | 6. ☐ | ☐ | ☐ | ☐ |
| 7. Follow-up appointments are documented in the clinical record. | 7. ☐ | ☐ | ☐ | ☐ |
| 8. After-hour encounters are documented in the clinical record. | 8. ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| 9. Missed appointments are documented in the clinical record and managed appropriately depending on the patient's care need and diagnosis. | 9. ☐ | ☐ | ☐ | ☐ |
| 10. Critical referrals, critical consultations, and critical diagnostic studies are tracked and appropriate follow-up is made when the results are not received within a timely manner. | 10. ☐ | ☐ | ☐ | ☐ |
| 11. Transition of care (e.g., pediatric to adult or adult to geriatric) is proactively planned, coordinated, and documented in the clinical record when indicated or when appropriate. | 11. ☐ | ☐ | ☐ | ☐ |
| 12. Electronic data management is continually assessed as a tool for facilitating the above-mentioned Standards, including consultations, referrals, and lab results. | 12. ☐ | ☐ | ☐ | ☐ |
| C. Comprehensiveness of Care | C. ☐ | ☐ | ☐ | ☐ |
| 1. If the Dental Home limits the population served, those limitations are disclosed to prospective patients. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. The Dental Home scope of service includes, but is not limited to: | 2. ☐ | ☐ | ☐ | ☐ |
| a. Preventive care (including surveillance and screening for special needs or assessment). | a. ☐ | ☐ | ☐ | ☐ |
| b. Wellness care (healthy lifestyle issues—appropriate diet, tobacco cessation, home care, etc.). | b. ☐ | ☐ | ☐ | ☐ |
| c. Acute pain and injury care. | c. ☐ | ☐ | ☐ | ☐ |
| d. Chronic disease management. | d. ☐ | ☐ | ☐ | ☐ |
| e. Advanced geriatric care. | e. ☐ | ☐ | ☐ | ☐ |
| 3. Patient education and self-management resources are provided. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Knowledge of community resources that support the patient's (and family's, as appropriate) needs are known by the Dental Home. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. The community's service limitations are known and alternate sources are coordinated by the Dental Home. | 5. ☐ | ☐ | ☐ | ☐ |
| 6. Referrals are appropriate to the patient's needs. When referrals occur, the Dental Home collaborates with the specialist. | 6. ☐ | ☐ | ☐ | ☐ |
| 7. The needs of the patient's personal caregiver (in 14.II.A.3), when known, are assessed and addressed to the extent that they impact the care of the patient. | 7. ☐ | ☐ | ☐ | ☐ |
| 8. Electronic data management is continually assessed as a tool for facilitating the above-mentioned Standards. | 8. ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| D. Accessibility | D. ☐ | ☐ | ☐ | ☐ |
| 1. The Dental Home establishes standards in writing to support patient access (e.g., provider availability, information, clinical record contents, advice, routine care, and urgent care). The Dental Home's data support that they meet those standards. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Patients are routinely and continuously assessed for their perceptions about access to the Dental Home (e.g., provider availability, information, clinical record contents, advice, routine care, and urgent care). | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Patients are provided information about how to obtain dental care at any time (365/24/7). | 3. ☐ | ☐ | ☐ | ☐ |
| 4. The Dental Home ensures on-call coverage (pre-arranged access to a clinician) when the Dental Home is not open. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. Electronic data management is continually assessed as a tool for facilitating the above-mentioned Standards. | 5. ☐ | ☐ | ☐ | ☐ |
| E. Quality | E. ☐ | ☐ | ☐ | ☐ |
| 1. Patient care is dentist-directed. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. The Dental Home incorporates evidence-based guidelines and performance measures in delivering clinical services including: | 2. ☐ | ☐ | ☐ | ☐ |
| a. Preventive care (including surveillance and screening for special needs or assessment). | a. ☐ | ☐ | ☐ | ☐ |
| b. Wellness care (healthy lifestyle issues—(appropriate diet, tobacco cessation, home care, etc.). | b. ☐ | ☐ | ☐ | ☐ |
| c. Acute pain and injury care. | c. ☐ | ☐ | ☐ | ☐ |
| d. Chronic disease management. | d. ☐ | ☐ | ☐ | ☐ |
| e. Advanced geriatric care. | e. ☐ | ☐ | ☐ | ☐ |
| 3. The Dental Home periodically assesses its application of available evidence-based guidelines and/or performance measures to ensure that they are being used effectively and appropriately. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Patient care is supervised by the Dental Home as evidenced by: | 4. ☐ | ☐ | ☐ | ☐ |
| a. Appropriate ordering of diagnostic radiographs (avoidance of redundancies and unnecessary exposure). | a. ☐ | ☐ | ☐ | ☐ |
| b. Appropriate management of patient referrals (avoidance of unnecessary referrals). | b. ☐ | ☐ | ☐ | ☐ |
| 5. The Dental Home assesses and continuously improves the services they provide. Measurements, quality studies, data trending, and benchmarking are key tools in a quality improvement/management program. | 5. ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| 6. In addition to the Standards presented in Chapter 5.I, the Dental Home's quality improvement program should include at least one study every three years on each of the following topics: | 6. ☐ | ☐ | ☐ | ☐ |
| a. Patient/dentist relationship. | a. ☐ | ☐ | ☐ | ☐ |
| b. Continuity of care. | b. ☐ | ☐ | ☐ | ☐ |
| c. Comprehensiveness of care. | c. ☐ | ☐ | ☐ | ☐ |
| d. Accessibility to care. | d. ☐ | ☐ | ☐ | ☐ |
| e. Clinical study. | e. ☐ | ☐ | ☐ | ☐ |
| 7. Electronic data management is continually assessed as a tool for facilitating the above-mentioned Standards. | 7. ☐ | ☐ | ☐ | ☐ |

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# 15. Other Professional and Technical Services

Professional and technical services provided or made available by an accreditable organization, even though they are not specifically mentioned in the *Handbook*, meet the needs of the patients and are provided in accordance with ethical and professional practices and legal requirements. Such an organization has the following characteristics.

| | Compliance | | | |
|---|---|---|---|---|
| | SC | PC | NC | N/A |
| **Subchapter I — General Services:** This subchapter applies to organizations that provide other professional and technical services. | I. ☐ | ☐ | ☐ | ☐ |
| A. Such services may include, but are not limited to: various medical services, rehabilitation services (physical, occupational, vocational therapy), massage therapy, acupuncture, registered dieticians, aestheticians, audiologists, and other individuals who provide services to patients and may submit separate charges for their services. | A. ☐ | ☐ | ☐ | ☐ |
| B. Such services provided or made available are appropriate to the needs of the patients and adequately support the organization's clinical capabilities. | B. ☐ | ☐ | ☐ | ☐ |
| C. Such services are provided by allied health professionals who have been credentialed/privileged in accordance with Standard 2.II.F or who have job descriptions outlined by the organization. | C. ☐ | ☐ | ☐ | ☐ |
| D. Such services are provided in accordance with ethical and professional practices and applicable federal and state laws and regulations. | D. ☐ | ☐ | ☐ | ☐ |
| E. Such services will be evaluated using applicable Standards from other chapters of the *Handbook*. | E. ☐ | ☐ | ☐ | ☐ |
| **Subchapter II — Travel Medicine:** This subchapter applies only to organizations that provide travel medicine services. | II. ☐ | ☐ | ☐ | ☐ |
| A. Organizations providing travel medicine services will ensure that these services are appropriate to the needs of the patient and are adequately supported by the organization's clinical capabilities. | A. ☐ | ☐ | ☐ | ☐ |
| 1. Travel medicine services are provided by personnel who have appropriate training, skills, and resource materials to provide quality services. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Travel medicine programs include: | 2. ☐ | ☐ | ☐ | ☐ |
| a. Appropriate medical oversight. | a. ☐ | ☐ | ☐ | ☐ |
| b. Clearly defined standing orders and protocols, including management of adverse reactions to immunizations. | b. ☐ | ☐ | ☐ | ☐ |
| c. Access to current Centers for Disease Control (CDC) and U.S. Department of State travel recommendations. | c. ☐ | ☐ | ☐ | ☐ |
| d. Appropriate storage and management of vaccines. | d. ☐ | ☐ | ☐ | ☐ |

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| | Compliance | | | |
|---|---|---|---|---|
| | SC | PC | NC | N/A |
| 3. Travel medicine services include: | 3. ☐ | ☐ | ☐ | ☐ |
| a. Comprehensive travel destination-specific risk assessment. | a. ☐ | ☐ | ☐ | ☐ |
| b. Appropriate preventive medicine interventions. | b. ☐ | ☐ | ☐ | ☐ |
| c. Education in risk and risk reduction. | c. ☐ | ☐ | ☐ | ☐ |
| 4. Entries in a patient's clinical record include: | 4. ☐ | ☐ | ☐ | ☐ |
| a. Travel destination and current health status. | a. ☐ | ☐ | ☐ | ☐ |
| b. Immunization and vaccine name(s), dosage form, dosage administered, lot number, and quantity. | b. ☐ | ☐ | ☐ | ☐ |
| c. Prescription medications given, quantity and date, dosage, and directions for use. | c. ☐ | ☐ | ☐ | ☐ |
| d. Preventive health education. | d. ☐ | ☐ | ☐ | ☐ |

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# 16. Health Education and Health Promotion

AAAHC encourages all health care organizations to provide or make available health education and health promotion services to meet the needs of the population served. These services should be provided in accordance with ethical and professional practices and legal requirements. Such an organization has the following characteristics.

| | Compliance | | | |
|---|---|---|---|---|
| | SC | PC | NC | N/A |
| ***Standards A through G will be applied to all health education and health promotion services. Standards A through J will be applied to organizations providing comprehensive health education and disease prevention programs.*** | | | | |
| A. Services provided or made available by the organization are appropriate to the needs of the population served. | ☐ | ☐ | ☐ | ☐ |
| B. Health education and health promotion services are provided by personnel that: | ☐ | ☐ | ☐ | ☐ |
| 1. Have necessary and appropriate training, education, credentials, and skills to carry out their responsibilities. | ☐ | ☐ | ☐ | ☐ |
| 2. Have access to and utilize consultative services, as appropriate. | ☐ | ☐ | ☐ | ☐ |
| 3. Have ready access to appropriate reference materials in health education and health promotion. | ☐ | ☐ | ☐ | ☐ |
| 4. Participate in continuing professional education in health education and wellness. | ☐ | ☐ | ☐ | ☐ |
| C. Health education and health promotion programs should include, but may not be limited to: | ☐ | ☐ | ☐ | ☐ |
| 1. Clearly defined educational goals and objectives. | ☐ | ☐ | ☐ | ☐ |
| 2. Evaluation of whether the goals or objectives have been met. | ☐ | ☐ | ☐ | ☐ |
| D. The organization should have adequate resources for the health education and health promotion services available. | ☐ | ☐ | ☐ | ☐ |
| E. Marketing or advertising regarding the health education and health promotion activities accurately reflects the services provided by the organization. | ☐ | ☐ | ☐ | ☐ |
| F. Policies and procedures are established to assess satisfaction with the health education and health promotion services. | ☐ | ☐ | ☐ | ☐ |
| G. When appropriate, health education and health promotion services, whether they occur within the context of a clinical visit or not, should be referenced or documented in the patient's clinical record. | ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| H. Health education and disease prevention programs should be based on a complete needs assessment for the population served, which: | H. ☐ | ☐ | ☐ | ☐ |
| 1. Considers relevant health risks and health education needs. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Uses a variety of data or data sources. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Quantifies risk whenever possible. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Uses data to direct programming. | 4. ☐ | ☐ | ☐ | ☐ |
| I. Health education and disease prevention programs should be comprehensive and consider the medical, psychological, social, and cultural needs of the population. Topics that should be considered include: | I. ☐ | ☐ | ☐ | ☐ |
| 1. Disease-specific screening and educational programs. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Substance abuse prevention and education, including programs related to alcohol, tobacco, and other drugs. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Promotion of healthy eating. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Promotion of physical fitness. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. Sexuality education and skill building for healthy relationships. | 5. ☐ | ☐ | ☐ | ☐ |
| 6. Sexual, physical, and emotional violence prevention. | 6. ☐ | ☐ | ☐ | ☐ |
| 7. Promotion of and education about stress management and relaxation. | 7. ☐ | ☐ | ☐ | ☐ |
| J. Health education and disease prevention programs should be included in quality management and improvement activities. | J. ☐ | ☐ | ☐ | ☐ |

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# 17. Behavioral Health Services

Behavioral health services are provided or made available by an accreditable organization to meet the needs of its clients and the population served. Behavioral health services are provided in accordance with all ethical practices, professional practices, and legal requirements. Behavioral health services are designed to improve and enhance the emotional, mental, and behavioral health of the organization's targeted client population. Such an organization has the following characteristics.

| | Compliance | | | |
|---|---|---|---|---|
| | SC | PC | NC | N/A |
| A. Behavioral health services are limited to those services that are approved by the governing body, consistent with the overall mission of the organization, and are responsive and specific to the diverse needs of the population being served. Behavioral health services may include but are not limited to the following: | A. ☐ | ☐ | ☐ | ☐ |
| 1. Counseling or psychotherapy services. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Crisis intervention and emergency services. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Consultative and outreach services. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Referral services. | 4. ☐ | ☐ | ☐ | ☐ |
| B. When behavioral health services are provided by an organization, those services are under the direction of a licensed professional who has been designated by the organization's governing body to provide such oversight. | B. ☐ | ☐ | ☐ | ☐ |
| C. Behavioral health services are provided only by health care professionals who are competent to perform such services. Such services are provided in accordance with AAAHC Standards and adhere to all applicable federal, state, and local requirements, and to appropriate professional ethics standards. | C. ☐ | ☐ | ☐ | ☐ |
| D. Other personnel assisting in the provision or administration of behavioral health services are carefully selected and are subject to supervision by a licensed professional. | D. ☐ | ☐ | ☐ | ☐ |
| E. The organization has appropriate and adequate resources to provide quality behavioral health services. These resources include but are not limited to facilities, equipment, providers, and clinical and administrative support staff. | E. ☐ | ☐ | ☐ | ☐ |
| F. An initial behavioral health history and medical history of each client is present in the clinical record. | F. ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| G. The clinical record is periodically updated, and may include assessment and management of: | G. ☐ | ☐ | ☐ | ☐ |
| 1. Risk of harm to self or others. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Known or potential addictive behaviors and substance abuse. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Client self-understanding, motivation, and decision-making. | 3. ☐ | ☐ | ☐ | ☐ |
| H. The written and signed informed consent of the client is obtained and incorporated into the treatment plan, which may include but is not limited to procedures, therapies, medication management, and other modalities of care and treatment. | H. ☐ | ☐ | ☐ | ☐ |
| I. The organization develops and adopts written policies and procedures regarding: | I. ☐ | ☐ | ☐ | ☐ |
| 1. Consistent client confidentiality and privacy assurances. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Maintenance of client records according to AAAHC Standards. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Client flow and case assignment. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Situations arising from outreach programs (when provided) such as identification of individuals who need immediate services. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. Management of referrals and transfers to and from the facility. | 5. ☐ | ☐ | ☐ | ☐ |
| 6. Cooperation with and coordination of medical care with behavioral health care. | 6. ☐ | ☐ | ☐ | ☐ |
| 7. Safety and security of staff, clients, and the organization. | 7. ☐ | ☐ | ☐ | ☐ |

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# 18. Teaching and Publication Activities

If staff is involved in teaching or publishing, an accreditable organization has policies governing those activities that are consistent with its mission, goals, and objectives. Such an organization has the following characteristics.

| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| A. Policies concerning teaching activities address the formal relationship and responsibilities between the organization and the training institution and its trainees. Such policies include but are not limited to: | A. ☐ | ☐ | ☐ | ☐ |
| 1. The terms and conditions of reimbursement or other compensation. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. The reasonableness of the time spent away from direct patient care and administrative activities. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. The training of all students and postgraduate trainees, including the extent of their involvement in patient care activities. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. The requirement or non-requirement for liability coverage. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. Adherence by trainees to organizational policies, including state and federal guidelines such as The Health Insurance Portability and Accountability Act (HIPAA) and OSHA. | 5. ☐ | ☐ | ☐ | ☐ |
| B. The policy concerning the provision of health care by personnel in any student or postgraduate trainee status provides for close and adequate supervision and for informing the patient of the status of the health care professional. | B. ☐ | ☐ | ☐ | ☐ |
| C. Policies concerning publishing activities address: | C. ☐ | ☐ | ☐ | ☐ |
| 1. The need for governing body approval when the views, policies, and procedures expressed in the publication are attributed to the organization. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. The terms and conditions of compensation from publication and the cost of publication. | 2. ☐ | ☐ | ☐ | ☐ |

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# 19. Research Activities

If research is conducted, an accreditable organization establishes and implements policies governing research that are consistent with its mission, goals, and objectives, and with its clinical capabilities. Such an organization has the following characteristics.

| | | Compliance | | | |
|---|---|---|---|---|---|
| | | SC | PC | NC | N/A |
| A. | Research activities are performed in accordance with ethical and professional practices and legal requirements, and these activities are periodically monitored. Such activities include, but are not limited to, clinical trials of drugs and other biologicals, devices, implants, or instruments that are classified as investigational or experimental, and techniques that are new, experimental, innovative, or otherwise not yet accepted as standard medical or dental practice. | A. ☐ | ☐ | ☐ | ☐ |
| B. | The written protocols for conducting research are approved by the governing body or its designee after medical (or dental) and legal review. | B. ☐ | ☐ | ☐ | ☐ |
| C. | Any research activities carried out within the organization are appropriate to the expertise of staff and the resources in the organization. | C. ☐ | ☐ | ☐ | ☐ |
| D. | Individuals engaged in research are provided with adequate facilities. | D. ☐ | ☐ | ☐ | ☐ |
| E. | Provisions are made to ensure that the rights and welfare of all research subjects are adequately protected and that the informed consent of each subject is obtained by adequate and appropriate methods in the language spoken by him or her. | E. ☐ | ☐ | ☐ | ☐ |
| F. | All professional staff is informed of the organization's research policies. | F. ☐ | ☐ | ☐ | ☐ |

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# 20. Overnight Care and Services

If an accreditable organization provides overnight care (i.e., has patients that are not discharged from the facility on the day they were admitted to the facility) and related services, such care and services meet the needs of the patients served and are provided in accordance with ethical and professional practices and legal requirements.

*Note: This chapter applies to organizations, or sub-units thereof, that provide care, including overnight accommodations, for patients who do not require the full range of services of an acute care hospital. Such patients may be recovering from surgery and require observation by medical personnel, receiving treatment for non-critical illnesses, or need only short-term or custodial care.*

| | Compliance | | | |
|---|---|---|---|---|
| | SC | PC | NC | N/A |
| A. The scope and limitations of overnight care and services are clearly specified. Such information is communicated to: | A. ☐ | ☐ | ☐ | ☐ |
| 1. Physicians who refer and admit patients to the program. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Staff who provide the care and services. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Potential patients in advance of their referral to the program. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Other health care professionals and relevant community agencies. | 4. ☐ | ☐ | ☐ | ☐ |
| B. A patient is admitted or discharged only upon the order of a physician who is responsible for the medical care of that patient. | B. ☐ | ☐ | ☐ | ☐ |
| C. Adequate supervision of overnight care and services is the responsibility of one or more qualified physicians who are approved by the governing body upon the recommendation of qualified medical staff. | C. ☐ | ☐ | ☐ | ☐ |
| 1. At least one physician is present or immediately available by telephone whenever patients are present. | 1. ☐ | ☐ | ☐ | ☐ |
| D. Providers may admit patients to this program if they: | D. ☐ | ☐ | ☐ | ☐ |
| 1. Are licensed to treat patients or supervise care and services in this setting. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Have been granted such privileges by the governing body of the organization, in accordance with Chapter 2.II. | 2. ☐ | ☐ | ☐ | ☐ |
| E. Policies and procedures are clearly specified that include, but are not limited to: | E. ☐ | ☐ | ☐ | ☐ |
| 1. Clinical criteria for determining eligibility for admission. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Clinical responsibilities for each patient during his/her stay. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Arrangements for emergency services. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Arrangements for transfer to other health care services as needed. | 4. ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| F. The organization has a written transfer agreement with a nearby hospital or grants admitting privileges only to physicians who have admitting privileges at a nearby hospital. | F. ☐ | ☐ | ☐ | ☐ |
| G. The overnight care unit meets applicable local and state codes, including licensing requirements if the state licenses such units. | G. ☐ | ☐ | ☐ | ☐ |
| H. Registered nurses and other health care professionals are appropriately trained and supervised and are available in sufficient numbers to meet patient needs. | H. ☐ | ☐ | ☐ | ☐ |
| I. At least one registered nurse is on duty at all times when patients are present. | I. ☐ | ☐ | ☐ | ☐ |
| J. Treatment rooms are provided or made available to meet patient needs and physician requirements. | J. ☐ | ☐ | ☐ | ☐ |
| K. Emergency power adequate for the size of the unit is available to protect the life and safety of patients. | K. ☐ | ☐ | ☐ | ☐ |
| L. Appropriate isolation procedures are followed when any patient is admitted with a suspected or diagnosed communicable disease. | L. ☐ | ☐ | ☐ | ☐ |
| M. Food service and refreshments are provided to meet the needs of patients. | M. ☐ | ☐ | ☐ | ☐ |
| 1. Evidence of compliance with local, state, and federal guidelines is present and adhered to regarding preparing, serving, disposal, and storing of food and drink for patient use. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Special dietary requirements for patient care are met. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Personnel providing food services meet local health department requirements. | 3. ☐ | ☐ | ☐ | ☐ |
| N. In addition to the applicable clinical records and health information requirements found in Chapter 6, the records for overnight care and services include: | N. ☐ | ☐ | ☐ | ☐ |
| 1. A current history and physical examination. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Treatment orders. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Nursing notes. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Follow-up instructions to patients. | 4. ☐ | ☐ | ☐ | ☐ |
| O. If overnight care is the only service provided by the organization, that organization meets all other applicable Standards contained in the *Handbook*. | O. ☐ | ☐ | ☐ | ☐ |
| P. If overnight care is only one of many services provided by the organization, these services shall be functionally integrated to ensure compliance with all other applicable Standards contained in the *Handbook*. | P. ☐ | ☐ | ☐ | ☐ |
| Q. Overnight care and services are reviewed as part of the organization's quality improvement program. | Q. ☐ | ☐ | ☐ | ☐ |

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# 21. Occupational Health Services

Occupational medicine is a specialty devoted to the prevention and management of occupational and environmental injury, illness, and disability, and promotion of health and productivity of workers, their families, and communities. This chapter will apply if an organization provides extensive services, complex services, or markets itself as an occupational health center. If an organization provides basic employee health services to its own employees, Standards 3.B-F will be used to evaluate these services.

| | Compliance | | | |
|---|---|---|---|---|
| | SC | PC | NC | N/A |
| A. Individuals who agree to laboratory testing or medical examinations at the request of their employer are afforded the patient rights noted in Chapter 1. In addition, they are informed of: | A. ☐ | ☐ | ☐ | ☐ |
| 1. The purpose and scope of the evaluation and the role of the examiner. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Confidentiality protections and information that may be conveyed to the employer. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Whether medical follow-up is necessary. | 3. ☐ | ☐ | ☐ | ☐ |
| B. Occupational health services are accurately portrayed to patients, employees, and purchasers of the services. | B. ☐ | ☐ | ☐ | ☐ |
| C. Occupational health services are provided by personnel who: | C. ☐ | ☐ | ☐ | ☐ |
| 1. Have access to and utilize, as appropriate, consultative services associated with evaluating workplace hazards such as industrial hygiene, ergonomics, toxicology, occupational health nursing, epidemiology, and occupational medicine physicians. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Have ready access to appropriate reference materials in occupational health and participate in occupational health continuing medical education. | 2. ☐ | ☐ | ☐ | ☐ |
| D. The provision of high-quality occupational health services is demonstrated by the following, as appropriate: | D. ☐ | ☐ | ☐ | ☐ |
| 1. An understanding of the specific workplace hazards for each employee/patient served. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. An understanding of the relationship of the condition or finding to workplace conditions and exposures. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Determination of whether the individual is able to perform essential functions of the job and whether accommodations are needed. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Preventive counsel concerning measures to reduce occupational exposures and hazards, including use of protective equipment. | 4. ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| 5. Compliance with occupational regulations such as the Occupational Safety and Health Act (OSHA), Americans with Disabilities Act (ADA), and state Workers' Compensation statutes concerning the organization's: | 5. ☐ | ☐ | ☐ | ☐ |
| a. Training and credentials of personnel. | a. ☐ | ☐ | ☐ | ☐ |
| b. Policies, procedures, and forms. | b. ☐ | ☐ | ☐ | ☐ |
| c. Equipment, including calibration and maintenance. | c. ☐ | ☐ | ☐ | ☐ |
| d. Clinical records and record management. | d. ☐ | ☐ | ☐ | ☐ |
| E. Entries in a patient's clinical record for each visit include, as appropriate: | E. ☐ | ☐ | ☐ | ☐ |
| 1. An occupational and exposure history, including essential job functions, conditions of work, and hazards of the job. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. The individual's current functional abilities. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Whether the individual is able to perform essential job functions and suggestions for accommodations or restrictions. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. The relationship of medical conditions or abnormal findings to workplace conditions and exposures. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. Preventive counsel concerning reduction of workplace exposures and use of personal protective equipment. | 5. ☐ | ☐ | ☐ | ☐ |
| 6. Relevant communications concerning the patient, work activities, or exposures, including communications with employers, insurance carriers, union representatives, and attorneys. | 6. ☐ | ☐ | ☐ | ☐ |
| F. Medical management of injury or illness minimizes disability and promotes functional recovery, directing special attention to cases in which: | F. ☐ | ☐ | ☐ | ☐ |
| 1. Recovery has been delayed. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Functional abilities have decreased during treatment. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Injury or illness is recurrent. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. There is permanent impairment, disability, or restriction. | 4. ☐ | ☐ | ☐ | ☐ |
| G. Work placement evaluations such as preplacement, transfer, or fitness for duty examinations assess current health and ability to perform the job as well as the extent and duration of recent health changes affecting job performance. | G. ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| H. Organizations providing medical surveillance evaluations of employees to identify adverse effects from exposure to workplace hazards ensure that: | H. ☐ | ☐ | ☐ | ☐ |
| 1. The health professionals performing or interpreting these evaluations have specific knowledge about the hazardous agent, including its effects, permissible and actual exposure levels, biologic monitoring, and regulatory requirements. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Whenever possible, surveillance data is statistically analyzed for health trends and effects of exposure. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. The results of workplace data for similar workers with similar exposures are considered in the evaluation of the employee. | 3. ☐ | ☐ | ☐ | ☐ |
| I. Organizations providing certification examinations mandated under state or federal statutes ensure that: | I. ☐ | ☐ | ☐ | ☐ |
| 1. The health care professional performing the evaluation has access to the Standard and related materials. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. The health care professional understands the statute as it relates to the exam. | 2. ☐ | ☐ | ☐ | ☐ |
| J. Organizations providing occupational health testing and ancillary service programs such as urine collection for drugs of abuse, breath alcohol content testing, blood lead determinations, audiograms, or chest x-rays ensure that these programs are administered under appropriate written protocols, which are: | J. ☐ | ☐ | ☐ | ☐ |
| 1. Specific to the service provided, addressing all relevant topics such as specimen collection, handling, transportation, receipt and report of results, record management, equipment, equipment calibration, and maintenance. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Under the supervision of a licensed physician or, if allowed, another health care professional. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Reviewed and updated periodically. | 3. ☐ | ☐ | ☐ | ☐ |
| K. Organizations providing consulting services ensure that the role and responsibilities of the consultant are clearly defined. | K. ☐ | ☐ | ☐ | ☐ |
| L. Organizations providing training and educational programs ensure that each program: | L. ☐ | ☐ | ☐ | ☐ |
| 1. Has written objectives. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Is tailored to the specific worker population and work conditions. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Includes an evaluation process and uses the results to improve program quality. | 3. ☐ | ☐ | ☐ | ☐ |

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| | Compliance | | | |
|---|---|---|---|---|
| | SC | PC | NC | N/A |
| M. If the organization is responsible for emergency and/or community preparedness planning, it ensures that: | M. ☐ | ☐ | ☐ | ☐ |
| 1. The disaster plan: | 1. ☐ | ☐ | ☐ | ☐ |
| a. Includes likely worksite scenarios for disasters, estimating potential morbidity and mortality. | a. ☐ | ☐ | ☐ | ☐ |
| b. Includes appropriate plans for medical segregation, decontamination, evacuation, and transportation in collaboration with local emergency planning committees. | b. ☐ | ☐ | ☐ | ☐ |
| 2. The toxicologic exposure plan: | 2. ☐ | ☐ | ☐ | ☐ |
| a. Provides counsel on the identification, decontamination, and evacuation of potentially exposed individuals or communities. | a. ☐ | ☐ | ☐ | ☐ |
| b. Ensures appropriate emergency treatment protocols for potentially acute exposures to toxic agents handled by employees. | b. ☐ | ☐ | ☐ | ☐ |
| c. Provides appropriate medical expertise for the case management of individual acute toxic exposures. | c. ☐ | ☐ | ☐ | ☐ |
| d. Provides sufficient training and exercises to ensure that the plan will be effective. | d. ☐ | ☐ | ☐ | ☐ |

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# 22. Immediate/Urgent Care Services

If an accreditable organization implies by its activities, advertising, or practices that its ***primary*** mission is to provide medical care of an urgent or immediate nature on a non-appointment basis, such care meets the needs of the patients it intends to serve. Such immediate care and urgent care is provided in accordance with ethical and professional practices and adheres to applicable local, state, and federal requirements. Such an organization has the following characteristics.

| | Compliance | | | |
|---|---|---|---|---|
| | SC | PC | NC | N/A |
| A. The range of services offered by the organization and its hours of operation are clearly defined and communicated to the public and relevant organizations. | A. ☐ | ☐ | ☐ | ☐ |
| B. Such organizations, unless they also provide emergency services, do not solicit patients with life-threatening conditions. | B. ☐ | ☐ | ☐ | ☐ |
| C. Patients seeking immediate/urgent care services are seen without prior appointments. | C. ☐ | ☐ | ☐ | ☐ |
| D. Immediate/urgent care services are performed only by health care professionals who are licensed to perform such procedures within the state in which the organization is located and who have been granted privileges to perform those procedures by the governing body of the organization, upon the recommendations of qualified medical staff and after medical review of the health care professional's documented education, training, experience, and current competence. | D. ☐ | ☐ | ☐ | ☐ |
| E. During hours of operation, at least one qualified physician is present or immediately available. | E. ☐ | ☐ | ☐ | ☐ |
| F. The organization is prepared in terms of personnel, equipment, and procedures to evaluate, stabilize, and transfer medical emergencies that may present themselves or arise in conjunction with services provided by the organization. | F. ☐ | ☐ | ☐ | ☐ |
| G. Equipment, drugs, and other agents necessary to provide immediate/urgent care services are available. | G. ☐ | ☐ | ☐ | ☐ |
| H. Communications are maintained with local police departments, fire departments, community social service agencies, ambulance services, poison control centers, and hospitals as needed to ensure high-quality patient care. | H. ☐ | ☐ | ☐ | ☐ |
| I. Laboratory and imaging services described in Chapters 12 and 13 are available to meet the needs of patients receiving immediate/urgent care. | I. ☐ | ☐ | ☐ | ☐ |
| J. Arrangements have been made to ensure that adequate specialty consultation services are available. | J. ☐ | ☐ | ☐ | ☐ |
| K. Health care professionals who maintain skills in advanced cardiac life support (ACLS) or advanced trauma life support (ATLS) are present. | K. ☐ | ☐ | ☐ | ☐ |
| L. All clinical support staff with direct patient contact maintain at a minimum skills in basic life support (BLS). | L. ☐ | ☐ | ☐ | ☐ |

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# 23. Emergency Services

If an accreditable organization implies by its activities, advertising, or practice that it provides emergency services on a regular basis to meet life-, limb-, or function-threatening conditions, such services meet the needs of the patients and are provided in accordance with ethical and professional practices and legal requirements. Such an organization has the following characteristics.

| | | Compliance | | | |
|---|---|---|---|---|---|
| | | SC | PC | NC | N/A |
| A. | Emergency services are provided 24 hours per day, every day of the year. | A. ☐ | ☐ | ☐ | ☐ |
| B. | Emergency services are performed only by health care professionals who are licensed to perform such procedures within the state in which the organization is located and who have been granted privileges to perform those procedures by the governing body of the organization, upon the recommendations of qualified medical staff and after medical review of the health care professional's documented education, training, experience, and current competence. | B. ☐ | ☐ | ☐ | ☐ |
| C. | At least one qualified physician is present at all times. | C. ☐ | ☐ | ☐ | ☐ |
| D. | Health care professionals assisting in the provision of emergency services are appropriately qualified, trained, and supervised and are available in sufficient numbers for the emergency services provided. | D. ☐ | ☐ | ☐ | ☐ |
| E. | Unless otherwise provided for by the governing body, equipment, drugs, and other agents recommended by the *Emergency Care Guidelines* of the American College of Emergency Physicians are available. | E. ☐ | ☐ | ☐ | ☐ |
| F. | Laboratory and imaging services described in Chapters 12 and 13 are immediately available. | F. ☐ | ☐ | ☐ | ☐ |
| G. | Communications are maintained with local police departments, fire departments, community social service agencies, ambulance services, poison control centers, and hospitals as needed to ensure high-quality patient care. | G. ☐ | ☐ | ☐ | ☐ |
| H. | Adequate specialty consultation services are immediately available. | H. ☐ | ☐ | ☐ | ☐ |
| I. | All clinical support staff with direct patient contact maintain at a minimum skills in basic life support (BLS). Medical personnel currently trained in ACLS or ATLS and privileged to provide advanced resuscitative techniques are present when patients are present. When pediatric patients are served, medical personnel who are currently trained in pediatric advanced life support (PALS) and age- and size-appropriate resuscitative equipment must be available at all times. Initial ACLS, ATLS, and PALS training and subsequent retraining is obtained from the American Heart Association or another vendor that includes "hands-on" training and skills demonstration of airway management and automated external defibrillator (AED) use. | I. ☐ | ☐ | ☐ | ☐ |

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# 24. Radiation Oncology Treatment Services

Radiation oncology treatment services provided or made available by an accreditable organization meet the needs of the patients and are provided in accordance with ethical and professional practices and legal requirements. Such an organization has the following characteristics.

| | Compliance | | | |
|---|---|---|---|---|
| | SC | PC | NC | N/A |
| A. Radiation oncology treatment services that are provided or made available by the organization are appropriate to the needs of the patient and are adequately supported by the organization's capabilities. | A. ☐ | ☐ | ☐ | ☐ |
| B. Radiation oncology services appropriate to the organization's function include, but are not limited to: | B. ☐ | ☐ | ☐ | ☐ |
| 1. Consultation services. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Simulation of treatment. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Treatment planning. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Clinical treatment management including but not limited to the use of teletherapy and brachytherapy. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. Maintenance of reports of services and radiographic images appropriate to the therapy, for the time required by applicable laws and policy of the organization. | 5. ☐ | ☐ | ☐ | ☐ |
| 6. Appropriate follow-up care of all patients. | 6. ☐ | ☐ | ☐ | ☐ |
| C. Radiation oncology services provided by the organization are directed by a physician who is qualified to assume professional, organizational, and administrative responsibility for the quality of services rendered. | C. ☐ | ☐ | ☐ | ☐ |
| D. The radiation oncology service has written safety and quality control policies and procedures, including policies and procedures for teletherapy and brachytherapy, that must be reviewed at least annually by a qualified medical physicist. The policies and procedures include, but are not limited to: | D. ☐ | ☐ | ☐ | ☐ |
| 1. The designation of a radiation safety officer and committee that meets on a periodic basis. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. A program to maintain personnel exposure records. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Annual calibration of teletherapy units. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Annual review of the radiation safety program by a qualified medical physicist. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. A program to inspect interlock systems of all treatment units. | 5. ☐ | ☐ | ☐ | ☐ |
| 6. Maintenance of the records of machine performance, maintenance, and malfunctions. | 6. ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| 7. Periodic testing of all sealed sources, satisfying all pertinent radiation regulations. | 7. ☐ | ☐ | ☐ | ☐ |
| 8. A program for maintenance and repair of equipment. | 8. ☐ | ☐ | ☐ | ☐ |
| 9. Quality control procedures for all therapeutic equipment. | 9. ☐ | ☐ | ☐ | ☐ |
| 10. Regulation of the acquisition, use, removal, handling, and storage of potentially hazardous materials. | 10. ☐ | ☐ | ☐ | ☐ |
| E. The radiation oncology treatment service maintains sufficient adequately trained and qualified health care professionals who are available and able to supervise and conduct work of the service, including the following: | E. ☐ | ☐ | ☐ | ☐ |
| 1. A radiation technologist certified by the American Registry of Radiologic Technologists (ARRT), or state-licensed technologist. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Dosimetrist. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Qualified radiation physicist. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Such other appropriately trained health care professionals as may be in keeping with local practice and legal requirements, such as oncology nurses, nutritionists, and medical social workers. | 4. ☐ | ☐ | ☐ | ☐ |
| F. The radiation oncology service should have adequate facilities and equipment to provide appropriate treatments and related treatments, which include: | F. ☐ | ☐ | ☐ | ☐ |
| 1. Supervoltage or megavoltage machine(s) capable of producing x-ray, gamma-ray, or proton beams for external beam treatments (includes isocentric and non-isocentric linear accelerators, GammaKnife, TomoTherapy, and cobalt-60 machines). | 1. ☐ | ☐ | ☐ | ☐ |
| 2. A kilovoltage x-ray source or electron-beam for skin lesions. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Access to computerized dosimetry. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Access to simulation and/or CT imaging equipment. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. Access to patient transport. | 5. ☐ | ☐ | ☐ | ☐ |
| 6. Personal immobilization devices with procedures to ensure proper identification to match each device to the proper patient. | 6. ☐ | ☐ | ☐ | ☐ |
| 7. Technologies for shaping dose distributions, including but not limited to multi-leaf collimators, metal alloy, or sheet lead; procedures for proper identification of each device (or electronic file) to the patient and radiation field; and established procedures for identification, handling, storage, and removal of devices made of metal alloys. | 7. ☐ | ☐ | ☐ | ☐ |
| 8. If High Dose Rate (HDR) brachytherapy, Low Dose Rate (LDR) brachytherapy, or similar procedures using radioactive seeds or other devices that are implanted or injected are used, appropriate storage containers are used and equipment is available and used to test the procedure room and storage containers in order to ensure that no potentially harmful residual radiation is present on site. | 8. ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| G. The radiation oncology service has policies addressing the quality of care, including but not limited to policies providing for the following: | G. ☐ | ☐ | ☐ | ☐ |
| 1. A recognized methodology for diagnosis and treatment, including but not limited to the use of teletherapy and brachytherapy. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. The performance of therapeutic services on the written order of a radiation oncologist. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. A physician is present or immediately available during treatment; in those situations in which the physician is not present but is immediately available, qualified support personnel are present. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Weekly chart and port film review for on-going therapies. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. Periodic new patient review. | 5. ☐ | ☐ | ☐ | ☐ |
| 6. Signed informed consent obtained prior to treatment. | 6. ☐ | ☐ | ☐ | ☐ |
| 7. Photo documentation of treatment setups. | 7. ☐ | ☐ | ☐ | ☐ |
| 8. Access to emergency treatment. | 8. ☐ | ☐ | ☐ | ☐ |
| H. The facility has access to appropriate supporting facilities, including diagnostic laboratories and imaging facilities. | H. ☐ | ☐ | ☐ | ☐ |
| I. In addition to the applicable clinical records and health information requirements found in Chapter 6, the following characteristics indicate good-quality patient care in the radiation oncology setting and are documented: | I. ☐ | ☐ | ☐ | ☐ |
| 1. Confirmation of the presence of malignancy by histopathology or a statement of benign condition. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Definition of tumor location, extent, and stage. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Definition of treatment volume. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Selection of dose. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. Selection of treatment modality. | 5. ☐ | ☐ | ☐ | ☐ |
| 6. Selection of treatment technique. | 6. ☐ | ☐ | ☐ | ☐ |
| 7. Dosimetry calculations. | 7. ☐ | ☐ | ☐ | ☐ |
| 8. Supervision of treatment and record of patient progress and tolerance. | 8. ☐ | ☐ | ☐ | ☐ |
| 9. Summary of completion with statement of follow-up plan. | 9. ☐ | ☐ | ☐ | ☐ |

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# 25. Medical Home

The services provided by an accreditable Medical Home are patient-centered, physician-, nurse practitioner-[1] or physician assistant-[1]directed, comprehensive, accessible, continuous, and organized to meet the needs of the individual patients served. The foundation of a Medical Home is the relationship between the patient, his/her family, as appropriate, and the Medical Home. Within the patient-centered Medical Home, patients are empowered to be responsible for their own health care. As used in these Standards, a Medical Home is the primary point of care for the patient. The Medical Home chapter will apply to organizations that choose the chapter in the *Application for Survey*. The Medical Home will be assessed from the perspective of the patient on the following characteristics.

| | Compliance | | | |
|---|---|---|---|---|
| | SC | PC | NC | N/A |
| A. Relationship – communication, understanding, and collaboration. (In this context, "physician" refers to the physician or the physician-, nurse practitioner-, or physician assistant-directed health care team). | A. ☐ | ☐ | ☐ | ☐ |
| 1. The patient can identify his/her physician and patient care team members. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Patients are fully empowered to participate in decisions involving their health care, except when such participation is contraindicated for medical reasons. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. The patients are provided with information and explanation regarding the Medical Home approach to care. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. The physician explains information in a manner that is easy to understand. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. The physician listens carefully to the patient and, when appropriate, the patient's personal caregiver(s). Caregivers may include a parent, legal guardian, or person with the patient's power of attorney. | 5. ☐ | ☐ | ☐ | ☐ |
| 6. The physician speaks to the patient about his/her health problems and concerns. | 6. ☐ | ☐ | ☐ | ☐ |
| 7. The physician provides easy-to-understand instructions about taking care of health concerns. | 7. ☐ | ☐ | ☐ | ☐ |
| 8. The physician knows important facts about the patient's health history. | 8. ☐ | ☐ | ☐ | ☐ |
| 9. The physician spends sufficient time with the patient. | 9. ☐ | ☐ | ☐ | ☐ |
| 10. The physician is as thorough as the patient feels is needed. | 10. ☐ | ☐ | ☐ | ☐ |
| 11. The staff keeps the patient informed with regard to his/her appointment when delayed. | 11. ☐ | ☐ | ☐ | ☐ |
| 12. The physician addresses specific principles to prevent illness. | 12. ☐ | ☐ | ☐ | ☐ |
| 13. The physician speaks with the patient about making lifestyle changes to help prevent illness. | 13. ☐ | ☐ | ☐ | ☐ |

[1]*As permitted by state law/regulation*

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| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| 14. The physician inquires as to the patient's concerns, worries, and stressors. | 14. ☐ | ☐ | ☐ | ☐ |
| 15. The physician inquires as to the patient's mental health status (*e.g.*, sad, empty, or depressed). | 15. ☐ | ☐ | ☐ | ☐ |
| 16. The Medical Home provides services within a team framework, and that "team" provider concept has been conveyed to the patient. | 16. ☐ | ☐ | ☐ | ☐ |
| 17. The family is included, as appropriate, in patient care decisions, treatment, and education. | 17. ☐ | ☐ | ☐ | ☐ |
| 18. The Medical Home treats its patients with cultural sensitivity. | 18. ☐ | ☐ | ☐ | ☐ |
| B. Accessibility | B. ☐ | ☐ | ☐ | ☐ |
| 1. The Medical Home establishes standards in writing to support patient access, such as provider availability, treatment plan information, clinical record contents, advice, routine care, and urgent care; the Medical Home's data supports that they meet those standards. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. Patients are routinely and continuously assessed for their perceptions about access to the Medical Home (provider availability, treatment plan information, clinical record contents, advice, routine care, and urgent care). | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Patients are provided information about how to obtain medical care at any time, 24 hours per day, every day of the year. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. The Medical Home ensures on-call coverage (pre-arranged access to a clinician) when the Medical Home is not open. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. Electronic data management is continually assessed as a tool for facilitating the above-mentioned Standards. | 5. ☐ | ☐ | ☐ | ☐ |
| C. Comprehensiveness of care | C. ☐ | ☐ | ☐ | ☐ |
| 1. If the Medical Home limits the population served, those limitations are disclosed to prospective patients. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. The Medical Home scope of service includes, but is not limited to: | 2. ☐ | ☐ | ☐ | ☐ |
| a. Preventive care including surveillance, anticipatory medical and oral health care guidance, and age-appropriate screening including well baby care. | a. ☐ | ☐ | ☐ | ☐ |
| b. Wellness care including healthy lifestyle issues such as appropriate sleep, stress relief, weight management, healthy diet, oral care, and others, as appropriate. | b. ☐ | ☐ | ☐ | ☐ |
| c. Health risk appraisal and health risk assessment and discussions with the patient. | c. ☐ | ☐ | ☐ | ☐ |
| d. Acute illness and injury care. | d. ☐ | ☐ | ☐ | ☐ |
| e. Chronic illness management. | e. ☐ | ☐ | ☐ | ☐ |
| f. End-of-life care. | f. ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| 3. Patient education and self-management resources are provided. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Knowledge of community resources that support the patient's (and family's, as appropriate) needs are known by the Medical Home. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. The community's service limitations are known and alternate sources are coordinated by the Medical Home. | 5. ☐ | ☐ | ☐ | ☐ |
| 6. Referrals are appropriate to the patient's needs; when referrals occur, the Medical Home collaborates with the specialist. | 6. ☐ | ☐ | ☐ | ☐ |
| 7. The needs of the patient's personal caregiver (see definition in Standard 25.A.5), when known, are assessed and addressed to the extent that they impact the care of the patient. | 7. ☐ | ☐ | ☐ | ☐ |
| 8. Electronic data management is continually assessed as a tool for facilitating the above-mentioned Standards. | 8. ☐ | ☐ | ☐ | ☐ |
| D. Continuity of care | D. ☐ | ☐ | ☐ | ☐ |
| 1. A significant number (more than 50%) of the Medical Home visits of any patient are with the same physician/physician team. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. If a consultation is ordered for the patient, it is documented in the clinical record. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. Referrals for services (external to the Medical Home) are documented in the clinical record. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Consultations (medical opinions obtained from other health care professionals) are recorded in the clinical record. | 4. ☐ | ☐ | ☐ | ☐ |
| 5. Referrals are disease- or procedure-specific. | 5. ☐ | ☐ | ☐ | ☐ |
| 6. The results of a patient referral are recorded in the clinical record; follow-up procedures exist, and the results of the referral are appropriately reported to the Medical Home as they are made available. | 6. ☐ | ☐ | ☐ | ☐ |
| 7. Follow-up appointments are documented in the clinical record. | 7. ☐ | ☐ | ☐ | ☐ |
| 8. After-hour encounters are documented in the clinical record. | 8. ☐ | ☐ | ☐ | ☐ |
| 9. Missed appointments are documented in the clinical record and managed appropriately depending on the patient's care needs and diagnosis. | 9. ☐ | ☐ | ☐ | ☐ |
| 10. Critical referrals, critical consultations, and critical diagnostic studies are tracked, and appropriate follow-up is made when the results are not received within a timely manner. | 10. ☐ | ☐ | ☐ | ☐ |
| 11. Transition of care (e.g., pediatric to adult or adult to geriatric) is proactively planned, coordinated, and documented in the clinical record when indicated or when appropriate. | 11. ☐ | ☐ | ☐ | ☐ |
| 12. Electronic data management is continually assessed as a tool for facilitating the above-mentioned Standards, including consultations, referrals, and lab results. | 12. ☐ | ☐ | ☐ | ☐ |

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| | Compliance SC | PC | NC | N/A |
|---|---|---|---|---|
| E. Quality | E. ☐ | ☐ | ☐ | ☐ |
| 1. Patient care is directed by a physician, nurse practitioner, or physician assistant. | 1. ☐ | ☐ | ☐ | ☐ |
| 2. The Medical Home incorporates evidence-based guidelines and performance measures in delivering clinical services. | 2. ☐ | ☐ | ☐ | ☐ |
| 3. The Medical Home periodically assesses its use of evidence-based guidelines and performance measures to ensure that they are current and being used effectively and appropriately. | 3. ☐ | ☐ | ☐ | ☐ |
| 4. Supervision of patient care by the Medical Home, as evidenced by: | 4. ☐ | ☐ | ☐ | ☐ |
| a. Appropriate and timely diagnosis based on findings of the current history and physical examination. | a. ☐ | ☐ | ☐ | ☐ |
| b. Medication review and update including prescription, over-the-counter, and diet supplements, and if indicated, use of recreational drugs and substances. | b. ☐ | ☐ | ☐ | ☐ |
| c. Appropriate ordering of diagnostic tests. | c. ☐ | ☐ | ☐ | ☐ |
| d. Absence of clinically unnecessary diagnostic or therapeutic procedures. | d. ☐ | ☐ | ☐ | ☐ |
| e. Appropriate management of patient referrals (avoidance of unnecessary referrals). | e. ☐ | ☐ | ☐ | ☐ |
| 5. The Medical Home assesses and continuously improves the services it provides; measurements, quality studies, data trending, and benchmarking are key tools in a quality improvement/ management program. | 5. ☐ | ☐ | ☐ | ☐ |
| 6. In addition to the Standards presented in Chapter 5.I, the Medical Home's quality improvement program includes at least one study every three years on each of the following topics: | 6. ☐ | ☐ | ☐ | ☐ |
| a. Patient/primary care provider relationship. | a. ☐ | ☐ | ☐ | ☐ |
| b. Accessibility to care. | b. ☐ | ☐ | ☐ | ☐ |
| c. Comprehensiveness of care. | c. ☐ | ☐ | ☐ | ☐ |
| d. Continuity of care. | d. ☐ | ☐ | ☐ | ☐ |
| e. Clinical study. | e. ☐ | ☐ | ☐ | ☐ |
| *NOTE: A single quality improvement study may include more than one of the five topic areas listed above.* | | | | |
| 7. Electronic data management is continually assessed as a tool for facilitating the above-mentioned Standards. | 7. ☐ | ☐ | ☐ | ☐ |

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Draft

**TRANSFER AGREEMENT BETWEEN**

**HARTFORD HOSPITAL**
**("Hospital")**

**AND**

**HHC HARTFORD SURGERY CENTER, LLC**
**("Facility")**

To facilitate continuity of care and the timely transfer of patients and records between the Hospital and the Facility, the parties named above agree as follows:

1. That both parties shall make their facilities available to receive and care for all patients who in the professional opinion of the patient's physician would receive more appropriate treatment or care in the receiving institution; provided that at the time of the proposed transfer, the receiving institution shall have the facilities available for the proper care for the transferring patient, in accordance with federal and state laws and regulations.

2. The transferring institution will send with each patient at the time of transfer and whenever possible with the driver of the vehicle which transports the patient, or in the case of emergency, as promptly as possible the completed transfer and referral forms mutually agreed upon to provide the medical and administrative information necessary to determine the appropriateness of the placement and to enable continuing care to the patient. The transfer and referral forms will include such information as current medical findings, diagnoses, a brief summary of the course of treatment followed in the transferring institution, nursing and dietary information, discharge medication list, ambulation status, and pertinent administrative and social information, as appropriate.

3. The Hospital shall make available its diagnostic and therapeutic services for emergency care, on an outpatient basis, as ordered or referred by the attending physician subject to federal and state laws and regulations and the Hospital's policies and procedures.

4. The transferring institution will be responsible for the transfer or other appropriate disposition of personal effects, particularly money and valuables, and information related to these items.

5. The transferring institution will be responsible for affecting the transfer of the patient, including arranging for appropriate and safe transportation and care of the patient during the transfer in accordance with applicable federal and state laws and regulations.

6. The receiving institution will have responsibility for the care of the patient upon acceptance of admission.

7. Each institution shall be solely responsible for billing and collecting charges which result from services it rendered to the patient. Charges for services performed by either facility shall be collected by the institution rendering such services, directly from the patient, third-party payer, or other sources normally billed by the institution. Neither facility shall have any liability to the other for such charges. However, the transferring institution will provide the receiving institution with

appropriate information it possesses pertinent to the financial status of the patient, the responsible party for the patient and any applicable information on benefit or insurance coverage.

8. The governing body of each facility shall have exclusive control of policies, management, assets, and affairs of its respective institutions. Neither institution shall assume any liability by virtue of the agreement for any debts or other obligations of either a financial or legal nature incurred by the other party to this agreement.

9. Nothing in this agreement shall be construed as limiting the rights of either institution to contract with any other facility on a limited or general basis.

10. This agreement shall be in effect from the effective date identified below and shall remain in force unless terminated by (i) either facility providing thirty (30) days prior written notice; or (ii) immediately upon the revocation of either party's license to operate by the State of Connecticut or the failure of either party to be properly certified to participate in Medicare or Medicaid..

11. Any dispute arising under this agreement shall be discussed directly by the Administrator of the Facility and the director of Case Management at Hartford Hospital. If no agreement is reached, the Director of Case Management will bring the matter to the attention of the Hartford Hospital Administration.

12. This agreement may be modified or amended by mutual agreement of the parties in writing.

13. Nothing in this agreement shall be construed as allowing the use of the other party's name in any promotional or advertising material without the prior written approval of the institution whose name is to be used.

IN WITNESS THEREFORE, the parties hereto are duly authorized to execute this agreement to be effective on the __ day of _____, 2013.

| **HARTFORD HOSPITAL** | **HHC HARTFORD SURGERY CENTER, LLC** |
|---|---|
| By:_____ | By: _____ |
| Printed Name: _____ | Printed Name: _____ |
| Its: _____ | Its: _____ |
| Date: _____ | Date: _____ |

**Hartford Healthcare**
**Financial Assistance Policy**

**Update Date: 12/16/2010**

**Purpose:** The purpose of this Policy is to set forth the policy of Hartford Healthcare Corporation (sometimes referred to as the "System") governing the provision of free or discounted Health Care Services to patients who meet the System's criteria for Financial Assistance. Specifically, this Policy will describe: (i) the eligibility criteria for Financial Assistance, and whether such assistance includes free or discounted care; (ii) the basis for calculating amounts charged to patients; (iii) the method for applying for Financial Assistance from the System's Hospitals; (iv) the actions the System may take in the event of non-payment, including collections action and reporting to credit agencies for patients that qualify for Financial Assistance; and (v) the System measures to widely publicize this Policy within the community served by Hartford Healthcare.

**Scope:** This Policy applies to all Hartford Health facilities Health Care Services regardless of the location at which they are being provided by the System.

**Definitions:**

*"Charges"* means for a Health Care Service for a patient who is either Uninsured or Underinsured and who is eligible for Financial Assistance, the average of the System's facility three best negotiated commercial payor rates for the Health Care Services.

*"Eligibility Criteria"* means the criteria set forth in this Policy to determine whether a patient qualifies for Financial Assistance for the Health Care Services provided by the System's facility.

*"EMTALA"* means the Emergency Medical Treatment and Labor Act, 42 USC 1395dd, as amended from time to time.

*"Family"* means pursuant to the Census Bureau definition, a group of two or more people who reside together and who are related by birth, marriage, civil union or adoption. For purposes of this Policy, if the patient claims someone as a dependent on their income tax return, they may be considered a dependent for purposes of the provision of financial assistance.

*"Family Income"* means the following income when calculating Federal Poverty Level Guidelines of liquid assets: earnings, unemployment compensation, workers' compensation, Social Security, Supplemental Security Income, public assistance, veterans' payments, survivor benefits, pension or retirement income, interest, dividends, rents, royalties, income from estates, trusts, educational assistance, alimony, child support, assistance from outside the household, and other miscellaneous sources of income. If a person lives with a Family, Family Income includes the income of all Family members.

*"Federal Poverty Level Guidelines"* means the federal poverty level guidelines established by the United States Department of Health and Human Services.

*"Financial Assistance"* means free or discounted Health Care Services provided to persons who, pursuant to the Eligibility Criteria, the Hospital has determined to be unable to pay for all or a portion of the Health Care Services.

*"Free Bed Funds"* means any gift of money, stock, bonds, financial instruments or other property made by any donor to Hartford Healthcare facilities for the purpose of establishing a fund to provide medical care to an inpatient or outpatient of Hartford Healthcare.

*"Health Care Services"* means Hartford Healthcare facilities (i) emergency medical services as defined by EMTALA; (ii) services for a condition which, if not promptly treated, will result in adverse change in the health status of the individual; (iii) non-elective services provided in response to life-threatening circumstances in a non-emergency department setting; and (iv) medically necessary services as determined by the System facility on a case-by-case basis at the facility's discretion.

*"Medically Indigent"* means persons whom the System facility has determined to be unable to pay some or all of their medical bills because their medical bills exceed a certain percentage of their Family Income or Family assets even though they have income or assets that otherwise exceed the generally applicable Eligibility Criteria for free or discounted care under the Policy.

*"Uninsured"* means a patient who has no level of insurance or third party assistance to assist in meeting his or her payment obligations for Health Care Services and is not covered by Medicare, Medicaid or Champus or any other health insurance program of any nation, state, territory or commonwealth, or under any other governmental or privately sponsored health or accident insurance or benefit program including, but not limited to workers' compensation and awards, settlements or judgments arising from claims, suits or proceedings involving motor vehicle accidents or alleged negligence.

*"Underinsured"* means the patient has some level of insurance or third-party assistance but still has out-of-pocket expenses such as high deductible plans that exceed his or her level of financial resources.

**Policy:** It is Hartford Healthcare's policy to provide Financial Assistance to all eligible individuals who are Uninsured, Underinsured, ineligible for a government program, or otherwise unable to pay for Health Care Services due to their limited financial resources. It is also the System's policy to provide without discrimination care for emergency medical conditions (as defined by EMTALA) to individuals regardless of their eligibility for Financial Assistance under this Policy or for government assistance.

## I. Determining Eligibility.

In determining eligibility for Financial Assistance, it is important that both the System facility and the patient work collaboratively. Specifically, the System facilities

will do its best to apply the Eligibility Criteria in a flexible and reasonable manner and the patient will do its best in responding to Hartford Healthcare requests for information in a timely manner.

1. **Eligibility for Financial Assistance.** Individuals who are Uninsured, Underinsured, ineligible for any government health care benefit program and unable to pay for their Health Care Services may be eligible for Financial Assistance pursuant to this Policy. The granting of Financial Assistance shall be based upon an individualized determination of financial need, and shall not take into account age, gender, race, color, national origin, marital status, social or immigrant status, sexual orientation or religious affiliation.

2. **Process for Determining Eligibility for Financial Assistance.** In connection with determining eligibility for Financial Assistance, the System (i) will require that the patient complete an application for Financial Assistance along with providing other financial information and documentation relevant to making a determination of financial eligibility; (ii) may rely upon publicly available information and resources to determine the financial resources of the patient or a potential guarantor; (iii) may pursue alternative sources of payment from public and private payment benefit programs; (iv) may review the patient's prior payment history; and (v) may consider the patient's receipt of state-funded prescription programs, participation in Women, Infants and Children programs, food stamps, subsidized school lunches, subsidized housing, or other public assistance as presumptive eligibility when there is insufficient information provided by the patient to determine eligibility.

3. **Processing Requests.** Hartford Healthcare will use its best efforts to facilitate the determination process prior to rendering services so long as the determination process does not interfere with the provision of emergency medical services as defined under federal law. However, eligibility determinations can be made at any time during the revenue cycle. During the eligibility determination process, the System facilities will at all times treat the patient or their authorized representative with dignity and respect and in accordance with all state and federal laws.

4. **Financial Assistance Guidelines.** Eligibility criteria for Financial Assistance may include, but is not limited to, such factors as Family size, liquid and non-liquid assets, employment status, financial obligations, amount and frequency of healthcare expense (i.e. Medically Indigent) and other financial resources available to the patient. Family size is determined based upon the number of dependents living in the household. In particular, eligibility for Financial Assistance will be determined in accordance with the following guidelines:

*(a) **Uninsured Patients:***

(i) If Family income is at or below 250% of the Federal Poverty Level Guidelines, the patient may qualify for up to a 100% discount against the System facility's Charges for Health Care Services;

(ii) If Family income is between 250% and 400% of the Federal Poverty Level Guidelines, the patient may qualify for up to a 50% discount against the System facility's Charges for Health Care Services;

(iii) Patients may also qualify for Free Bed Funds in accordance with the Hartford Healthcare Free Bed Funds Policy; and

(iv) Patients may have presumptive eligibility if they are homeless and have no assets or qualify for other means-tested government programs.

*(b)* ***Underinsured Patients:***

(i) Payment plans will be extended for any patient liability (including without limitation to amounts due under high deductible plans) identified in a manner consistent with the System's Payment Plan Policy;

(ii) If Family Income is at or below 250% of the Federal Poverty Level Guidelines, the patient may qualify for up to a 100% discount against the lesser of (a) the account balance after insurance payments from third-party payors are applied; or (b) the Charges for the Health Care Services;

(iii) If Family Income is between 250% and 400% of the Federal Poverty Level Guidelines, the patient may qualify for up to 50% discount against the lesser of (a) the account balance after insurance payments from third-party payors are applied; or (b) the Charges for the Health Care Services;

(v) Patients may also qualify for Free Bed Funds in accordance with Hartford Healthcare Free Bed Funds Policy; and

(vi) Patients may have presumptive eligibility if they are homeless and have no assets or qualify for other means-tested government programs.

*(c)* ***Medically Indigent:*** Patients will be required to submit a Financial Assistance application along with other supporting documentation, such as medical bills, drug and medical device bills and other evidence relating to high-dollar medical liabilities, so that the Hartford Healthcare System Hardship Committee can determine whether the patient qualifies for Financial Assistance due to the patient's medical expenses and liabilities.

**II. Method for Applying for Financial Assistance.** Patients may ask any nurse, physician, chaplain, or staff member from Patient Registration, Patient Accounts, Office of Professional Services, Case Coordination, or Social Services about initiating the Financial Assistance application process. Information about applying for Financial Assistance is

also available online at www.hartfordhealthcare.org. Signage and written information regarding how to apply for Financial Assistance will be available in Hartford Healthcare facilitiesl emergency service and patient registration areas. Once a patient or his or her legal representative requests information about Financial Assistance, a Financial Counselor will provide the patient or his or her legal representative with the Financial Assistance application along with a list of the required documents that must be provided to process the application. If the patient or his or her legal representative does not provide the necessary documentation and information required to make a Financial Eligibility determination within fourteen (14) calendar days of the Hartford Healthcare facility's request, the Financial Assistance application will be deemed incomplete and rendered void. However, if an application is deemed complete by the System facility, the System facility will provide to the patient or his or her legal representative a written determination of financial eligibility within five (5) business days. Decisions by the System facilities that the patient does not qualify for Financial Assistance may be appealed by the patient or his or her legal representative within fourteen (14) calendar days of the determination. If the patient or his or her legal representative appeals the determination, the Director of Patient Access will review the determination along with any new information and render a final decision within five (5) business days.

**III. Relationship to Hartford Healthcare Collection Practices.** In the event a patient fails to qualify for Financial Assistance or fails to pay their portion of discounted Charges pursuant to this Policy, and the patient does not pay timely their obligations to Hartford Healthcare, the System reserves the right to institute and pursue collection actions and to pursue any remedies available at law or in equity, including but not limited to, imposing wage garnishments or filing and foreclosing on liens on primary residences or other assets, instituting and prosecuting legal actions and reporting the matter to one or more credit rating agencies. For those patients who qualify for Financial Assistance and who, in the System's sole determination, are cooperating in good faith to resolve the System's outstanding accounts, the System facilities may offer extended payment plans to eligible patients, will not impose wage garnishments or liens on primary residences, will not send unpaid bills to outside collection agencies and will cease all collection efforts.

**IV. Publication and Education.** Hartford Healthcare facilities will disseminate information about its Financial Assistance Policy as follows: (i) provide signage regarding this Policy and written summary information describing the Policy along with financial assistance contact information in the Emergency Department, Labor and Delivery areas and all other System patient registration areas; (ii) directly provide to each patient written summary information describing the Policy along with financial assistance contact information in all admission, patient registration, discharge, billing and collection written communications; (iii) post the Policy on the System's web site with clear linkage to the Policy on the System's home page; (iv) educate all admission and registration personnel regarding the Policy so that they can serve as an informational resource to patients regarding the Policy; and (v) include the tag line "Please ask about our Financial Assistance Policy" in all Hartford Healthcare written advertisements.

**V. Relation to Free Bed Funds.** If a patient applies for Financial Assistance, Hartford Healthcare facilities will determine his or her eligibility for Financial Assistance and or Free Bed Funds.

**VI. Regulatory Compliance.** The System will comply with all state and federal laws, rules and regulations applicable to the conduct described in this Policy.

| | |
|---|---|
| **Reviewed By:** | Niobus Queiro, Revenue Cycle Director, Hartford Healthcare Corporation |
| | Shelly McCafferty, PFS Director, Hartford Healthcare Corporation |
| | Becky Peters, PAS Director, Hartford Hospital |
| | Joan Feldman, Legal Counsel to Hartford Healthcare Corporation |
| **Approved By:** | _____ **Thomas Marchozzi, EVP & CFO Hartford Healthcare Corp.** |
| **Date:** | **October 1, 2010** |

**Issued Date: 08/16/2010**

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

| Total Facility: Hartford Hospital<br>Description | FY 2012 Actual Results | FY 2016 Projected W/out CON | FY 2016 Projected Incremental | FY 2016 Projected With CON |
|---|---|---|---|---|
| **NET PATIENT REVENUE** | | | | |
| Non-Government | $421,071,330 | $546,563,319 | ($485,469) | $546,077,850 |
| Medicare | $381,926,070 | $381,093,731 | $213,959 | $381,307,690 |
| Medicaid and Other Medical Assistance | $114,354,648 | $85,727,235 | ($83,484) | $85,643,751 |
| Other Government | $9,281,003 | $6,510,684 | $0 | $6,510,684 |
| Total Net Patient Patient Revenue | $926,633,051 | $1,019,894,969 | ($354,994) | $1,019,539,975 |
| Other Operating Revenue | $172,515,114 | $177,932,000 | $1,902,231 | $179,834,231 |
| Revenue from Operations | $1,099,148,165 | $1,197,826,969 | $1,547,237 | $1,199,374,206 |
| **OPERATING EXPENSES** | | | | |
| Salaries and Fringe Benefits | $604,512,881 | $647,562,000 | | $647,562,000 |
| Professional / Contracted Services | $44,286,457 | $45,000,000 | | $45,000,000 |
| Supplies and Drugs | $133,308,976 | $171,085,000 | $699,086 | $171,784,086 |
| Bad Debts | $22,645,968 | $25,824,000 | | $25,824,000 |
| Other Operating Expense | $173,935,441 | $158,178,000 | | $158,178,000 |
| Subtotal | $978,689,723 | $1,047,649,000 | $699,086 | $1,048,348,086 |
| Depreciation/Amortization | $46,274,726 | $66,850,000 | | $66,850,000 |
| Interest Expense | $4,517,043 | $5,943,000 | | $5,943,000 |
| Lease Expense | $17,167,465 | $19,957,000 | | $19,957,000 |
| Total Operating Expense | $1,046,648,957 | $1,140,399,000 | $699,086 | $1,141,098,086 |
| Gain/(Loss) from Operations | $52,499,208 | $57,427,969 | $848,151 | $58,276,120 |
| Plus: Non-Operating Revenue | $56,285,568 | $20,461,000 | | $20,461,000 |
| Revenue Over/(Under) Expense | $108,784,776 | $77,888,969 | $848,151 | $78,737,120 |
| FTEs | 6,033 | 6,243 | 0 | 6,243 |
| *Volume Statistics: | 24,679 | 25,000 | (205) | 24,795 |

Provide projected inpatient and/or outpatient statistics for any new services and provide actual and projected inpatient and/or outpatient statistics for al

**12. C (i).** Please provide one year of actual re volume statistics without, incremental to and with the

| **Total Facility: Hartford Hospital**<br>**Description** | **FY 2017 Projected W/out CON** | **FY 2017 Projected Incremental** | **FY 2017 Projected With CON** |
|---|---|---|---|
| **NET PATIENT REVENUE** | | | |
| Non-Government | $566,938,975 | $316,709 | $567,255,684 |
| Medicare | $382,930,428 | $482,989 | $383,413,417 |
| Medicaid and Other Medical Assistance | $85,258,946 | $42,246 | $85,301,192 |
| Other Government | $6,482,230 | $0 | $6,482,230 |
| Total Net Patient Patient Revenue | $1,041,610,579 | $841,944 | $1,042,452,523 |
| Other Operating Revenue | $184,234,000 | $1,934,412 | $186,168,412 |
| Revenue from Operations | $1,225,844,579 | $2,776,356 | $1,228,620,935 |
| **OPERATING EXPENSES** | | | |
| Salaries and Fringe Benefits | $662,993,000 | | $662,993,000 |
| Professional / Contracted Services | $47,000,000 | | $47,000,000 |
| Supplies and Drugs | $176,394,000 | $1,329,163 | $177,723,163 |
| Bad Debts | $26,702,000 | | $26,702,000 |
| Other Operating Expense | $158,323,000 | | $158,323,000 |
| Subtotal | $1,071,412,000 | $1,329,163 | $1,072,741,163 |
| Depreciation/Amortization | $68,668,000 | | $68,668,000 |
| Interest Expense | $6,151,000 | | $6,151,000 |
| Lease Expense | $20,856,000 | | $20,856,000 |
| Total Operating Expense | $1,167,087,000 | $1,329,163 | $1,168,416,163 |
| Gain/(Loss) from Operations | $58,757,579 | $1,447,193 | $60,204,772 |
| Plus: Non-Operating Revenue | $20,461,000 | | $20,461,000 |
| Revenue Over/(Under) Expense | $79,218,579 | $1,447,193 | $80,665,772 |
| FTEs | 6,243 | 0 | 6,243 |
| *Volume Statistics: | 25,000 | 147 | 25,147 |

Provide projected inpatient and/or outpatient statistics for any existing services which will change due to the proposal.

**12. C (i).** Please provide one year of actual re
without, incremental to and with the

| **Total Facility: Hartford Hospital**<br><br>**Description** | **FY 2018 Projected W/out CON** | **FY 2018 Projected Incremental** | **FY 2018 Projected With CON** |
|---|---|---|---|
| **NET PATIENT REVENUE** | | | |
| Non-Government | $586,649,639 | $766,150 | $587,415,789 |
| Medicare | $398,838,254 | $637,291 | $399,475,545 |
| Medicaid and Other Medical Assistance | $84,642,610 | $114,824 | $84,757,434 |
| Other Government | $6,448,720 | $0 | $6,448,720 |
| Total Net Patient Patient Revenue | $1,076,579,223 | $1,518,265 | $1,078,097,488 |
| Other Operating Revenue | $190,975,000 | $1,950,364 | $192,925,364 |
| Revenue from Operations | $1,267,554,223 | $3,468,629 | $1,271,022,852 |
| **OPERATING EXPENSES** | | | |
| Salaries and Fringe Benefits | $695,765,000 | | $695,765,000 |
| Professional / Contracted Services | $49,000,000 | | $49,000,000 |
| Supplies and Drugs | $176,001,000 | $1,661,001 | $177,662,001 |
| Bad Debts | $27,512,000 | | $27,512,000 |
| Other Operating Expense | $158,123,000 | | $158,123,000 |
| Subtotal | $1,106,401,000 | $1,661,001 | $1,108,062,001 |
| Depreciation/Amortization | $72,561,000 | | $72,561,000 |
| Interest Expense | $6,085,000 | | $6,085,000 |
| Lease Expense | $21,745,000 | | $21,745,000 |
| Total Operating Expense | $1,206,792,000 | $1,661,001 | $1,208,453,001 |
| Gain/(Loss) from Operations | $60,762,223 | $1,807,628 | $62,569,851 |
| Plus: Non-Operating Revenue | $20,461,000 | $0 | $20,461,000 |
| Revenue Over/(Under) Expense | $81,223,223 | $1,807,628 | $83,030,851 |
| FTEs | 6,243 | 0 | 6,243 |
| *Volume Statistics: | 25,000 | 336 | 25,336 |

Provide projected inpatient and/or outpatient statistics for a

**Hartford Hospital**

**12.C(ii).** 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 | Ambulatory Surgery | | | | | | | | | |
| Type of Unit Description: | Cases | | | | | | | | | |
| # of Months in Operation | 12 | | | | | | | | | |
| **FY 2017** | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| **FY Projected Incremental** | | Rate | Units | Gross Revenue Col. 2 * Col. 3 | Allowances/ Deductions | Charity Care | Bad Debt | Net Revenue Col.4 - Col.5 -Col.6 - Col.7 | Operating Expenses Col. 1 Total * Col. 4 / Col. 4 Total | Gain/(Loss) from Operations Col. 8 - Col. 9 |
| Total Incremental Expenses: | **$1,661,001** | | | | | | | | | |
| **Total Facility by Payer Category:** | | | | | | | | | | |
| Medicare | | $4,714 | 189 | $890,946 | $253,655 | | | $637,291 | $934,313 | ($297,022) |
| Medicaid | | $4,714 | (42) | ($197,988) | ($312,812) | | | $114,824 | ($207,625) | $322,449 |
| CHAMPUS/TriCare | | $4,714 | 0 | $0 | $0 | | | $0 | $0 | $0 |
| **Total Governmental** | | | 147 | $692,958 | ($59,157) | $0 | $0 | $752,115 | $726,688 | $25,427 |
| Commercial Insurers | | $4,714 | 161 | $758,954 | $124,596 | | | $634,158 | $795,896 | ($161,738) |
| Uninsured | | $4,714 | 28 | $131,992 | | | | $131,992 | $138,417 | ($6,425) |
| **Total NonGovernment** | | $4,714 | 189 | $890,946 | $124,596 | $0 | $0 | $766,150 | $934,313 | ($168,163) |
| **Total All Payers** | | $4,714 | 336 | $1,583,904 | $65,439 | $0 | $0 | $1,518,265 | $1,661,001 | ($142,736) |
| Other Operating Revenue | | | | | | | | | | $1,950,364 |
| Gain from Operations | | | | | | | | | | $1,807,628 |

**13. B i.** Please provide one year of actual results and 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:<br>Description | FY 2012 Actual Results | FY2016 Projected W/out CON | FY2016 Projected Incremental | FY2016 Projected With CON | FY2017 Projected W/out CON | FY2017 Projected Incremental | FY2017 Projected With CON | FY2018 Projected W/out CON | FY2018 Projected Incremental | FY2018 Projected With CON |
|---|---|---|---|---|---|---|---|---|---|---|
| **NET PATIENT REVENUE** | | | | | | | | | | |
| Non-Government | $0 | $0 | $8,301,469 | $8,301,469 | $0 | $8,797,700 | $8,797,700 | $0 | $9,301,090 | $9,301,090 |
| Medicare | $0 | $0 | $719,101 | $719,101 | $0 | $761,275 | $761,275 | $0 | $806,713 | $806,713 |
| Medicaid and Other Medical Assistance | $0 | $0 | $162,305 | $162,305 | $0 | $172,572 | $172,572 | $0 | $182,371 | $182,371 |
| Other Government | $0 | $0 | $1,095 | $1,095 | $0 | $1,073 | $1,073 | $0 | $1,052 | $1,052 |
| Total Net Patient Patient Revenue | $0 | $0 | $9,183,970 | $9,183,970 | $0 | $9,732,621 | $9,732,621 | $0 | $10,291,225 | $10,291,225 |
| Other Operating Revenue | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Revenue from Operations | $0 | $0 | $9,183,970 | $9,183,970 | $0 | $9,732,621 | $9,732,621 | $0 | $10,291,225 | $10,291,225 |
| **OPERATING EXPENSES** | | | | | | | | | | |
| Salaries and Fringe Benefits | $0 | $0 | $1,558,575 | $1,558,575 | $0 | $1,730,805 | $1,730,805 | $0 | $1,919,220 | $1,919,220 |
| Professional / Contracted Services | $0 | $0 | $825,721 | $825,721 | $0 | $873,693 | $873,693 | $0 | $922,595 | $922,595 |
| Supplies and Drugs | $0 | $0 | $1,772,648 | $1,772,648 | $0 | $1,993,559 | $1,993,559 | $0 | $2,237,039 | $2,237,039 |
| Bad Debts | $0 | $0 | $90,930 | $90,930 | $0 | $96,363 | $96,363 | $0 | $101,893 | $101,893 |
| Other Operating Expense | $0 | $0 | $688,801 | $688,801 | $0 | $722,374 | $722,374 | $0 | $757,842 | $757,842 |
| Subtotal | $0 | $0 | $4,936,675 | $4,936,675 | $0 | $5,416,793 | $5,416,793 | $0 | $5,938,589 | $5,938,589 |
| Depreciation/Amortization | $0 | $0 | $547,500 | $547,500 | $0 | $547,500 | $547,500 | $0 | $547,500 | $547,500 |
| Interest Expense | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Lease Expense | $0 | $0 | $426,500 | $426,500 | $0 | $426,500 | $426,500 | $0 | $426,500 | $426,500 |
| Total Operating Expense | $0 | $0 | $5,910,675 | $5,910,675 | $0 | $6,390,793 | $6,390,793 | $0 | $6,912,589 | $6,912,589 |
| Gain/(Loss) from Operations | $0 | $0 | $3,273,295 | $3,273,295 | $0 | $3,341,827 | $3,341,827 | $0 | $3,378,636 | $3,378,636 |
| Non-Operating Income | | | | $0 | | | $0 | | | $0 |
| Income before provision for income taxes | $0 | $0 | $3,273,295 | $3,273,295 | $0 | $3,341,827 | $3,341,827 | $0 | $3,378,636 | $3,378,636 |
| Provision for income taxes/distributions | | | $3,273,295 | $3,273,295 | | $3,341,827 | $3,341,827 | | $3,378,636 | $3,378,636 |
| Net Income | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Retained earnings, beginning of year | | | $0 | $0 | | $0 | $0 | | $0 | $0 |
| Retained earnings, end of year | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| FTEs | | | 24 | 24 | | 25 | 25 | | 26 | 26 |
| *Volume Statistics: Surgical Cases | | | 2,526 | 2,526 | | 2,731 | 2,731 | | 2,947 | 2,947 |

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.

**13.C(ii).** 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 | Outpatient |
| Type of Unit Description: | Surgical Cases |
| # of Months in Operation | 12 |

| **FY 2016**<br>**FY Projected Incremental**<br>Total Incremental Expenses:<br><br>**Total Facility by Payer Category:** | (1)<br><br>**$5,910,675** | (2)<br>Rate<br>Col. 2 * Col. 3 | (3)<br>Units | (4)<br>Gross Revenue | (5)<br>Allowances/ Deductions | (6)<br>Charity Care | (7)<br>Bad Debt | (8)<br>Net Revenue<br>Col.4 - Col.5 -Col.6 - Col.7 | (9)<br>Operating Expenses<br>Col. 1 Total * Col. 4 / Col. 4 Total | (10)<br>Gain/(Loss) from Operations<br>Col. 8 - Col. 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| Medicare | | $6,800 | 398 | $2,706,400 | $1,987,299 | | | $719,101 | $916,967 | ($197,866) |
| Medicaid | | $6,800 | 141 | $958,800 | $796,495 | | | $162,305 | $324,855 | ($162,550) |
| CHAMPUS/TriCare | | $6,800 | 1 | $6,800 | $5,705 | | | $1,095 | $2,304 | ($1,208) |
| **Total Governmental** | | | 540 | $3,672,000 | $2,789,499 | $0 | $0 | $882,501 | $1,244,126 | ($361,625) |
| Commercial Insurers | | $6,800 | 1,945 | $13,226,000 | $5,019,292 | | | $8,206,708 | $4,481,158 | $3,725,550 |
| Uninsured | | $6,800 | 41 | $278,800 | | $184,039 | $90,930 | $3,831 | $94,461 | ($90,630) |
| **Total NonGovernment** | | | 1,986 | $13,504,800 | $5,019,292 | $184,039 | $90,930 | $8,210,539 | $4,575,619 | $3,634,919 |
| **Total All Payers** | | $6,800 | 2,526 | 17,176,800 | 7,808,791 | 184,039 | 90,930 | 9,093,040 | 5,819,745 | 3,273,295 |

**13.C(ii).** 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 | Outpatient |
| Type of Unit Description: | Surgical Cases |
| # of Months in Operation | 12 |

| **FY 2015**<br>**FY Projected Incremental**<br>Total Incremental Expenses: **$6,390,793**<br><br>**Total Facility by Payer Category:** | (1) | (2)<br>Rate | (3)<br>Units | (4)<br>Gross Revenue<br>Col. 2 * Col. 3 | (5)<br>Allowances/<br>Deductions | (6)<br>Charity Care | (7)<br>Bad Debt | (8)<br>Net Revenue<br>Col.4 - Col.5<br>-Col.6 - Col.7 | (9)<br>Operating Expenses<br>Col. 1 Total *<br>Col. 4 / Col. 4 Total | (10)<br>Gain/(Loss) from Operations<br>Col. 8 - Col. 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| Medicare | | $7,140 | 430 | $3,070,200 | $2,308,925 | | | $761,275 | $991,067 | ($229,792) |
| Medicaid | | $7,140 | 153 | $1,092,420 | $919,848 | | | $172,572 | $352,636 | ($180,064) |
| CHAMPUS/TriCare | | $7,140 | 1 | $7,140 | $6,067 | | | $1,073 | $2,305 | ($1,231) |
| **Total Governmental** | | | 584 | $4,169,760 | $3,234,840 | $0 | $0 | $934,920 | $1,346,008 | ($411,088) |
| Commercial Insurers | | $7,140 | 2,103 | $15,015,420 | $6,318,111 | | | $8,697,309 | $4,847,011 | $3,850,298 |
| Uninsured | | $7,140 | 44 | $314,160 | | $213,769 | $96,363 | $4,029 | $101,412 | ($97,383) |
| **Total NonGovernment** | | | 2,147 | $15,329,580 | $6,318,111 | $213,769 | $96,363 | $8,701,338 | $4,948,423 | $3,752,915 |
| **Total All Payers** | | $7,140 | 2,731 | 19,499,340 | 9,552,951 | 213,769 | 96,363 | 9,636,258 | 6,294,431 | 3,341,827 |

**13.C(ii).** 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 | Outpatient |
| Type of Unit Description: | Surgical Cases |
| # of Months in Operation | 12 |

| **FY 2016**<br>**FY Projected Incremental**<br>Total Incremental Expenses: | (1)<br>**$6,912,589** | (2)<br>Rate | (3)<br>Units | (4)<br>Gross Revenue<br>Col. 2 * Col. 3 | (5)<br>Allowances/<br>Deductions | (6)<br>Charity Care | (7)<br>Bad Debt | (8)<br>Net Revenue<br>Col.4 - Col.5<br>-Col.6 - Col.7 | (9)<br>Operating Expenses<br>Col. 1 Total *<br>Col. 4 / Col. 4 Total | (10)<br>Gain/(Loss) from Operations<br>Col. 8 - Col. 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total Facility by Payer Category:** | | | | | | | | | | |
| Medicare | | $7,497 | 465 | $3,486,105 | $2,679,392 | | | $806,713 | $1,074,643 | ($267,931) |
| Medicaid | | $7,497 | 165 | $1,237,005 | $1,054,634 | | | $182,371 | $381,325 | ($198,954) |
| CHAMPUS/TriCare | | $7,497 | 1 | $7,497 | $6,445 | | | $1,052 | $2,311 | ($1,259) |
| **Total Governmental** | | | 631 | $4,730,607 | $3,740,472 | $0 | $0 | $990,135 | $1,458,279 | ($468,144) |
| Commercial Insurers | | $7,497 | 2,269 | $17,010,693 | $7,815,713 | | | $9,194,980 | $5,243,797 | $3,951,183 |
| Uninsured | | $7,497 | 47 | $352,359 | | $246,249 | $101,893 | $4,217 | $108,620 | ($104,403) |
| **Total NonGovernment** | | | 2,316 | $17,363,052 | $7,815,713 | $246,249 | $101,893 | $9,199,197 | $5,352,417 | $3,846,780 |
| **Total All Payers** | | $7,497 | 2,947 | 22,093,659 | 11,556,185 | 246,249 | 101,893 | 10,189,332 | 6,810,696 | 3,378,636 |

# STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH

Jewel Mullen, M.D., M.P.H., M.P.A.
Commissioner

Dannel P. Malloy
Governor
Nancy Wyman
Lt. Governor

July 19, 2013

The Honorable John Fonfara
Senator
State of Connecticut
Legislative Office Building, Room 3700
Hartford, CT 06106-1591

Re: Certificate of Need, Docket Number 13-31851-CON
HHC Hartford Surgery Center, LLC
Establish an Orthopedic Outpatient Surgery Facility on the Hartford Hospital Campus.

Dear Senator Fonfara:

On July 11, 2013, the Department of Public Health ("DPH") received your letter addressed to Commissioner Mullen concerning the Certificate of Need ("CON") for the proposal by HHC Hartford Surgery Center, LLC to establish an Orthopedic Outpatient Surgery Facility on the Hartford Hospital Campus.

I welcome and appreciate your comments regarding this matter. I have forwarded your letter to DPH's Office of Health Care Access ("OHCA"). Your letter will be made part of OHCA's formal record of the CON application docket. Please be advised, once a decision has been rendered it will be posted and available on OHCA's website at http:// www.ct.gov/dph/ohca. Meanwhile, OHCA's website maintains status reports that you may review at your convenience.

If you have any further concerns or questions, please feel free to contact Kimberly Martone at (860) 418-7029.

Sincerely,

Lisa A. Davis, MBA, BSN, RN
Deputy Commissioner

LAD:KRM:bko

Connecticut Department of Public Health

Phone: (860) 509-8000 • Fax: (860) 509-7184 • VP: (860) 899-1611
410 Capitol Avenue, P.O. Box 340308
Hartford, Connecticut 06134-0308
www.ct.gov/dph
*Affirmative Action/Equal Opportunity Employer*

SENATOR JOHN FONFARA
*First District*

Legislative Office Building, Room 3700
Hartford, CT 06106-1591
Tel. (860) 240-0043
Fax (860) 240-0036
www.SenatorFonfara.cga.ct.gov

State of Connecticut
SENATE

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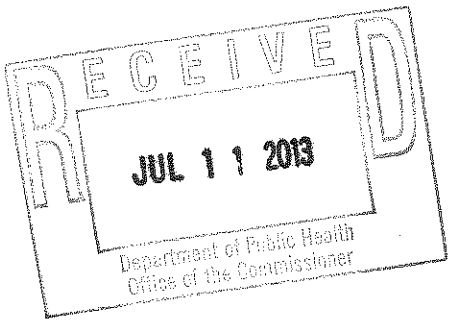
Legislative Management

July 11, 2013




Commissioner Jewel Mullen, MD, MPH, MPA
State of Connecticut
Department of Public Health
410 Capitol Avenue
Hartford, CT 06134

Dear Dr. Mullen:

I am writing today in support of Hartford Hospital's proposed plans for an ambulatory surgery center. Hartford Hospital has a long history of providing and introducing sophisticated high-quality orthopedic services and advances to the region, including but not limited to orthopedic trauma surgery services, joint replacement surgery, bone reconstruction surgery, and other specialty and general orthopedic services.

Given a growing need and demand for high value cost-effective orthopedic services, the Hospital is committed to developing comprehensive musculoskeletal services that would include, as a critical component, an ambulatory surgery center dedicated to providing ambulatory orthopedic surgical services located on the Hartford Hospital main campus in Hartford. An initiative like this will not only respond to a growing demand in orthopedic services but will continue to provide the security of good jobs for many and contribute greatly to the economic stability of the city.

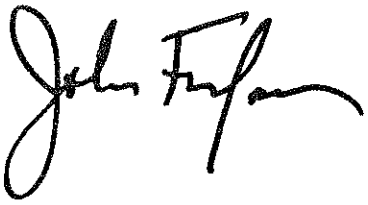
Furthermore, the Hospital's Musculoskeletal Institute will be one component of a nationally recognized orthopedic center of excellence that offers high quality and cost-effective orthopedic services. Such a Center will be a unique asset to the region. In addition, the Musculoskeletal Institute will provide specialized and sophisticated orthopedic services, along with a commitment to the development of evidence-based best practices, clinical treatment protocols, commitment to technological advances, clinical research and valuable opportunities for orthopedic-related clinical educational opportunities, including for the University of Connecticut orthopedic surgical residency program. It is a great example of our ability to not only create a high quality center of care but also provide for great academic partnerships, so that patients receive the highest level of quality care in the most appropriate, cost effective setting.

I believe that the creation of Hartford Hospital's Musculoskeletal Center could result in it becoming a destination for orthopedic services, including ambulatory surgery services. National experts project strong growth for orthopedics, including ambulatory surgery in the Greater

Hartford Market. The growing demand for orthopedic services is consistent with the needs generated by an aging population and the continued transition from inpatient to ambulatory intervention in orthopedic surgery.

I urge approval of Hartford Hospital's Certificate of Need request for the benefit of the region and all of its residents.

Sincerely,



John W. Fonfara
State Senator, 1st District

# STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

*Office of Health Care Access*

August 14, 2013

Barbara A. Durdy
Director, Strategic Planning
Hartford HealthCare Corporation
181 Patricia Genova Drive
Newington, CT 06111

Re: Certificate of Need Application, Docket Number 13-31851-CON
Hartford Hospital, Constitution Surgery Centers, LLC and Affiliated Physicians, collectively to be known as HHC Hartford Surgery Center, LLC
Establishment of an Ambulatory Surgery Center, to be located on the Campus of Hartford Hospital

Dear Ms. Durdy:

On July 15, 2013, the Office of Health Care Access ("OHCA") received the Certificate of Need ("CON") application of Hartford Hospital ("Hospital"), Constitution Surgery Centers, LLC ("CSC") and Affiliated Physicians' formed HHC Hartford Surgery Center, LLC ("New LLC") (collectively known as "Applicants") to establish an ambulatory surgery center ("ASC") on the campus of Hartford Hospital, at a total capital expenditure of $6,500,000.

OHCA has reviewed the CON application pursuant to Section 19a-643-74 of OHCA's Regulations and finds that the information submitted is deficient, and that additional information and/or clarification is required as outlined below:

1. On page 12 of the CON application, the Applicants state that the proposed Primary Service Area ("PSA") for the new LLC is based on the Hospital's current PSA; additionally, the Applicants' listed the proposed PSA for the New LLC in Exhibit 7 of the CON application. As evidence, provide the most recent completed Fiscal Year's orthopedic patients' towns of origin for Hartford Hospital. Totaling to 100% and listing the towns with the highest percentage first. Please explain what towns from that list are considered to be the PSA towns for the New LLC.

2. Regarding the proposed joint venture, please provide the following:

   a) The breakdown of the 49% by ownership interest of the New LLC by CSC and the Affiliated Physicians;
   b) A chart of organization for the New LLC; and
   c) The makeup of the Board of Directors or the governing body of the New LLC.

3. Who are the "Affiliated Physicians" in the joint venture? Are these individual physicians or a physician group?

4. On page 7 of the CON application, the Applicants state that Orthopedic Associates of Hartford, P.C. ("OAH") is the principal physician group collaborating with the Hospital on the proposed ASC. Please clarify OAH's role in this joint venture, as well as its ownership interest.

5. What will CSC's role be in this joint venture? Please detail.

6. Where will the 3 proposed new Operating Rooms ("OR") and 2 shelled spaces will physically located? Provide a schematic drawing of the proposed ASC.

7. On page 6 of the CON application, the Applicants state that the Hospital currently operates 42 ORs, and of these, 8 are dedicated to outpatient surgery. For the 8 ORs dedicated to outpatient surgery, provide the following:

    a) 3 full completed years of historical volume by OR (including year to date);
    b) Types of surgeries performed in each OR and the average times of usage by type of surgery;
    c) Capacity for each OR for each of the past 3 completed years. Be sure to provide an explanation as to how the Applicants derived to the capacity for each OR.
    d) Provide 3 years projected volume for each of the ORs and provide annual capacity. Provide all assumptions utilized for projected volume and annual capacity.

**Note:** Whenever discussing capacity in this application, be sure to include the following: minutes between cases for cleanup, number of hours per day, number of days per week, number weeks per year, optimal utilization for an operating room (%), and average time per case.

8. Provide the following regarding OAH:
    a) By location, the number of ORs operated;
    b) 3 years of completed annual historical volume (including year to date);
    c) Capacity for each OR for each of the past 3 completed years. Be sure to provide an explanation as to how the Applicants derived the capacity for each OR.

9. Regarding the projected volumes table on page 11 of the CON application (Table 3), please address the following:

    a) After the shift in volume to the New LLC, what does the Hospital plan to do with the available capacity at the Hospital's West Hartford ASC and main campus locations?
    b) What does OAH plan to do with the available capacity at its two locations after shifting 1,769 cases by year three of this proposal?

10. On page 9 of the CON application, the Applicants state that an aging population and a rise in the incidence of obesity are two factors contributing the most to the overall projected growth in orthopedic surgery. Provide specific demographic data, national, state and regional level that provides evidence supporting tis statement.

11. Please clarify the first 3 Fiscal Years of this proposal. The projected volumes on pages 10 and 16, utilize years 2015-2017, page 17 utilizes years 2014-2015 and Financial Attachment I, page 411-413 utilizes FYs 2016-2018, Please reconcile the projected fiscal years.

12. Provide a copy of the rate schedule for the New LLC's services.

In responding to the questions contained in this letter, please repeat each question before providing your response. **Paginate and date** your response, i.e., each page in its entirety. Information filed after the initial CON application submission (e.g., completeness response letter, prefile testimony, late file submissions and the like) must be numbered sequentially from the Applicant's document preceding it. Please begin your submission using Page 419 and reference "Docket Number: 13-31851-CON." Submit one (1) original and three (3) hard copies of your response. In addition, please submit a scanned copy of your response, in an Adobe format (.pdf) including all attachments on CD. If available, a copy of the response in MS Word should also be copied to the CD.

Pursuant to Section 19a-639a(c) of the Connecticut General Statutes, you must submit your response to this request for additional information not later than sixty days after the date that this request was transmitted. Therefore, please provide your written responses to OHCA no later than October 13, 2013, otherwise your application will be automatically considered withdrawn.

If you have any questions concerning this letter, please feel free to contact me at OHCA at (860) 418-7012.

Sincerely,

Steven Lazarus
Associate Health Care Analyst

**********
*** TX REPORT ***
**********

TRANSMISSION OK

| | |
|---|---|
| TX/RX NO | 3645 |
| RECIPIENT ADDRESS | 918609724650 |
| DESTINATION ID | |
| ST. TIME | 08/14 15:52 |
| TIME USE | 00'47 |
| PAGES SENT | 4 |
| RESULT | OK |

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH
*OFFICE OF HEALTH CARE ACCESS*

***FAX SHEET***

TO: Barbara Durdy

FAX: (860) 972-4650

AGENCY:

FROM: Steve Lazarus

DATE: 8/14/13 TIME: 3:45

NUMBER OF PAGES: 4
*(including transmittal sheet*

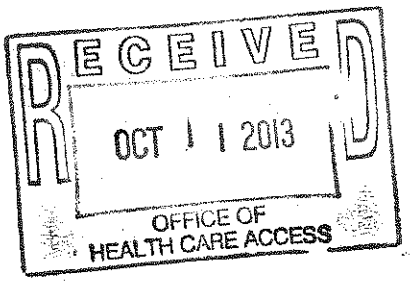
Comments: Complaint Letter regarding Dal. 13-31851-CON

*PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.*

SHIPMAN & GOODWIN LLP®

COUNSELORS AT LAW

Joan W. Feldman
Phone: 860-251-5104
Fax: 860-251-5211
jfeldman@goodwin.com




October 11, 2013

Steven Lazarus
Associate Health Care Analyst
Department of Public Health
Office of Health Care Access
410 Capitol Avenue, MS#13HCA
P.O. Box 340308
Hartford, CT 06134-0308

**RE: HHC Hartford Surgery Center, LLC**
**Completeness Letter Responses; Docket Number 13-31851-CON**

Dear Mr. Lazarus:

On behalf of HHC Hartford Surgery Center, LLC (the "Applicant"), enclosed please find the original and 6 hard copies of the Applicant's responses to your Certificate of Need Completeness Letter dated August 14, 2013. As requested, I have also included a CD with a scanned copy of the Applicant's entire response (including attachments or exhibits), and electronic versions of any Microsoft Word or Excel documents, as applicable.

Please do not hesitate to contact me at 860-251-5104 if you have any questions.

Sincerely,

Joan W. Feldman

Enclosures

000419 (10/11/13)

2945530v5

1. On page 12 of the CON application, the Applicants state that the proposed Primary Service Area ("PSA") for the new LLC is based on the Hospital's current PSA; additionally, the Applicants' listed the proposed PSA for the New LLC in Exhibit 7 of the CON application. As evidence, provide the most recent completed Fiscal Year's orthopedic patients' towns of origin for Hartford Hospital. Totaling to 100% and listing the towns with the highest percentage first. Please explain what towns from the list are considered to be the PSA towns for the New LLC.

**Please see Exhibit 20 attached hereto for Hartford Hospital's inpatient and outpatient orthopedic discharges for FY 2012 by patient town of origin. As you will see, 69% of total inpatient discharges and 79% of outpatient surgeries originate from Hartford Hospital's primary service area.**

2. Regarding the proposed joint venture, please provide the following:

(a) The breakdown of the 49% by ownership interest of the New LLC by CSC and the Affiliated Physicians;

**OAH will own approximately a 42% interest in the HHC Hartford Surgery Center (the "Proposed ASC") and CSC will own approximately a 7% interest in the Proposed ASC. Hartford Hospital will own the remaining 51% interest in the Proposed ASC.**

(b) A chart of the organization for the New LLC; and

**Attached hereto as Exhibit 21 is the organizational chart for the New LLC.**

(c) The makeup of the Board of Directors or the governing body of the New LLC.

**The New LLC shall have 3 classes of members: Class A, Class B and Class C members. Hartford Hospital will be the sole Class B member, OAH physicians and CSC will be the Class A members. Only Class A and Class B have voting rights in the Proposed ASC. Class C will be reserved for physicians who have an ownership interest in the Proposed ASC who are not members of OAH. Class A and Class B each have 3 representatives on the governing body. Class C will have no representatives on the governing body. The unanimous vote of both Class A and Class B shall be required, unless the matter before the governing body involves a tax-exempt status matter wherein Class B shall have a unilateral right to take action.**

3. Who are the "Affiliated Physicians" in the joint venture? Are these individual physicians or a physician group?

**The term "Affiliated Physicians" is intended to mean all orthopedic surgeons on the medical staff of Hartford Hospital, including those physicians with or without an ownership interest that perform surgery at the Proposed ASC.**

4. On page 7 of the CON application, the Applicants state that Orthopedic Associates of Hartford, P.C. ("OAH") is the principal physician group collaborating with the Hospital on the proposed ASC. Please clarify OAH's role in this joint venture, as well as its ownership interest.

**OAH will have approximately a 42% ownership interest in the Proposed ASC. OAH has had a longstanding clinical affiliation with Hartford Hospital, with all of the OAH physicians having active medical staff status at Hartford Hospital. In addition, OAH has been integrally involved in collaborating with Hartford Hospital in the planning of the Hartford Hospital Musculoskeletal Institute (the "Institute"), including the Proposed ASC, and will continue to assist Hartford Hospital in the clinical management of the Institute. OAH also has extensive experience as an owner of 2 other orthopedic ambulatory surgery centers.**

5. What will CSC's role be in this joint venture? Please detail.

**CSC will have approximately a 7% ownership interest in the Proposed ASC. In addition, pursuant to a management agreement with the Proposed ASC, CSC will provide day-to-day management services relating to the Proposed ASC's operations. CSC has an established track record of effectively managing orthopedic ambulatory surgery centers in the State of Connecticut and is currently managing OAH's Rocky Hill ambulatory surgery center (the "Rocky Hill ASC") and the Glastonbury Hand Surgery Center (the "Glastonbury ASC"). CSC also provides management services to the Hartford Hospital eye surgery center. OAH physicians and Hartford Hospital have a great deal of confidence in CSC's ability to effectively manage the Proposed ASC based upon their past and current working relationship.**

6. Where will the 3 proposed new Operating Rooms ("OR") and 2 shelled spaces will physically located? Provide a schematic drawing of the proposed ASC.

**Attached hereto as Exhibit 22, please find a schematic drawing of the Proposed ASC indicating where the 3 ORs will be located along with the 2 shelled spaces. The Proposed ASC will be located on the Hartford Hospital campus and have a connector to Hartford Hospital.**

7. On page 6 of the CON application, the Applicants state that the Hospital currently operates 42 ORs, and of these, 8 are dedicated to outpatient surgery. For the 8 ORs dedicated to outpatient surgery, provide the following:

(a) 3 full completed years of historical volume by OR (including year to date):

**Please see Exhibit 23.**

(b) Types of surgeries performed in each OR and the average times of usage by type of surgery:

**Please see Exhibit 23.**

(c) Capacity for each OR for each of the past 3 completed years. Be sure to provide an explanation as to how the Applicants derived the capacity for each OR.

**Please see Exhibit 23.**

(d) Provide 3 years projected volume for each of the ORs and provide annual capacity. Provide all assumptions utilized for projected volume and annual capacity.

**Please see Exhibit 23.**

8. Provide the following regarding OAH:

(a) By location, the number of ORs operated:

**OAH owns and operates the Rocky Hill ASC, which has 4 operating rooms in Rocky Hill, CT. OAH also holds a 50% interest in the Glastonbury ASC, an ambulatory surgery center jointly owned with Hartford Hospital and CSC in Glastonbury, CT. The Glastonbury ASC has 3 operating rooms.**

**Please also see Exhibit 24.**

(b) 3 years of completed annual historical volume (including year to date):

**Please see Exhibit 24.**

(c) Capacity for each OR for each of the past 3 completed years. Be sure to provide and explanation as to how the Applicants derived the capacity for each OR.

**Please see Exhibit 24.**

**Based upon the data provided in Exhibit 24 attached hereto, both the Rocky Hill and Glastonbury ASCs are operating at or above capacity. Because the utilization is so high, the Applicant plans to shift to the Proposed ASC a total of**

**approximately 1,700 cases per year from both the Rocky Hill and the Glastonbury ASCs.**

9. Regarding the projected volumes table on page 11 of the CON application (Table 3), please address the following:

(a) After the shift in volume to the New LLC, what does the Hospital plan to do with the available capacity at the Hospital's West Hartford ASC and main campus locations?

**The following factors will contribute to an increase in utilization at Hartford Hospital's Main Campus (the "Main Campus") operating rooms and Hartford Hospital's Blue Back Square / West Hartford ambulatory surgery center (the "West Hartford ASC") operating rooms:**

**Increase in the Number of Hartford Hospital Surgeons. The additional capacity that will be created as a result of the shifting of outpatient orthopedic cases from Hartford Hospital's West Hartford ASC (representing approximately 4% of the overall West Hartford surgical cases) and the Main Campus outpatient operating rooms (representing approximately 15% of the overall main campus surgical cases) will allow Hartford Hospital to accommodate the volume generated from 10 new full time surgeons that it will have recruited by 2014. The additional volume generated from these 10 new surgeons will represent significant gain to Hartford Hospital with respect to the overall number of surgical cases it performs each year. As previously indicated in the CON Application (See CON Application at page 14, Table 1b), it is projected that with the addition of 10 new surgeons[1], that the operating room capacity of the Main Campus outpatient operating rooms will be at or above 83% or higher by FY 2016 when the Proposed ASC becomes operational. When the Proposed ASC becomes operational, Hartford Hospital plans to close 3 of its small and outdated outpatient operating rooms. In addition, Hartford Hospital plans on closing 2 additional inpatient operating rooms. Please note that Hartford Hospital does perform certain outpatient cases in some of its inpatient operating rooms (e.g., plastic surgery). With the closure of 2 inpatient operating rooms, Hartford Hospital will be shifting all of its outpatient plastic surgery cases previously done in inpatient operating rooms to the remaining outpatient operating rooms.**

**In addition, the number of Hartford Hospital affiliated employed surgeons is expected to continue to increase over the next 2 years. Over the last 3 years, the number of Hartford Hospital affiliated employed surgeons has increased by 76 (representing a 162% increase). The employed surgeons will not have an ownership interest in the Proposed ASC and will likely perform a majority of their**

[1] Since the CON Application has been submitted, Hartford Hospital has increased its recruiting plans by another 10 surgeons.

**outpatient surgical cases in the West Hartford ASC and the Main Campus operating rooms.**

**Please see Exhibit 23 attached hereto demonstrating the capacity in the remaining dedicated outpatient operating rooms on the Main Campus.**

**Blue Back Square Strategic Plan. If the Proposed ASC is approved by OHCA, Hartford Hospital will relocate its Hearing and Balance Center to the West Hartford ASC location. http://www.harthosp.org/hearing/default.aspx. With the move to the West Hartford Blue Back Square location, cochlear implants, bone anchored hearing aids and other surgical procedures relating thereto and previously performed at the Main Campus will be performed at the West Hartford ASC. These cases currently represent approximately 170 surgical procedures performed in the Main Campus each year. In addition, approximately 480 incremental surgical cases are anticipated for FY 2014 in plastics, colorectal, gynecology and uro-gynecology as new surgeons ramp up their practices at the West Hartford Blue Back Square location. Thus, there will be an incremental increase of approximately 650 cases per year moved and or newly generated to the West Hartford ASC.**

**See Exhibit 25 attached hereto.**

**Transfer Center. As the quaternary care hospital for the Hartford HealthCare system, Hartford Hospital receives many patient transfers from within and outside of the Hartford HealthCare system. With The Hospital of Central Connecticut at New Britain and Bradley Memorial, MidState Medical Center, and Windham Hospital in the Hartford HealthCare system, Hartford Hospital now receives approximately 210 transfers of patients each year that require surgery. With the addition of Backus Hospital to the Hartford HealthCare system, the number of transfer cases to Hartford Hospital will inevitably increase. In addition, Hartford Hospital receives 350 transfers per year of patients requiring surgery from facilities outside of the Hartford HealthCare system. All of these surgeries must be accommodated on an urgent basis in the Main Campus operating rooms. Hartford Hospital has to have ample capacity to be responsive to surgical emergencies.**

(b) What does OAH plan to do with the available capacity at its two locations after shifting 1,769 cases by year three of the proposal:

**As demonstrated above, both the Rocky Hill and Glastonbury ASCs are currently operating at capacity. If the Proposed ASC is approved by OHCA, the additional capacity will afford the OAH physicians greater flexibility in accommodating patient and physician preferences.**

**The number of orthopedic surgical cases are unlikely to remain constant, but rather are expected to grow dramatically. Please also see the articles attached**

**hereto as Exhibit 26 which discuss the continued shift of inpatient cases to outpatient settings, the economic benefits associated with performing surgery in an outpatient setting and the higher level of patient satisfaction associated with surgery being performed in an outpatient setting.**

10. On page 9 of the CON application, the Applicants state that an aging population and a rise in the incidence of obesity are two factors contributing the most to the overall projected growth in orthopedic surgery. Provide specific demographic data, national, state and regional level that provides evidence supporting this statement.

**Regardless of whether or not the aging population or obesity alone are the sole or contributing factors to the rapid growth in joint replacement surgery in our nation, the indisputable fact is that the incidence of joint replacement surgery has grown significantly and will continue to grow dramatically. See Exhibit 27 attached hereto.**
**Since obesity and the aging population are contributing factors, we provide the following information in response to question 10.**

**Obesity: On a national and regional level, the Centers for Disease Control (the "CDC") reported that 35.7% of U.S. and 25.3% of Northeast region adults, respectively, are obese. As to State populations, the CDC reported that 25.6% of Connecticut adult residents are obese. See the CDC's "Adult Obesity Facts."[2]**

**While these numbers are alarming in and of themselves, the historic trend of obesity rates between 1985 and 2010 are further illustrative of the increasing numbers of obese U.S. and Connecticut residents. More specifically, in 1990, not one U.S. state had an incidence of obesity equal to or greater than 15%. By 2000, 23 states had an incidence of obesity between 20-24%. By 2010, no U.S. state had an incidence of obesity less than 20% and 36 U.S. states had an incidence of obesity equal to or greater than 25%. With respect to Connecticut, the incidence of obesity increased from less than 10% in 1985 to between 20-24% in 2010. See the CDC's "Obesity Trends Among U.S. Adults Between 1985 and 2010[3]."**

**Age: As of 2010, the U.S. Census Bureau reported that the number of persons 65 and older in the U.S. and Connecticut are 40,267,984 and 506,559, respectively.[4] More importantly, these numbers are expected to increase significantly in the future. For example, the U.S. Census Bureau states that "[b]etween 2010 and 2050, the United States is projected to experience rapid growth in its older population. In 2050, the number of Americans aged 65 and older is projected to be 88.5 million, more than double its projected population of 40.2 million in 2010. The baby boomers are largely responsible for this increase in the older population, as they will begin crossing into this category in 2011." See page 1 of the U.S. Census Bureau's report titled "The Next Four Decades -**

[2] This CDC report can be found at http://www.cdc.gov/obesity/data/adult.html.
[3] This CDC report can be found at http://www.cdc.gov/obesity/downloads/obesity_trends_2010.pdf.
[4] This data can be found at http://www.aoa.gov/Aging_Statistics/Census_Population/census2010/Index.aspx

**The Older Population in the United States: 2010 to 2050."[5] Furthermore, and with respect to Connecticut, the number of Connecticut residents 65 and over is projected to increase from approximately 500,000 to 800,000 between 2010 and 2030.[6]**

**Relationship Between Obesity, Age and Joint Replacement: It is well established in the medical literature that there is a strong relationship between obesity, age and osteoarthritis and the eventual need for joint replacement surgery. The medical literature and articles attached hereto as Exhibit 27 and 28 provide strong evidence linking obesity and age with the need for joint replacement surgery. According to a study conducted by the National Institutes of Health,**

> **Our study found a strong association between obesity and the need for TKR or THR in nonelderly adults. These findings support those previously observed in the elderly population. As the prevalence of overweight and obese individuals continues to rise, an increase in the number of total joint replacements may rise accordingly.**

**See Exhibit 28 attached hereto.**

11. Please clarify the first 3 Fiscal Years of this proposal. The projected volumes on pages 10 and 16, utilize years 2015-2017, page 17 utilizes years 2014-2015 and Financial Attachment I, page 411-413 utilizes FYs 2016-2018, Please reconcile the projected fiscal years.

**The tables presented on pages 10, 16 and 17 of the CON Application do not reflect the correct dates of operation for the proposed ASC and are corrected below. The Proposed ASC is anticipated to open in October of 2015. The first full year of operation will be FY 2016 as reflected in Financial Attachment I.**

[5] The report can be found at http://www.aoa.gov/AoARoot/Aging_Statistics/future_growth/DOCS/p25-1138.pdf
[6] This report and data can be found at http://www.aoa.gov/AoARoot/Aging_Statistics/future_growth/future_growth.aspx

## Table 2: Projected Number of Procedures and Operating Rooms

**Projected Number of Procedures and Operating Rooms**

| | FY2016 | FY2017 | FY2018 |
|---|---|---|---|
| Hand and Wrist procedures | 825 | 890 | 958 |
| Foot and Ankle | 173 | 182 | 192 |
| Knee and Shoulder | 1,332 | 1,452 | 1,578 |
| General | 196 | 207 | 219 |
| | 2,526 | 2,731 | 2,947 |
| Minutes of Surgery / Cleanup | 227,340 | 245,790 | 265,230 |
| OR need calculated | 2.37 | 2.56 | 2.76 |
| Number of ORs required | 3 | 3 | 3 |

**OHCA Facility Plan Guidelines**
**Unless otherwise supported by documentation from Applicant:**

**Capacity of the proposed facility will be based on 8 hours per day, 5 days per week**
**for a total of 2,000 per year**

**Optimal utilization of an OR = 80%**
**Average time per case = 60 minutes**
**Cleanup time = 30 per case**

**Optimal OR utilization in minutes = 96000 minutes per OR**

## OHCA Table 2a: Projected Outpatient Surgical Volume, By Procedure Type

| | Projected Volume (First 3 Full Operation FYs)* | | |
|---|---|---|---|
| | **FY2016** | **FY2017** | **FY2018** |
| Hand, Wrist, Elbow | **825** | **890** | **958** |
| Foot, Ankle | **173** | **182** | **192** |
| Knee, Shoulder | **1332** | **1452** | **1578** |
| General | **196** | **207** | **220** |
| **Total** | **2526** | **2731** | **2947** |

## OHCA Table 2b: Projected Outpatient Surgical Volume, By Operating Room

| | Projected Volume (First 3 Full Operation FYs)* | | |
|---|---|---|---|
| | **FY2016** | **FY2017** | **FY2018** |
| OR1 | **853** | **853** | **853** |
| OR2 | **853** | **853** | **853** |
| OR3 | **820** | **1023** | **1241** |
| Total | **2526** | **2731** | **2947** |

12. Provide a copy of the rate schedule for the New LLC's services.

**There is no rate schedule for the New LLC's services. The Proposed ASC will accept commercial, governmental and self-pay payers and will be competitive with the market. The goal of the project is to provide cost-effective services. The Applicant has no control over the professional fees of the physicians providing services at the Proposed ASC, but all physicians will be required to comply with the Hospital's Financial Assistance Policy.**

# EXHIBIT 20

## Hartford Hospital
**FY 2012 Inpatient Orthopedic Discharges**
## By Patient Origin

| Patient Town of Origin | Hartford Hospital | % Discharges |
|---|---|---|
| HARTFORD | 261 | 11.3% |
| WEST HARTFORD | 129 | 5.6% |
| EAST HARTFORD | 118 | 5.1% |
| WETHERSFIELD | 93 | 4.0% |
| GLASTONBURY | 87 | 3.8% |
| WINDSOR | 84 | 3.6% |
| MANCHESTER | 79 | 3.4% |
| NEWINGTON | 73 | 3.1% |
| ENFIELD | 68 | 2.9% |
| ROCKY HILL | 67 | 2.9% |
| BRISTOL | 56 | 2.4% |
| BLOOMFIELD | 53 | 2.3% |
| VERNON ROCKVILLE | 50 | 2.2% |
| NEW BRITAIN | 45 | 1.9% |
| MIDDLETOWN | 35 | 1.5% |
| TOLLAND | 35 | 1.5% |
| WINDSOR LOCKS | 35 | 1.5% |
| SOUTH WINDSOR | 34 | 1.5% |
| MERIDEN | 31 | 1.3% |
| SOUTHINGTON | 26 | 1.1% |
| TORRINGTON | 26 | 1.1% |
| AVON | 23 | 1.0% |
| FARMINGTON | 23 | 1.0% |
| BERLIN | 22 | 0.9% |
| SUFFIELD | 21 | 0.9% |
| BROAD BROOK | 19 | 0.8% |
| CROMWELL | 19 | 0.8% |
| ELLINGTON | 19 | 0.8% |
| PLAINVILLE | 18 | 0.8% |
| EAST HAMPTON | 17 | 0.7% |
| GRANBY | 17 | 0.7% |
| STAFFORD SPRINGS | 17 | 0.7% |
| WILLIMANTIC | 17 | 0.7% |
| COLCHESTER | 16 | 0.7% |
| SIMSBURY | 16 | 0.7% |
| SOUTH GLASTONBURY | 15 | 0.6% |
| COLUMBIA | 14 | 0.6% |
| EAST WINDSOR | 14 | 0.6% |
| PLANTSVILLE | 14 | 0.6% |
| WATERBURY | 14 | 0.6% |
| COVENTRY | 13 | 0.6% |
| NORWICH | 13 | 0.6% |
| MARLBOROUGH | 11 | 0.5% |
| SOMERS | 11 | 0.5% |
| STORRS MANSFIELD | 11 | 0.5% |
| WALLINGFORD | 11 | 0.5% |
| AMSTON | 10 | 0.4% |
| BOLTON | 9 | 0.4% |
| UNIONVILLE | 9 | 0.4% |
| BURLINGTON | 8 | 0.3% |
| NEW HARTFORD | 8 | 0.3% |
| NORTH GRANBY | 8 | 0.3% |
| TERRYVILLE | 8 | 0.3% |
| WILLINGTON | 8 | 0.3% |
| WINSTED | 8 | 0.3% |
| ASHFORD | 7 | 0.3% |
| HEBRON | 7 | 0.3% |
| LEBANON | 7 | 0.3% |
| PORTLAND | 7 | 0.3% |
| EAST GRANBY | 6 | 0.3% |
| HARWINTON | 6 | 0.3% |
| OLD SAYBROOK | 6 | 0.3% |

**Hartford Hospital Primary Service Area Towns**

AVON
BERLIN
BLOOMFIELD
BRISTOL
BURLINGTON
CANTON
CROMWELL
EAST GRANBY
EAST HARTFORD
EAST WINDSOR
ELLINGTON
ENFIELD
FARMINGTON
GLASTONBURY
GRANBY
HARTFORD
MANCHESTER
MARLBOROUGH
MERIDEN
MIDDLETOWN
NEW BRITAIN
NEWINGTON
PLAINVILLE
PORTLAND
ROCKY HILL
SIMSBURY
SOUTH WINDSOR
SOUTHINGTON
SUFFIELD
VERNON
WEST HARTFORD
WETHERSFIELD
WINDSOR
WINDSOR LOCKS

**Note:**
**69% of inpatient orthopedic discharges in FY 2012 originated from within Hartford Hospital primary service area towns**

## Hartford Hospital
**FY 2012 Inpatient Orthopedic Discharges**
## By Patient Origin

| Patient Town of Origin | Hartford Hospital | % Discharges |
|---|---|---|
| WEST SUFFIELD | 6 | 0.3% |
| WESTFIELD | 6 | 0.3% |
| ANDOVER | 5 | 0.2% |
| **CANTON** | **5** | **0.2%** |
| CHESHIRE | 5 | 0.2% |
| EAST HADDAM | 5 | 0.2% |
| JEWETT CITY | 5 | 0.2% |
| KENSINGTON | 5 | 0.2% |
| MANSFIELD | 5 | 0.2% |
| NORTH WINDHAM | 5 | 0.2% |
| WATERTOWN | 5 | 0.2% |
| WINDHAM | 5 | 0.2% |
| BRANFORD | 4 | 0.2% |
| BRIDGEPORT | 4 | 0.2% |
| HAMPTON | 4 | 0.2% |
| NEW HAVEN | 4 | 0.2% |
| PLEASANT VALLEY | 4 | 0.2% |
| SALEM | 4 | 0.2% |
| SPRINGFIELD | 4 | 0.2% |
| BOZRAH | 3 | 0.1% |
| CHAPLIN | 3 | 0.1% |
| COLLINSVILLE | 3 | 0.1% |
| DAYVILLE | 3 | 0.1% |
| DEEP RIVER | 3 | 0.1% |
| EAST HARTLAND | 3 | 0.1% |
| EAST LONGMEADOW | 3 | 0.1% |
| GALES FERRY | 3 | 0.1% |
| HADDAM | 3 | 0.1% |
| HAMDEN | 3 | 0.1% |
| HIGGANUM | 3 | 0.1% |
| LITCHFIELD | 3 | 0.1% |
| LUDLOW | 3 | 0.1% |
| MOODUS | 3 | 0.1% |
| MOOSUP | 3 | 0.1% |
| NIANTIC | 3 | 0.1% |
| OLD LYME | 3 | 0.1% |
| PLYMOUTH | 3 | 0.1% |
| STAMFORD | 3 | 0.1% |
| THOMASTON | 3 | 0.1% |
| THOMPSON | 3 | 0.1% |
| AGAWAM | 2 | 0.1% |
| BELCHERTOWN | 2 | 0.1% |
| BETHLEHEM | 2 | 0.1% |
| BROOKLYN | 2 | 0.1% |
| CHICOPEE | 2 | 0.1% |
| DANBURY | 2 | 0.1% |
| DURHAM | 2 | 0.1% |
| EAST LYME | 2 | 0.1% |
| IVORYTON | 2 | 0.1% |
| MIDDLEFIELD | 2 | 0.1% |
| MYSTIC | 2 | 0.1% |
| NEW MILFORD | 2 | 0.1% |
| NORTHFIELD | 2 | 0.1% |
| PALM DESERT | 2 | 0.1% |
| POMFRET CENTER | 2 | 0.1% |
| PRESTON | 2 | 0.1% |
| SCOTLAND | 2 | 0.1% |
| SHELTON | 2 | 0.1% |
| SOUTHWICK | 2 | 0.1% |
| STERLING | 2 | 0.1% |
| TARIFFVILLE | 2 | 0.1% |
| UNCASVILLE | 2 | 0.1% |

Hartford Hospital Primary Service Area Towns

## Hartford Hospital
**FY 2012 Inpatient Orthopedic Discharges**
## By Patient Origin

| Patient Town of Origin | Hartford Hospital | % Discharges |
|---|---|---|
| VOLUNTOWN | 2 | 0.1% |
| WATERFORD | 2 | 0.1% |
| WEST GRANBY | 2 | 0.1% |
| WEST HAVEN | 2 | 0.1% |
| WEST SPRINGFIEL | 2 | 0.1% |
| WESTBROOK | 2 | 0.1% |
| WOLCOTT | 2 | 0.1% |
| AMHERST | 1 | 0.0% |
| ANSONIA | 1 | 0.0% |
| BALTIC | 1 | 0.0% |
| BETHEL | 1 | 0.0% |
| BROOKFIELD | 1 | 0.0% |
| CAPE CORAL | 1 | 0.0% |
| CENTRAL VILLAGE | 1 | 0.0% |
| CHARLESTOWN | 1 | 0.0% |
| CHARLTON CITY | 1 | 0.0% |
| CHESTER | 1 | 0.0% |
| CLINTON | 1 | 0.0% |
| COLD BROOK | 1 | 0.0% |
| DANIELSON | 1 | 0.0% |
| DUDLEY | 1 | 0.0% |
| E LONGMEADOW | 1 | 0.0% |
| EAST BERLIN | 1 | 0.0% |
| EAST HAVEN | 1 | 0.0% |
| EAST PEORIA | 1 | 0.0% |
| EAST WOODSTOCK | 1 | 0.0% |
| EASTFORD | 1 | 0.0% |
| ESSEX | 1 | 0.0% |
| FEEDING HILLS | 1 | 0.0% |
| FORT LEE | 1 | 0.0% |
| FOSTER | 1 | 0.0% |
| FRAMINGHAM | 1 | 0.0% |
| FUQUAY VARINA | 1 | 0.0% |
| GOSHEN | 1 | 0.0% |
| GRANVILLE | 1 | 0.0% |
| GREAT BARRINGTO | 1 | 0.0% |
| GRISWOLD | 1 | 0.0% |
| GROTON | 1 | 0.0% |
| GUILFORD | 1 | 0.0% |
| HAMPDEN | 1 | 0.0% |
| HAWTHORNE | 1 | 0.0% |
| HOLYOKE | 1 | 0.0% |
| IMMOKALEE | 1 | 0.0% |
| INDIAN ORCHARD | 1 | 0.0% |
| JOHNSTON | 1 | 0.0% |
| KILLINGWORTH | 1 | 0.0% |
| LEDYARD | 1 | 0.0% |
| LEOMINSTER | 1 | 0.0% |
| LONGMEADOW | 1 | 0.0% |
| MAHOPAC | 1 | 0.0% |
| MAMARONECK | 1 | 0.0% |
| MASHANTUCKET | 1 | 0.0% |
| MEDFORD | 1 | 0.0% |
| MIDDLEBURY | 1 | 0.0% |
| MILFORD | 1 | 0.0% |
| MILWAUKEE | 1 | 0.0% |
| MINDEN | 1 | 0.0% |
| MORRIS | 1 | 0.0% |
| NAUGATUCK | 1 | 0.0% |
| NEW LONDON | 1 | 0.0% |
| NEWMANSTOWN | 1 | 0.0% |
| NEWTOWN | 1 | 0.0% |

Hartford Hospital Primary Service Area Towns

## Hartford Hospital
**FY 2012 Inpatient Orthopedic Discharges**
## By Patient Origin

| Patient Town of Origin | Hartford Hospital | % Discharges |
|---|---|---|
| NORFOLK | 1 | 0.0% |
| NORTH FRANKLIN | 1 | 0.0% |
| NORTH GROSVENOR | 1 | 0.0% |
| NORTH HAVEN | 1 | 0.0% |
| NORTH SALEM | 1 | 0.0% |
| NORTH STONINGTON | 1 | 0.0% |
| NORTHFORD | 1 | 0.0% |
| NORTON | 1 | 0.0% |
| OAKDALE | 1 | 0.0% |
| OAKVILLE | 1 | 0.0% |
| OXFORD | 1 | 0.0% |
| PEQUABUCK | 1 | 0.0% |
| PITTSFIELD | 1 | 0.0% |
| PLAINFIELD | 1 | 0.0% |
| PONCA CITY | 1 | 0.0% |
| POWNAL | 1 | 0.0% |
| PROSPECT | 1 | 0.0% |
| PUTNAM | 1 | 0.0% |
| RIVERTON | 1 | 0.0% |
| RIVERVIEW | 1 | 0.0% |
| ROCKFALL | 1 | 0.0% |
| SAN DIEGO | 1 | 0.0% |
| SAN FRANCISCO | 1 | 0.0% |
| SOUTH CHATHAM | 1 | 0.0% |
| SOUTH LYME | 1 | 0.0% |
| SOUTH WINDHAM | 1 | 0.0% |
| SOUTHAMPTON | 1 | 0.0% |
| SOUTHBURY | 1 | 0.0% |
| STOCKBRIDGE | 1 | 0.0% |
| STURBRIDGE | 1 | 0.0% |
| TAFTVILLE | 1 | 0.0% |
| TAMPA | 1 | 0.0% |
| TAUNTON | 1 | 0.0% |
| WARE | 1 | 0.0% |
| WASSAIC | 1 | 0.0% |
| WEATOGUE | 1 | 0.0% |
| WEST CORNWALL | 1 | 0.0% |
| WEST SIMSBURY | 1 | 0.0% |
| WOODBURY | 1 | 0.0% |
| WOODSTOCK | 1 | 0.0% |
| **Totals** | **2,318** | 100.0% |

**Hartford Hospital Primary Service Area Towns**

## Hartford Hospital
**FY 2012 Outpatient Orthopedic Discharges**
**By Patient Origin**

| Patient Town of Origin | Hartford Hospital | % Discharges |
|---|---|---|
| HARTFORD | 226 | 16% |
| WEST HARTFORD | 108 | 7% |
| WINDSOR | 94 | 6% |
| MANCHESTER | 69 | 5% |
| EAST HARTFORD | 66 | 5% |
| NEWINGTON | 48 | 3% |
| BLOOMFIELD | 47 | 3% |
| WETHERSFIELD | 40 | 3% |
| ENFIELD | 37 | 3% |
| ROCKY HILL | 37 | 3% |
| SOUTH WINDSOR | 37 | 3% |
| GLASTONBURY | 35 | 2% |
| VERNON ROCKVILLE | 29 | 2% |
| WINDSOR LOCKS | 27 | 2% |
| SIMSBURY | 26 | 2% |
| NEW BRITAIN | 23 | 2% |
| EAST GRANBY | 21 | 1% |
| AVON | 19 | 1% |
| TOLLAND | 19 | 1% |
| NORTH GRANBY | 18 | 1% |
| MERIDEN | 17 | 1% |
| SUFFIELD | 16 | 1% |
| ELLINGTON | 15 | 1% |
| FARMINGTON | 15 | 1% |
| MIDDLETOWN | 15 | 1% |
| CANTON | 13 | 1% |
| GRANBY | 13 | 1% |
| CROMWELL | 12 | 1% |
| PLAINVILLE | 12 | 1% |
| BERLIN | 10 | 1% |
| STAFFORD SPRINGS | 10 | 1% |
| BRISTOL | 9 | 1% |
| MARLBOROUGH | 9 | 1% |
| WATERBURY | 9 | 1% |
| COLCHESTER | 8 | 1% |
| NORWICH | 8 | 1% |
| PORTLAND | 8 | 1% |
| COVENTRY | 7 | 0% |
| EAST HAMPTON | 7 | 0% |
| SOUTHINGTON | 7 | 0% |
| COLUMBIA | 6 | 0% |
| SOUTH GLASTONBURY | 6 | 0% |
| WILLINGTON | 6 | 0% |
| EAST HARTLAND | 5 | 0% |
| EAST WINDSOR | 5 | 0% |
| SPRINGFIELD | 5 | 0% |
| BOLTON | 4 | 0% |
| BROAD BROOK | 4 | 0% |
| BURLINGTON | 4 | 0% |
| HEBRON | 4 | 0% |
| KENSINGTON | 4 | 0% |
| MILFORD | 4 | 0% |
| PLYMOUTH | 4 | 0% |
| SOMERS | 4 | 0% |
| STORRS MANSFIELD | 4 | 0% |
| TORRINGTON | 4 | 0% |
| WEATOGUE | 4 | 0% |
| WILLIMANTIC | 4 | 0% |
| AMSTON | 3 | 0% |
| ASHFORD | 3 | 0% |

**Hartford Hospital Primary Service Area Towns**

AVON
BERLIN
BLOOMFIELD
BRISTOL
BURLINGTON
CANTON
CROMWELL
EAST GRANBY
EAST HARTFORD
EAST WINDSOR
ELLINGTON
ENFIELD
FARMINGTON
GLASTONBURY
GRANBY
HARTFORD
MANCHESTER
MARLBOROUGH
MERIDEN
MIDDLETOWN
NEW BRITAIN
NEWINGTON
PLAINVILLE
PORTLAND
ROCKY HILL
SIMSBURY
SOUTH WINDSOR
SOUTHINGTON
SUFFIELD
VERNON
WEST HARTFORD
WETHERSFIELD
WINDSOR
WINDSOR LOCKS

**Note:**
**79% of outpatient orthopedic discharges in FY 2012 originated from within Hartford Hospital primary service area towns**

## Hartford Hospital
**FY 2012 Outpatient Orthopedic Discharges**
**By Patient Origin**

| Patient Town of Origin | Hartford Hospital | % Discharges |
|---|---|---|
| BROOKLYN | 3 | 0% |
| CHESHIRE | 3 | 0% |
| DAYVILLE | 3 | 0% |
| LEBANON | 3 | 0% |
| LEDYARD | 3 | 0% |
| LITCHFIELD | 3 | 0% |
| PLANTSVILLE | 3 | 0% |
| TERRYVILLE | 3 | 0% |
| WEST GRANBY | 3 | 0% |
| WEST SIMSBURY | 3 | 0% |
| WINSTED | 3 | 0% |
| WOLCOTT | 3 | 0% |
| ANDOVER | 2 | 0% |
| CANAAN | 2 | 0% |
| CLINTON | 2 | 0% |
| EAST HADDAM | 2 | 0% |
| EASTFORD | 2 | 0% |
| GOSHEN | 2 | 0% |
| HADDAM | 2 | 0% |
| HIGGANUM | 2 | 0% |
| NEW HARTFORD | 2 | 0% |
| OLD SAYBROOK | 2 | 0% |
| SALEM | 2 | 0% |
| UNCASVILLE | 2 | 0% |
| UNIONVILLE | 2 | 0% |
| WALLINGFORD | 2 | 0% |
| ATLANTA | 1 | 0% |
| BARKHAMSTED | 1 | 0% |
| BETHEL | 1 | 0% |
| BIRMINGHAM | 1 | 0% |
| BRIDGEPORT | 1 | 0% |
| BUZZARDS BAY | 1 | 0% |
| CANTERBURY | 1 | 0% |
| CHAPLIN | 1 | 0% |
| CROWLEY LAKE | 1 | 0% |
| DURHAM | 1 | 0% |
| E LONGMEADOW | 1 | 0% |
| EAST HAVEN | 1 | 0% |
| EAST LYME | 1 | 0% |
| FAIRFIELD | 1 | 0% |
| GALES FERRY | 1 | 0% |
| HADLYME | 1 | 0% |
| HAMPTON | 1 | 0% |
| HARWINTON | 1 | 0% |
| INDIAN ORCHARD | 1 | 0% |
| INDIANAPOLIS | 1 | 0% |
| JEWETT CITY | 1 | 0% |
| KILLINGWORTH | 1 | 0% |
| LEE | 1 | 0% |
| LINCOLN | 1 | 0% |
| LONGMEADOW | 1 | 0% |
| MADISON | 1 | 0% |
| MEREDITH | 1 | 0% |
| MIDDLEFIELD | 1 | 0% |
| MONSON | 1 | 0% |
| MORRIS | 1 | 0% |
| NEW HAVEN | 1 | 0% |
| NEW LONDON | 1 | 0% |
| NIANTIC | 1 | 0% |
| NORTH BRANFORD | 1 | 0% |

**Hartford Hospital Primary Service Area Towns**

## Hartford Hospital
**FY 2012 Outpatient Orthopedic Discharges**
**By Patient Origin**

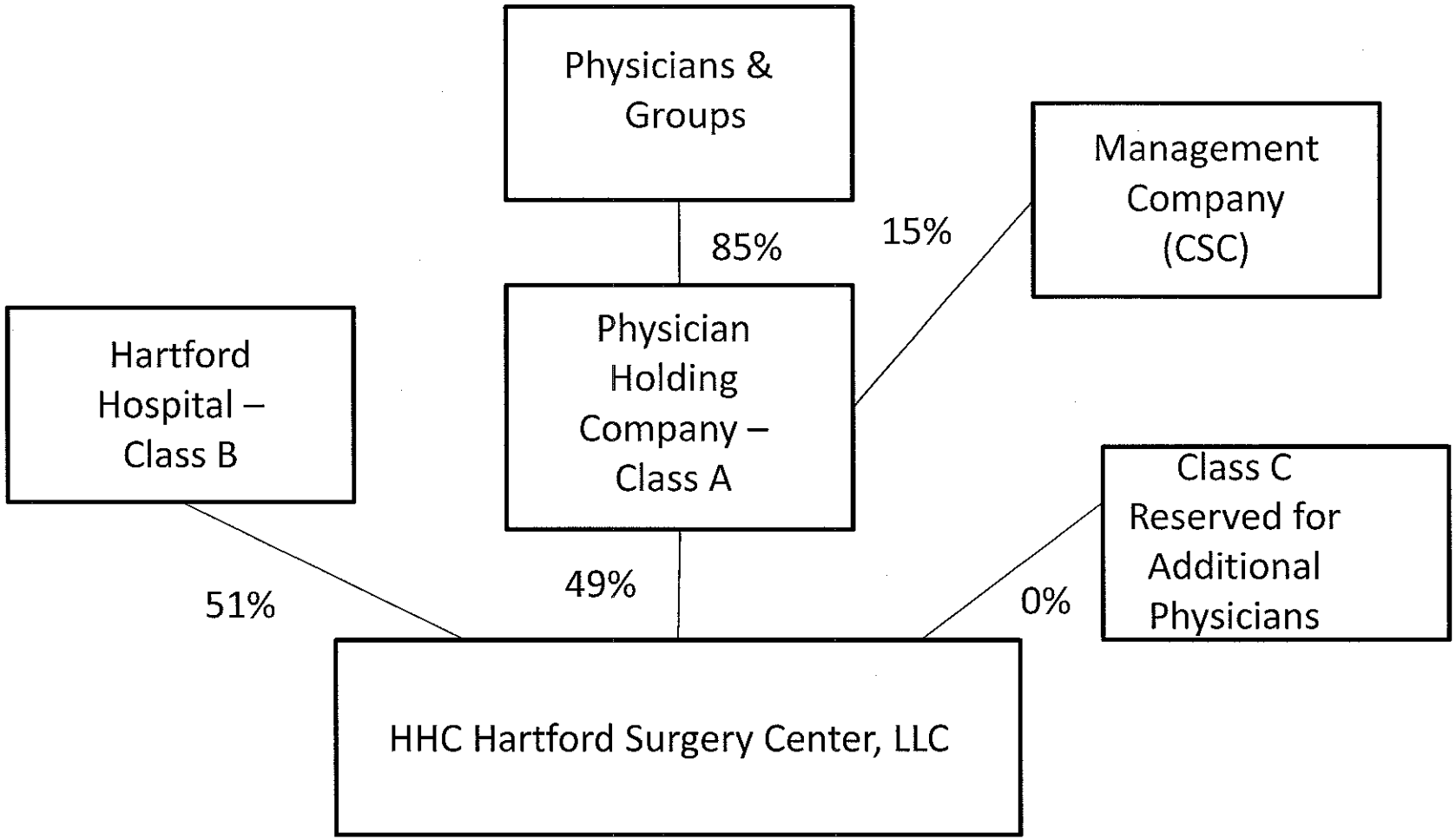
| Patient Town of Origin | Hartford Hospital | % Discharges |
|---|---|---|
| NORTH HAVEN | 1 | 0% |
| NORTHAMPTON | 1 | 0% |
| OLD LYME | 1 | 0% |
| OTHER THAN US | 1 | 0% |
| PLEASANT VALLEY | 1 | 0% |
| POMFRET CENTER | 1 | 0% |
| PRESTON | 1 | 0% |
| PUTNAM | 1 | 0% |
| SOMERSVILLE | 1 | 0% |
| SOUTHWICK | 1 | 0% |
| TARIFFVILLE | 1 | 0% |
| THE VILLAGES | 1 | 0% |
| THOMASTON | 1 | 0% |
| TORTOLA | 1 | 0% |
| WAUREGAN | 1 | 0% |
| WEST SPRINGFIEL | 1 | 0% |
| WEST SUFFIELD | 1 | 0% |
| WESTBROOK | 1 | 0% |
| WESTFIELD | 1 | 0% |
| WILKES BARRE | 1 | 0% |
| WILMINGTON | 1 | 0% |
| WINDHAM | 1 | 0% |
| WOODSTOCK | 1 | 0% |
| Totals | 1,454 | 100% |

Hartford Hospital Primary Service Area Towns

# EXHIBIT 21

DRAFT

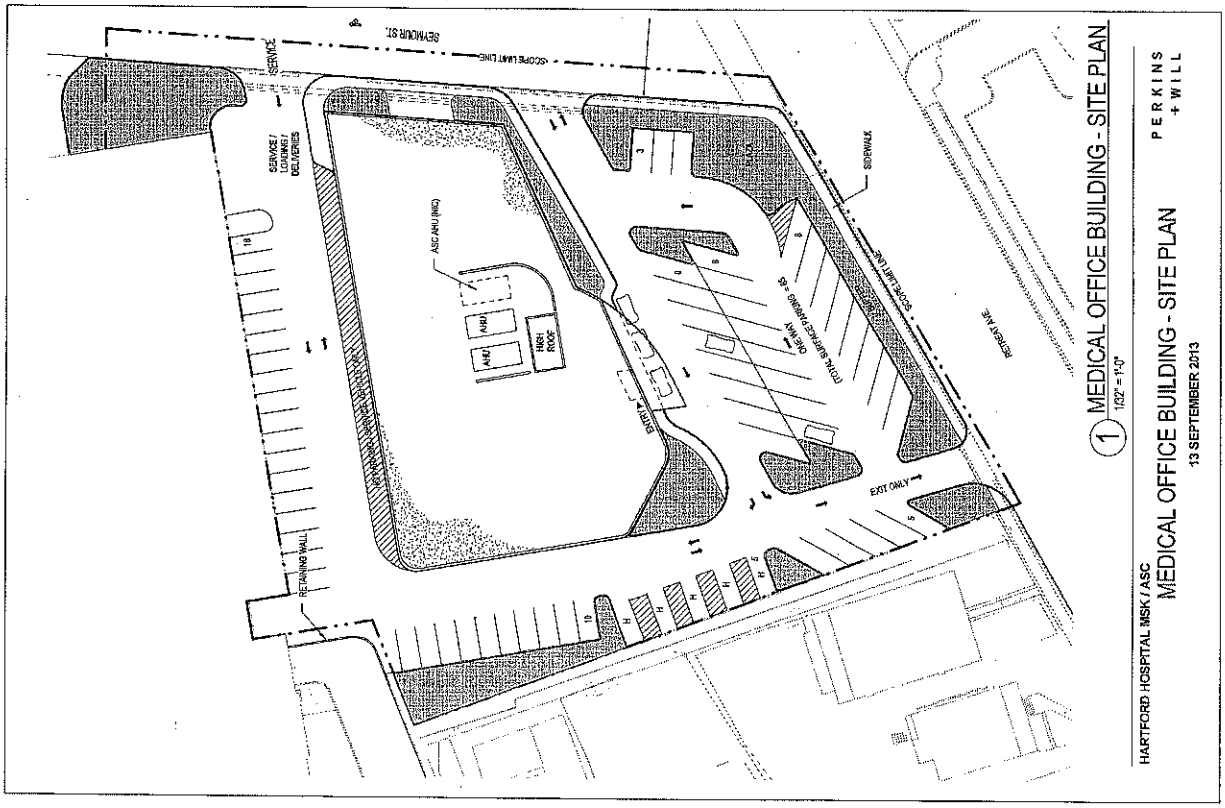
# Organizational Structure

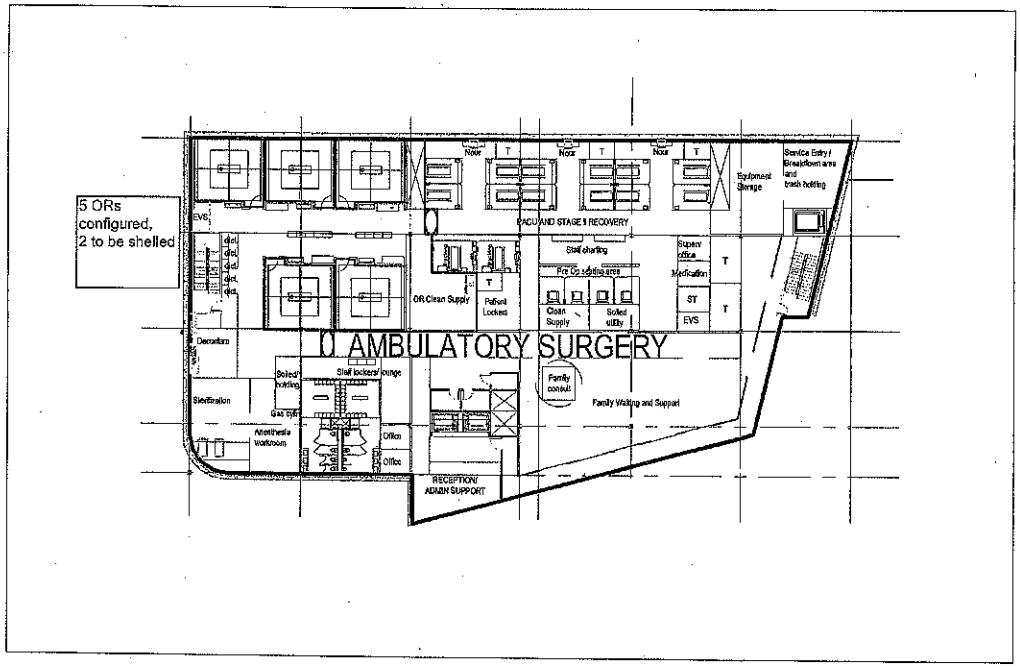





3017915v1

# EXHIBIT 22




| | | | |
|---|---|---|---|
| HDR | Hartford Hospital Musculoskeletal Institute | 208978 | |
| | 3rd Floor / Ambulatory Surgery | 8.26.2013 | |

# EXHIBIT 23

| FY 2010 OutPatients | Capacity per week | Hours of Operation | Turnover Time | # Cases | Avg Case Time | # Minutes | % Utilization |
|---|---|---|---|---|---|---|---|
| Outpatient Surgial Suites | 1,820,487 | 7:45-3:30 | 30 Mins Per Case | 10,888 | 114 | 1,236,143 | 68% |

| Service | Total # Cases |
|---|---|
| Bariatrics Surgery | 48 |
| Cardiovascular Surgery | 12 |
| Cysto Surgery | 1055 |
| ENT Surgery | 672 |
| General Surgery | 2917 |
| GYN Surgery | 1269 |
| Joint Surgery | 7 |
| Neurosurgery | 13 |
| OMF Surgery | 79 |
| Ophtalmology Surgery | 1139 |
| Orthopedic Surgery | 1491 |
| Peripheral Vascular Thoracic | 300 |
| Plastic Surgery | 1210 |
| Podiatry Surgery | 288 |
| Robotics Surgery | 30 |
| Spine Surgery | 220 |
| Urology Surgery | 138 |
| Grand Total | 10888 |

| FY 2011 OutPatients | Capacity per week | Hours of Operation | Turnover Time | # Cases | Avg Case Time | # Minutes | % Utilization |
|---|---|---|---|---|---|---|---|
| Outpatient Surgial Suites | 1,820,487 | 7:45-3:30 | 30 Mins Per Case | 11,555 | 113 Min | 1,311,514 | 72% |

| Service | Total # Cases |
|---|---|
| Bariatrics Surgery | 136 |
| Cardiovascular Surgery | 11 |
| Cysto Surgery | 1119 |
| ENT Surgery | 696 |
| General Surgery | 3093 |
| GYN Surgery | 1353 |
| Joint Surgery | 11 |
| Neurosurgery | 16 |
| OMF Surgery | 96 |
| Ophtalmology Surgery | 1410 |
| Orthopedic Surgery | 1222 |
| Peripheral Vascular Thoracic | 329 |
| Plastic Surgery | 1225 |
| Podiatry Surgery | 292 |
| Robotics Surgery | 134 |
| Spine Surgery | 242 |
| Urology Surgery | 170 |
| Grand Total | 11555 |

| FY 2012 OutPatients | Capacity per week | Hours of Operation | Turnover Time | # Cases | Avg Case Time | # Minutes | % Utilization |
|---|---|---|---|---|---|---|---|
| Outpatient Surgial Suites | 1,820,487 | 7:45-3:30 | 30 Mins Per Case | 11,851 | 113 | 1,342,002 | 74% |

| Service | Total # Cases |
|---|---|
| Bariatrics Surgery | 121 |
| Cardiovascular Surgery | 14 |
| Cysto Surgery | 1055 |
| ENT Surgery | 715 |
| General Surgery | 3124 |
| GYN Surgery | 1493 |
| Joint Surgery | 10 |
| Neurosurgery | 17 |
| OMF Surgery | 57 |
| Ophtalmology Surgery | 1403 |
| Orthopedic Surgery | 1092 |
| Peripheral Vascular Thoracic | 323 |
| Plastic Surgery | 1381 |
| Podiatry Surgery | 251 |
| Robotics Surgery | 285 |
| Spine Surgery | 338 |
| Urology Surgery | 172 |
| Grand Total | 11851 |

Hartford Hospital
Outpatient Operating Room Capacity and Utilzation
3 Year Projections

| FY 2014 OutPatients | Capacity per week | Hours of Operation | Turnover Time | # Cases | Avg Case Time | # Minutes | % Utilization |
|---|---|---|---|---|---|---|---|
| Outpatient Surgical Suites | 1,820,487 | 7:45-3:30 | 30 Mins Per Case | 12,141 | 113 | 1,371,933 | 75% |

| FY 2015 OutPatients | Capacity per week | Hours of Operation | Turnover Time | # Cases | Avg Case Time | # Minutes | % Utilization |
|---|---|---|---|---|---|---|---|
| Outpatient Surgical Suites | 1,820,487 | 7:45-3:30 | 30 Mins Per Case | 12,322 | 113 | 1,392,386 | 76% |

| FY 2016 OutPatients | Capacity per week | Hours of Operation | Turnover Time | # Cases | Avg Case Time | # Minutes | % Utilization |
|---|---|---|---|---|---|---|---|
| Outpatient Surgical Suites | 1,379,157 | 7:45-3:30 | 30 Mins Per Case | 10,209 | 113 | 1,153,617 | 83% |

notes:
Includes new outpatient volume from new surgeons (FY 2014-605 cases; FY2015-1,295 cases; FY2016-960 cases)
FY 2016 excludes orthopedic cases transitioning to proposed ASC (Bone and Joint Center)
approximately (15% of total outpatient cases)
Decreased capacity in FY 2016 reflects the closure of 3 outdated operating rooms.

# EXHIBIT 24

**Cases and Operating Rooms - OASC Rocky Hill ASC (4 ORs)**

| | 2010 | 2011 | 2012 | Jan-Jul 2013ytd |
|---|---|---|---|---|
| Total Orthopedic Surgery | 4,716 | 4,585 | 4,570 | 2,752 |
| Minutes of Surgery / Cleanup | 424,440 | 412,650 | 411,300 | 247,680 |
| OR need calculated | 4.42 | 4.30 | 4.28 | 4.42 |
| Number of ORs required | 5 | 5 | 5 | 5 |

**OHCA Facility Plan Guidelines**
**Unless otherwise supported by documentation from Applicant:**

**Capacity of the proposed facility will be based on 8 hours per day , 5 days per week for a total of 2,000 per year**

**Optimal utilization of an OR = 80%**
**Average time per case = 60 minutes**
**Cleanup time = 30 per case**

**Optimal OR utilization in minutes = 96000 minutes per OR**

**Cases and Operating Rooms - Glastonbury ASC (3 ORs)**

| | 2010 | 2011 | 2012 | Jan-Jul 2013ytd |
|---|---|---|---|---|
| Orthopedic Surgery | 607 | 2,081 | 3,011 | 1,903 |
| Minutes of Surgery / Cleanup | 54,630 | 187,290 | 270,990 | 171,270 |
| OR need calculated | 0.57 | 1.95 | 2.82 | 3.06 |
| Number of ORs required | 1 | 2 | 3 | 4 |

**OHCA Facility Plan Guidelines**
**Unless otherwise supported by documentation from Applicant:**

**Capacity of the proposed facility will be based on 8 hours per day , 5 days per week for a total of 2,000 per year**

**Optimal utilization of an OR = 80%**
**Average time per case = 60 minutes**
**Cleanup time = 30 per case**

**Optimal OR utilization in minutes = 96000 minutes per OR**

# EXHIBIT 25

Hartford Hospital
Outpatient Operating Room Capacity and Utilzation
3 Year Projections

| FY 2014 OutPatients | Capacity per week | Hours of Operation | Turnover Time | # Cases | Avg Case Time | # Minutes | % Utilization |
|---|---|---|---|---|---|---|---|
| West Hartford Surgery Center | 330,997 | 7:30-3:30 | 15 Mins per Case | 2731 | 90 | 245790 | 0.74 |

| FY 2015 OutPatients | Capacity per week | Hours of Operation | Turnover Time | # Cases | Avg Case Time | # Minutes | % Utilization |
|---|---|---|---|---|---|---|---|
| West Hartford Surgery Center | 330,997 | 7:30-3:30 | 15 Mins per Case | 3059 | 90 | 275310 | 0.83 |

| FY 2016 OutPatients | Capacity per week | Hours of Operation | Turnover Time | # Cases | Avg Case Time | # Minutes | % Utilization |
|---|---|---|---|---|---|---|---|
| West Hartford Surgery Center | 330,997 | 7:30-3:30 | 15 Mins per Case | 3059 | 90 | 275310 | 0.83 |

notes:
Includes incremental outpatient volume from new surgeons and projected growth through FY 2016
(FY 2014 -411 cases; FY 2015 - 739 cases; FY 2016 - 739 cases)

# EXHIBIT 26

An error discovered in the processing of the 2006 National Survey of Ambulatory Surgery procedure data resulted in a revised data set. All analyses involving procedure data were rerun and some reported findings have changed. The required revisions have been made. In addition, some standard errors for both visits and procedures were printed incorrectly in the original report and these have been corrected in this revised report. For more information, see the explanation at the end of the report.

National Health Statistics Reports

Number 11 ■ January 28, 2009–Revised September 4, 2009

# Ambulatory Surgery in the United States, 2006

by Karen A. Cullen, Ph.D., M.P.H.; Margaret J. Hall, Ph.D.; and Aleksandr Golosinskiy, Division of Health Care Statistics

## Abstract

*Objectives*—This report presents national estimates of surgical and nonsurgical procedures performed on an ambulatory basis in hospitals and freestanding ambulatory surgery centers in the United States during 2006. Data are presented by types of facilities, age and sex of the patients, and geographic regions. Major categories of procedures and diagnoses are shown by age and sex. Selected estimates are compared between 1996 and 2006.

*Methods*—The estimates are based on data collected through the 2006 National Survey of Ambulatory Surgery by the Centers for Disease Control and Prevention's National Center for Health Statistics (NCHS). The survey was conducted from 1994–1996 and again in 2006. Diagnoses and procedures presented are coded using the *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD–9–CM).

*Results*—In 2006, an estimated 53.3 million surgical and nonsurgical procedures were performed during 34.7 million ambulatory surgery visits. Of the 34.7 million visits, 19.9 million occurred in hospitals and 14.9 million occurred in freestanding ambulatory surgery centers. The rate of visits to freestanding ambulatory surgery centers increased about 300 percent from 1996 to 2006, whereas the rate of visits to hospital-based surgery centers remained largely unchanged during that time period. Females had significantly more ambulatory surgery visits (20.0 million) than males (14.7 million), and a significantly higher rate of visits (132.0 per 1,000 population) compared with males (100.4 per 1,000 population).

Average times for surgical visits were higher for ambulatory surgery visits to hospital-based ambulatory surgery centers than for visits to freestanding ambulatory surgery centers for the amount of time spent in the operating room (61.7 minutes compared with 43.2 minutes), the amount of time spent in surgery (34.2 minutes compared with 25.1 minutes), the amount of time spent in the postoperative recovery room (79.0 minutes compared with 53.1 minutes), and overall time (146.6 minutes compared with 97.7 minutes).

Although the majority of visits had only one or two procedures performed (59.8 percent and 27.7 percent, respectively), 1.0 percent had five or more procedures performed. Frequently performed procedures on ambulatory surgery patients included endoscopy of large intestine (5.7 million), endoscopy of small intestine (3.5 million), extraction of lens (3.1 million), injection of agent into spinal canal (2.0 million), and insertion of prosthetic lens (2.6 million). The leading diagnoses at ambulatory surgery visits included cataract (3.0 million); benign neoplasms (2.0 million), malignant neoplasms (1.2 million), diseases of the esophagus (1.1 million), and diverticula of the intestine (1.1 million).

**Keywords**: Outpatients • Diagnoses • Procedures • ICD–9–CM • National Survey of Ambulatory Surgery

## Introduction

This report presents data from the 2006 National Survey of Ambulatory Surgery (NSAS). The survey, previously conducted annually from 1994 through 1996, was conducted by NCHS to gather and disseminate data about ambulatory surgery in the United States. For NSAS, ambulatory surgery refers to surgical and nonsurgical procedures performed on an ambulatory (outpatient) basis in a hospital or freestanding center's general operating rooms, dedicated ambulatory surgery rooms, and other specialized rooms, such as endoscopy units and cardiac catheterization laboratories. NSAS is the principal source for national data on the characteristics of visits to hospital-based and freestanding ambulatory surgery centers.

Ambulatory surgery has been increasing in the United States since the early 1980s. Two major reasons for the increase are advances in medical technology and changes in payment arrangements. The medical advances include improvements in anesthesia, which enable patients to regain consciousness more quickly with fewer after effects and better analgesics for relief of pain. In addition, minimally invasive and noninvasive procedures have been developed and are being used with increasing frequency. Examples include laser surgery, laparoscopy, and endoscopy. These medical advances have made surgery less complex and risky (1) and have allowed many

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Centers for Disease Control and Prevention
National Center for Health Statistics

000451 (10/11/13)

procedures to move from inpatient to ambulatory settings (2–6).

At the same time, concern about rising health care costs led to changes in the Medicare program that encouraged the development of ambulatory surgery. In the early 1980s, the Medicare program was expanded to cover care in ambulatory surgery centers, and a prospective payment system based on diagnosis-related groups was adopted for hospital inpatient care that created strong financial incentives for hospitals to shift less complex surgery to outpatient settings. Many state Medicaid plans and private insurers followed the lead of the Medicare program and adopted similar policies (7).

Additional changes in the health care system, such as the growth of managed care along with consolidation of hospitals, have furthered the growth of ambulatory surgery (3,8). As these changes occurred, many types of surgeries done in hospitals were increasingly performed during ambulatory visits. Both in conjunction with and as a result of these changes, the number of freestanding ambulatory surgery centers (ASCs) grew from 239 in 1983 (9) to over 3,300 nearly two decades later (3,10). The number of procedures being performed in ASCs also increased dramatically—from 380,000 procedures in 1983 to 31.5 million in 1996 (5).

The National Hospital Discharge Survey (NHDS), which has been conducted by NCHS every year since 1965, includes information on surgical and nonsurgical procedures performed in inpatient settings (11–13). Although NHDS remains a good source of data for procedures that can be done only on an inpatient basis, such as open-heart surgery or cesarean delivery, NHDS estimates have become incomplete for procedures that can be performed on an ambulatory basis. NSAS was undertaken to obtain information about ambulatory procedures. For many types of procedures, data from both NHDS and NSAS are now required to obtain national estimates. Reports that present both ambulatory and inpatient procedure data for 1994, 1995, and 1996 have been published (14–16).

NSAS and NHDS are two of the NCHS provider-based surveys that constitute the National Health Care Surveys (NHCS). The NHCS were designed to provide nationally representative data on the use of health care resources of major sectors of the health care delivery system. Information on ambulatory procedures is also collected in two other NHCS surveys. The National Ambulatory Medical Care Survey obtains information on procedures ordered or performed during visits to physicians' offices (17), and the National Hospital Ambulatory Medical Care Survey (NHAMCS) collects data on procedures ordered or performed during visits to hospital outpatient and emergency departments (18).

# Methods

## Data source

NSAS covers procedures performed in ambulatory surgery centers, both hospital-based and freestanding. The hospital universe includes noninstitutional hospitals exclusive of federal, military, and Department of Veterans Affairs hospitals located in the 50 states and the District of Columbia. Only short-stay hospitals (hospitals with an average length of stay for all patients of fewer than 30 days), or those whose specialty was general (medical or surgical), or children's general were included in the survey. These hospitals must also have had six beds or more staffed for patient use. This universe definition is the same as that used for the NHDS and the NHAMCS. For the 2006 NSAS, the hospital sample frame was constructed from the products of Verispan, L.L.C., specifically its "Healthcare Market Index, Updated June 15, 2005" and its "Hospital Market Profiling Solution, Second Quarter, 2005" (19). These products were formerly known as the SMG Hospital Market Database. In 2006, the sample consisted of 224 hospitals. Of the 224 hospitals, 35 were found to be out-of-scope (ineligible) because they went out of business or otherwise failed to meet the criteria for the NSAS universe. Of the 189 in-scope (eligible) hospitals, 142 hospitals responded to the survey for a response rate of 75.1%.

The universe of freestanding facilities included ones that were regulated by the states or certified by the Centers for Medicare & Medicaid Services (CMS) for Medicare participation. The sampling frame consisted of facilities listed in the 2005 Verispan Freestanding Outpatient Surgery Center Database (20) and Medicare-certified facilities included in the CMS Provider-of-Services (POS) file (21). Facilities specializing in dentistry, podiatry, abortion, family planning, or birthing were excluded. However, procedures commonly found in these settings were not excluded from in-scope locations. In 1994–1996, pain block locations were also excluded; however, they were included in the 2006 NSAS. In 2006, the sample consisted of 472 freestanding ASCs. Of the 472 freestanding ambulatory surgery centers, 74 were found to be out-of-scope (ineligible) because they failed to meet the criteria for the NSAS universe. Of the 398 in-scope (eligible) freestanding ambulatory surgery centers, 295 responded to the survey for a response rate of 74.1%. The overall response rate was 74.4%.

## Sample design

The NSAS sampled facilities were selected using a multistage probability design with facilities having varying selection probabilities. Independent samples of hospitals and freestanding ambulatory surgery centers were drawn. Unlike the 1994–1996 NSAS, which used a three-stage stratified cluster design, with the first stage consisting of geographic primary sampling units or PSUs, the 2006 NSAS used a two-stage list-based sample design. Facilities were stratified by facility type (hospital compared with freestanding), ambulatory surgery status of hospitals (i.e., whether or not the hospital performed such surgery), facility specialty, and geographic region.

The first stage of the design consisted of selection of facilities using systematic random sampling with probabilities proportional to the annual

number of ambulatory surgeries performed. For the stratum of hospitals which, according to the sampling frame data, did not have ambulatory surgery, a national sample of 25 hospitals was selected to permit estimates of surgery in hospitals that either added ambulatory surgery since the frame was selected or differed from the frame.

At the second stage, within sampled facilities, a sample of ambulatory surgery visits was selected using a systematic random sampling procedure. Selection of visits within each facility was performed separately for each location where ambulatory surgery was performed. These locations included main operating rooms; dedicated ambulatory surgery units; cardiac catheterization laboratories; and rooms for laser procedures, endoscopy, and laparoscopy. Locations within hospitals dedicated exclusively to abortion, dentistry, podiatry, or small procedures were not included. The exclusion of these specialty locations, as well as the exclusion of facilities dedicated exclusively to those specialties, was recommended based on the feasibility study for the NSAS that was conducted in 1989–1991. Based on the recommendation of outside experts who were consulted prior to the design of the 2006 NSAS, the 2006 NSAS includes pain block facilities, whereas the 1994–1996 NSAS did not (22). Because NSAS data are collected from a sample of visits, persons with multiple visits during the year may be sampled more than once. NSAS estimates are of the number of visits to or procedures performed in ambulatory surgery facilities, not the number of persons served by these facilities.

## Data collection

Sample selection and abstraction of information from medical records were performed at the facilities. Facility staff did the sampling in about 40 percent of facilities that participated in the 2006 survey, and facility staff abstracted the data in about 30 percent of the participating facilities. In the remaining facilities, the work was performed by personnel of the U.S. Census Bureau acting on behalf of NCHS. Data processing and medical coding were performed by the Constella Group Inc., Durham, North Carolina. Editing and estimation were completed at NCHS.

The abstract form ("Technical Notes") contains items relating to the personal characteristics of the patients such as age, sex, race, and ethnicity; and administrative items such as date of procedure, disposition, and expected sources of payment. The medical information includes up to seven diagnoses and six procedures, which were coded according to the *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD–9–CM) (23).

A quality control program was conducted on the coding and entering of data from abstracts to electronic form. Approximately 10 percent of the abstractions were independently recoded by an NSAS coder at the Constella Group, Inc., with discrepancies resolved by a chief coder. The overall error rate for the 2006 NSAS was 0.3 percent for diagnosis coding and keying, 0.2 percent for procedure coding and keying, and 0.3 percent for demographic coding and keying.

## Estimation

Because of the complex multistage design of the NSAS, the survey data must be inflated or weighted in order to produce national estimates. The estimation procedure produces essentially unbiased national estimates, and has three basic components: inflation by reciprocals of the probabilities of sample selection, adjustment for nonresponse, and population weighting ratio adjustments. These three components of the final weight are described in more detail in another report (22).

## Standard errors

The standard error (SE) is primarily a measure of sampling variability that occurs by chance because only a sample, rather than the entire universe, is surveyed. Estimates of the sampling variability for this report were calculated using Taylor approximations in SUDAAN, which takes into account the complex sample design of the NSAS. A description of the software and the approach it uses has been published (24). The SEs of statistics presented in this report are included in each of the tables.

## Testing of significance and rounding

In this report, statistical inference is based on the two-sided *t*-test with a critical value of 2.58 (0.01 level of significance). Terms such as "higher" and "less" indicate that differences are statistically significant. Terms such as "similar" or "no difference" mean that no statistically significant difference exists between the estimates being compared. A lack of comment on the difference between any two estimates does not mean that the difference was tested and found not to be significant.

The feasibility of using one weight to calculate estimates and variances was assessed to determine whether the SEs produced from the single-weight variable were for the most part greater than the SEs produced by the variance weights for the same estimates. For certain estimates, the single weights produced variances that underestimated the true variances. This underestimation can lead to Type I errors in which the null hypothesis is incorrectly rejected when using the commonly used significance level of alpha=0.05. As a result, the decision was made that an alpha of 0.01 should be used to reduce the likelihood of committing a Type I error.

Estimates of counts in the tables have been rounded to the nearest thousand. Therefore, figures within tables do not always add to the totals. Rates and percentages were calculated from unrounded figures and may not precisely agree with rates or percentages calculated from rounded data.

## Nonsampling error

As in any survey, results are subject to both sampling and nonsampling errors. Nonsampling errors include

reporting and processing errors as well as biases due to nonresponse and incomplete response. The magnitude of the nonsampling errors cannot be computed. However, these errors were kept to a minimum by procedures built into the operation of the survey. To eliminate ambiguities and to encourage uniform reporting, attention was given to the phrasing of items, terms, and definitions. Quality control procedures and consistency and edit checks reduced errors in data coding and processing. The unweighted response rate for the 2006 NSAS was 74.4%. Table 1 presents weighted characteristics of NSAS respondents and nonrespondents, along with weighted response rates. Responding compared with nonresponding distributions were similar, with the exception of higher cooperation among facilities in a nonmetropolitan statistical area. The effect of this differential response is minimized in the visit estimates in most cases, as NSAS uses a nonresponse adjustment factor that takes annual visit volume, specialty, facility type, and geographic region into account. Item nonresponse rates in NSAS are generally low (5% or fewer). However, levels of nonresponse may vary considerably in the survey.

NSAS does not completely measure ambulatory procedures that are performed in locations such as physicians' offices, for example, injections of therapeutic substances, skin biopsies, and certain plastic surgery procedures. The National Ambulatory Medical Care Survey has data about procedures in physicians' offices (17) and the National Hospital Ambulatory Medical Care Survey provides information about procedures in other hospital outpatient and emergency departments (18). As medical technology continues to advance and changes in payment policy promote it, increasing numbers and types of procedures may move from NSAS facilities to elsewhere.

Because certain freestanding facilities and certain specialized locations within hospitals and freestanding facilities are excluded from the NSAS design, ambulatory procedures performed in some specialties are not completely measured by the survey. Excluded specialties include dentistry, podiatry, abortion, family planning, and birthing; and locations that perform small procedures, such as removal of skin lesions, were also excluded. However, procedures in these specialties performed in general operating rooms or other in-scope locations are included in the survey.

The determination of whether an ambulatory surgery facility is a hospital or a freestanding center is based on the universe from which the facility was selected. In most cases, it was apparent whether a facility was a hospital or a freestanding ambulatory surgery center, but some facilities were not easily classified. For example, a "freestanding" facility may be owned by a hospital but located some distance away. If such a facility is separately listed in the 2005 Verispan Freestanding Outpatient Surgery Center Database or in the CMS POS file and is selected into the NSAS sample from this universe, it is considered a freestanding facility. Additional definitions of terms used in the NSAS have been published (22).

## Use of tables

The statistics presented in this report are based on a sample, and therefore may differ from the figures that would be obtained if a complete census had been taken. Visits are reported by first-listed diagnosis, which is the one specified as the principal diagnosis on the face sheet or discharge summary of the medical record, or if a principal diagnosis was not specified, the first one listed on the face sheet or discharge summary of the medical record. It was usually the main cause of the visit. The number of first-listed diagnoses is the same as the number of visits.

The estimates shown in this report include surgical procedures, such as tonsillectomy; diagnostic procedures, such as ultrasound; and other therapeutic procedures, such as injection or infusion of cancer chemotherapeutic substance. Up to six procedures are coded for each visit. All-listed procedures include all occurrences of the procedure coded regardless of the order on the medical record.

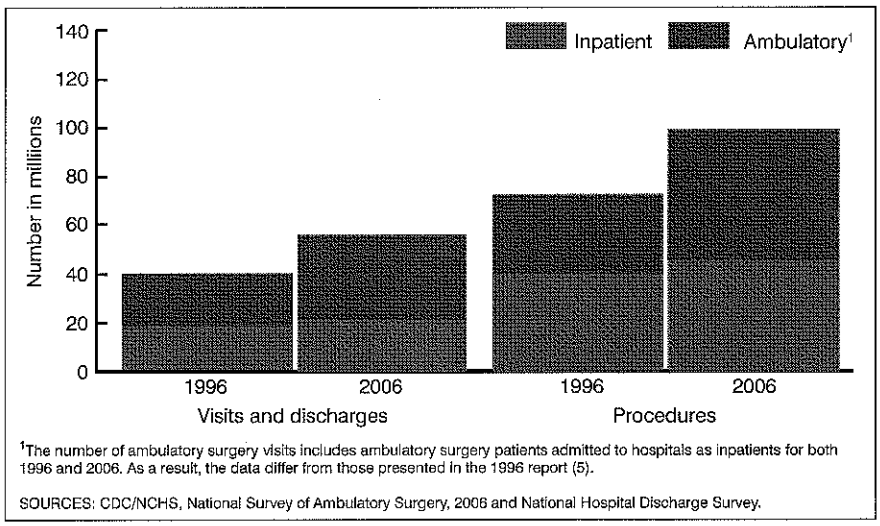
The diagnoses and procedures appear in separate tables of this report, presented by chapter of the ICD–9–CM. Within these chapters, subcategories of diagnoses or procedures are shown. These specific categories were selected primarily because of their large numbers or because they are of special interest.

According to the 2006 NSAS, an estimated 287,000 ambulatory surgery visits with procedures were admitted to the hospital as inpatients. Of these, 269,000 (93.8 percent) were visits to hospitals and 18,000 (6.2 percent) were visits to freestanding centers. In most instances, the ambulatory procedures for these patients become part of their inpatient records. People admitted as inpatients were included in this report, and procedures for these patients were included in the summaries of outpatient procedures, as described in the first version of this report for 1994 (5). These patients were excluded in the 1995 and 1996 *Advance Data Reports* (4,5) and will be excluded to avoid double counting from the Series 13 report in which data from the 2006 NHDS and 2006 NSAS will be presented together, following the same process as reports published using the 1994–1996 data (14–16).

The chances are about 40 in 100 that an estimate from the sample would differ from a complete census by more than the SE. The chances are 9 in 100 that the difference would be more than twice the SE, and about 4 in 100 that the difference would be more than 2.5 times as large as the SE.

The relative standard error (RSE) of an estimate is obtained by dividing the SE by the estimate itself. The RSE is expressed as a percentage of an estimate and can be multiplied by the estimate to obtain the SE. Because of low reliability, estimates with a RSE of more than 30 percent or those based on a sample of fewer than 30 records are replaced by asterisks (*). The estimates that are based on 30 to 59 patient records are preceded by an asterisk (*) to indicate that they also have low reliability.

The population estimates used in computing rates are for the U.S. civilian population, including institutionalized persons, as of July 1, 2006. Rates are computed using adjustments made after the 2000 census (postcensal estimates) of the civilian population of the United States. The data are from unpublished tabulations provided by the U.S. Census Bureau. Facilities are classified by location into one of the four geographic regions of the United States that correspond to those used by the U.S. Census Bureau.




[1]The number of ambulatory surgery visits includes ambulatory surgery patients admitted to hospitals as inpatients for both 1996 and 2006. As a result, the data differ from those presented in the 1996 report (5).

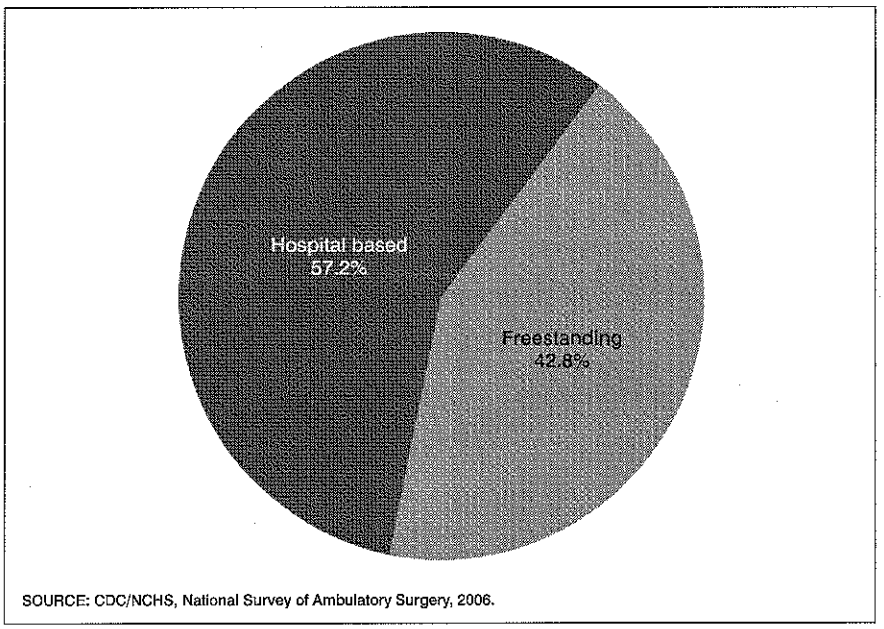
SOURCES: CDC/NCHS, National Survey of Ambulatory Surgery, 2006 and National Hospital Discharge Survey.

**Figure 1. Ambulatory surgery visits and discharges of hospital inpatients with procedures: United States, 1996 and 2006 (revised)**

# Results

## Patient and facility characteristics

- In 2006, an estimated 53.3 million surgical and nonsurgical procedures were performed during 34.7 million ambulatory surgery visits (Table 2).
- The 34.7 million ambulatory surgery visits accounted for about 61.6 percent of the combined total of ambulatory surgery visits and inpatient discharges with surgical and nonsurgical procedures (56.4 million) (Figure 1).
- An estimated 19.9 million (57.2 percent) of the ambulatory surgery visits occurred in hospitals and 14.9 million (42.8 percent) occurred in freestanding centers (Table 2, Figure 2).
- From 1996 to 2006, the change in the rate of visits to freestanding centers was larger than that for visits to hospital-based ambulatory surgery centers. The rate of visits to freestanding ambulatory surgery centers increased about 300 percent from 1996 to 2006, while the rate in hospital-based centers was flat (Figure 3).
- Females had significantly more ambulatory surgery visits (20.0 million) than males (14.7 million), and a significantly higher rate of visits (132.0 per 1,000 population) compared with males (100.4 per 1,000 population) (Table 2).
- Although the vast majority of ambulatory surgery visits had routine discharges (93.1 percent), 0.8 percent were admitted as inpatients (Table 3).
- Although general anesthesia alone was provided in 30.7 percent of ambulatory surgery visits, 20.8 percent received anesthesia only intravenously, and 20.8 percent received multiple types of anesthesia (data not shown).

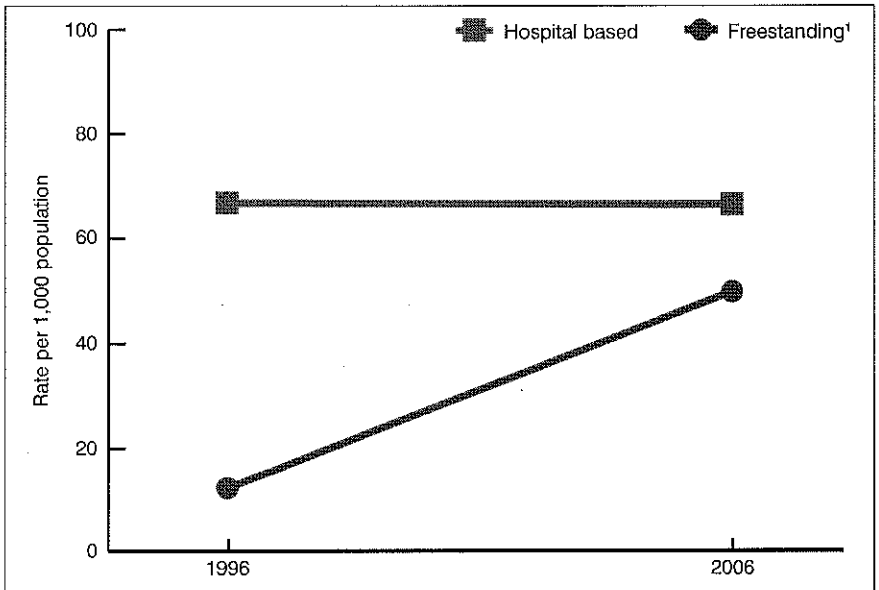



SOURCE: CDC/NCHS, National Survey of Ambulatory Surgery, 2006.

**Figure 2. Percent distribution of ambulatory surgery visits by type of facility: United States, 2006**

## Surgical times for ambulatory surgery visits

- Total time is defined as the length of time from when the patient enters the operating room to the time he or she leaves postoperative care. Operating room time is the length of time the patient is in the operating room. The surgical time is the portion of the




[1]The rate of ambulatory surgery visits includes ambulatory surgery patients admitted to hospitals as inpatients for both 1996 and 2006. As a result, the data differ from those presented in the 1996 report (5).

SOURCE: CDC/NCHS, National Survey of Ambulatory Surgery.

**Figure 3. Rates of ambulatory surgery visits by facility type: United States, 1996 and 2006**

time spent in the operating room during which the surgical procedure occurs. Typically, the surgical time is the time from when the incision is made until the wound is closed. After the surgical procedure, the patient recovers in the postoperative room before he or she is discharged; the time spent here is considered the post operative room time. Average times for surgical visits were higher for ambulatory surgery visits to hospital-based ambulatory surgery centers than for visits to freestanding ambulatory surgery centers for the amount of time spent in the operating room (61.7 minutes compared with 43.2 minutes), the amount of time spent in surgery (34.2 minutes compared with 25.1 minutes), the amount of time spent in the postoperative recovery room (79.0 minutes compared with 53.1 minutes), and overall time (146.6 minutes compared with 97.7 minutes) (Table 4).

- The average time spent in surgery also varied with the diagnosis. The average surgical time for inguinal hernia diagnoses was more than twice that for diagnoses of benign neoplasm of the colon (49.4 minutes compared with 21.8 minutes) (Table 5).

## Ambulatory procedures

- Females had significantly more ambulatory surgery procedures (30.6 million) than males (22.7 million) and a significantly higher rate of procedures (2,020.2 per 10,000 population) than males (1,548.1 per 10,000 population) (Tables 6,7). This was driven by differences for females between 15 and 64 years of age (Figure 4).
- Although the majority of visits had only one or two procedures performed (59.8 percent and 27.7 percent, respectively), 1.0 percent had five or more procedures performed (Figure 5).
- Frequently performed procedures on ambulatory patients included endoscopy of large intestine (5.7 million), endoscopy of the small intestine (3.5 million), extraction of lens (3.1 million), injection of agent into spinal canal (2.0 million), and insertion of prosthetic lens (2.6 million) (Table 6).
- Females had higher rates per 10,000 population than males for certain ambulatory procedures, such as extraction (125.5 compared with 78.8) and insertion (105.2 compared with 67.4) of lens and endoscopy of the small (134.7 compared with 97.1) and large (217.8 compared with 166.4) intestine (Table 7).
- Ambulatory procedures often performed on children under 15 years included myringotomy with insertion of tube (667,000), tonsillectomy with or without adenoidectomy (530,000), and adenoidectomy without tonsillectomy (132,000) (Table 6).
- Common ambulatory procedures for persons 15–44 years of age were endoscopy of large intestine (779,000); endoscopy of small intestine (770,000); injection of agent into spinal canal (533,000); injection or infusion of therapeutic or prophylactic substance (429,000); and operations on muscle, tendon, facia, and bursa (403,000) (Table 6).
- Ambulatory surgery procedures commonly performed on persons 45–64 years of age were endoscopy of large intestine (2.9 million), endoscopy of small intestine (1.4 million), injection of agent into spinal canal (835,000), and operations on muscle, tendon, fascia and bursa (755,000) (Table 6).
- For persons 65–74 years of age, endoscopy of large intestine (1.2 million), extraction of lens (1.1 million), insertion of lens (923,000), endoscopy of small intestine (648,000), and endoscopic polypectomy of the large intestine (424,000) were the most frequent ambulatory procedures (Table 6).
- Common ambulatory procedures for those 75 years of age or over were extraction of lens (1.3 million), insertion of lens (1.1 million), endoscopy of large intestine (778,000), endoscopy of small intestine (550,000), and injection of agent into spinal canal (336,000) (Table 6).

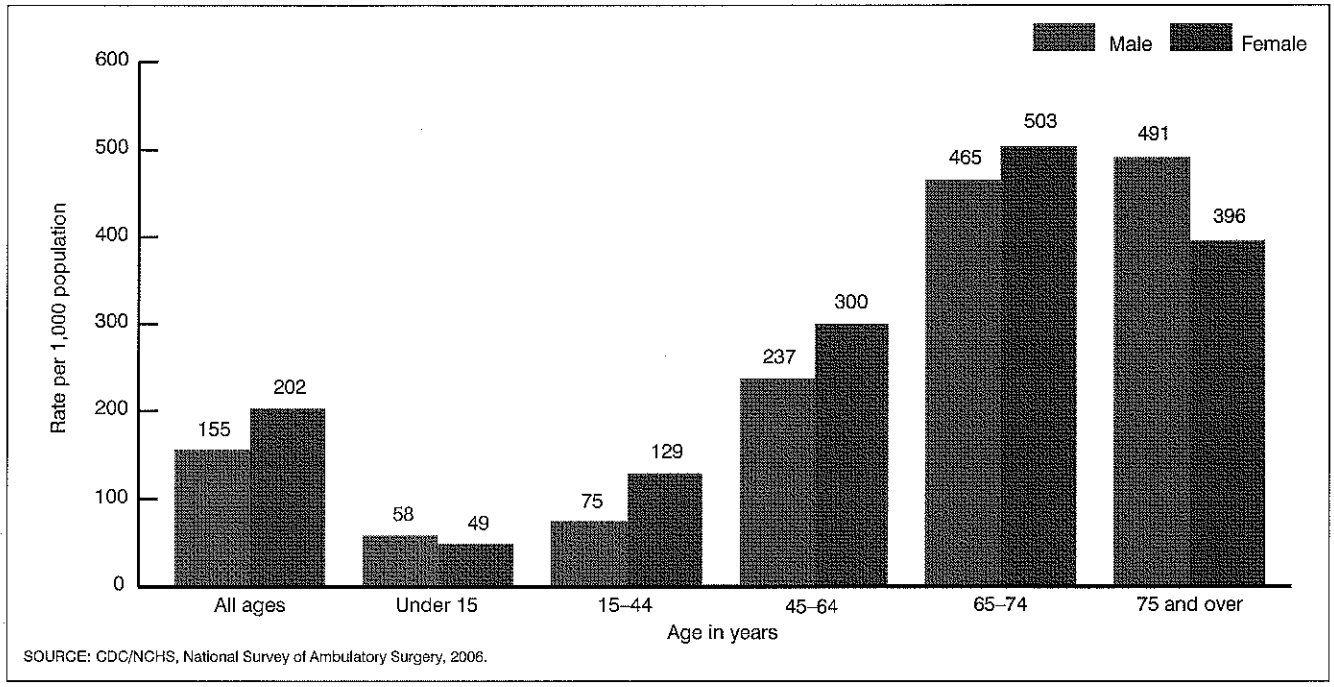



**Figure 4. Rate of ambulatory surgery procedures by age and sex: United States, 2006 (revised)**

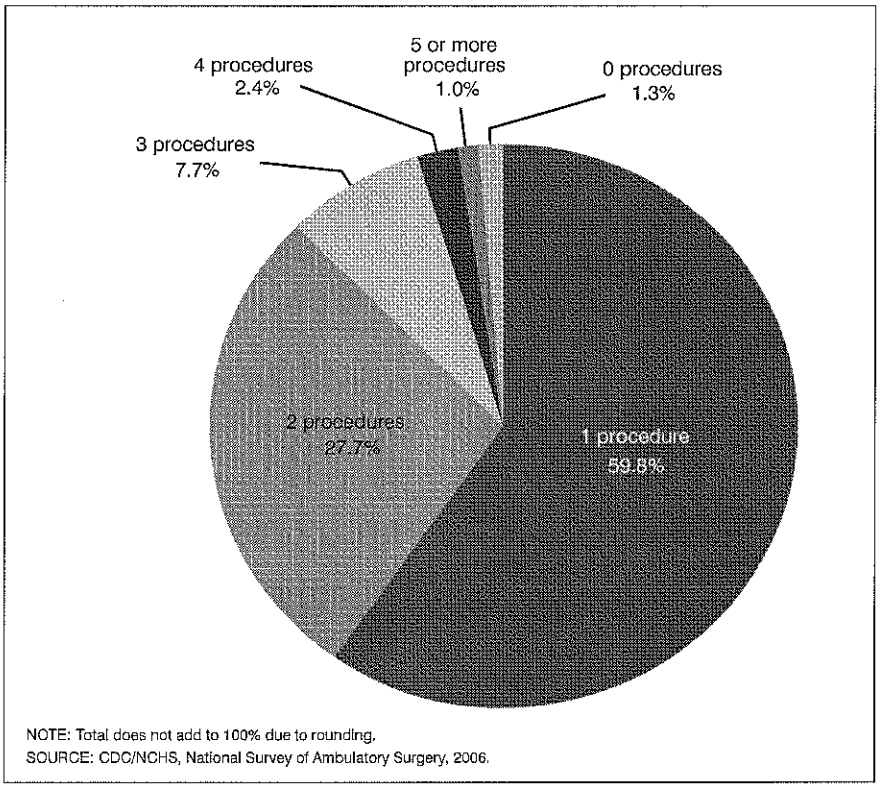



**Figure 5. Percent distribution of the number of ambulatory surgery procedures performed per visit: United States, 2006 (revised)**

## Diagnoses for ambulatory surgery visits

- The leading diagnoses at ambulatory surgery visits included cataract (3.0 million); benign neoplasms (2.0 million), malignant neoplasms (1.2 million), diseases of the esophagus (1.1 million), and diverticula of the intestine (1.1 million) (Table 8).
- Rates of ambulatory surgery visits per 10,000 population varied by gender. For example, the rate of ambulatory surgery visits was higher for females than for males for first-listed diagnoses of cataract (123.5 compared with 77.5) (Table 9).

# Discussion

## May 2009 revisions of NSAS 2006 data file originally released on October 22, 2008

### Identification of a double coding issue with NSAS 2006 data set

The 2006 NSAS public-use data files were released in October 2008. A

researcher contacted NCHS in mid February questioning the fact that the number of myringotomies in the 2006 NSAS was double the number of children under 15 years of age receiving this procedure. In the 1996 NSAS data, there was close to a one-to-one correspondence between these two estimates. The reason for the difference was that in 1996, myringotomy was coded once per record, even if the procedure was performed bilaterally; in 2006, myringotomy was coded twice if performed bilaterally. This inconsistency was unintentional.

Given this inconsistency, the entire 2006 NSAS data set was examined to see if there were other records with multiple identical procedure codes. It was determined that a total of 4,923 records (including myringotomies) of the original 52,233 records in 2006 NSAS had multiple coding (approximately 9%). Double coding was present in only 35 records of 125,000 in the 1996 NSAS.

## Coding guidelines followed for the 2006 NSAS data

The 1994–1996 NSAS procedure coding guidelines were based upon *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD–9–CM) inpatient coding guidelines that were in effect at that time. With the use of these guidelines, multiple coding rarely occurred, even if bilateral or other multiple procedures codes were listed in the record more than one time. Instead of using these ICD–9–CM inpatient coding guidelines, the 2006 NSAS used National Hospital Ambulatory Medical Care Survey (NHAMCS) procedure coding guidelines. Although NHAMCS guidelines were also based on ICD–9–CM codes, they differed in allowing double coding if the following circumstances occurred: if more than one site was specified, if a procedure was bilateral, and if an abstractor recorded a procedure multiple times. In NHAMCS, an editing process removed all double codes that were determined to be inappropriate. However, this step in the editing process was not incorporated into the 2006 NSAS data production, thereby creating the double coding issue.

**Table A. A comparison of estimates of procedures from Table 2, by selected characteristics: United States, 2006**

| Characteristic | Original NSAS (Number in thousands) | Revised NSAS (Number in thousands) | Revised/ original (Percent) | Decrease | Percent decrease |
|---|---|---|---|---|---|
| Total procedures | 57,062 | 53,329 | 93.5 | 3,733 | 7 |
| Facility type | | | | | |
| Hospital based | 32,320 | 30,761 | 95.2 | 1,559 | 5 |
| Freestanding | 24,742 | 22,568 | 91.2 | 2,174 | 9 |
| Male | | | | | |
| Hospital based | 14,051 | 13,286 | 94.6 | 765 | 5 |
| Freestanding | 10,277 | 9,395 | 91.4 | 882 | 9 |
| Female | | | | | |
| Hospital-based | 18,270 | 17,475 | 95.6 | 795 | 4 |
| Freestanding | 14,465 | 13,173 | 91.1 | 1,292 | 9 |
| Region | | | | | |
| Northeast | 8,551 | 8,018 | 93.8 | 533 | 6 |
| Midwest | 13,583 | 12,575 | 92.6 | 1,008 | 7 |
| South | 25,509 | 24,023 | 94.2 | 1,486 | 6 |
| West | 9,420 | 8,713 | 92.5 | 707 | 8 |
| Male | | | | | |
| Northeast | 3,710 | 3,486 | 94.0 | 224 | 6 |
| Midwest | 5,803 | 5,321 | 91.7 | 482 | 8 |
| South | 10,755 | 10,143 | 94.3 | 612 | 6 |
| West | 4,060 | 3,730 | 91.9 | 330 | 8 |
| Female | | | | | |
| Northeast | 4,841 | 4,532 | 93.6 | 309 | 6 |
| Midwest | 7,780 | 7,254 | 93.2 | 526 | 7 |
| South | 14,754 | 13,879 | 94.1 | 875 | 6 |
| West | 5,359 | 4,983 | 93.0 | 376 | 7 |
| Metropolitan status | | | | | |
| Metropolitan statistical area | 48,874 | 45,691 | 93.5 | 3,183 | 7 |
| Nonmetropolitan statistical area | 8,189 | 7,638 | 93.3 | 551 | 7 |
| Male | | | | | |
| Metropolitan statistical area | 20,821 | 19,399 | 93.2 | 1,422 | 7 |
| Nonmetropolitan statistical area | 3,507 | 3,282 | 93.6 | 225 | 6 |
| Female | | | | | |
| Metropolitan statistical area | 28,053 | 26,292 | 93.7 | 1,761 | 6 |
| Nonmetropolitan statistical area | 4,682 | 4,356 | 93.0 | 326 | 7 |

NOTES: Table A is a comparison of the January 28, 2009, *National Health Statistics Report*, Number 11, procedure estimates (taken from Table 2) to the revised estimates in this September 4, 2009, revision. NSAS is the National Survey of Ambulatory Surgery.

## Revising the NSAS Data Set and How It Affected the Data

To maintain comparability with the 1994–1996 NSAS data, since multiple codes were not included in the 1996 NSAS, all multiple procedure codes were removed from the 2006 NSAS data. As a result, the estimate for the total number of 2006 NSAS procedures fell from 57,062,000 to 53,329,000, a 6.5% decrease. Categories were differentially affected. Tables A and B show the 2006 NSAS original and the 2006 NSAS revised estimates for some of the major procedure categories included in this and the January 28, 2009, NSAS *National Health Statistics Report*. The tables also include ratios of the revised estimates to the original estimates to show relative changes. As expected, the revised estimates decreased most for bilateral and other multiple site procedures.

**Table B. A comparison of estimates of procedures from Table 6, by selected characteristics: United States, 2006**

| Characteristic | Original NSAS (Number in thousands) | Revised NSAS (Number in thousands) | Revised/ original (Percent) | Decrease | Percent decrease |
|---|---|---|---|---|---|
| Total procedures | 57,062 | 53,329 | 93.5 | 3,733 | 7 |
| Age | | | | | |
| Under 15 years | 4,034 | 3,266 | 81.0 | 768 | 19 |
| 15–44 years | 13,691 | 12,780 | 93.3 | 911 | 7 |
| 45–64 years | 21,369 | 20,167 | 94.4 | 1,202 | 6 |
| 65–74 years | 9,622 | 9,182 | 95.4 | 440 | 5 |
| 75 years and over | 8,345 | 7,934 | 95.1 | 411 | 5 |
| Sex | | | | | |
| Male | 24,328 | 22,681 | 93.2 | 1,647 | 7 |
| Female | 32,734 | 30,648 | 93.6 | 2,086 | 6 |
| Procedure category | | | | | |
| Nervous system | 4,106 | 3,198 | 77.9 | 908 | 22 |
| Eye | 7,296 | 7,085 | 97.1 | 211 | 3 |
| Ear | 1,723 | 1,114 | 64.7 | 609 | 35 |
| Nose, mouth, and pharynx | 3,179 | 2,864 | 90.1 | 315 | 10 |
| Respiratory system | 448 | 445 | 99.3 | 3 | 1 |
| Cardiovascular system | 1,395 | 1,376 | 98.6 | 19 | 1 |
| Digestive system | 14,677 | 14,414 | 98.2 | 263 | 2 |
| Urinary system | 1,799 | 1,776 | 98.7 | 23 | 1 |
| Male genital organs | 655 | 631 | 96.3 | 24 | 4 |
| Female genital organs | 2,503 | 2,497 | 99.8 | 6 | 0.2 |
| Musculoskeletal system | 8,439 | 7,944 | 94.1 | 495 | 6 |
| Integumentary system | 4,108 | 3,581 | 87.2 | 527 | 13 |
| Misc diagnostic/therapeutic and new technologies | 6,387 | 6,060 | 94.9 | 327 | 5 |
| Other (includes endocrine system, hemic and lymphatic system, and obstetrical procedures | 346 | 344 | 99.4 | 2 | 1 |

NOTES: Table B is a comparison of the January 28, 2009, *National Health Statistics Reports*, Number 11, procedure estimates (taken from Table 6) to the revised estimates in this September 4, 2009, revision. NSAS is the National Survey of Ambulatory Surgery.

### The procedure estimates for the following chapters were most affected by the deletion of multiple codes:

- Operations on the nervous system decreased 22% largely due to multiple coding of injection of agent into spinal canal.
- Operations on the ear decreased 35% largely due to double coding of myringotomy with insertion of tube.
- Operations on the nose, mouth, and pharynx decreased 10%.
- Operations on the integumentary system decreased 13% largely due to multiple coding of excision or destruction of lesion or tissue of skin and subcutaneous tissue.

Since myringotomies are a common procedure for children, estimates for both myringotomies and for overall procedures for children decreased a great deal after double coding was eliminated. The children's estimate decreased by 19% and the myringotomy estimate decreased by 44%.

### Steps taken to improve coding in the future

A coding manual for the 2009 Ambulatory Surgical Center (ASC) data (now being gathered through NHAMCS) that clarifies the multiple coding issue is being prepared for coding of NHAMCS data. The differences between CPT and ICD–9–CM coding principles are discussed in the new manual along with what to do if the record contains only CPT codes. For the 2009 coding of ASC data, a crosswalk has been developed to generate ICD–9–CM codes from CPT codes. Instructions detailing how to handle duplicate codes are also included.

When the 2009 NHAMCS data are processed, NCHS will examine all double coding and remove any codes that are found to be inappropriate.

Your suggestions are welcomed on how to handle multiple codes in future ASC data. Please send any suggestions to Nancy Sonnenfeld at nsonnenfeld@cdc.gov.

### Steps data users should take upon receiving the revised data

All data analyses based on the original NSAS data set should not be used. Instead, the analyses should be rerun using the revised data set. Similarly, any estimates or standard errors taken from the original NSAS *National Health Statistics Reports* (January 28, 2009) should not be used. Instead, these numbers should be obtained from this revised (September 4, 2009) report. Changes in this report are not limited to procedure estimates and standard errors affected by the method of handling multiple codes. Printing errors were also discovered, which affected some of the standard errors for visits and for procedures. These errors have been corrected in this revised report.

## What has changed in the revised NSAS data set

As was indicated previously in the discussion of the data set revision, the estimates of some procedures (PROC1-PROC6), particularly those that were coded multiple times, have changed. They are lower because duplicates have been deleted. The values for other variables that were derived from the procedure data had to be derived again from the newer data set. The variables affected were NUMPROC (number of procedures per visit), SGFLAG1-SGFLAG6 (flags indicating if the procedures were surgical or nonsurgical), and PD1CLASS-PD6CLASS (the Agency for Health Care Research and Quality's Procedure Class Tool variables). Because of the changes in certain estimates, standard errors for these estimates may also have changed.

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000460 (10/11/13)

**Table 1. Characteristics of the 2006 National Survey of Ambulatory Surgery facility respondents and nonrespondents: United States**

| Facility characteristic | Number of sampled in-scope facilities | Total percent distribution (weighted) | Responding facility percent distribution (weighted) | Nonresponding facility percent distribution (weighted) | Weighted response rate | Standard error |
|---|---|---|---|---|---|---|
| All facilities | 587 | 100.0 | 100.0 | 100.0 | 83.7 | 2.6 |
| Facility type | | | | | | |
| Hospital based | 189 | 49.9 | 51.2 | 43.1 | 85.9 | 3.8 |
| Freestanding | 398 | 50.1 | 48.8 | 56.9 | 81.5 | 3.3 |
| Geographic region | | | | | | |
| Northeast | 90 | 11.7 | 12.5 | 8.2 | 88.7 | 4.5 |
| Midwest | 126 | 24.1 | 23.7 | 25.9 | 82.5 | 6.8 |
| South | 222 | 40.4 | 41.8 | 33.2 | 86.6 | 3.6 |
| West | 149 | 23.7 | 22.0 | 32.8 | 77.5 | 5.2 |
| Metropolitan status[1] | | | | | | |
| Metropolitan statistical area | 521 | 73.1 | 70.1 | 88.6 | 80.3 | 2.9 |
| Nonmetropolitan statistical area | 66 | 26.9 | 29.9 | 11.4 | 93.1 | 3.7 |
| Growth area[2] | | | | | | |
| Below 7.8% growth | 209 | 43.3 | 46.1 | 29.3 | 89.0 | 3.5 |
| Above 7.8% growth | 378 | 56.7 | 53.9 | 70.7 | 80.0 | 3.4 |
| Poverty status of area[2] | | | | | | |
| Below 13.1% in poverty | 337 | 51.9 | 52.1 | 51.3 | 83.9 | 3.1 |
| Above 13.1% in poverty | 250 | 48.1 | 47.9 | 48.7 | 83.5 | 4.2 |
| Primary care shortage area[2] | | | | | | |
| Nonshortage area | 99 | 22.5 | 24.3 | 13.7 | 90.1 | 5.0 |
| Shortage area | 488 | 77.5 | 75.7 | 86.3 | 81.8 | 3.1 |

[1]Distribution between respondents and nonrespondents is significantly different ($p < 0.05$).
[2]Based on the Area Resource File value for the county in which the facility is located. Growth is based on the population difference between 2006 and 1996. Poverty is based on the percentage of population below the poverty level. Shortage area includes full or partial shortage area for primary care physicians.

SOURCE: CDC/NCHS, National Survey of Ambulatory Surgery.

**Table 2. Number, percent distribution, and rate of ambulatory surgery visits and all-listed procedures, by facility characteristics and sex: United States, 2006**

| Characteristic | Both sexes | | Male | | Female | |
|---|---|---|---|---|---|---|
| | Estimate | Standard error | Estimate | Standard error | Estimate | Standard error |
| | | | Number in thousands | | | |
| Total visits | 34,738 | 1,829 | 14,707 | 781 | 20,032 | 1,072 |
| Facility type | | | | | | |
| Hospital based | 19,869 | 880 | 8,491 | 395 | 11,379 | 518 |
| Freestanding | 14,869 | 1,603 | 6,216 | 674 | 8,653 | 939 |
| Region | | | | | | |
| Northeast | 5,298 | 645 | 2,248 | 273 | 3,051 | 385 |
| Midwest | 8,047 | 610 | 3,378 | 272 | 4,669 | 355 |
| South | 15,931 | 1,540 | 6,749 | 656 | 9,182 | 897 |
| West | 5,462 | 427 | 2,331 | 179 | 3,130 | 266 |
| Metropolitan status | | | | | | |
| Metropolitan statistical area | 29,715 | 1,943 | 12,566 | 825 | 17,149 | 1,138 |
| Nonmetropolitan statistical area | 5,024 | 937 | 2,140 | 407 | 2,883 | 537 |
| | | | Percent distribution | | | |
| Total visits | 100.0 | ... | 100.0 | ... | 100.0 | ... |
| Facility type | | | | | | |
| Hospital based | 57.2 | 2.9 | 57.7 | 2.9 | 56.8 | 2.9 |
| Freestanding | 42.8 | 2.9 | 42.3 | 2.9 | 43.2 | 2.9 |
| Region | | | | | | |
| Northeast | 15.3 | 1.7 | 15.3 | 1.7 | 15.2 | 1.8 |
| Midwest | 23.2 | 1.8 | 23.0 | 1.8 | 23.3 | 1.8 |
| South | 45.9 | 2.7 | 45.9 | 2.8 | 45.8 | 2.8 |
| West | 15.7 | 1.3 | 15.9 | 1.3 | 15.6 | 1.4 |
| Metropolitan status | | | | | | |
| Metropolitan statistical area | 85.5 | 2.7 | 85.4 | 2.8 | 85.6 | 2.7 |
| Nonmetropolitan statistical area | 14.5 | 2.7 | 14.6 | 2.8 | 14.4 | 2.7 |
| | | | Rate per 1,000 population[1] | | | |
| Total visits | 116.5 | 6.1 | 100.4 | 5.3 | 132.0 | 7.1 |
| Facility type | | | | | | |
| Hospital based | 66.6 | 3.0 | 58.0 | 2.7 | 75.0 | 3.4 |
| Freestanding | 49.9 | 5.4 | 42.4 | 4.6 | 57.0 | 6.2 |
| Region | | | | | | |
| Northeast | 96.9 | 11.8 | 84.6 | 10.3 | 108.5 | 13.7 |
| Midwest | 121.7 | 9.2 | 103.8 | 8.3 | 139.0 | 10.6 |
| South | 147.0 | 14.2 | 127.3 | 12.4 | 165.7 | 16.2 |
| West | 79.2 | 6.2 | 67.8 | 5.2 | 90.5 | 7.7 |
| Metropolitan status | | | | | | |
| Metropolitan statistical area | 119.3 | 7.8 | 102.7 | 6.7 | 135.5 | 9.0 |
| Nonmetropolitan statistical area | 99.6 | 18.6 | 85.3 | 16.2 | 113.8 | 21.2 |

See footnotes at end of table.

**Table 2. Number, percent distribution, and rate of ambulatory surgery visits and all-listed procedures, by facility characteristics and sex: United States, 2006—Con.**

| Characteristic | Both sexes | | Male | | Female | |
|---|---|---|---|---|---|---|
| | Estimate | Standard error | Estimate | Standard error | Estimate | Standard error |
| | | | Number in thousands | | | |
| Total procedures | 53,329 | 2,654 | 22,681 | 1,138 | 30,648 | 1,575 |
| Facility type | | | | | | |
| Hospital based | 30,761 | 1,276 | 13,286 | 593 | 17,475 | 751 |
| Freestanding | 22,568 | 2,328 | 9,395 | 971 | 13,173 | 1,385 |
| Region | | | | | | |
| Northeast | 8,018 | 898 | 3,486 | 392 | 4,532 | 530 |
| Midwest | 12,575 | 904 | 5,321 | 412 | 7,254 | 532 |
| South | 24,023 | 2,224 | 10,143 | 939 | 13,879 | 1,316 |
| West | 8,713 | 690 | 3,730 | 299 | 4,983 | 430 |
| Metropolitan status | | | | | | |
| Metropolitan statistical area | 45,691 | 2,853 | 19,399 | 1,213 | 26,292 | 1,686 |
| Nonmetropolitan statistical area | 7,638 | 1,387 | 3,282 | 613 | 4,356 | 791 |
| | | | Percent distribution | | | |
| Total procedures | 100.0 | ... | 100.0 | ... | 100.0 | ... |
| Facility type | | | | | | |
| Hospital based | 57.7 | 2.7 | 58.6 | 2.7 | 57.0 | 2.8 |
| Freestanding | 42.3 | 2.7 | 41.4 | 2.7 | 43.0 | 2.8 |
| Region | | | | | | |
| Northeast | 15.0 | 1.6 | 15.4 | 1.6 | 14.8 | 1.6 |
| Midwest | 23.6 | 1.7 | 23.5 | 1.8 | 23.7 | 1.8 |
| South | 45.0 | 2.6 | 44.7 | 2.6 | 45.3 | 2.7 |
| West | 16.3 | 1.3 | 16.4 | 1.4 | 16.3 | 1.4 |
| Metropolitan status | | | | | | |
| Metropolitan statistical area | 85.7 | 2.6 | 85.5 | 2.7 | 85.8 | 2.6 |
| Nonmetropolitan statistical area | 14.3 | 2.6 | 14.5 | 2.7 | 14.2 | 2.6 |
| | | | Rate per 1,000 population[1] | | | |
| Total procedures | 178.8 | 8.9 | 154.8 | 7.8 | 202.0 | 10.4 |
| Facility type | | | | | | |
| Hospital based | 101.3 | 4.3 | 89.4 | 4.0 | 112.7 | 4.9 |
| Freestanding | 77.5 | 7.8 | 65.4 | 6.6 | 89.3 | 9.1 |
| Region | | | | | | |
| Northeast | 146.6 | 16.4 | 131.3 | 14.7 | 161.1 | 18.8 |
| Midwest | 190.2 | 13.7 | 163.5 | 12.7 | 215.9 | 15.8 |
| South | 221.6 | 20.5 | 191.3 | 17.7 | 250.5 | 23.8 |
| West | 126.3 | 10.0 | 108.4 | 8.7 | 144.0 | 12.4 |
| Metropolitan status | | | | | | |
| Metropolitan statistical area | 183.5 | 11.5 | 158.5 | 9.9 | 207.7 | 13.3 |
| Nonmetropolitan statistical area | 151.5 | 27.5 | 130.8 | 24.4 | 172.0 | 31.2 |

... Category not applicable.

[1]Rates were calculated using U.S. Census Bureau 2000-based postcensal estimates of the civilian population as of July 1, 2006.

SOURCE: CDC/NCHS, National Survey of Ambulatory Surgery.

**Table 3. Number of ambulatory surgery visits by disposition and principal expected source of payment: United States, 2006**

| Characteristic | Estimate | Standard error | Percent distribution | Standard error |
|---|---|---|---|---|
| | | Number in thousands | | |
| All visits | 34,738 | 1,829 | 100 | ... |
| Disposition of patient | | | | |
| Routine[1] | 32,356 | 1,792 | 93.1 | 0.9 |
| Observation status | 401 | 66 | 1.2 | 0.2 |
| Inpatient admission | 287 | 43 | 0.8 | 0.1 |
| Surgery cancelled | 79 | 19 | 0.2 | 0.1 |
| Not stated | 944 | 174 | 2.7 | 0.5 |
| Other | * | * | * | * |
| Principal expected source of payment | | | | |
| Private insurance | 18,070 | 1,045 | 53.0 | 1.2 |
| Medicare | 10,996 | 660 | 32.2 | 0.9 |
| Medicaid | 2,204 | 189 | 6.5 | 0.5 |
| Workers compensation | 627 | 101 | 1.8 | 0.3 |
| Other government insurance | 309 | 63 | 0.9 | 0.2 |
| Self pay | 1,131 | 185 | 3.3 | 0.5 |
| Other | 783 | 170 | 2.3 | 0.5 |

... Category not applicable.
* Figure does not meet standards of reliability or precision.
[1]Patients with routine disposition were those who were discharged to their normal place of residence, i.e., home, nursing home, or prison.
SOURCE: CDC/NCHS, National Survey of Ambulatory Surgery.

**Table 4. Distribution of times for surgical visits by ambulatory surgery facility type: United States, 2006**

| Calculated time in minutes | Mean | Standard error | 25th percentile | Median | 75th percentile |
|---|---|---|---|---|---|
| | | | Total | | |
| Total[1] | 124.5 | 3.6 | 65 | 100 | 153 |
| Operating room[2] | 53.7 | 1.4 | 25 | 40 | 65 |
| Surgical[3] | 30.3 | 0.8 | 11 | 20 | 36 |
| Postoperative room[4] | 66.9 | 2.0 | 32 | 51 | 81 |
| | | | Hospital based | | |
| Total[1] | 146.6 | 5.3 | 84 | 120 | 177 |
| Operating room[2] | 61.7 | 1.6 | 33 | 50 | 75 |
| Surgical[3] | 34.2 | 0.9 | 13 | 24 | 43 |
| Postoperative room[4] | 79.0 | 3.2 | 25 | 39 | 60 |
| | | | Freestanding | | |
| Total[1] | 97.7 | 3.8 | 53 | 76 | 120 |
| Operating room[2] | 43.2 | 2.0 | 20 | 30 | 50 |
| Surgical[3] | 25.1 | 1.4 | 9 | 15 | 27 |
| Postoperative room[4] | 53.1 | 2.3 | 29 | 43 | 66 |

[1]Total time was calculated by subtracting the time when the patient entered the operating room from the time the patient left postoperative care.
[2]Operating room time was calculated by subtracting the time when the patient entered the operating room from the time the patient left the operating room.
[3]Surgical time was calculated by subtracting the time the surgery began from the time the surgery ended. Surgical time typically extends from when the first incision is made until the wound is closed.
[4]Postoperative room time was calculated by subtracting the time when the patient entered postoperative care from the time the patient left postoperative care.
SOURCE: CDC/NCHS, National Survey of Ambulatory Surgery.

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**Table 5. Average surgical duration by selected diagnoses and ambulatory surgery facility type: United States, 2006**

| Selected diagnoses and ICD–9–CM codes | Average total time (in minutes)[1] | Standard error | Average surgical time (in minutes)[2] | Standard error |
|---|---|---|---|---|
| | | Total | | |
| Cataract .366 | 70.2 | 2.7 | 18.1 | 0.7 |
| Benign neoplasm of the colon .211.3 | 90.3 | 4.1 | 21.8 | 0.7 |
| Diverticula of the intestine .562 | 79.5 | 4.2 | 16.9 | 0.7 |
| Intervertebral disc disorders .722 | 82.9 | 7.2 | 21.1 | 3.0 |
| Hemorrhoids .455 | 86.7 | 4.0 | 18.2 | 0.9 |
| Gastritis and duodenitis .535 | 91.0 | 6.5 | 14.2 | 1.3 |
| Chronic diseases of tonsils and adenoids .474 | 155.2 | 7.9 | 22.5 | 1.0 |
| Otitis media and Eustachian tube disorders .381–382 | 65.7 | 5.1 | 12.3 | 1.0 |
| Carpal tunnel syndrome .354.0 | 96.0 | 3.6 | 18.2 | 0.9 |
| Inguinal hernia .550 | 169.0 | 6.4 | 49.4 | 1.6 |
| | | Hospital based | | |
| Cataract .366 | 88.4 | 3.7 | 22.7 | 1.5 |
| Benign neoplasm of the colon .211.3 | 111.5 | 7.5 | 24.6 | 1.4 |
| Diverticula of the intestine .562 | 102.7 | 5.0 | 19.0 | 1.7 |
| Intervertebral disc disorders .722 | 107.4 | 14.8 | 29.9 | 5.4 |
| Hemorrhoids .455 | 112.0 | 6.6 | 20.7 | 1.3 |
| Gastritis and duodenitis .535 | 111.4 | 7.8 | 17.9 | 1.7 |
| Chronic diseases of tonsils and adenoids .474 | 161.6 | 11.0 | 23.4 | 1.5 |
| Otitis media and Eustachian tube disorders .381–382 | 75.0 | 4.9 | 13.5 | 1.4 |
| Carpal tunnel syndrome .354.0 | 111.2 | 5.6 | 19.1 | 1.1 |
| Inguinal hernia .550 | 177.2 | 7.2 | 52.0 | 1.8 |
| | | Freestanding | | |
| Cataract .366 | 57.3 | 2.4 | 14.9 | 0.5 |
| Benign neoplasm of the colon .211.3 | 77.9 | 3.0 | 20.0 | 0.7 |
| Diverticula of the intestine .562 | 68.3 | 4.0 | 15.9 | 0.7 |
| Intervertebral disc disorders .722 | 61.4 | 5.3 | 12.8 | 2.2 |
| Hemorrhoids .455 | 75.1 | 4.0 | 16.9 | 1.3 |
| Gastritis and duodenitis .535 | 68.9 | 6.6 | 10.0 | 1.0 |
| Chronic diseases of tonsils and adenoids .474 | 148.9 | 10.2 | 20.6 | 0.9 |
| Otitis media and Eustachian tube disorders .381–382 | 56.8 | 5.8 | 10.2 | 0.6 |
| Carpal tunnel syndrome .354.0 | 83.8 | 3.2 | 17.1 | 1.3 |
| Inguinal hernia .550 | 145.8 | 7.7 | 40.1 | 2.3 |

[1]Total time was calculated by subtracting the time when the patient entered the operating room from the time the patient left postoperative care.
[2]Surgical time was calculated by subtracting the time the surgery began from the time the surgery ended. Surgical time typically extends from when the first incision is made until the wound is closed.

NOTE: Procedure categories and code numbers are based on the *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD–9–CM).

SOURCE: CDC/NCHS, National Survey of Ambulatory Surgery.

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**Table 6. Number of ambulatory surgery procedures, by procedure category, sex, and age: United States, 2006**

| Procedure category and ICD–9–CM code | Total | Sex | | Age | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Male | Female | Under 15 years | 15–44 years | 45–64 years | 65–74 years | 75 years and over |
| | Number in thousands | | | | | | | |
| All procedures | 53,329 | 22,681 | 30,648 | 3,266 | 12,780 | 20,167 | 9,182 | 7,934 |
| Operations on the nervous system .01–05 | 3,198 | 1,272 | 1,926 | * | 888 | 1,385 | 427 | 484 |
| Injection of agent into spinal canal .03.91–03.92 | 1,991 | 844 | 1,147 | * | 533 | 835 | 286 | 336 |
| Release of carpal tunnel .04.43 | 577 | 179 | 398 | * | 143 | 279 | 73 | 81 |
| Operations on the eye .08–16 | 7,085 | 2,803 | 4,283 | 103 | 266 | 1,651 | 2,289 | 2,775 |
| Operations on eyelids .08 | 386 | 137 | 249 | *29 | 39 | 156 | 75 | 87 |
| Extraction of lens .13.1–13.6 | 3,058 | 1,154 | 1,904 | * | 38 | 610 | 1,070 | 1,335 |
| Insertion of prosthetic lens (pseudophakos) .13.7 | 2,582 | 987 | 1,595 | * | 33 | 524 | 923 | 1,098 |
| Operations on the ear .18–20 | 1,114 | 568 | 545 | 858 | 118 | 59 | *38 | 41 |
| Myringotomy with insertion of tube .20.01 | 715 | 382 | 333 | 667 | *32 | * | * | * |
| Operations on the nose, mouth, and pharynx .21–29 | 2,864 | 1,441 | 1,423 | 1,050 | 937 | 617 | 162 | 97 |
| Incision, excision, and destruction of nose .21.1,21.3–21.4,21.6 | 293 | 142 | 151 | * | 144 | 77 | *34 | *18 |
| Turbinectomy .21.6 | 196 | 100 | 96 | * | 110 | 54 | * | * |
| Repair and plastic operations on the nose .21.8 | 308 | 160 | 147 | * | 153 | 100 | *27 | * |
| Operations on nasal sinuses .22 | 606 | 328 | 278 | * | 222 | 276 | * | * |
| Tonsillectomy with or without adenoidectomy .28.2–28.3 | 737 | 314 | 423 | 530 | 186 | * | * | – |
| Adenoidectomy without tonsillectomy .28.6 | 140 | 83 | 57 | 132 | * | * | – | – |
| Operations on the respiratory system .30–34 | 445 | 225 | 220 | *34 | 70 | 176 | 88 | *77 |
| Bronchoscopy with or without biopsy .33.21–33.24,33.27 | 173 | 71 | 102 | * | * | *67 | *43 | * |
| Operations on the cardiovascular system .35–39,00.50–00.51,00.53–00.55,00.61–00.66 | 1,376 | 712 | 664 | * | 165 | 605 | 284 | 312 |
| Cardiac catheterization .37.21–37.23 | 492 | 280 | 212 | * | *41 | 238 | 123 | 88 |
| Operations on the digestive system .42–54 | 14,414 | 6,500 | 7,914 | * | 2,824 | 6,448 | 2,925 | 1,956 |
| Dilation of esophagus .42.92 | 341 | 140 | 201 | * | *37 | 152 | 83 | 66 |
| Endoscopy of small intestine with or without biopsy .45.11–45.14,45.16 | 3,467 | 1,423 | 2,044 | * | 770 | 1,390 | 648 | 550 |
| Endoscopy of large intestine with or without biopsy .45.21–45.25 | 5,741 | 2,438 | 3,304 | * | 779 | 2,921 | 1,233 | 778 |
| Endoscopic polypectomy of large intestine .45.42 | 1,399 | 788 | 611 | * | 69 | 701 | 424 | 207 |
| Laparoscopic cholecystectomy .51.23 | 503 | 87 | 416 | * | 229 | 193 | * | * |
| Hernia repair .53.0–53.1,53.2–53.9 | 920 | 724 | 196 | 73 | 298 | 331 | 133 | 84 |
| Repair of inguinal hernia .53.0–53.1 | 526 | 482 | *45 | 39 | 139 | 186 | 88 | 74 |
| Operations on the urinary system .55–59 | 1,776 | 932 | 844 | * | 375 | 624 | 369 | 356 |
| Cystoscopy with or without biopsy .57.31–57.33 | 751 | 406 | 345 | * | 147 | 271 | 157 | 169 |
| Operations on the male genital organs .60–64 | 631 | 631 | ... | 166 | 146 | 143 | 109 | 67 |
| Operations on the female genital organs .65–71 | 2,497 | ... | 2,497 | * | 1,633 | 689 | 109 | *60 |
| Hysteroscopy .68.12 | 313 | ... | 313 | – | 159 | 121 | * | * |
| Dilation and curettage of uterus .69.0 | 611 | ... | 611 | – | 334 | 227 | *29 | * |
| Operations on the musculoskeletal system .76–84,00.70–00.73,00.80–00.84 | 7,944 | 3,856 | 4,088 | 295 | 2,602 | 3,696 | 871 | 479 |
| Partial excision of bone .76.2–76.3,77.6–77.8 | 449 | 231 | 218 | * | 121 | 228 | 57 | *31 |
| Reduction of fracture .76.7,79.0–79.3 | 495 | 310 | 185 | 102 | 213 | 115 | *35 | *29 |
| Injection of therapeutic substance into joint or ligament .76.96,81.92 | 218 | 87 | 131 | * | 45 | 112 | 32 | *26 |
| Removal of implanted devices from bone .76.97,78.6 | 212 | 108 | 104 | 27 | 85 | 58 | * | * |
| Excision and repair of bunion and other toe deformities .77.5 | 461 | 68 | 394 | * | 115 | 226 | 83 | *30 |
| Arthroscopy of knee .80.26 | 956 | 502 | 455 | * | 358 | 448 | 103 | *32 |
| Excision of semilunar cartilage of knee .80.6 | 690 | 384 | 307 | * | 204 | 352 | 90 | *42 |
| Replacement or other repair of knee .81.42–81.47,81.54–81.55,00.80–00.84 | 463 | 260 | 203 | * | 216 | 190 | *35 | * |
| Operations on muscle, tendon, fascia, and bursa .82–83 | 1,465 | 642 | 823 | 55 | 403 | 755 | 165 | 88 |

See footnotes at end of table.

**Table 6. Number of ambulatory surgery procedures, by procedure category, sex, and age: United States, 2006—Con.**

| Procedure category and ICD–9–CM code | Total | Sex | | Age | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Male | Female | Under 15 years | 15–44 years | 45–64 years | 65–74 years | 75 years and over |
| | Number in thousands | | | | | | | |
| Operations on the integumentary system .85–86 | 3,581 | 1,045 | 2,535 | 166 | 1,223 | 1,415 | 435 | 341 |
| Biopsy of breast .85.11–85.12 | 261 | * | 250 | * | 79 | 130 | *28 | * |
| Local excision of lesion of breast (lumpectomy) .85.21 | 329 | * | 317 | * | 110 | 133 | *52 | * |
| Excision or destruction of lesion or tissue of skin and subcutaneous tissue .86.2–86.4 | 1,092 | 542 | 550 | 100 | 332 | 395 | 139 | 127 |
| Miscellaneous diagnostic and therapeutic procedures and new technologies[1] .87–99,00 | 6,060 | 2,617 | 3,442 | 242 | 1,456 | 2,517 | 999 | 846 |
| Arteriography and angiocardiography using contrast material .88.4–88.5 | 1,054 | 561 | 492 | – | *74 | 471 | 297 | 213 |
| Diagnostic ultrasound .88.7,00.21–00.25,00.28,00.29 | 322 | 159 | 162 | * | 53 | 147 | 70 | 50 |
| Injection or infusion of therapeutic or prophylactic substance .99.1–99.2 | 1,462 | 529 | 933 | 35 | 429 | 599 | 202 | 196 |
| Operations on the endocrine system, operations on the hemic and lymphatic system, and obstetrical procedures .06–07,40–41,72–75 | 344 | 78 | 266 | * | 77 | 140 | *78 | *41 |

* Figure does not meet standards of reliability or precision.
. . . Category not applicable.
– Quantity zero.
[1]Chapter 00 codes included in this category: 00.01–00.03, 00.09, 00.10–00.18, 00.21–00.25, 00.28–00.29, 00.31–00.35, 00.39, 00.40–00.43, 00.45–00.48, 00.52, 00.74–00.76, and 00.91–00.93.

NOTES: Procedure categories and code numbers are based on the *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD–9–CM). The standard error (SE) of an estimate can be obtained by multiplying the estimate by the corresponding relative standard error (RSE). The RSE can be obtained by dividing the SE of the rate by the rate in Table 7.

SOURCE: CDC/NCHS, National Survey of Ambulatory Surgery.



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**Table 7. Rate and standard error for the rate of ambulatory surgery procedures, by procedure category, sex, and age: United States, 2006**

| Procedure category and ICD–9–CM code | Total | Sex | | Age | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Male | Female | Under 15 years | 15–44 years | 45–64 years | 65–74 years | 75 years and over |
| | Rate per 10,000 population[1] | | | | | | | |
| All procedures | 1,788.3 | 1,548.1 | 2,020.2 | 537.5 | 1,019.2 | 2,695.9 | 4,854.0 | 4,325.3 |
| Operations on the nervous system .01–05 | 107.2 | 86.9 | 126.9 | * | 70.8 | 185.2 | 225.7 | 263.8 |
| Injection of agent into spinal canal .03.91–03.92 | 66.8 | 57.6 | 75.6 | * | 42.5 | 111.6 | 151.3 | 183.4 |
| Release of carpal tunnel .04.43 | 19.3 | 12.2 | 26.2 | * | 11.4 | 37.3 | 38.7 | 44.2 |
| Operations on the eye .08–16 | 237.6 | 191.3 | 282.3 | 17.0 | 21.2 | 220.8 | 1,210.0 | 1,513.0 |
| Operations on eyelids .08 | 12.9 | 9.4 | 16.4 | *4.7 | 3.1 | 20.9 | 39.6 | 47.5 |
| Extraction of lens .13.1–13.6 | 102.5 | 78.8 | 125.5 | * | 3.0 | 81.6 | 565.7 | 727.6 |
| Insertion of prosthetic lens (pseudophakos) .13.7 | 86.6 | 67.4 | 105.2 | * | 2.6 | 70.1 | 488.2 | 598.7 |
| Operations on the ear .18–20 | 37.3 | 38.8 | 35.9 | 141.2 | 9.4 | 7.9 | *20.2 | 22.3 |
| Myringotomy with insertion of tube .20.01 | 24.0 | 26.1 | 21.9 | 109.7 | *2.6 | * | * | * |
| Operations on the nose, mouth, and pharynx .21–29 | 96.0 | 98.3 | 93.8 | 172.9 | 74.7 | 82.5 | 85.8 | 53.1 |
| Incision, excision, and destruction of nose .21.1,21.3–21.4,21.6 | 9.8 | 9.7 | 9.9 | * | 11.5 | 10.3 | *18.1 | *9.6 |
| Turbinectomy .21.6 | 6.6 | 6.8 | 6.4 | * | 8.8 | 7.2 | * | * |
| Repair and plastic operations on the nose .21.8 | 10.3 | 11.0 | 9.7 | * | 12.2 | 13.3 | *14.4 | * |
| Operations on nasal sinuses .22 | 20.3 | 22.4 | 18.3 | * | 17.7 | 36.9 | * | * |
| Tonsillectomy with or without adenoidectomy .28.2–28.3 | 24.7 | 21.4 | 27.9 | 87.2 | 14.9 | * | * | – |
| Adenoidectomy without tonsillectomy .28.6 | 4.7 | 5.6 | 3.8 | 21.8 | * | * | – | – |
| Operations on the respiratory system .30–34 | 14.9 | 15.4 | 14.5 | *5.6 | 5.6 | 23.6 | 46.3 | *42.1 |
| Bronchoscopy with or without biopsy .33.21–33.24,33.27 | 5.8 | 4.8 | 6.8 | * | * | *9.0 | *22.7 | * |
| Operations on the cardiovascular system .35–39,00.50–00.51,00.53–00.55,00.61–00.66 | 46.1 | 48.6 | 43.8 | * | 13.2 | 80.9 | 150.0 | 169.9 |
| Cardiac catheterization .37.21–37.23 | 16.5 | 19.1 | 14.0 | * | *3.2 | 31.9 | 65.0 | 48.0 |
| Operations on the digestive system .42–54 | 483.3 | 443.7 | 521.7 | * | 225.2 | 861.9 | 1,546.3 | 1,066.2 |
| Dilation of esophagus .42.92 | 11.4 | 9.6 | 13.2 | * | *3.0 | 20.4 | 43.7 | 35.8 |
| Endoscopy of small intestine with or without biopsy .45.11–45.14,45.16 | 116.3 | 97.1 | 134.7 | * | 61.4 | 185.9 | 342.6 | 299.6 |
| Endoscopy of large intestine with or without biopsy .45.21–45.25 | 192.5 | 166.4 | 217.8 | * | 62.1 | 390.4 | 651.6 | 424.3 |
| Endoscopic polypectomy of large intestine .45.42 | 46.9 | 53.8 | 40.3 | * | 5.5 | 93.7 | 223.9 | 112.6 |
| Laparoscopic cholecystectomy .51.23 | 16.9 | 5.9 | 27.4 | * | 18.2 | 25.9 | * | * |
| Hernia repair .53.0–53.1,53.2–53.9 | 30.9 | 49.4 | 12.9 | 11.9 | 23.8 | 44.3 | 70.6 | 46.0 |
| Repair of inguinal hernia .53.0–53.1 | 17.7 | 32.9 | *2.9 | 6.5 | 11.1 | 24.9 | 46.6 | 40.2 |
| Operations on the urinary system .55–59 | 59.6 | 63.6 | 55.7 | * | 29.9 | 83.5 | 195.3 | 194.1 |
| Cystoscopy with or without biopsy .57.31–57.33 | 25.2 | 27.7 | 22.7 | * | 11.7 | 36.2 | 83.1 | 92.2 |
| Operations on the male genital organs .60–64 | 21.2 | 43.1 | ... | 27.4 | 11.6 | 19.2 | 57.4 | 36.7 |
| Operations on the female genital organs .65–71 | 83.7 | ... | 164.6 | * | 130.2 | 92.1 | 57.4 | *32.7 |
| Hysteroscopy .68.12 | 10.5 | ... | 20.7 | – | 12.7 | 16.2 | * | * |
| Dilation and currettage of uterus .69.0 | 20.5 | ... | 40.2 | – | 26.7 | 30.3 | *15.4 | * |
| Operations on the musculoskeletal system .76–84,00.70–00.73,00.80–00.84 | 266.4 | 263.2 | 269.5 | 48.6 | 207.5 | 494.1 | 460.5 | 261.3 |
| Partial excision of bone .76.2–76.3,77.6–77.8 | 15.1 | 15.8 | 14.4 | * | 9.6 | 30.5 | 29.9 | *17.0 |
| Reduction of fracture .76.7,79.0–79.3 | 16.6 | 21.2 | 12.2 | 16.8 | 17.0 | 15.4 | *18.5 | *16.0 |
| Injection of therapeutic substance into joint or ligament .76.96,81.92 | 7.3 | 5.9 | 8.6 | * | 3.6 | 14.9 | 16.9 | *14.2 |
| Removal of implanted devices from bone .76.97,78.6 | 7.1 | 7.3 | 6.9 | 4.4 | 6.8 | 7.7 | * | * |
| Excision and repair of bunion and other toe deformities .77.5 | 15.5 | 4.6 | 26.0 | * | 9.1 | 30.3 | 44.1 | *16.5 |
| Arthroscopy of knee .80.26 | 32.1 | 34.2 | 30.0 | * | 28.5 | 59.9 | 54.3 | *17.7 |
| Excision of semilunar cartilage of knee .80.6 | 23.1 | 26.2 | 20.2 | * | 16.3 | 47.1 | 47.8 | *22.8 |
| Replacement or other repair of knee .81.42–81.47,81.54–81.55,00.80–00.84 | 15.5 | 17.7 | 13.4 | * | 17.2 | 25.4 | *18.6 | * |
| Operations on muscle, tendon, fascia, and bursa .82–83 | 49.1 | 43.8 | 54.2 | 9.0 | 32.1 | 100.9 | 87.3 | 47.8 |

See footnotes at end of table.

**Table 7. Rate and standard error for the rate of ambulatory surgery procedures, by procedure category, sex, and age: United States, 2006—Con.**

| Procedure category and ICD–9–CM code | Total | Sex | | Age | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Male | Female | Under 15 years | 15–44 years | 45–64 years | 65–74 years | 75 years and over |
| | | | | Rate per 10,000 population[1] | | | | |
| Operations on the integumentary system .85–86 | 120.1 | 71.3 | 167.1 | 27.3 | 97.5 | 189.2 | 229.9 | 186.1 |
| Biopsy of breast .85.11–85.12 | 8.8 | * | 16.5 | * | 6.3 | 17.4 | *14.7 | * |
| Local excision of lesion of breast (lumpectomy) .85.21 | 11.0 | * | 20.9 | * | 8.8 | 17.8 | *27.4 | * |
| Excision or destruction of lesion or tissue of skin and subcutaneous tissue .86.2–86.4 | 36.6 | 37.0 | 36.3 | 16.4 | 26.5 | 52.8 | 73.4 | 69.2 |
| Miscellaneous diagnostic and therapeutic procedures and new technologies[2] .87–99,00 | 203.2 | 178.6 | 226.9 | 39.8 | 116.1 | 336.4 | 528.1 | 461.4 |
| Arteriography and angiocardiography using contrast material .88.4–88.5 | 35.3 | 38.3 | 32.5 | – | *5.9 | 62.9 | 156.8 | 116.0 |
| Diagnostic ultrasound .88.7,00.21–00.25,00.28,00.29 | 10.8 | 10.9 | 10.7 | * | 4.2 | 19.7 | 36.8 | 27.5 |
| Injection or infusion of therapeutic or prophylactic substance .99.1–99.2 | 49.0 | 36.1 | 61.5 | 5.7 | 34.2 | 80.1 | 107.0 | 107.0 |
| Operations on the endocrine system, operations on the hemic and lymphatic system, and obstetrical procedures .06–07,40–41,72–75 | 11.5 | 5.3 | 17.5 | * | 6.1 | 18.7 | *41.2 | *22.5 |
| | | | | Standard error | | | | |
| All procedures | 89.00 | 77.65 | 103.83 | 72.44 | 57.38 | 148.54 | 286.03 | 231.38 |
| Operations on the nervous system .01–05 | 11.32 | 10.57 | 12.94 | * | 9.57 | 19.50 | 27.43 | 37.71 |
| Injection of agent into spinal canal .03.91–03.92 | 8.97 | 8.72 | 10.01 | * | 7.31 | 15.38 | 23.29 | 29.95 |
| Release of carpal tunnel .04.43 | 2.07 | 1.55 | 2.99 | * | 1.95 | 5.05 | 6.50 | 9.35 |
| Operations on the eye .08–16 | 21.50 | 16.25 | 27.63 | 3.06 | 3.11 | 21.09 | 142.35 | 134.99 |
| Operations on eyelids .08 | 1.36 | 1.33 | 1.95 | *1.30 | 0.58 | 3.23 | 6.31 | 8.37 |
| Extraction of lens .13.1–13.6 | 10.02 | 7.09 | 13.29 | * | 0.54 | 9.41 | 67.74 | 67.42 |
| Insertion of prosthetic lens (pseudophakos) .13.7 | 9.02 | 6.28 | 12.08 | * | 0.49 | 8.58 | 63.85 | 57.88 |
| Operations on the ear .18–20 | 6.87 | 6.09 | 8.04 | 30.27 | 1.87 | 1.43 | *5.08 | 6.62 |
| Myringotomy with insertion of tube .20.01 | 5.20 | 5.28 | 5.41 | 25.32 | *0.73 | * | * | * |
| Operations on the nose, mouth, and pharynx .21–29 | 10.76 | 10.54 | 12.78 | 25.76 | 8.67 | 12.86 | 16.80 | 10.80 |
| Incision, excision, and destruction of nose .21.1,21.3–21.4,21.6 | 1.28 | 1.34 | 1.83 | * | 2.14 | 1.63 | *4.72 | *2.33 |
| Turbinectomy .21.6 | 0.95 | 1.14 | 1.23 | * | 1.45 | 1.35 | * | * |
| Repair and plastic operations on the nose .21.8 | 1.17 | 1.58 | 1.24 | * | 1.66 | 2.12 | *3.82 | * |
| Operations on nasal sinuses .22 | 3.27 | 3.64 | 4.08 | * | 3.36 | 9.02 | * | * |
| Tonsillectomy with or without adenoidectomy .28.2–28.3 | 4.15 | 3.52 | 5.17 | 16.93 | 2.15 | * | * | – |
| Adenoidectomy without tonsillectomy .28.6 | 0.99 | 1.41 | 0.86 | 4.79 | * | * | – | – |
| Operations on the respiratory system .30–34 | 1.98 | 2.17 | 2.48 | *1.45 | 1.31 | 4.51 | 9.96 | *8.10 |
| Bronchoscopy with or without biopsy .33.21–33.24,33.27 | 0.97 | 0.78 | 1.63 | * | * | *2.32 | *6.07 | * |
| Operations on the cardiovascular system .35–39,00.50–00.51,00.53–00.55,00.61–00.66 | 5.69 | 6.51 | 5.44 | * | 2.05 | 11.89 | 23.17 | 24.91 |
| Cardiac catheterization .37.21–37.23 | 2.51 | 3.07 | 2.24 | * | *0.84 | 5.78 | 12.17 | 11.18 |
| Operations on the digestive system .42–54 | 41.17 | 39.15 | 44.18 | * | 20.69 | 77.38 | 158.44 | 94.26 |
| Dilation of esophagus .42.92 | 1.63 | 1.55 | 2.14 | * | *0.80 | 3.45 | 9.02 | 7.33 |
| Endoscopy of small intestine with or without biopsy .45.11–45.14,45.16 | 10.46 | 9.45 | 12.04 | * | 7.33 | 18.77 | 32.51 | 29.46 |
| Endoscopy of large intestine with or without biopsy .45.21–45.25 | 21.68 | 19.32 | 24.41 | * | 10.15 | 43.49 | 87.41 | 46.99 |
| Endoscopic polypectomy of large intestine .45.42 | 5.76 | 6.72 | 5.30 | * | 1.25 | 11.00 | 36.55 | 14.02 |
| Laparoscopic cholecystectomy .51.23 | 1.51 | 0.84 | 2.79 | * | 2.25 | 2.98 | * | * |
| Hernia repair .53.0–53.1,53.2–53.9 | 2.42 | 4.22 | 1.29 | 2.58 | 2.20 | 4.99 | 10.61 | 7.07 |
| Repair of inguinal hernia .53.0–53.1 | 1.48 | 2.87 | *0.56 | 1.17 | 1.39 | 2.93 | 8.53 | 6.97 |
| Operations on the urinary system .55–59 | 4.82 | 5.39 | 5.38 | * | 3.99 | 9.10 | 24.40 | 20.98 |
| Cystoscopy with or without biopsy .57.31–57.33 | 2.95 | 3.40 | 3.05 | * | 2.29 | 4.82 | 12.46 | 12.97 |
| Operations on the male genital organs .60–64 | 1.87 | 3.81 | ... | 5.07 | 1.35 | 3.06 | 8.85 | 6.77 |
| Operations on the female genital organs .65–71 | 7.20 | ... | 14.15 | * | 11.67 | 9.85 | 11.27 | *8.52 |
| Hysteroscopy .68.12 | 1.60 | ... | 3.14 | – | 2.37 | 2.54 | * | * |
| Dilation and curettage of uterus .69.0 | 2.17 | ... | 4.27 | – | 3.07 | 4.00 | *3.48 | * |

See footnotes at end of table.



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**Table 7. Rate and standard error for the rate of ambulatory surgery procedures, by procedure category, sex, and age: United States, 2006—Con.**

| Procedure category and ICD–9–CM code | Total | Sex | | Age | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Male | Female | Under 15 years | 15–44 years | 45–64 years | 65–74 years | 75 years and over |
| | Standard error | | | | | | | |
| Operations on the musculoskeletal system .76–84,00.70–00.73,00.80–00.84 | 19.47 | 21.20 | 20.32 | 5.85 | 19.10 | 38.44 | 48.77 | 24.82 |
| Partial excision of bone .76.2–76.3,77.6–77.8 | 1.45 | 1.92 | 1.59 | * | 1.33 | 3.98 | 5.48 | *3.78 |
| Reduction of fracture .76.7,79.0–79.3 | 1.68 | 2.44 | 1.37 | 2.21 | 2.28 | 2.67 | *4.88 | *3.33 |
| Injection of therapeutic substance into joint or ligament .76.96,81.92 | 0.87 | 1.00 | 1.16 | * | 0.78 | 2.26 | 3.20 | *3.27 |
| Removal of implanted devices from bone .76.97,78.6 | 0.94 | 1.29 | 1.01 | 1.20 | 1.27 | 1.17 | * | * |
| Excision and repair of bunion and other toe deformities .77.5 | 1.79 | 0.84 | 3.30 | * | 1.69 | 4.23 | 8.82 | *4.01 |
| Arthroscopy of knee .80.26 | 3.72 | 4.43 | 3.69 | * | 3.98 | 7.18 | 9.35 | *4.45 |
| Excision of semilunar cartilage of knee .80.6 | 1.99 | 2.86 | 1.80 | * | 1.88 | 4.51 | 6.94 | *4.92 |
| Replacement or other repair of knee .81.42–81.47,81.54–81.55,00.80–00.84 | 1.97 | 2.81 | 1.64 | * | 2.86 | 3.28 | *3.95 | * |
| Operations on muscle, tendon, fascia, and bursa .82–83 | 5.22 | 3.37 | 8.29 | 1.75 | 4.43 | 12.84 | 13.25 | 7.76 |
| Operations on the integumentary system .85–86 | 8.53 | 6.42 | 13.24 | 3.92 | 9.50 | 14.66 | 20.62 | 19.98 |
| Biopsy of breast .85.11–85.12 | 1.26 | * | 2.43 | * | 1.23 | 2.93 | *3.56 | * |
| Local excision of lesion of breast (lumpectomy) .85.21 | 1.17 | * | 2.29 | * | 1.45 | 2.22 | *6.37 | * |
| Excision or destruction of lesion or tissue of skin and subcutaneous tissue .86.2–86.4 | 3.20 | 3.92 | 3.33 | 2.57 | 3.24 | 5.25 | 13.11 | 10.15 |
| Miscellaneous diagnostic and therapeutic procedures and new technologies[2] .87–99,00 | 16.60 | 15.67 | 19.36 | 5.56 | 14.75 | 30.74 | 48.83 | 47.14 |
| Arteriography and angiocardiography using contrast material .88.4–88.5 | 5.40 | 6.50 | 4.91 | – | *1.61 | 10.60 | 27.50 | 25.38 |
| Diagnostic ultrasound .88.7,00.21–00.25,00.28,00.29 | 1.76 | 1.79 | 2.12 | * | 0.95 | 3.86 | 8.70 | 6.49 |
| Injection or infusion of therapeutic or prophylactic substance .99.1–99.2 | 7.20 | 4.86 | 10.46 | 1.09 | 7.30 | 13.78 | 16.48 | 13.21 |
| Operations on the endocrine system, operations on the hemic and lymphatic system, and obstetrical procedures .06–07,40–41,72–75 | 1.16 | 0.77 | 1.98 | * | 1.07 | 2.53 | *7.97 | *5.08 |

* Figure does not meet standards of reliability or precision.

– Quantity zero.

. . . Category not applicable.

[1]Rates were calculated using U.S. Census Bureau 2000-based postcensal estimates of the civilian population as of July 1, 2006.

[2]Chapter 00 codes included in this category: 00.01–00.03, 00.09, 00.10–00.18, 00.21–00.25, 00.28–00.29, 00.31–00.35, 00.39, 00.40–00.43, 00.45–00.48, 00.52, 00.74–00.76, 00.91–00.93.

NOTES: Procedure categories and code numbers are based on the *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD–9–CM). The relative standard error (RSE) can be obtained by dividing the standard error (SE) of the rate by the rate. The SE of a number in Table 6 can be obtained by multiplying the RSE by the estimate.

SOURCE: CDC/NCHS, National Survey of Ambulatory Surgery.

**Table 8. Number of ambulatory surgery visits by first-listed diagnosis, sex, and age: United States, 2006**

| Category of first-listed diagnosis and ICD–9–CM code | Total | Sex | | Age | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Male | Female | Under 15 years | 15–44 years | 45–64 years | 65–74 years | 75 years and over |
| | Number in thousands | | | | | | | |
| All conditions | 34,738 | 14,707 | 20,032 | 2,471 | 8,351 | 12,948 | 5,887 | 5,081 |
| Infectious and parasitic diseases .001–139 | 145 | 64 | 81 | * | * | *42 | * | * |
| Neoplasms .140–239 | 3,285 | 1,626 | 1,659 | 69 | 381 | 1,474 | 772 | 589 |
| Malignant neoplasms .140–208,230–234 | 1,173 | 534 | 639 | * | 117 | 446 | 285 | 314 |
| Malignant neoplasm of skin .172–173,176.0,198.2 | 303 | 164 | 139 | * | 34 | 87 | 59 | 123 |
| Malignant neoplasm of breast .174–175,198.81 | 235 | * | 234 | – | *35 | 121 | *52 | * |
| Benign neoplasms .210–229 | 2,000 | 1,039 | 961 | 53 | 241 | 985 | 468 | 253 |
| Benign neoplasm of colon .211.3 | 1,389 | 785 | 604 | – | 90 | 730 | 380 | 189 |
| Lipoma .214 | 126 | 61 | 64 | * | *23 | 76 | * | * |
| Endocrine, nutritional and metabolic diseases, and immunity disorders .240–279 | 266 | 74 | 192 | * | 91 | 103 | *34 | * |
| Diseases of the nervous system and sense organs .320–389 | 5,308 | 2,114 | 3,194 | 729 | 412 | 1,243 | 1,317 | 1,607 |
| Carpal tunnel syndrome .354.0 | 552 | 171 | 381 | – | 138 | 263 | 66 | 86 |
| Cataract .366 | 3,009 | 1,135 | 1,874 | * | 34 | 592 | 1,066 | 1,313 |
| Disorders of the eyelid .373–374 | 174 | 71 | 103 | * | *12 | 58 | 45 | 48 |
| Otitis media and Eustachian tube disorders .381–382 | 623 | 324 | 299 | 577 | * | * | * | * |
| Diseases of the circulatory system .390–459 | 1,736 | 832 | 904 | * | 256 | 860 | 353 | 264 |
| Heart disease .391–392.0,393–398,402,404,410–416,420–429 | 540 | 318 | 222 | * | *41 | 241 | 131 | 128 |
| Hemorrhoids .455 | 715 | 287 | 427 | * | 151 | 411 | 108 | *45 |
| Diseases of the respiratory system .460–519 | 1,294 | 591 | 703 | 572 | 396 | 207 | 81 | *38 |
| Deviated nasal septum .470 | 134 | 77 | 57 | * | 75 | 42 | * | * |
| Chronic sinusitis .473 | 141 | 82 | 59 | * | 52 | 56 | * | * |
| Chronic disease of tonsils and adenoids .474 | 680 | 273 | 407 | 496 | 172 | * | – | – |
| Diseases of the digestive system .520–579 | 6,808 | 3,081 | 3,727 | 326 | 1,597 | 2,688 | 1,242 | 955 |
| Diseases of teeth and supporting structures .520–525 | 221 | 114 | 107 | 171 | * | * | * | * |
| Diseases of esophagus .530 | 1,132 | 531 | 601 | * | 255 | 447 | 224 | 177 |
| Gastritis and duodenitis .535 | 703 | 228 | 475 | * | 170 | 257 | 146 | 118 |
| Hernia .550–553 | 1,141 | 764 | 377 | 64 | 335 | 418 | 174 | 149 |
| Inguinal hernia .550 | 515 | 470 | *45 | 33 | 131 | 189 | 91 | 71 |
| Noninfectious enteritis and colitis .555–558 | 228 | 102 | 126 | * | 81 | 87 | *34 | * |
| Diverticula of intestine .562 | 1,135 | 513 | 622 | * | *59 | 522 | 306 | 248 |
| Cholelithiasis .574 | 376 | *64 | 312 | * | 178 | 130 | * | * |
| Diseases of the genitourinary system .580–629 | 2,932 | 847 | 2,085 | 115 | 1,143 | 1,050 | 358 | 267 |
| Calculus of kidney and ureter .592 | 381 | 178 | 204 | * | 144 | 165 | *40 | *31 |
| Benign mammary dysplasias .610 | 94 | – | 94 | – | *35 | *45 | * | * |
| Lump or mass in breast .611.72 | 198 | * | 191 | * | 83 | 85 | * | * |
| Disorders of menstruation and other abnormal vaginal bleeding .626,627.0–627.1 | 481 | ... | 481 | – | 250 | 201 | * | * |
| Complications of pregnancy, childbirth, and the puerperium .630–677 | 322 | ... | 322 | – | 315 | * | – | – |
| Abortion and ectopic and molar pregnancy .630–639 | 260 | ... | 260 | – | 253 | * | – | – |
| Diseases of the skin and subcutaneous tissue .680–709 | 631 | 292 | 339 | 56 | 224 | 233 | * | 49 |
| Sebaceous cyst .706.2 | 134 | 69 | 65 | * | *44 | 53 | * | * |
| Diseases of the musculoskeletal system and connective tissue .710–739 | 4,523 | 1,875 | 2,648 | 67 | 1,336 | 2,035 | 599 | 486 |
| Arthropathies and related disorders .710–719 | 809 | 378 | 431 | * | 276 | 378 | 89 | 52 |
| Internal derangement of knee .717 | 321 | 177 | 144 | * | 116 | 150 | *33 | * |
| Intervertebral disc disorders .722 | 861 | 404 | 456 | – | 312 | 389 | 93 | 67 |
| Lumbago .724.2 | 156 | 64 | 91 | – | 35 | 57 | 31 | 33 |
| Rheumatism, excluding back .725–729 | 968 | 382 | 586 | *26 | 287 | 484 | 114 | 57 |
| Acquired deformities of toe .735 | 287 | 58 | 229 | * | 74 | 121 | 61 | *28 |

See footnotes at end of table.



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**Table 8. Number of ambulatory surgery visits by first-listed diagnosis, sex, and age: United States, 2006—Con.**

| Category of first-listed diagnosis and ICD–9–CM code | Total | Sex | | Age | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Male | Female | Under 15 years | 15–44 years | 45–64 years | 65–74 years | 75 years and over |
| Congenital anomalies .740–759 | 479 | 184 | * | 132 | 126 | * | * | * |
| Symptoms, signs, and ill-defined conditions .780–799 | 1,390 | 548 | 842 | * | 403 | 520 | 185 | 147 |
| Abdominal pain .789.0 | 167 | 51 | 116 | * | 53 | 71 | * | * |
| Injury and poisoning .800–999 | 2,230 | 1,255 | 976 | 169 | 777 | 848 | 270 | 166 |
| Fractures .800–829 | 513 | 321 | 192 | 102 | 237 | 107 | *32 | *35 |
| Current tear of medial cartilage or meniscus of knee .836.0 | 424 | 253 | 171 | * | 120 | 231 | 53 | *20 |
| Supplementary classifications .V01–V85 | 3,134 | 1,245 | 1,890 | 74 | 778 | 1,406 | 503 | 373 |
| Visit for sterilization .V25.2 | 292 | 50 | 242 | * | 263 | * | – | – |
| Diseases of the blood and blood-forming organs, mental disorders, and certain conditions originating in the perinatal period .280–289,290–319,760–779 | 255 | 80 | 174 | * | *47 | 88 | *47 | *62 |
| Anemias .280–285 | 189 | *58 | 131 | * | * | *61 | *40 | *62 |

* Figure does not meet standards of reliability or precision.

– Quantity zero.

. . . Category not applicable.

NOTES: Diagnostic categories and code numbers are based on the *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD–9–CM). The standard error (SE) of an estimate can be obtained by multiplying the estimate by the corresponding relative standard error (RSE). The RSE can be obtained by dividing the SE of the rate by the rate in Table 9.

SOURCE: CDC/NCHS, National Survey of Ambulatory Surgery.



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**Table 9. Rate and standard error for the rate of ambulatory surgery visits by first-listed diagnosis, sex, and age: United States, 2006**

| Category of first-listed diagnosis and ICD–9–CM code | Total | Sex | | Age | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Male | Female | Under 15 years | 15–44 years | 45–64 years | 65–74 years | 75 years and over |
| | Rate per 10,000 population[1] | | | | | | | |
| All conditions | 1,164.9 | 1,003.8 | 1,320.4 | 406.7 | 666.0 | 1,731.0 | 3,111.9 | 2,769.8 |
| Infectious and parasitic diseases .001–139 | 4.9 | 4.4 | 5.4 | * | * | *5.6 | * | * |
| Neoplasms .140–239 | 110.2 | 111.0 | 109.4 | 11.4 | 30.4 | 197.0 | 408.2 | 320.9 |
| Malignant neoplasms .140–208,230–234 | 39.3 | 36.4 | 42.1 | * | 9.3 | 59.6 | 150.9 | 171.1 |
| Malignant neoplasm of skin .172–173,176.0,198.2 | 10.2 | 11.2 | 9.2 | * | 2.7 | 11.6 | 31.2 | 67.0 |
| Malignant neoplasm of breast .174–175,198.81 | 7.9 | * | 15.4 | – | *2.8 | 16.1 | *27.4 | * |
| Benign neoplasms .210–229 | 67.1 | 70.9 | 63.3 | 8.7 | 19.2 | 131.7 | 247.3 | 137.7 |
| Benign neoplasm of colon .211.3 | 46.6 | 53.6 | 39.8 | – | 7.1 | 97.6 | 200.9 | 103.1 |
| Lipoma .214 | 4.2 | 4.2 | 4.2 | * | *1.8 | 10.2 | * | * |
| Endocrine, nutritional and metabolic diseases, and immunity disorders .240–279 | 8.9 | 5.1 | 12.7 | * | 7.3 | 13.8 | *18.2 | * |
| Diseases of the nervous system and sense organs .320–389 | 178.0 | 144.3 | 210.5 | 120.1 | 32.8 | 166.1 | 696.1 | 876.3 |
| Carpal tunnel syndrome .354.0 | 18.5 | 11.7 | 25.1 | – | 11.0 | 35.1 | 35.1 | 46.6 |
| Cataract .366 | 100.9 | 77.5 | 123.5 | * | 2.7 | 79.2 | 563.7 | 715.6 |
| Disorders of the eyelid .373–374 | 5.8 | 4.8 | 6.8 | * | *0.9 | 7.7 | 24.0 | 26.0 |
| Otitis media and Eustachian tube disorders .381–382 | 20.9 | 22.1 | 19.7 | 95.0 | * | * | * | * |
| Diseases of the circulatory system .390–459 | 58.2 | 56.8 | 59.6 | * | 20.4 | 115.0 | 186.8 | 144.1 |
| Heart disease .391–392.0,393–398,402,404,410–416,420–429 | 18.1 | 21.7 | 14.7 | * | *3.2 | 32.2 | 69.2 | 69.7 |
| Hemorrhoids .455 | 24.0 | 19.6 | 28.2 | * | 12.0 | 54.9 | 57.1 | *24.3 |
| Diseases of the respiratory system .460–519 | 43.4 | 40.3 | 46.3 | 94.2 | 31.5 | 27.7 | 42.6 | *20.9 |
| Deviated nasal septum .470 | 4.5 | 5.3 | 3.8 | * | 6.0 | 5.6 | * | * |
| Chronic sinusitis .473 | 4.7 | 5.6 | 3.9 | * | 4.1 | 7.5 | * | * |
| Chronic disease of tonsils and adenoids .474 | 22.8 | 18.6 | 26.8 | 81.7 | 13.7 | * | – | – |
| Diseases of the digestive system .520–579 | 228.3 | 210.3 | 245.7 | 53.6 | 127.4 | 359.3 | 656.7 | 520.6 |
| Diseases of teeth and supporting structures .520–525 | 7.4 | 7.8 | 7.1 | 28.1 | * | * | * | * |
| Diseases of esophagus .530 | 37.9 | 36.2 | 39.6 | * | 20.3 | 59.8 | 118.2 | 96.5 |
| Gastritis and duodenitis .535 | 23.6 | 15.5 | 31.3 | * | 13.6 | 34.3 | 77.0 | 64.4 |
| Hernia .550–553 | 38.3 | 52.1 | 24.9 | 10.6 | 26.7 | 55.8 | 92.2 | 81.4 |
| Inguinal hernia .550 | 17.3 | 32.1 | *3.0 | 5.4 | 10.5 | 25.3 | 48.0 | 38.9 |
| Noninfectious enteritis and colitis .555–558 | 7.6 | 6.9 | 8.3 | * | 6.4 | 11.7 | *18.2 | * |
| Diverticula of intestine .562 | 38.1 | 35.0 | 41.0 | * | *4.7 | 69.8 | 161.7 | 135.0 |
| Cholelithiasis .574 | 12.6 | *4.4 | 20.6 | * | 14.2 | 17.4 | * | * |
| Diseases of the genitourinary system .580–629 | 98.3 | 57.8 | 137.4 | 18.9 | 91.1 | 140.4 | 189.1 | 145.5 |
| Calculus of kidney and ureter .592 | 12.8 | 12.1 | 13.4 | * | 11.5 | 22.0 | *21.2 | *16.8 |
| Benign mammary dysplasias .610 | 3.2 | – | 6.2 | – | *2.8 | *6.0 | * | * |
| Lump or mass in breast .611.72 | 6.6 | * | 12.6 | * | 6.6 | 11.4 | * | * |
| Disorders of menstruation and other abnormal vaginal bleeding .626,627.0–627.1 | 16.1 | ... | 31.7 | – | 20.0 | 26.9 | * | * |
| Complications of pregnancy, childbirth, and the puerperium .630–677 | 10.8 | ... | 21.2 | – | 25.1 | * | – | – |
| Abortion and ectopic and molar pregnancy .630–639 | 8.7 | ... | 17.1 | – | 20.2 | * | – | – |
| Diseases of the skin and subcutaneous tissue .680–709 | 21.2 | 19.9 | 22.3 | 9.3 | 17.9 | 31.2 | * | 27.0 |
| Sebaceous cyst .706.2 | 4.5 | 4.7 | 4.3 | * | *3.5 | 7.1 | * | * |
| Diseases of the musculoskeletal system and connective tissue .710–739 | 151.7 | 128.0 | 174.6 | 11.0 | 106.5 | 272.1 | 316.9 | 264.7 |
| Arthropathies and related disorders .710–719 | 27.1 | 25.8 | 28.4 | * | 22.0 | 50.6 | 46.9 | 28.3 |
| Internal derangement of knee .717 | 10.8 | 12.1 | 9.5 | * | 9.2 | 20.0 | *17.2 | * |
| Intervertebral disc disorders .722 | 28.9 | 27.6 | 30.1 | – | 24.9 | 52.0 | 49.1 | 36.4 |
| Lumbago .724.2 | 5.2 | 4.4 | 6.0 | – | 2.8 | 7.6 | 16.6 | 17.8 |
| Rheumatism, excluding back .725–729 | 32.5 | 26.1 | 38.6 | *4.2 | 22.9 | 64.7 | 60.5 | 31.1 |
| Acquired deformities of toe .735 | 9.6 | 3.9 | 15.1 | * | 5.9 | 16.2 | 32.2 | *15.5 |

See footnotes at end of table.

**Table 9. Rate and standard error for the rate of ambulatory surgery visits by first-listed diagnosis, sex, and age: United States, 2006—Con.**

| Category of first-listed diagnosis and ICD–9–CM code | Total | Sex | | Age | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Male | Female | Under 15 years | 15–44 years | 45–64 years | 65–74 years | 75 years and over |
| | | | | Rate per 10,000 population[1] | | | | |
| Congenital anomalies .740–759 | 16.1 | 12.6 | * | 21.7 | 10.0 | * | * | * |
| Symptoms, signs, and ill-defined conditions .780–799 | 46.6 | 37.4 | 55.5 | * | 32.2 | 69.5 | 97.7 | 80.3 |
| Abdominal pain .789.0 | 5.6 | 3.5 | 7.7 | * | 4.2 | 9.4 | * | * |
| Injury and poisoning .800–999 | 74.8 | 85.6 | 64.3 | 27.9 | 62.0 | 113.4 | 142.6 | 90.4 |
| Fractures .800–829 | 17.2 | 21.9 | 12.7 | 16.8 | 18.9 | 14.3 | *17.0 | *19.1 |
| Current tear of medial cartilage or meniscus of knee .836.0 | 14.2 | 17.3 | 11.3 | * | 9.5 | 30.9 | 28.0 | *10.7 |
| Supplementary classifications .V01–V85 | 105.1 | 84.9 | 124.6 | 12.2 | 62.1 | 187.9 | 265.9 | 203.4 |
| Visit for sterilization .V25.2 | 9.8 | 3.4 | 16.0 | * | 20.9 | * | – | – |
| Diseases of the blood and blood-forming organs, mental disorders, and certain conditions originating in the perinatal period .280–289,290–319,760–779 | 8.5 | 5.5 | 11.5 | * | *3.8 | 11.8 | *25.1 | *33.8 |
| Anemias .280–285 | 6.3 | *4.0 | 8.6 | * | * | *8.2 | *21.1 | *33.8 |
| | | | | Standard error | | | | |
| All conditions | 61.32 | 53.33 | 70.69 | 54.26 | 35.76 | 100.68 | 195.86 | 156.70 |
| Infectious and parasitic diseases .001–139 | 0.90 | 0.85 | 1.24 | * | * | *1.37 | * | * |
| Neoplasms .140–239 | 7.96 | 8.89 | 7.90 | 1.94 | 2.75 | 16.81 | 39.52 | 25.97 |
| Malignant neoplasms .140–208,230–234 | 2.76 | 3.20 | 3.01 | * | 1.22 | 5.11 | 15.04 | 18.58 |
| Malignant neoplasm of skin .172–173,176.0,198.2 | 1.26 | 1.60 | 1.21 | * | 0.61 | 1.92 | 5.43 | 13.56 |
| Malignant neoplasm of breast .174–175,198.81 | 0.77 | * | 1.52 | – | *0.76 | 2.17 | *5.07 | * |
| Benign neoplasms .210–229 | 6.27 | 7.19 | 6.04 | 1.55 | 2.18 | 13.86 | 31.43 | 14.94 |
| Benign neoplasm of colon .211.3 | 5.42 | 6.13 | 5.18 | – | 1.68 | 12.00 | 28.25 | 12.22 |
| Lipoma .214 | 0.61 | 0.84 | 0.84 | * | *0.46 | 1.93 | * | * |
| Endocrine, nutritional and metabolic diseases, and immunity disorders .240–279 | 1.10 | 0.84 | 1.76 | * | 1.38 | 2.07 | *4.00 | * |
| Diseases of the nervous system and sense organs .320–389 | 13.69 | 10.58 | 17.50 | 22.75 | 3.62 | 13.98 | 75.05 | 75.91 |
| Carpal tunnel syndrome .354.0 | 2.02 | 1.51 | 2.92 | – | 1.95 | 4.87 | 6.23 | 9.54 |
| Cataract .366 | 9.90 | 6.98 | 13.19 | * | 0.50 | 9.24 | 67.68 | 66.28 |
| Disorders of the eyelid .373–374 | 0.65 | 0.76 | 0.88 | * | *0.25 | 1.34 | 4.50 | 4.36 |
| Otitis media and Eustachian tube disorders .381–382 | 4.19 | 3.94 | 4.65 | 20.45 | * | * | * | * |
| Diseases of the circulatory system .390–459 | 5.11 | 6.22 | 5.23 | * | 2.71 | 11.07 | 22.02 | 19.84 |
| Heart disease .391–392.0,393–398,402,404,410–416,420–429 | 2.68 | 3.57 | 2.37 | * | *0.86 | 5.61 | 12.87 | 13.80 |
| Hemorrhoids .455 | 3.16 | 3.20 | 3.61 | * | 2.39 | 7.12 | 9.11 | *5.26 |
| Diseases of the respiratory system .460–519 | 5.73 | 5.15 | 6.92 | 20.07 | 3.55 | 4.41 | 7.87 | *5.32 |
| Deviated nasal septum .470 | 0.66 | 0.92 | 0.84 | * | 1.17 | 1.37 | * | * |
| Chronic sinusitis .473 | 0.71 | 1.00 | 0.84 | * | 0.85 | 1.66 | * | * |
| Chronic disease of tonsils and adenoids .474 | 4.48 | 3.48 | 5.71 | 18.27 | 2.03 | * | – | – |
| Diseases of the digestive system .520–579 | 18.04 | 16.10 | 20.74 | 8.11 | 11.77 | 31.61 | 64.45 | 47.47 |
| Diseases of teeth and supporting structures .520–525 | 1.21 | 1.38 | 1.35 | 4.99 | * | * | * | * |
| Diseases of esophagus .530 | 4.31 | 4.28 | 4.86 | * | 2.81 | 7.88 | 17.63 | 12.02 |
| Gastritis and duodenitis .535 | 3.12 | 2.19 | 4.38 | * | 2.43 | 4.92 | 13.40 | 11.48 |
| Hernia .550–553 | 3.38 | 4.71 | 2.88 | 2.33 | 2.90 | 5.97 | 11.16 | 11.74 |
| Inguinal hernia .550 | 1.58 | 3.09 | *0.56 | 1.13 | 1.33 | 3.49 | 8.56 | 6.92 |
| Noninfectious enteritis and colitis .555–558 | 1.42 | 1.38 | 2.11 | * | 1.68 | 2.28 | *4.54 | * |
| Diverticula of intestine .562 | 5.25 | 6.01 | 5.21 | * | *1.03 | 12.67 | 22.33 | 19.19 |
| Cholelithiasis .574 | 1.20 | *0.71 | 2.22 | * | 1.98 | 2.42 | * | * |
| Diseases of the genitourinary system .580–629 | 5.71 | 4.23 | 8.89 | 3.46 | 5.70 | 10.17 | 20.18 | 18.20 |
| Calculus of kidney and ureter .592 | 1.32 | 1.54 | 1.60 | * | 1.95 | 2.73 | *4.20 | *4.63 |
| Benign mammary dysplasias .610 | 0.61 | – | 1.21 | – | *0.69 | *1.48 | * | * |
| Lump or mass in breast .611.72 | 1.07 | * | 2.04 | * | 1.22 | 2.57 | * | * |
| Disorders of menstruation and other abnormal vaginal bleeding .626,627.0–627.1 | 1.90 | ... | 3.73 | – | 2.59 | 3.25 | * | * |

See footnotes at end of table.

**Table 9. Rate and standard error for the rate of ambulatory surgery visits by first-listed diagnosis, sex, and age: United States, 2006—Con.**

| Category of first-listed diagnosis and ICD–9–CM code | Total | Sex | | Age | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Male | Female | Under 15 years | 15–44 years | 45–64 years | 65–74 years | 75 years and over |
| | Standard error | | | | | | | |
| Complications of pregnancy, childbirth, and the puerperium .630–677 | 1.35 | ... | 2.65 | – | 3.17 | * | – | – |
| Abortion and ectopic and molar pregnancy .630–639 | 1.27 | ... | 2.50 | – | 2.99 | * | – | – |
| Diseases of the skin and subcutaneous tissue .680–709 | 3.02 | 3.02 | 4.06 | 2.04 | 2.41 | 7.03 | * | 5.30 |
| Sebaceous cyst .706.2 | 0.69 | 1.11 | 0.77 | * | *0.77 | 1.44 | * | * |
| Diseases of the musculoskeletal system and connective tissue .710–739 | 11.91 | 11.38 | 13.53 | 1.64 | 10.18 | 21.94 | 28.02 | 32.52 |
| Arthropathies and related disorders .710–719 | 2.96 | 3.44 | 3.01 | * | 3.58 | 5.37 | 6.84 | 4.84 |
| Internal derangement of knee .717 | 1.79 | 2.69 | 1.36 | * | 2.22 | 3.04 | *4.09 | * |
| Intervertebral disc disorders .722 | 4.49 | 4.23 | 5.10 | – | 5.40 | 7.26 | 9.32 | 6.28 |
| Lumbago .724.2 | 0.93 | 0.95 | 1.18 | – | 0.80 | 1.51 | 4.55 | 4.40 |
| Rheumatism, excluding back .725–729 | 2.26 | 2.23 | 3.08 | *0.97 | 2.12 | 5.56 | 7.55 | 5.40 |
| Acquired deformities of toe .735 | 1.35 | 0.81 | 2.21 | * | 1.21 | 2.78 | 8.32 | *3.65 |
| Congenital anomalies .740–759 | 4.79 | 2.66 | * | 3.51 | 2.75 | * | * | * |
| Symptoms, signs, and ill-defined conditions .780–799 | 7.79 | 6.81 | 9.04 | * | 4.91 | 12.20 | 15.95 | 11.22 |
| Abdominal pain .789.0 | 0.95 | 0.71 | 1.49 | * | 0.89 | 2.16 | * | * |
| Injury and poisoning .800–999 | 5.15 | 6.22 | 5.27 | 3.51 | 5.05 | 8.65 | 20.49 | 11.84 |
| Fractures .800–829 | 1.49 | 2.23 | 1.31 | 2.23 | 2.20 | 2.51 | *4.74 | *4.17 |
| Current tear of medial cartilage or meniscus of knee .836.0 | 1.58 | 2.46 | 1.28 | * | 1.54 | 3.80 | 5.29 | *2.77 |
| Supplementary classifications .V01–V85 | 8.88 | 8.70 | 10.44 | 2.06 | 5.93 | 19.34 | 31.05 | 24.27 |
| Visit for sterilization .V25.2 | 1.15 | 0.52 | 2.20 | * | 2.43 | * | – | – |
| Diseases of the blood and blood-forming organs, mental disorders, and certain conditions originating in the perinatal period .280–289,290–319,760–779 | 1.19 | 1.12 | 1.71 | * | *0.74 | 2.78 | *6.55 | *7.27 |
| Anemias .280–285 | 1.01 | *0.93 | 1.42 | * | * | *2.09 | *5.94 | *7.27 |

* Figure does not meet standards of reliability or precision.
– Quantity zero.
... Category not applicable.
[1]Rates were calculated using U.S. Census Bureau 2000-based postcensal estimates of the civilian population as of July 1, 2006.

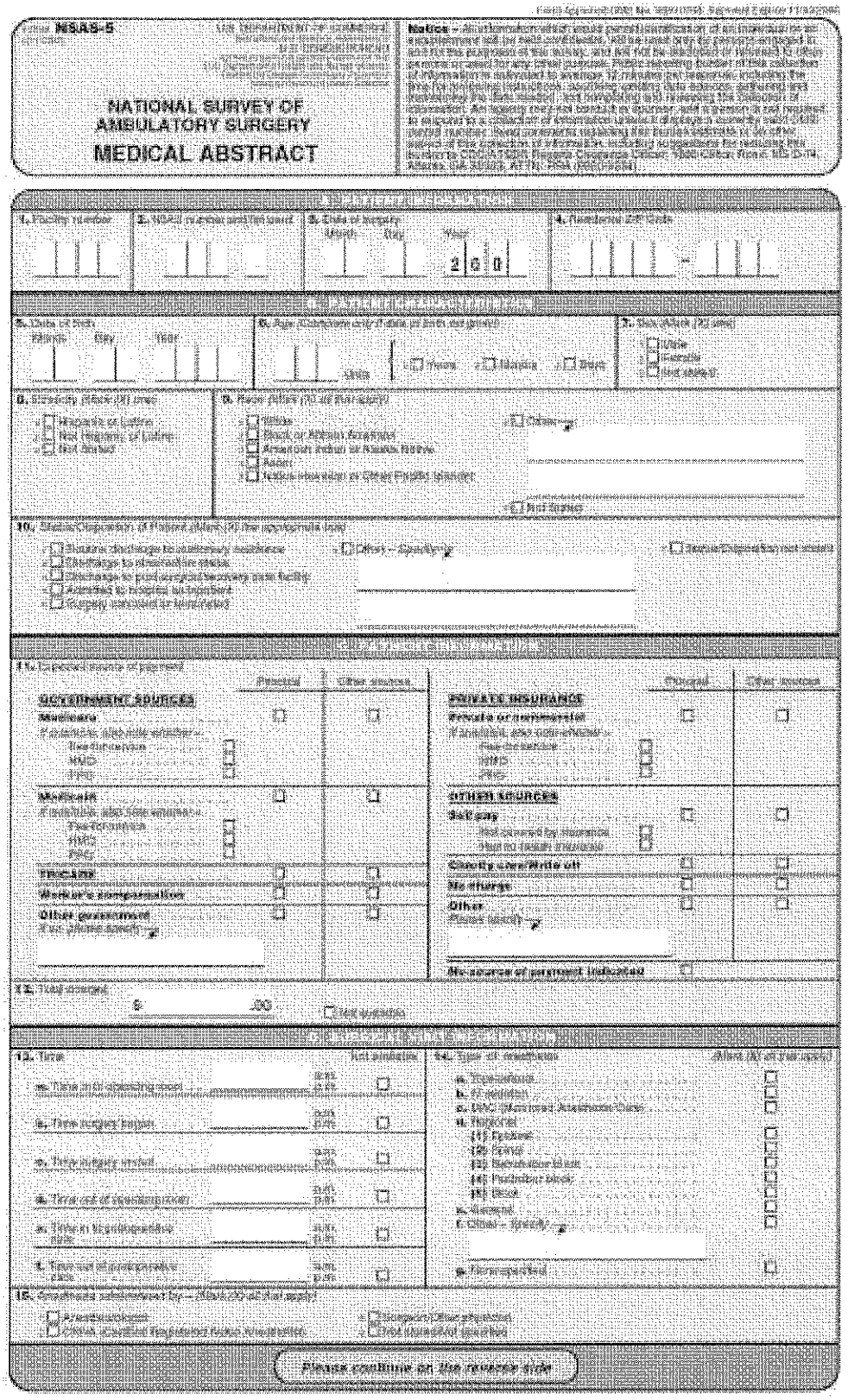
NOTES: Diagnostic categories and code numbers are based on the *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD–9–CM). The relative standard error (RSE) can be obtained by dividing the standard error (SE) of the rate by the rate. The SE of a number in Table 8 can be obtained by multiplying the RSE by the estimate.

SOURCE: CDC/NCHS, National Survey of Ambulatory Surgery.



000475 (10/11/13)

# Technical Notes



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Form NSAS-5

U.S. DEPARTMENT OF COMMERCE
U.S. DEPARTMENT OF HEALTH
[illegible]

**NATIONAL SURVEY OF AMBULATORY SURGERY**

**MEDICAL ABSTRACT**

**Notice** – [illegible]

**A. PATIENT INFORMATION**

1. Facility number
2. NSAS number and file card
3. Date of surgery: Month Day Year 2 6 0
4. Residence Z/P Code

**B. PATIENT INFORMATION**

5. Date of birth: Month Day Year
6. Age (Complete only if date of birth not given): Units ☐ Years ☐ Months ☐ Days
7. Sex (Mark (X) one): ☐ Male ☐ Female ☐ Not stated
8. Ethnicity (Mark (X) one): ☐ Hispanic or Latino ☐ Not Hispanic or Latino ☐ Not stated
9. Race (Mark (X) all that apply): ☐ White ☐ Black or African Americans ☐ American Indian or Alaska Native ☐ Asian ☐ Native Hawaiian or Other Pacific Islander ☐ Other ☐ Not stated
10. Status/Disposition of Patient (Mark (X) the appropriate box): ☐ Routine discharge to outdoor residence ☐ Discharge to observation status ☐ Discharge to post-surgical recovery care facility ☐ Admitted to hospital as inpatient ☐ Surgery canceled or terminated ☐ Other – Specify ☐ Status/Disposition not stated

**C. PAYMENT INFORMATION**

11. Expected source of payment

| | Principal | Other sources |
|---|---|---|
| **GOVERNMENT SOURCES** | | |
| **Medicare** | ☐ | ☐ |
| If medicare, also note whether – Fee-for-service ☐ HMO ☐ PPO ☐ | | |
| **Medicaid** | ☐ | ☐ |
| If medicaid, also note whether – Fee-for-service ☐ HMO ☐ PPO ☐ | | |
| **TRICARE** | ☐ | ☐ |
| **Worker's compensation** | ☐ | ☐ |
| **Other government** If so, please specify | ☐ | ☐ |

| | Principal | Other sources |
|---|---|---|
| **PRIVATE INSURANCE** | | |
| **Private or commercial** | ☐ | ☐ |
| If private, also note whether – Fee-for-service ☐ HMO ☐ PPO ☐ | | |
| **OTHER SOURCES** | | |
| **Self-pay** | ☐ | ☐ |
| Not covered by insurance ☐ Has no health insurance ☐ | | |
| **Charity care/Write off** | ☐ | ☐ |
| **No charge** | ☐ | ☐ |
| **Other** Please specify | ☐ | ☐ |
| **No source of payment indicated** | ☐ | |

12. Total charges $ .00 ☐ Not available

**D. PROCEDURE INFORMATION**

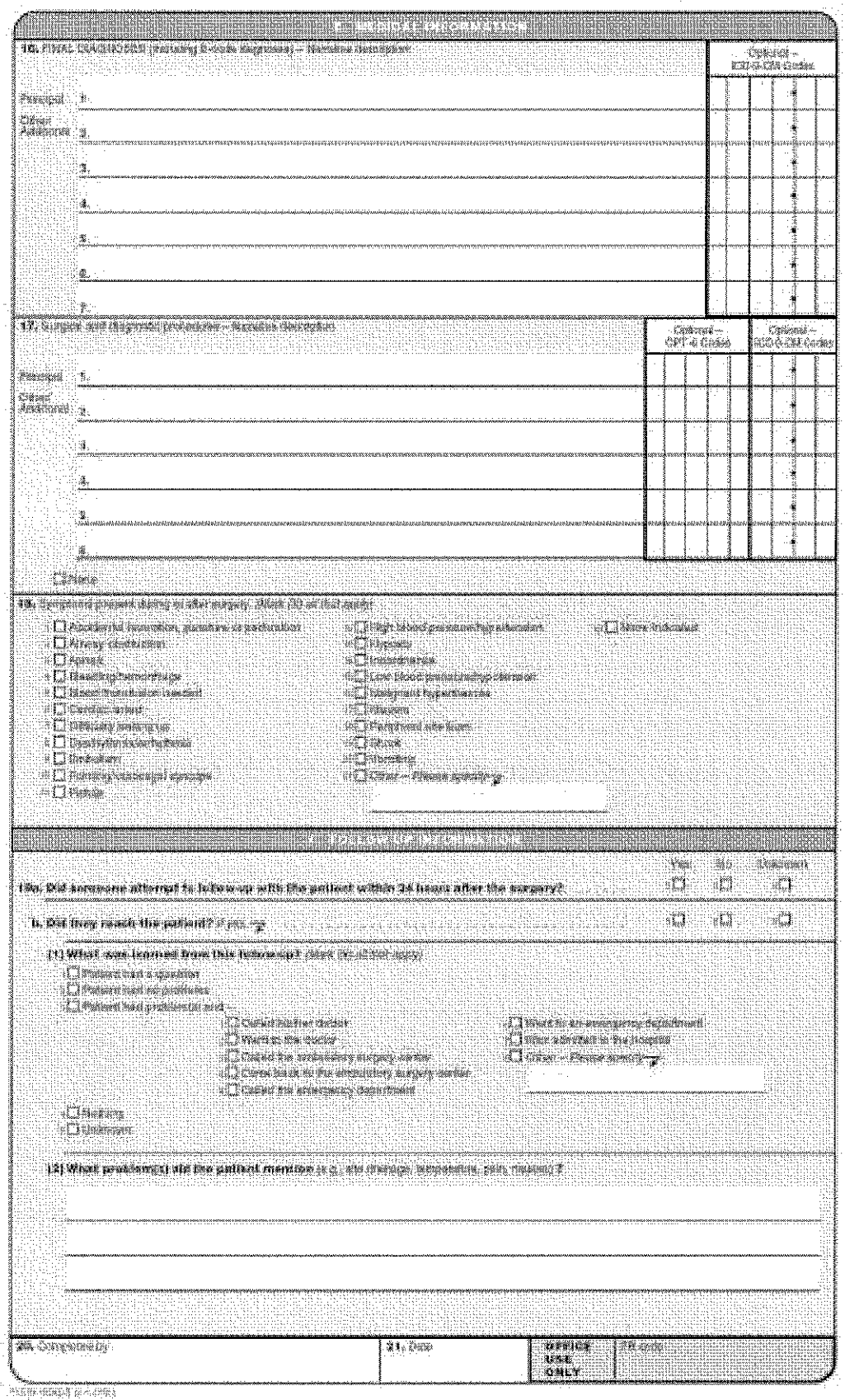
13. Time — Not available
a. Time in to operating room ____ a.m. p.m. ☐
b. Time surgery began ____ a.m. p.m. ☐
c. Time surgery ended ____ a.m. p.m. ☐
d. Time out of operating room ____ a.m. p.m. ☐
e. Time in to postoperative care ____ a.m. p.m. ☐
f. Time out of postoperative care ____ a.m. p.m. ☐

14. Type of anesthesia (Mark (X) all that apply)
a. Type/Sedation ☐
b. IV sedation ☐
c. DAC (Monitored Anesthesia Care) ☐
d. Regional
(1) Epidural ☐
(2) Spinal ☐
(3) Nerve/Nerve block ☐
(4) Peripheral block ☐
(5) Block ☐
e. General ☐
f. Other – Specify ☐
g. Non-specified ☐

15. Anesthesia administered by – (Mark (X) all that apply)
☐ Anesthesiologist ☐ Surgeon/Other physician
☐ CRNA (Certified Registered Nurse Anesthetist) ☐ Not stated/not specified

Please continue on the reverse side

000476 (10/11/13)



000477 (10/11/13)

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000478 (10/11/13)

HEALTHCARE COST AND UTILIZATION PROJECT

Agency for Healthcare Research and Quality

STATISTICAL BRIEF #86

February 2010

# Hospital-Based Ambulatory Surgery, 2007

*Allison Russo, M.P.H., Anne Elixhauser, Ph.D., Claudia Steiner, M.P.H., M.D., and Lauren Wier, M.P.H.*

## Introduction

Ambulatory surgery (AS), or outpatient surgery, is a planned surgical episode where the patient requires hospital care for less than 24 hours. Outpatient procedures account for a growing proportion of surgeries performed in U.S. hospitals because AS increasingly substitutes for inpatient surgery for many procedures.[1] Nationally, 63 percent of all surgeries in 2005 did not require an overnight hospital stay and were considered outpatient, compared with 51 percent in 1990 and only 16 percent in 1980.[2,3]

Two major factors explain this overall growth in ambulatory surgeries. First, advances in surgical technology and anesthesia have made surgery easier on patients and increased the demand for outpatient procedures. Second, in an effort to reduce rising health care costs, health care payment policies have encouraged AS. For example, the Medicare program adopted an outpatient prospective payment system authorizing payment for surgical services in a variety of settings, such as a physician's office, a hospital outpatient department, or an ambulatory surgical center. A comparison of AS data to inpatient surgery data is essential for understanding utilization patterns and costs for specific surgical procedures.

This Statistical Brief presents data from the Healthcare Cost and Utilization Project (HCUP) State Ambulatory Surgery Databases (SASD) and State Inpatient Databases (SID). These databases provide information on hospital-based ambulatory and inpatient surgeries performed in short-term, acute-care hospitals in the 28

[1] LJ, McCarthy E, Pokras R. Changing patterns of surgical care in the United States, 1980-1995. *Health Care Finance Rev*. 1999 Fall; 21(1):31-49.
[2] National Center for Health Statistics. *Health, United States, 2007 with Chartbook on Trends in the Health of Americans*. Hyattsville, MD: 2008.
[3] These statistics include major and minor surgical procedures performed in inpatient operating suites, outpatient surgery suites, or procedure rooms within an outpatient care facility.

### Highlights

- In the 28 states evaluated, nearly 58 percent of surgical encounters in hospitals were performed on outpatients.
- There were nearly 5,600 ambulatory surgery (AS) visits per 100,000 population compared with almost 4,100 inpatient surgical visits per 100,000.
- The mean charge for AS was lower than for inpatient surgery—$6,100 versus $39,900. The aggregate charge across the 28 states for AS was about one-fifth of total inpatient charges—$55.6 billion versus $259 billion.
- Procedures related to the digestive system accounted for 40 percent of all AS.
- Procedures done on the eye, ear, and nose/mouth/pharynx were predominantly outpatient. Roughly two-thirds of surgical procedures on the skin, digestive system, and urinary system were outpatient.
- Colonoscopy and biopsy was the most commonly performed AS procedure in 2007, followed by upper GI endoscopy, lens and cataract procedures, diagnostic cardiac catheterization, and debridement of wound.
- Major procedures that were performed less frequently on an outpatient basis, but with significant numbers include PTCA, appendectomy, open prostatectomy, oophorectomy, hysterectomy, hip fracture/dislocation repair, lower extremity amputation, and spinal fusion.

states that provided AS data to HCUP in 2007. These 28 states encompass about two-thirds of the U.S. population. These statistics exclude procedures performed in freestanding AS centers because these centers are not included in many State AS data sources.

This report compares the utilization of ambulatory surgery procedures in hospitals to inpatient procedures in 28 states that provide data sources for both hospital-based ambulatory and inpatient surgery. The analysis is limited to major invasive procedures requiring anesthesia services or sedation, but excludes procedures that are performed infrequently in ambulatory surgery settings, procedures that are adjunct to the principal procedure, dental procedures, obstetrical procedures, and procedures that are done predominantly in outpatient settings outside of hospitals.[4] This report provides information about the distribution of inpatient versus outpatient surgical procedures by body system, as well as the most common surgical procedures performed in an outpatient setting. In addition, ambulatory and inpatient volume, procedure rates, and hospital charge information are compared for each procedure. Unless otherwise noted, estimates are based on all-listed procedures. All differences between estimates provided in the text are statistically significant at the 0.05 level or better.

**Findings**

*Characteristics of ambulatory surgery procedures performed in community hospitals*
Based on data from the 28 states examined for this report, nearly 10.8 million ambulatory surgery (AS) visits took place in 2007, totaling $55.6 billion in aggregate charges (table 1). These visits resulted in over 12.4 million procedures (1.2 procedures per AS visit). This compares to 7.9 million inpatient stays that involved 11.0 million surgical procedures (1.4 procedures per hospital stay). Overall, 57.7 percent of procedures performed in hospitals were ambulatory in nature. In 2007, this translated to approximately 5,600 hospital-based AS visits per 100,000 population, compared with 4,100 inpatient procedure stays per 100,000 population.

The mean charge for hospital-based AS procedures was considerably lower than the charge for inpatient hospital stays that included procedures—$6,100 versus $39,900. Aggregate charges across the 28 states were about one-fifth of the national bill for inpatient—$55.6 billion versus $259 billion. Most hospital-based AS procedures were performed in large, metropolitan, private not-for-profit hospitals. However, compared with inpatient procedures, AS was more likely to be performed in smaller hospitals, outside metropolitan areas, and in non-teaching settings.

*Ambulatory versus inpatient surgeries, by body system*
Figure 1 shows that nearly all hospital-based procedures related to the eye (99.3 percent), ear (96.3 percent), and nose/mouth/pharynx (93.8 percent) were outpatient. About two-thirds of all hospital-based procedures on the skin (70.4 percent), digestive system (66.8 percent), and urinary system (61.7 percent) were also outpatient. Roughly half of all hospital-based procedures involving the musculoskeletal (54.0 percent), nervous (47.9 percent), female genital (47.5 percent), and endocrine systems (46.0 percent), were outpatient.

In contrast, respiratory, cardiovascular, male genital, and hemic/lymphatic procedures were primarily inpatient. About one in three surgical procedures on the respiratory (31.2 percent) and cardiovascular (29.4 percent) systems were performed in an outpatient setting, while less than 10 percent of all procedures on male genital organs and the hemic/lymphatic system were outpatient.

*The most common ambulatory surgeries performed in community hospitals*
Table 2 lists the 25 most common AS procedures performed in community hospitals. Colonoscopy and biopsy was the most common AS procedure and comprised nearly 18.1 percent of all procedures performed in an outpatient setting. Upper GI endoscopy and biopsy accounted for 10.8 percent of all outpatient procedures. Other digestive system procedures commonly performed in the outpatient setting included: cholecystectomy, or gall bladder surgery (2.5

[4] Full details about the types of procedures reported in this report are provided under "Definitions" on page 4.

percent of all AS); hernia repair (inguinal and femoral—2.1 percent; other hernias—1.4 percent); and esophageal dilatation (1.3 percent). In fact, more ambulatory surgeries involved the digestive system (40.0 percent) than any other body system (data not shown).

Though procedures on the cardiovascular system accounted for a small number of AS overall, diagnostic cardiac catheterization alone comprised 3.8 percent of all outpatient procedures in the hospitals in these 28 states. Four of the 25 most common ambulatory procedures were related to the musculoskeletal system: excision of semilunar cartilage of knee (2.5 percent of all AS), partial bone excision (1.5 percent), arthroplasty other than hip or knee (1.4 percent), and other fracture and dislocation procedure (1.2 percent). Two commonly performed outpatient procedures on the skin were wound debridement (2.6 percent) and incision and drainage of the skin and subcutaneous tissue (1.4 percent).

Lens and cataract procedures, most often performed on elderly patients, accounted for 5.5 percent of all AS in the hospitals in these 28 states.[5] Four of the 25 most common outpatient procedures were primarily or exclusively performed on women: other excision of cervix and uterus (2.1 percent of all AS), breast biopsy (1.9 percent), lumpectomy/quadrantectomy of the breast (1.9 percent), and diagnostic dilatation and curettage (D&C) (1.5 percent). Tonsillectomy and/or adenoidectomy and myringotomy (ear tube surgery)—two procedures primarily performed on children—were two of the most common surgical procedures performed in the ambulatory setting (2.5 percent and 1.9 percent of all procedures, respectively).

Three procedures involving the urinary tract were also among the top 25 AS procedures performed in hospitals—endoscopy/biopsy (1.6 percent of all AS), transurethral procedures for urinary obstruction (1.5 percent), and ureteral catheterization (1.3 percent). Finally, decompression of peripheral nerves (e.g., carpal tunnel release) comprised 1.5 percent of all AS, while bronchoscopy made up 1.1 percent of all AS.

Table 2 also provides information on the total number of procedures, rates, and the percentage of each procedure performed on an outpatient basis. For many procedures, it is clear that very few are done in an inpatient setting. For example, lens and cataract procedures, excision of semilunar cartilage of the knee, tonsillectomy, breast biopsy, lumpectomy, myringotomy, D&C, and decompression of peripheral nerve have rates lower than 10 inpatient procedures per 100,000 population, while rates for their outpatient counterparts are 12–50 times higher (over 300 times higher for lens procedures).

*An inventory of ambulatory surgical procedures performed in community hospitals*
The appendix provides a comprehensive listing of all major procedures, by body system, performed in an outpatient setting in community hospitals.[6] Overall, the highest numbers of ambulatory surgical procedures were performed on the digestive and musculoskeletal systems. The endocrine system accounted for the fewest outpatient procedures.

The appendix also provides details on procedures less commonly performed in AS settings that were not covered in table 2. For example, although laminectomy (Clinical Classifications Software (CCS) 3) is not a predominantly outpatient procedure, 22.1 percent were performed in an ambulatory setting (42.7 AS procedures per 100,000 population versus 150.8 inpatient (IP) procedures per 100,000 population). Other major procedures that are not predominantly AS but with significant numbers of ambulatory cases include:

- PTCA (CCS 45): 17.7 AS procedures vs. 242.4 IP procedures per 100,000 population
- Appendectomy (CCS 80): 26.8 AS procedures vs. 118.9 IP procedures per 100,000 population

[5] The total number of lens and cataract procedures is much higher; many are performed in freestanding AS centers, which are not included in these data.
[6] The appendix shows all procedures that were considered "surgical procedures" throughout this Brief. That is, these procedures comprise all the surgeries from which information was derived for tables 1-2 and figure 1.

- Open prostatectomy (CCS 114): 3.0 AS procedures vs. 28.1 IP procedures per 100,000 population
- Oophorectomy (CCS 119): 31.9 AS procedures vs. 121.4 IP procedures per 100,000 population
- Hysterectomy (CCS 124): 26.7 AS procedures vs. 166.6 IP procedures per 100,000 population
- Hip fracture/dislocation repair (CCS 146): 8.1 AS procedures vs. 98.0 IP procedures per 100,000 population
- Lower extremity amputation (CCS 157): 8.1 AS procedures vs. 38.2 IP procedures per 100,000 population
- Spinal fusion (CCS 158): 14.8 AS procedures vs. 124.0 IP procedures per 100,000 population

Mean charges for outpatient procedures were always lower than for inpatient. However, the difference in inpatient and outpatient charges for operations on the male genital organs was minimal when compared to other surgeries. The highest mean charges per visit were found among outpatient procedures performed on the cardiovascular system.

**Data Source**

The estimates in this Statistical Brief are based upon data from the HCUP 2007 State Inpatient Database (SID) and 2007 State Ambulatory Surgery Database (SASD). This report evaluates inpatient and outpatient surgery data from 28 selected states that contributed data to both the 2007 SASD and SID: California, Colorado, Connecticut, Florida, Georgia, Hawaii, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, South Carolina, South Dakota, Tennessee, Utah, Vermont, and Wisconsin. Supplemental source included data on state population estimates from Table 1: Annual Estimates of the Population for the United States, Regions, States, and Puerto Rico: April 1, 2000 to July 1, 2007 (NST-EST2007-01), Population Division, U.S. Census Bureau, Release date: December 27, 2007 (http://www.census.gov/popest/states/tables/NST-EST2007-01.xls).

**Definitions**

*Surgical procedures and Clinical Classifications Software (CCS)*
Multiple surgical procedures can be listed on a record in the SID and SASD. Frequencies and rankings of procedures are based on all-listed—that is, all procedures listed on the record. Procedures are de-duplicated: if a particular procedure occurs multiple times during the same surgical visit or hospital stay, it is counted only once.

CCS groupings of procedures were used throughout the report. CCS categorizes procedure codes into clinically meaningful categories.[7] This "clinical grouper" makes it easier to quickly understand patterns of procedure use.

Procedures on ambulatory surgery records can be coded using ICD-9-CM or the Common Procedural Terminology (CPT). When CPT was used, the CCS for Services and Procedures[8] was used to classify procedures into groupings comparable to the CCS.

*Case definition*
Records from the SASD meeting the following criteria were included:

[7] HCUP CCS. Healthcare Cost and Utilization Project (HCUP). June 2009. U.S. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp
[8] HCUP CCS-Services and Procedures. Healthcare Cost and Utilization Project (HCUP). June 2009. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/toolssoftware/ccs_svcsproc/ccssvcproc.jsp.

- At least one surgical procedure as defined by an *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM) procedure code in the range of 00.50–86.99 or 88.40–88.59.
- At least one major therapeutic or diagnostic operating room procedure as defined by the HCUP Procedure Classes.[9] Diagnostic procedures are included only if invasive, requiring anesthesia services or sedation.
- Length of stay of 0 or 1 day.
- Originate from a hospital-based ambulatory surgery center having at least 200 ambulatory surgical visits per year.
- The ambulatory surgery facility is designated as a short-term, community, non-rehabilitation hospital. Freestanding ambulatory surgery centers were not included.
- The procedure comprised at least 2,000 ambulatory surgery cases across the 28 states in 2007, because the focus of this analysis was on the most frequent procedures done in the ambulatory setting.
- Excludes procedures with the following characteristics: a procedure that is adjunct to another procedure (e.g., "extracorporeal circulation auxiliary to open heart procedures"), a heterogeneous "other" procedure category (e.g., "other OR heart procedures" which includes a wide range of heterogeneous, infrequent procedures), dental procedures, and procedures predominantly done in freestanding centers, radiology centers, or physician offices (e.g., "dialysis," "proctoscopy," "extracorporeal lithotripsy," and "indwelling catheter").
- Obstetrical procedures were excluded.

Records from the SID meeting similar criteria were included:

- At least one surgical procedure as defined by an ICD-9-CM procedure code in the range of 00.50–86.99 or 88.40–88.59.
- At least one major therapeutic or diagnostic operating room procedure as defined by the HCUP Procedure Classes. Diagnostic procedures are included only if invasive, requiring anesthesia services or sedation.
- Originate from a hospital with at least 200 inpatient surgical stays.
- The inpatient facility is designated as a short-term, community, non-rehabilitation hospital.
- The procedure met the criteria for including procedures from the SASD.
- Obstetrical procedures were excluded.

*Types of hospitals included in HCUP*
HCUP is based on data from community hospitals, defined as short-term, non-Federal, general and other hospitals, excluding hospital units of other institutions (e.g., prisons). HCUP data include OB-GYN, ENT, orthopedic, cancer, pediatric, public, and academic medical hospitals. They exclude long-term care, rehabilitation, psychiatric, and alcoholism and chemical dependency hospitals, but these types of encounters are included if they are from community hospitals.

*Unit of analysis*
For this report, any reference to "visit" or "hospital stay" indicates that the unit of analysis is the record rather than the surgical procedure. Any reference to "surgeries" indicates that the unit of analysis is a major operating room procedure. A visit or stay can involve multiple procedures.

*Charges*
Charges in HCUP data are the amount the hospital charged or billed for the entire surgical visit or hospital stay and do not reflect charges for individual surgical procedures. Charges do not necessarily reflect reimbursements or costs and do not include most professional (physician) fees. Cost-to-charge ratios are available to convert inpatient hospital charges to inpatient hospital costs, but an equivalent ratio for outpatient hospital data is currently not available.

[9] HCUP Procedure Classes. Healthcare Cost and Utilization Project (HCUP). November 2009. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/toolssoftware/procedure/procedure.jsp .

**About HCUP**

HCUP is a family of powerful health care databases, software tools, and products for advancing research. Sponsored by the Agency for Healthcare Research and Quality (AHRQ), HCUP includes the largest all-payer encounter-level collection of longitudinal health care data (inpatient, ambulatory surgery, and emergency department) in the United States, beginning in 1988. HCUP is a Federal-State-Industry Partnership that brings together the data collection efforts of many organizations—such as State data organizations, hospital associations, private data organizations, and the Federal government—to create a national information resource.

HCUP would not be possible without the contributions of the following data collection Partners from across the United States:

**Arizona** Department of Health Services
**Arkansas** Department of Health
**California** Office of Statewide Health Planning and Development
**Colorado** Hospital Association
**Connecticut** Hospital Association
**Florida** Agency for Health Care Administration
**Georgia** Hospital Association
**Hawaii** Health Information Corporation
**Illinois** Department of Public Health
**Indiana** Hospital Association
**Iowa** Hospital Association
**Kansas** Hospital Association
**Kentucky** Cabinet for Health and Family Services
**Louisiana** Department of Health and Hospitals
**Maine** Health Data Organization
**Maryland** Health Services Cost Review Commission
**Massachusetts** Division of Health Care Finance and Policy
**Michigan** Health & Hospital Association
**Minnesota** Hospital Association
**Missouri** Hospital Industry Data Institute
**Nebraska** Hospital Association
**Nevada** Department of Health and Human Services
**New Hampshire** Department of Health & Human Services
**New Jersey** Department of Health and Senior Services
**New York** State Department of Health
**North Carolina** Department of Health and Human Services
**Ohio** Hospital Association
**Oklahoma** State Department of Health
**Oregon** Association of Hospitals and Health Systems
**Pennsylvania** Health Care Cost Containment Council
**Rhode Island** Department of Health
**South Carolina** State Budget & Control Board
**South Dakota** Association of Healthcare Organizations
**Tennessee** Hospital Association
**Texas** Department of State Health Services
**Utah** Department of Health
**Vermont** Association of Hospitals and Health Systems
**Virginia** Health Information
**Washington** State Department of Health
**West Virginia** Health Care Authority
**Wisconsin** Department of Health Services
**Wyoming** Hospital Association

**About the SID**

The HCUP State Inpatient Databases (SID) are hospital inpatient databases from data organizations participating in HCUP. The SID contain the universe of the inpatient discharge abstracts in the participating HCUP States, translated into a uniform format to facilitate multistate comparisons and analyses. Together, the SID encompass almost 90 percent of all U.S. community hospital discharges in 2007. The SID can be used to investigate questions unique to one state; to compare data from two or more states; to conduct market area variation analyses; and to identify state-specific trends in inpatient care utilization, access, charges, and outcomes.

**About the SASD**

The HCUP State Ambulatory Surgery Databases (SASD) capture surgeries performed on the same day in which patients are admitted and released. All of the SASD databases from organizations participating in HCUP include abstracts from hospital-affiliated ambulatory surgery sites. Some contain the universe of ambulatory surgery encounter abstracts for that state, including records from both hospital-affiliated and freestanding surgery centers. In order to provide information that is comparable across all states, analysis was restricted to hospital-affiliated ambulatory surgery.

**For More Information**

For more information about HCUP, visit www.hcup-us.ahrq.gov.

For additional HCUP statistics, visit HCUPnet, our interactive query system, at www.hcup.ahrq.gov.

For information on other hospitalizations in the U.S., download *HCUP Facts and Figures: Statistics on Hospital-Based Care in the United States in 2007*, located at http://www.hcup-us.ahrq.gov/reports.jsp.

For a detailed description of HCUP, more information on the design of the SID, SASD, and methods to calculate estimates, please refer to the following publications:

Steiner, C., Elixhauser, A., Schnaier, J. The Healthcare Cost and Utilization Project: An Overview. *Effective Clinical Practice* 5(3):143–51, 2002.

*Introduction to the HCUP State Inpatient Databases*. Online. July 17, 2009. U.S. Agency for Healthcare Research and Quality. http://www.hcup-us.ahrq.gov/db/state/siddist/Introduction_to_SID.pdf.

*Introduction to the HCUP State Ambulatory Surgery Databases*. Online. July 17, 2009. U.S. Agency for Healthcare Research and Quality. http://www.hcup-us.ahrq.gov/db/state/sasddist/Introduction_to_SASD.pdf.

Russo, C.A., Owens, P., Steiner, C., Josephsen J. *Ambulatory Surgery in U.S. Hospitals, 2003.* HCUP Fact Book No. 9. Online. January 2007. U.S. Agency for Healthcare Research and Quality. http://www.ahrq.gov/data/hcup/factbk9/factbk9.pdf.

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AHRQ welcomes questions and comments from readers of this publication who are interested in obtaining more information about access, cost, use, financing, and quality of health care in the United States. We also invite you to tell us how you are using this Statistical Brief and other HCUP data and tools, and to share suggestions on how HCUP products might be enhanced to further meet your needs. Please e-mail us at hcup@ahrq.gov or send a letter to the address below:

Irene Fraser, Ph.D., Director
Center for Delivery, Organization, and Markets
Agency for Healthcare Research and Quality
540 Gaither Road
Rockville, MD 20850

**Table 1: The characteristics of ambulatory and inpatient surgeries performed in community hospitals in 28 states, 2007**

| Characteristics | Ambulatory surgeries | Inpatient surgeries |
|---|---|---|
| Total visits/stays for surgeries (percentage of all surgical encounters) | 10,797,700 (57.7%) | 7,918,400 (42.3%) |
| Visits/stays per 100,000 population* | 5,600 | 4,100 |
| Total number of surgeries (percentage of all surgical procedures) | 12,426,800 (53.0%) | 11,007,500 (47.0%) |
| Average number of surgeries per visit/stay | 1.2 | 1.4 |
| Total (aggregate) charge (percentage of total charges for surgical encounters) | $55.6 billion (17.7%) | $258.9 billion (82.3%) |
| Mean charge per visit/stay** | $6,100 | $39,900 |
| Percentage of visits/stays by type of community hospital†: | | |
| Large hospitals | 57.5% | 64.4% |
| Metropolitan hospitals | 83.8% | 90.0% |
| Teaching hospitals | 44.0% | 52.8% |
| Non-federal government hospitals | 12.7% | 12.5% |
| Private not-for-profit hospitals | 76.3% | 76.5% |
| Private for-profit hospitals | 11.0% | 11.0% |

*Based on state population estimates from the U.S. Census Bureau.
**Mean charges are for hospital-based ambulatory and inpatient surgical visits and stays. Inpatient surgical stays are typically more expensive because of longer lengths of stay and the use of multiple procedures.
†Hospital characteristics related to bed size, location, and teaching status are not mutually exclusive.

**Source**: Agency for Healthcare Research and Quality, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases and State Ambulatory Surgery Databases, 2007, from the following 28 states: CA, CO, CT, FL, GA, HI, IA, IN, KS, KY, MD, ME, MI, MN, MO, NC, NE, NH, NJ, NY, OH, OK, SC, SD, TN, UT, VT, and WI.

**Table 2: The 25 most common ambulatory surgeries performed in community hospitals in 28 states, 2007**

| All-listed procedures | Percentage of all ambulatory surgeries | Total number | | Total number of surgeries per 100,000 population* | | Percentage performed in an ambulatory setting |
|---|---|---|---|---|---|---|
| | | Ambulatory surgeries (in thousands) | Inpatient surgeries (in thousands) | Ambulatory surgeries | Inpatient surgeries | |
| Colonoscopy and biopsy | 18.1% | 2,247 | 363 | 1,160 | 187 | 86.1% |
| Upper gastrointestinal endoscopy, biopsy | 10.8% | 1,347 | 756 | 695 | 390 | 64.0% |
| Lens and cataract procedures | 5.5% | 689 | 1 | 356 | 1 | 99.8% |
| Diagnostic cardiac catheterization, coronary arteriography | 3.8% | 471 | 937 | 243 | 484 | 33.4% |
| Debridement of wound, infection or burn | 2.6% | 326 | 196 | 168 | 101 | 62.4% |
| Excision of semilunar cartilage of knee | 2.5% | 317 | 6 | 164 | 3 | 98.2% |
| Cholecystectomy and common duct exploration | 2.5% | 313 | 267 | 162 | 138 | 53.9% |
| Tonsillectomy and/or adenoidectomy | 2.5% | 306 | 17 | 158 | 9 | 94.8% |
| Inguinal and femoral hernia repair | 2.1% | 267 | 32 | 138 | 17 | 89.3% |
| Other excision of cervix and uterus | 2.1% | 266 | 34 | 137 | 18 | 88.6% |
| Breast biopsy and other diagnostic procedures on breast | 1.9% | 241 | 7 | 124 | 4 | 97.3% |
| Lumpectomy, quadrantectomy of breast | 1.9% | 235 | 11 | 121 | 6 | 95.5% |
| Myringotomy (ear tube surgery) | 1.9% | 232 | 7 | 120 | 4 | 97.0% |
| Endoscopy and endoscopic biopsy of the urinary tract | 1.6% | 199 | 124 | 103 | 64 | 61.5% |
| Partial excision bone | 1.5% | 191 | 130 | 99 | 67 | 59.6% |
| Diagnostic dilatation and curettage (D&C) | 1.5% | 190 | 15 | 98 | 8 | 92.6% |
| Transurethral excision, drainage, or removal urinary obstruction | 1.5% | 186 | 71 | 96 | 37 | 72.3% |
| Decompression peripheral nerve | 1.5% | 185 | 10 | 95 | 5 | 95.0% |
| Arthroplasty other than hip or knee | 1.4% | 180 | 43 | 93 | 22 | 80.8% |
| Other hernia repair | 1.4% | 175 | 134 | 90 | 69 | 56.5% |
| Incision and drainage, skin and subcutaneous tissue | 1.4% | 169 | 145 | 87 | 75 | 53.9% |
| Ureteral catheterization | 1.3% | 165 | 118 | 85 | 61 | 58.2% |
| Esophageal dilatation | 1.3% | 161 | 25 | 83 | 13 | 86.4% |
| Other fracture and dislocation procedure | 1.2% | 148 | 101 | 76 | 52 | 59.3% |
| Diagnostic bronchoscopy and biopsy of bronchus | 1.1% | 141 | 236 | 73 | 122 | 37.5% |

*Based on state population estimates from the U.S. Census Bureau.

**Source**: Agency for Healthcare Research and Quality, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases and State Ambulatory Surgery Databases, 2007, from the following 28 States: CA, CO, CT, FL, GA, HI, IA, IN, KS, KY, MD, ME, MI, MN, MO, NC, NE, NH, NJ, NY, OH, OK, SC, SD, TN, UT, VT, and WI.

**Appendix: Major ambulatory surgeries performed in community hospitals in 28 states, 2007*** (*pages 11 through 15*)

| All-Listed procedures (CCS number and category) | Total number | | Total number of surgeries per 100,000 population** | | Percentage performed in an ambulatory setting | Mean charge per visit/stay | |
|---|---|---|---|---|---|---|---|
| | Ambulatory surgeries (in thousands) | Inpatient surgeries (in thousands) | Ambulatory surgeries | Inpatient surgeries | | Ambulatory surgeries | Inpatient surgeries |
| ***Operations on the nervous system*** | | | | | | | |
| 1 Incision and excision of CNS | 73.7 | 68.8 | 38.1 | 35.5 | 51.7 | $10,829 | $79,485 |
| 3 Laminectomy, excision intervertebral disc | 82.7 | 292.1 | 42.7 | 150.8 | 22.1 | $12,038 | $24,987 |
| 6 Decompression peripheral nerve | 184.7 | 9.7 | 95.4 | 5.0 | 95.0 | $4,672 | $25,956 |
| ***Operations on the endocrine system*** | | | | | | | |
| 10 Thyroidectomy, partial or complete | 33.3 | 39.0 | 17.2 | 20.2 | 46.0 | $13,493 | $20,628 |
| ***Operations on the eye*** | | | | | | | |
| 13 Corneal transplant | 11.7 | 0.3 | 6.0 | 0.1 | 97.6 | $13,119 | $27,705 |
| 14 Glaucoma procedures | 41.3 | 0.4 | 21.3 | 0.2 | 99.1 | $4,938 | $19,231 |
| 15 Lens and cataract procedures | 689.4 | 1.3 | 355.9 | 0.7 | 99.8 | $4,870 | $23,183 |
| 16 Repair of retinal tear, detachment | 57.0 | 1.7 | 29.4 | 0.9 | 97.1 | $10,516 | $31,161 |
| 17 Destruction of lesion of retina and choroid | 31.1 | 2.2 | 16.1 | 1.1 | 93.4 | $2,337 | $101,386 |
| ***Operations on the ear*** | | | | | | | |
| 22 Tympanoplasty | 36.7 | 1.0 | 19.0 | 0.5 | 97.4 | $7,739 | $18,555 |
| 23 Myringotomy | 231.9 | 7.2 | 119.7 | 3.7 | 97.0 | $3,547 | $22,930 |
| 24 Mastoidectomy | 10.9 | 1.9 | 5.6 | 1.0 | 85.4 | $13,900 | $33,980 |
| 25 Diagnostic procedures on ear | 4.4 | 0.9 | 2.3 | 0.5 | 83.2 | $2,990 | $28,530 |
| ***Operations on the nose, mouth, and pharynx*** | | | | | | | |
| 28 Plastic procedures on nose | 127.0 | 12.0 | 65.6 | 6.2 | 91.4 | $7,809 | $23,343 |
| 30 Tonsillectomy and/or adenoidectomy | 306.4 | 16.7 | 158.1 | 8.6 | 94.8 | $5,286 | $13,618 |
| ***Operations on the respiratory system*** | | | | | | | |

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**Appendix: Major ambulatory surgeries performed in community hospitals in 28 states, 2007*** (*pages 11 through 15*)

| All-Listed procedures (CCS number and category) | Total number | | Total number of surgeries per 100,000 population** | | Percentage performed in an ambulatory setting | Mean charge per visit/stay | |
|---|---|---|---|---|---|---|---|
| | Ambulatory surgeries (in thousands) | Inpatient surgeries (in thousands) | Ambulatory surgeries | Inpatient surgeries | | Ambulatory surgeries | Inpatient surgeries |
| 35 Tracheoscopy and laryngoscopy with biopsy | 69.2 | 41.8 | 35.7 | 21.6 | 62.4 | $3,267 | $24,223 |
| 37 Diagnostic bronchoscopy and biopsy of bronchus | 141.5 | 235.6 | 73.0 | 121.6 | 37.5 | $4,608 | $43,630 |
| 39 Incision of pleura, thoracentesis, chest drainage | 38.4 | 270.7 | 19.8 | 139.8 | 12.4 | $3,076 | $33,347 |
| ***Operations on the cardiovascular system*** | | | | | | | |
| 45 Percutaneous coronary angioplasty (PTCA) | 34.2 | 469.5 | 17.7 | 242.4 | 6.8 | $34,920 | $46,769 |
| 47 Diagnostic cardiac catheterization, coronary arteriography | 470.9 | 937.2 | 243.1 | 483.8 | 33.4 | $11,878 | $28,260 |
| 48 Insertion, revision, replacement, removal of cardiac pacemaker or cardioverter/defibrillator | 82.4 | 237.1 | 42.5 | 122.4 | 25.8 | $28,441 | $73,658 |
| 53 Varicose vein stripping, lower limb | 25.4 | 0.8 | 13.1 | 0.4 | 97.0 | $8,459 | $23,228 |
| 57 Creation, revision and removal of arteriovenous fistula or vessel-to-vessel cannula for dialysis | 78.9 | 35.2 | 40.7 | 18.2 | 69.1 | $10,277 | $55,828 |
| 60 Embolectomy and endarterectomy of lower limbs | 18.8 | 28.1 | 9.7 | 14.5 | 40.2 | $20,550 | $49,739 |
| ***Operations on the hemic and lymphatic system*** | | | | | | | |
| 65 Bone marrow biopsy | 40.0 | 63.0 | 20.7 | 32.5 | 38.8 | $5,069 | $56,469 |
| 222 Blood transfusion | 134.5 | 1631.5 | 69.4 | 842.1 | 7.6 | $3,435 | $24,926 |
| ***Operations on the digestive system*** | | | | | | | |
| 68 Injection or ligation of esophageal varices | 7.0 | 0.1 | 3.6 | 0.1 | 98.3 | $2,464 | $43,076 |
| 69 Esophageal dilatation | 160.7 | 25.2 | 83.0 | 13.0 | 86.4 | $3,116 | $22,833 |
| 70 Upper gastrointestinal endoscopy, biopsy | 1346.8 | 756.3 | 695.2 | 390.4 | 64.0 | $3,131 | $25,226 |
| 71 Gastrostomy, temporary and permanent | 32.1 | 144.7 | 16.6 | 74.7 | 18.1 | $3,846 | $51,514 |

**Appendix: Major ambulatory surgeries performed in community hospitals in 28 states, 2007*** (*pages 11 through 15*)

| All-Listed procedures (CCS number and category) | Total number | | Total number of surgeries per 100,000 population** | | Percentage performed in an ambulatory setting | Mean charge per visit/stay | |
|---|---|---|---|---|---|---|---|
| | Ambulatory surgeries (in thousands) | Inpatient surgeries (in thousands) | Ambulatory surgeries | Inpatient surgeries | | Ambulatory surgeries | Inpatient surgeries |
| 76 Colonoscopy and biopsy | 2247.4 | 363.1 | 1160.0 | 187.4 | 86.1 | $2,369 | $24,356 |
| 80 Appendectomy | 51.9 | 230.3 | 26.8 | 118.9 | 18.4 | $14,156 | $21,746 |
| 81 Hemorrhoid procedures | 64.2 | 7.9 | 33.1 | 4.1 | 89.0 | $5,978 | $20,173 |
| 82 Endoscopic cannulation of pancreas (ERCP) | 42.1 | 26.9 | 21.7 | 13.9 | 61.0 | $6,115 | $32,782 |
| 83 Biopsy of liver | 73.4 | 50.3 | 37.9 | 25.9 | 59.4 | $3,599 | $41,657 |
| 84 Cholecystectomy and common duct exploration | 312.6 | 266.9 | 161.4 | 137.8 | 53.9 | $10,838 | $32,339 |
| 85 Inguinal and femoral hernia repair | 266.9 | 31.8 | 137.8 | 16.4 | 89.3 | $8,187 | $35,598 |
| 86 Other hernia repair | 174.6 | 134.4 | 90.1 | 69.4 | 56.5 | $8,711 | $30,397 |
| 87 Laparoscopy | 83.3 | 56.6 | 43.0 | 29.2 | 59.5 | $8,215 | $31,572 |
| 88 Abdominal paracentesis | 62.5 | 132.3 | 32.2 | 68.3 | 32.1 | $2,590 | $30,956 |
| 90 Excision, lysis peritoneal adhesions | 41.3 | 242.1 | 21.3 | 125.0 | 14.6 | $10,311 | $48,373 |
| **Operations on the urinary system** | | | | | | | |
| 100 Endoscopy and endoscopic biopsy of the urinary tract | 198.9 | 124.5 | 102.7 | 64.3 | 61.5 | $4,300 | $29,406 |
| 101 Transurethral excision, drainage, or removal urinary obstruction | 185.6 | 71.1 | 95.8 | 36.7 | 72.3 | $8,044 | $24,309 |
| 102 Ureteral catheterization | 165.0 | 118.3 | 85.2 | 61.1 | 58.2 | $7,944 | $23,466 |
| 103 Nephrotomy and nephrostomy | 5.9 | 27.8 | 3.0 | 14.4 | 17.5 | $11,877 | $45,946 |
| 106 Genitourinary incontinence procedures | 71.9 | 63.5 | 37.1 | 32.8 | 53.1 | $9,929 | $16,633 |
| 109 Procedures on the urethra | 62.8 | 23.5 | 32.4 | 12.1 | 72.8 | $6,544 | $26,881 |
| **Operations on the male genital organs** | | | | | | | |
| 113 Transurethral prostatectomy (TURP) | 30.2 | 47.6 | 15.6 | 24.6 | 38.8 | $10,900 | $18,612 |
| 114 Open prostatectomy | 5.8 | 54.4 | 3.0 | 28.1 | 9.6 | $22,771 | $26,890 |
| 115 Circumcision | 54.7 | 786.2 | 28.2 | 405.8 | 6.5 | $4,770 | $5,727 |
| ***Operations on the female genital organs*** | | | | | | | |

000491 (10/11/13)

**Appendix: Major ambulatory surgeries performed in community hospitals in 28 states, 2007*** (*pages 11 through 15*)

| All-Listed procedures (CCS number and category) | Total number | | Total number of surgeries per 100,000 population** | | Percentage performed in an ambulatory setting | Mean charge per visit/stay | |
|---|---|---|---|---|---|---|---|
| | Ambulatory surgeries (in thousands) | Inpatient surgeries (in thousands) | Ambulatory surgeries | Inpatient surgeries | | Ambulatory surgeries | Inpatient surgeries |
| 119 Oophorectomy, unilateral and bilateral | 61.9 | 235.2 | 31.9 | 121.4 | 20.8 | $11,896 | $22,540 |
| 121 Ligation of fallopian tubes | 96.8 | 189.5 | 49.9 | 97.8 | 33.8 | $7,646 | $11,455 |
| 122 Removal ectopic pregnancy | 8.4 | 11.5 | 4.4 | 5.9 | 42.4 | $12,421 | $17,145 |
| 124 Hysterectomy, abdominal and vaginal | 51.8 | 322.7 | 26.7 | 166.6 | 13.8 | $14,839 | $19,476 |
| 125 Other excision of cervix and uterus | 266.3 | 34.1 | 137.4 | 17.6 | 88.6 | $7,362 | $19,339 |
| 127 Dilatation and curettage (D&C), aspiration after delivery or abortion | 121.3 | 26.3 | 62.6 | 13.6 | 82.2 | $5,472 | $13,189 |
| 128 Diagnostic dilatation and curettage (D&C) | 190.0 | 15.3 | 98.1 | 7.9 | 92.6 | $6,366 | $22,376 |
| 129 Repair of cystocele and rectocele, obliteration of vaginal vault | 26.0 | 75.2 | 13.4 | 38.8 | 25.7 | $11,504 | $16,398 |
| **Operations on the musculoskeletal system** | | | | | | | |
| 142 Partial excision bone | 191.2 | 129.8 | 98.7 | 67.0 | 59.6 | $7,590 | $43,531 |
| 143 Bunionectomy or repair of toe deformities | 115.3 | 3.2 | 59.5 | 1.6 | 97.3 | $7,699 | $21,552 |
| 144 Treatment, facial fracture or dislocation | 57.5 | 20.9 | 29.7 | 10.8 | 73.4 | $7,872 | $37,249 |
| 145 Treatment, fracture or dislocation of radius and ulna | 114.5 | 51.0 | 59.1 | 26.3 | 69.2 | $7,807 | $27,774 |
| 146 Treatment, fracture or dislocation of hip and femur | 15.7 | 189.8 | 8.1 | 98.0 | 7.6 | $7,435 | $39,431 |
| 147 Treatment, fracture or dislocation of lower extremity (other than hip or femur) | 104.0 | 143.8 | 53.7 | 74.2 | 42.0 | $8,916 | $30,789 |
| 148 Other fracture and dislocation procedure | 147.6 | 101.4 | 76.2 | 52.3 | 59.3 | $6,986 | $33,983 |
| 149 Arthroscopy | 122.7 | 10.1 | 63.3 | 5.2 | 92.4 | $8,970 | $26,028 |
| 150 Division of joint capsule, ligament or cartilage | 44.8 | 9.7 | 23.1 | 5.0 | 82.3 | $8,436 | $21,661 |

000492 (10/11/13)

**Appendix: Major ambulatory surgeries performed in community hospitals in 28 states, 2007* (*pages 11 through 15*)**

| All-Listed procedures (CCS number and category) | Total number | | Total number of surgeries per 100,000 population** | | Percentage performed in an ambulatory setting | Mean charge per visit/stay | |
|---|---|---|---|---|---|---|---|
| | Ambulatory surgeries (in thousands) | Inpatient surgeries (in thousands) | Ambulatory surgeries | Inpatient surgeries | | Ambulatory surgeries | Inpatient surgeries |
| 151 Excision of semilunar cartilage of knee | 316.8 | 5.8 | 163.5 | 3.0 | 98.2 | $7,357 | $25,900 |
| 152 Arthroplasty knee | 140.4 | 375.0 | 72.4 | 193.6 | 27.2 | $12,535 | $38,674 |
| 154 Arthroplasty other than hip or knee | 180.2 | 42.7 | 93.0 | 22.1 | 80.8 | $11,387 | $35,824 |
| 155 Arthrocentesis | 100.3 | 44.5 | 51.8 | 23.0 | 69.3 | $1,149 | $21,822 |
| 157 Amputation of lower extremity | 15.7 | 74.1 | 8.1 | 38.2 | 17.5 | $5,843 | $58,073 |
| 158 Spinal fusion | 28.6 | 240.2 | 14.8 | 124.0 | 10.6 | $23,175 | $67,079 |
| ***Operations on the integumentary system*** | | | | | | | |
| 165 Breast biopsy and other diagnostic procedures on breast | 240.5 | 6.7 | 124.1 | 3.4 | 97.3 | $3,863 | $33,749 |
| 166 Lumpectomy, quadrantectomy of breast | 235.0 | 11.1 | 121.3 | 5.7 | 95.5 | $7,458 | $21,836 |
| 167 Mastectomy | 22.9 | 46.0 | 11.8 | 23.7 | 33.3 | $15,003 | $23,339 |
| 168 Incision and drainage, skin and subcutaneous tissue | 169.4 | 145.0 | 87.4 | 74.9 | 53.9 | $1,674 | $18,201 |
| 169 Debridement of wound, infection or burn | 326.0 | 196.0 | 168.3 | 101.2 | 62.4 | $1,790 | $45,742 |
| 172 Skin graft | 111.5 | 59.8 | 57.5 | 30.9 | 65.1 | $6,080 | $66,369 |

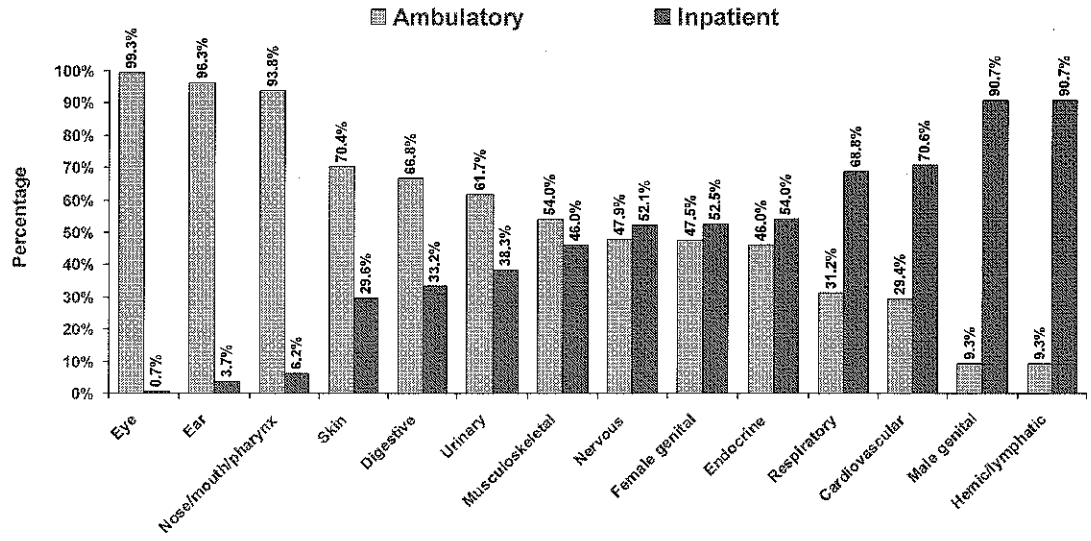
*Statistics are based on major surgery-related procedures only. Diagnostic procedures are included only if invasive, requiring anesthesia services or sedation. Additionally, CCS procedure categories with fewer than 2,000 ambulatory surgery cases are excluded. Other excluded procedures include: a procedure that is adjunct to another procedure, a heterogeneous "other" procedure category, dental procedures, and procedures predominantly done in freestanding centers, radiology centers, or physician offices.

**Based on State population estimates from the U.S. Census Bureau.

**Source**: Agency for Healthcare Research and Quality, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases and State Ambulatory Surgery Databases, 2007, from the following States: CA, CO, CT, FL, GA, HI, IA, IN, KS, KY, MD, ME, MI, MN, MO, NC, NE, NH, NJ, NY, OH, OK, SC, SD, TN, UT, VT, and WI.

000493 (10/11/13)

## Figure 1. Ambulatory versus inpatient surgeries by body system, 2007




Source: AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, State Inpatient Databases and State Ambulatory Surgery Databases, 2007, from the following 26 states: CA, CO, CT, FL, GA, HI, IA, IN, KS, KY, MD, ME, MI, MN, MO, NC, NE, NH, NJ, NY, OH, OK, SC, SD, TN, UT, VT, and WI

# EXHIBIT 27

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AMERICAN MEDICAL NEWS

HEALTH

# Hip, knee replacement surgery rates skyrocket over 7 years

■ The operations have proven to be cost-effective, but concern is growing that the burgeoning need will overtax the health care system.

By VICTORIA STAGG ELLIOTT (HTTP://WWW.AMEDNEWS.COM/APPS/PBCS.DLL/PERSONALIA?ID=VELLIOTT) —
Posted May 5, 2008

Implanting artificial joints, once the stuff of science fiction, has become so common -- and is expected to become even more so -- that it may overwhelm the health care system, according to a paper in the April 15 *Arthritis Care & Research.*

"The demand is exploding," said Sunny Kim, PhD, the paper's author and assistant professor of biostatistics at Florida International University in Miami. "Are we ready as a nation? I don't think so."

Analyzing data from the Nationwide Inpatient Sample, Dr. Kim found that primary hip replacements increased by 48%, from 153,080 procedures in 1997 to 225,900 in 2004. First-time knee replacements grew by 63% from 264,331 in 1997 to 431,485 in 2004. If these trends continue, an estimated 600,000 hip replacements and 1.4 million knee replacements will be carried out in 2015.

The fact that the number of these procedures is increasing and most likely will continue to grow is supported by other studies. For instance, one in the April 2007 *Journal of Bone & Joint Surgery* predicted that demand for primary hip replacement would grow 174% by 2030 and for an initial knee replacement by 673%.

Several theories are offered for this phenomenon. One is that the population is aging, although Dr. Kim's paper suggested that the rate of increase far outpaced the change in this demographic factor. Another, though, is that the population is heavier, and many experts consider this explanation to be the best reason why so many joints are wearing out.

"A lot of ideas get thrown around, but I would say that probably the No. 1 factor is obesity," said Trish Palmer, MD, a family physician and assistant professor of primary care sports medicine with Midwest Orthopedics at Rush in Chicago.

The rate of obesity and overweight has grown significantly and is recognized by many public health agencies and medical societies, including the American Medical Association, as a major public health problem.

But while obesity is considered to be a central problem, many experts point to other issues as also playing a role. Improvements in technology, both in joint construction as well as computer-assisted surgery to improve the precision of how it is aligned, lead physicians to be more at ease with making this recommendation.

On the patient side, controversies over the safety of pain relief medications such as the Cox-2 inhibitors are leading some to prefer non-pharmacologic options for long-term pain relief. "People don't want to take medications," said Paul Lachiewicz, MD, professor of orthopedics at the University of North Carolina at Chapel Hill. "They want it fixed."

Also, manufacturers of artificial joints have been promoting these devices in direct-to-consumer advertising, and patients are more aware of them than ever.

These dynamics may be driving down the age at which this operation is performed, as reflected in the increased number of people ages 45 to 64 who have knees or hips replaced. According to Dr. Kim's paper, in 1997 this age group comprised 27% of all first-time hip replacements and 26% of initial knee replacements. Both of these numbers increased to 36% in 2004.

"Orthopedic surgeons performing these procedures are much more likely to recommend the procedure be performed at an earlier stage, because we're more confident that the product will last longer and allow patients to enjoy a more active, pain-free, productive future," said Stephen Hurst, MD, an orthopedic surgeon in San Mateo, Calif.

**Cost, access become issues**

Still, even though experts say this technology has proven to be cost-effective for most patients, it is not without financial bite. That reality is the point from where most of the concern about the increase results. According to Dr. Kim's paper, joint replacements cost hospitals $9.1 billion in 2004, about half of that paid for by Medicare.

"People are not arguing that it's not a worthwhile intervention, but we are anxious about who's going to pay for it," said William Maloney, MD, chair of orthopedic surgery at Stanford University in California. "Hip and knee replacement could break the bank."

Other concerns stem from what could become an access issue -- will there be an adequate supply of surgeons to meet the demand?

"The number of orthopedic surgeons is not increasing at the rate that the need for joints is increasing," Dr. Hurst said. "It's going to be difficult to keep up. Most orthopedic surgeons are reasonably busy, and many are busier than they want to be."

Also, the growing number of people getting this procedure done at younger ages increases the likelihood that they may outlive their artificial joint and will need to have it replaced with another one. Those surgeries are costlier and riskier, and the rate of these types of procedures has started to inch upward as well.

"There's no doubt that for all the same reasons, revisions are going to increase, and revision is a much more expensive and much more difficult [procedure] for the patient and for the doctor," said Anthony DiGioia, MD, director of the bone and joint health program at Magee-Womens Hospital at the University of Pittsburgh Medical Center. "It raises the stakes."

To cut the risk of revision and other complications, the American Academy of Orthopaedic Surgeons is working to establish a registry to identify implants that last longer and strategies that can lengthen their life even further. A request for information from vendors who may become a part of the project was issued in March. Numerous other countries, including Canada, Sweden and Great Britain, already have such registries.

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ADDITIONAL INFORMATION

## Who gets new joints?

The number of people having hips or knees replaced for the first time increased dramatically from 1997 to 2004, particularly among those ages 45 to 64.

Here is a breakdown of primary hip and knee replacements for select years:

| 1997 | | |
|---|---|---|
| **Age** | **Hip** | **Knee** |
| 18-44 | 10,999 (7.2%) | 4,730 (2.0%) |
| 45-64 | 40,596 (26.5%) | 67,556 (25.6%) |
| 65-84 | 92,177 (60.2%) | 182,709 (69.1%) |
| 85+ | 9,225 (6.0%) | 9,314 (3.5%) |
| Total | 153,080 | 264,331 |
| **2000** | | |
| **Age** | **Hip** | **Knee** |
| 18-44 | 12,196 (7.4%) | 5,551 (2.0%) |
| 45-64 | 51,671 (31.3%) | 88,113 (31.3%) |
| 65-84 | 91,211 (55.5%) | 178,653 (63.5%) |
| 85+ | 9,216 (5.6%) | 9,160 (3.2%) |
| Total | 164,458 | 281,534 |
| **2004** | | |
| **Age** | **Hip** | **Knee** |
| 18-44 | 15,065 (6.7%) | 8,468 (2.0%) |
| 45-64 | 81,210 (36.0%) | 157,149 (36.4%) |
| 65-84 | 117,612 (52.1%) | 251,773 (58.4%) |
| 85+ | 11,305 (5.0%) | 13,304 (3.1%) |
| Total | 225,900 | 431,485 |

**Note:** Percentages may not add up to 100% because of rounding. The total number of procedures includes a small number done in those younger than 18. So few occur for that age group that those figures are not considered reliable and are not broken out.

**Source:** ***Arthritis Care & Research*****, April 15**

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EXTERNAL LINKS

"Changes in surgical loads and economic burden of hip and knee replacements in the US: 1997 -2004," abstract, *Arthritis Care & Research*, April 15 (**link: http://www3.interscience.wiley.com/cgi-bin/abstract/117949600/** )

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**Scientific Articles** | April 01, 2007

# Projections of Primary and Revision Hip and Knee Arthroplasty in the United States from 2005 to 2030

Steven Kurtz, PhD[1]; Kevin Ong, PhD[1]; Edmund Lau, MS[2]; Fionna Mowat, PhD[2]; Michael Halpern, MPH, MD, PhD[3]

[1] Exponent Inc., 3401 Market Street, Suite 300, P hiladelphia, PA 19104. E-mail address for K. Ong: kong@ex ponent.com

[2] Exponent Inc., 149 Commonw ealth Drive, Menlo Park, CA 94025

[3] Exponent Inc., 1800 Diagonal Road, Sui te 355, Alexandr ia, VA 22314

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*Investigation performed at Exponent Inc., Philadelphia, Pennsylvania*

The Journal of Bone and Joint Surgery, Incorporated

*J Bone Joint Surg Am*, 2007 Apr 01;89(4):780-785. doi: 10.2106/JBJ S.F.00222

## Abstract

**Background:** Over the past decade, there has been an increase in the number of revision total hip and knee arthroplasties performed in the United States. The purpose of this study was to formulate projections for the number of primary and revision total hip and knee arthroplasties that will be performed in the United States through 2030.

**Methods:** The Nationwide Inpatient Sample (1990 to 2003) was used in conjunction with United States Census Bureau data to quantify primary and revision arthroplasty rates as a function of age, gender, race and/or ethnicity, and census region. Projections were performed with use of Poisson regression on historical procedure rates in combination with population projections from 2005 to 2030.

**Results:** By 2030, the demand for primary total hip arthroplasties is estimated to grow by 174% to 572,000. The demand for primary total knee arthroplasties is projected to grow by 673% to 3.48 million procedures. The demand for hip revision procedures is projected to double by the year 2026, while the demand for knee revisions is expected to double by 2015. Although hip revisions are currently more frequently performed than knee revisions, the demand for knee revisions is expected to surpass the demand for hip revisions after 2007. Overall, total hip and total knee revisions are projected to grow by 137% and 601%, respectively, between 2005 and 2030.

**Conclusions:** These large projected increases in demand for total hip and knee arthroplasties provide a quantitative basis for future policy decisions related to the numbers of orthopaedic surgeons needed to perform these procedures and the deployment of appropriate resources to serve this need.

Over the past thirteen years, there has been an increase in the number of revision total hip arthroplasties and total knee arthroplasties performed in the United States[1], while the revision burden—defined as the ratio of revision arthroplasties to the total number of arthroplasties—has remained relatively constant. Previous analyses of nationwide data on the procedures have indicated that the revision burden for total hip arthroplasty was approximately 17.5% between 1990 and 2002, whereas the revision burden for total knee arthroplasty was approximately 8.2%[1]. In economic terms, revision total hip arthroplasty is estimated to have consumed 19% of the Medicare hip replacement expenditures between 1997 to 2003, whereas total knee arthroplasty revisions consumed only 8% of the total annual Medicare expenditures for knee replacement[2].

In Scandinavia, England, Australia, and Canada, the numbers of these procedures that have been performed are readily obtainable from national arthroplasty registries[3-6]. However, in the United States, the American Academy of Orthopaedic

Surgeons (AAOS)[7] and other investigators have had to rely on representative surveys of hospital discharge records to provide estimates of the prevalence of primary and revision arthroplasties[1,8].

Given the many years required for the training of surgeons and the equally complex task of planning for hospital capacity, reliable projections regarding the demand for arthroplasties are crucial for policy makers in government, education, and industry. Importantly, reliable projections of revision arthroplasties would be particularly useful, as they consume greater economic resources than do primary procedures[9].

For this study, we hypothesized that the demand for total hip and total knee arthroplasties in the United States will increase substantially over the next twenty-five years. To test this hypothesis, we performed statistical projections of the number of primary and revision total hip and total knee arthroplasties between 2005 and 2030 on the basis of the available historical Nationwide Inpatient Sample (NIS) data from 1990 to 2003[10], compared with projections assuming a constant prevalence.

## Materials and Methods

### Data Sources

The National Hospital Discharge Survey (NHDS) and the NIS are national (United States) sample surveys of hospital discharge records. Comparisons of the two surveys conducted by the Agency for Healthcare Research and Quality have found that, on a year-by-year basis, the numbers of surgical procedures estimated to have been performed from the NIS and the NHDS are similar, differing by approximately 10%[11]. However, the NIS collects a substantially larger number of discharge records than does the NHDS and is therefore better suited to accurately quantify the prevalence of inpatient arthroplasty procedures in the United States. Consequently, we relied on the NIS data from 1990 to 2003 for our projections for the current study. The NIS is a federal-state cooperative database designed to compile annually a representative sample of hospital discharge records in the United States. In 2003, the NIS had a sample size of about eight million discharge records from approximately 1000 hospitals, which represent approximately 20% of all United States community hospitals. All of the discharge records from 1990 to 2003 were examined for this study.

We obtained demographic data on the patients (e.g., age, gender, and race and/or ethnicity) from the NIS. Disease diagnoses and surgical procedures performed (if any) were recorded for the NIS with use of the Ninth Revision of the International Classification of Diseases (ICD-9-CM). Specifically, primary hip and knee arthroplasty are identified by the ICD-9-CM codes 81.51 and 81.54, respectively. For revisions, the corresponding codes are 81.53 and 81.55. From 1990 to 2003, the ICD-9-CM codes for these procedures were consistent, thereby allowing the determination of longitudinal trends in the prevalence of both primary and revision joint arthroplasty. We also used projected population statistics for the nation and for individual states by age, gender, and race and/or ethnicity through 2025 that were published by the Census Bureau in 1997[12].

### Projection Methodology and Statistical Analyses

The annual prevalence of arthroplasty surgery was modeled with use of a Poisson regression with age, gender, race and/or ethnicity, census region, and calendar year as covariates to account for differences in prevalence among population subgroups as well as changes over time. Age was categorized into eight subgroups (less than forty-five, forty-five to fifty-four, fifty-five to sixty-four, sixty-five to sixty-nine, seventy to seventy-four, seventy-five to seventy-nine, eighty to eighty-four, and eighty-five or more years old), while race and/or ethnicity was grouped into five categories (white, black, Asian, Hispanic, and Native American). "Hispanic" included all patients of Hispanic origin, regardless of race. Four census regions (Northeast, South, Midwest, and West) and the two genders were also categorical covariates in the analysis. Two-way interactions between age, gender, race, census region, and calendar year were included in the regression model. Surgery prevalence was calculated by dividing the number of procedures estimated from the NIS for each population subgroup by the corresponding population from the Census Bureau. The projected number of procedures was estimated by applying the surgery prevalence estimated from the regression model to the projected population data for each subgroup. The projected national total is the sum of the projected number of procedures from each subpopulation. Independent models were used for

each type of primary and revision hip and knee arthroplasty.

To evaluate the methodological sensitivity of our results, we compared our primary projections obtained from the NIS (in which the prevalence of surgery is allowed to vary over time on the basis of the actual data) with projections in which the prevalence of each population subgroup was held constant on the basis of the 1990 to 2003 averages. Deviance and Pearson chi-square values were determined to describe the goodness of fit for the Poisson regression model for the various arthroplasty data. Additional detailed descriptions of the statistical analyses are presented in the Appendix.

## Results

In 2003, the most recent year for which national inpatient procedure data are currently available from NIS, a total of 202,500 primary total hip arthroplasties and 402,100 primary total knee arthroplasties were performed nationally in the United States. During the same year, a total of 36,000 revision total hip arthroplasties and 32,700 revision total knee arthroplasties were performed.

### Sensitivity of Projection Methodology

Between 1990 and 2003, the prevalence of primary and revision total hip and knee arthroplasties all increased substantially over time. The overall goodness of fit of the regression models, represented by the value of the scaled Pearson chi square (a measure of the lack of fit between model and data), averaged 1.11 (range, 1.03 for primary total knee replacement to 1.26 for revision total knee replacement procedures) (see Appendix). When the year of surgery was excluded from the Poisson regression model to simulate a constant prevalence over time, the models fitted with the remaining covariates all showed a substantial increase in the deviance value (i.e., poorer fit), especially for knee arthroplasty.

The projections of primary and revision total joint replacement were found to be highly sensitive to assumptions regarding trends in the prevalence of surgery. If the trends (i.e., increases in the prevalence of surgery) observed from 1990 to 2003 were to continue, by 2030 the projections with use of the NIS data could range from two to five times greater than the projections assuming a constant surgery prevalence over time (Table I). The projections for primary and revision total knee surgery were more sensitive to modeling assumptions than those for primary or revision total hip arthroplasty because of the steep increase in the number of knee procedures from 1990 to 2003.

TABLE I Summary of Sensitivity Analysis of the Projected Number of Hip and Knee Arthroplasties with Use of Models Comparing Variable Prevalence (Baseline) with Constant Prevalence

| | Annual Number of Procedur es (in Thousands)† | | | |
|---|---|---|---|---|
| Type of Procedure* | 2005 | 2010 | 2020 | 2030 |
| Primary total hip arthroplasty | | | | |
| Variable | 209 (193-225) | 253 (232-276) | 384 (339-435) | 572 (481-681) |
| Constant | 179 (156-202) | 194 (169-219) | 236 (205-268) | 277 (240-315) |
| Primary total knee arthroplasty | | | | |
| Variable | 450 (425-477) | 663 (618-711) | 1520 (1362-1700) | 3481 (2948-4136) |
| Constant | 301 (265-337) | 329 (289-370) | 415 (364-467) | 488 (425-550) |
| Revision total hip arthroplasty | | | | |
| Variable | 40.8 (34.9-47.0) | 47.8 (40.3-56.1) | 67.6 (54.0-83.9) | 96.7 (72.1-130.0) |
| Constant | 36.0 (29.5-42.6) | 38.9 (31.8-46.0) | 47.2 (38.3-56.0) | 56.6 (45.8-67.5) |
| Revision total knee arthroplasty | | | | |
| Variable | 38.3 (32.6-44.3) | 55.3 (46.5-65.1) | 121 (95.9-153) | 268 (193-381) |
| Constant | 25.9 (21.3-30.5) | 28.1 (23.0-33.3) | 35.1 (28.6-41.7) | 41.7 (33.6-49.9) |

The variable prevalence (baseline) and the constant prevalence are based on 1990 to 2003 data from the Nationwide Inpatient Sample.The values are given as the projected value with the 95% prediction interval in parentheses.

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**Projected Primary and Revision Arthroplasty Procedures with Use of the Nationwide Inpatient Sample Baseline Model**

Our projection model predicted substantial increases in the numbers of hip and knee replacement procedures (Figs. 1 and 2). On the basis of the NIS model, the demand for primary total hip arthroplasty was estimated to grow by 174%, from 208,600 (95% prediction interval, 193,300 to 224,600) in 2005 to 572,000 (95% prediction interval, 481,000 to 681,000) by 2030 (Fig. 1). If the number of total knee arthroplasties performed continues at the current rate, the demand for primary total knee arthroplasty is projected to grow by 673%, from 450,000 (95% prediction interval, 425,000 to 477,000) in 2005 to 3.48 million procedures (95% prediction interval, 2.95 to 4.14 million) by 2030.

Overall, the total number of revision arthroplasty procedures performed in 2005 is expected to double by the year 2026 for revision total hip arthroplasty and by 2015 for revision total knee arthroplasty. Although more revision total hip arthroplasties than revision total knee arthroplasties are currently performed, the number of revision total knee arthroplasties performed were predicted to outnumber total hip arthroplasty revisions after 2007 (Fig. 2). Total hip arthroplasty revisions were projected to grow from 40,800 (95% prediction interval, 34,900 to 47,000) in 2005 to 96,700 (95% prediction interval, 72,100 to 130,000) in 2030 (an increase of 137%). If the trend observed from 1990 to 2003 were to continue, total knee arthroplasty revisions were projected to grow from 38,300 (95% prediction interval, 32,600 to 44,300) in 2005 to 268,200 (95% prediction interval, 192,700 to 381,400) in 2030 (an increase of 601%).

On the basis of these estimates, the revision burden for total hip replacements was projected to be 16.3% in 2005 and 14.5% in 2030. The corresponding revision burden for total knee replacements was projected to be 7.8% in 2005 and 7.2% in 2030.

## Discussion

In this study, arthroplasty projections were derived by considering temporal changes in arthroplasty rates, as well as in population subgroups. As the official demographer of the United States, the Census Bureau has devoted considerable effort to developing reliable projections of the future United States population. In contrast, little information is available to quantify the expected number of hip and knee revision arthroplasties in the future. For example, the projection recently developed by the AAOS[7] was limited to primary hip and knee replacements. The AAOS projections were found to have underpredicted the expected utilization of primary joint replacement surgery[1] because they were based on the NHDS survey, which has a much lower sample size than the NIS. Additionally, the AAOS estimates assumed a constant prevalence of surgery over time. In contrast, our results underscore the importance of accounting for changes in the rate of surgery for future projections because the prevalence of surgery is changing rapidly over time.

The present study provides, for the first time to our knowledge, quantification of the demand for primary and revision hip and knee arthroplasties in the United States through 2030. We project a massive increase in demand for primary and revision total joint procedures over the next two decades—a demand that, to be met, will need to be addressed with a combination of increased economic resources, operative efficiency, technical capacity (i.e., additional surgeons), and implant longevity.

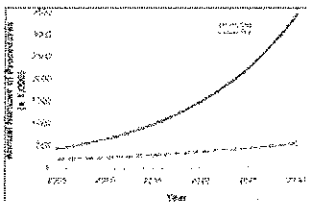

Fig. 1: The projected number of primary total hip arthroplasty (THA) and total knee arthroplasty (TKA) procedures in the United States from 2005 to 2030.

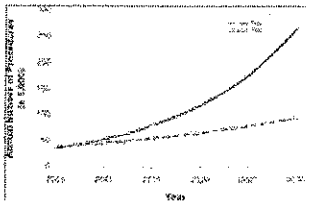

Fig. 2: The projected number of revision total hip arthroplasty (THA) and total knee arthroplasty (TKA) procedures in the United States from 2005 to 2030.

The projections in this study are limited on the basis of an extrapolation of historical procedural data. As demonstrated in this study, the uncertainties inherent in such an extrapolation can be minimized by choosing a suitably large set of historical data (e.g., NIS instead of NHDS), and by incorporating as many covariates as possible into the model. Nevertheless, these projections are limited by the quantity and quality of available data. The trends established by historical data, even if accurate, may not persist in the future because of improvements in implant technology, such as advanced bearing materials or designs. Furthermore, it is impossible to anticipate, at present, whether future orthopaedic treatment technologies or newer pharmaceutical nonoperative interventions will lead to a reduced demand for primary total joint replacements by 2030. Our model also does not incorporate unforeseen changes in economic factors associated with these arthroplasties. It is uncertain, for example, to what extent the United States health-care system will be able to finance the future demand for arthroplasties anticipated by the present study.

We selected a twenty-five-year time frame for the study, extending to 2030, purely to facilitate comparisons with previous AAOS projections, which employed an identical time frame. Intuitively, we appreciate that long-term projections will be more prone to unexpected disruptions than those spanning a near-term horizon. Nevertheless, such uncertainties in no way diminish the value and necessity of conducting projections for the purpose of long-range planning and policy-making.

Consequently, it is inevitable that the projections performed in the present study will be superseded in the future as new years of procedure data become available. Other methodological approaches to the prediction problem, such as age-period-cohort models or generalized additive models, should also be attempted to further validate the reliability of the projections established by the present approach. It is relatively straightforward to update the projections reported in this study with use of the present methodology, but continued monitoring and updating will need to occur.

In addition, it is clear from the different trends observed that the sensitivity of the projections appears to be procedure-dependent. For example, because of the substantially higher rate of increase in knee arthroplasty between 1990 and 2003, the models simulating a constant prevalence over time produced a considerably poorer fit. Consequently, the specific findings for total hip and knee replacement should not be generalized to other orthopaedic procedures, which may exhibit entirely different historical growth histories. However, this study establishes a methodology whereby an investigator can systematically evaluate orthopaedic surgery projections in a generalized statistically based framework. Although the data and projected number of procedures can be updated regularly, the methodology we have developed is expected to remain relevant for years to come.

The projections for revision procedures in this study were limited by the generality of the ICD-9-CM codes in the existing data, which currently do not yet discriminate between partial or total revision of an artificial joint. As of October 2005, new ICD-9-CM codes had been introduced by the Center for Medicare and Medicaid Services (CMS) for revision hip and knee arthroplasties. New ICD-9-CM codes also had been introduced to track the type of bearing (ceramic, metal, or polyethylene) used for total hip replacements. However, 2006 will provide the first full year of data incorporating this new coding scheme, and there is a two and a half-year lag between the end of the calendar year and the production of the corresponding NIS dataset. Furthermore, at least four years of data would be necessary to perform even the most rudimentary projection. Consequently, it will be well into the second decade of this century that sufficient years of information will be available for mathematically sound projections with use of the recently introduced ICD-9-CM procedure codes.

We modeled revision hip and knee replacement as independent orthopaedic procedures for this study, although it is feasible

to construct a predictive model for future revisions on the basis of the number of primary procedures performed and an assumed Kaplan-Meier-type survivorship model for the different population subgroups. However, the necessary survival data for such a model can only be derived from a longitudinal database, such as a national implant registry, which does not yet exist in the United States. The only rationale for developing such a complex model would be historical evidence that the revision burden was changing over time, as has been documented in Sweden. However, available data in the United States between 1990 and 2003 do not support such a hypothesis; indeed, the revision burden has remained essentially unchanged in this country for over a decade[1]. Between 1990 and 2002, the national revision burden for total hip arthroplasty ranged between 15.2% and 20.5% (average, 17.5%); for total knee arthroplasty, the revision burden varied between 7.3% and 9.7% (average, 8.2%)[1]. Without compelling evidence that either implant technology or surgical technique have improved the survival of primary replacements at a national level, it is difficult to say whether a more sophisticated projection method for revisions than the one we employed in the present study would be of use. The revision projections in the current study may be interpreted as a conservative upper bound for what awaits the orthopaedic community if improvements in primary implant survival cannot be achieved at a national level.

The recent ICD-9-CM coding changes for hip and knee revisions in the United States were accompanied by 26.5% increases in reimbursement by the CMS and the formation of separate diagnosis-related group codes for primary and revision procedures (544 and 545, respectively)[13]. The changes in coding and reimbursement reflect heightened awareness and acceptance by CMS of the greater burden that revisions place on patients, surgeons, and hospitals. The revision projections in the current study provide the necessary foundation for future cost-benefit analyses at a national level, to quantify the increasing societal impact of revision arthroplasty in the United States.

## Appendix

A table showing the summary of multivariate Poisson regression analysis results and a detailed description of the projection methodology and statistical analysis are available with the electronic versions of this article, on our web site atjbjs.org (go to the article citation and click on "Supplementary Material") and on our quarterly CD-ROM (call our subscription department, at 781-449-9780, to order the CD-ROM). ?

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ORIGINAL PAPER

S. Harms · R. Larson · A. E. Sahmoun · J. R. Beal

# Obesity increases the likelihood of total joint replacement surgery among younger adults

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**Abstract** We conducted a retrospective review of medical charts of patients, aged 18 to 59 years old, who underwent either a total knee replacement (TKR) or total hip replacement (THR) from January 2002 to December 2004. Of the 204 study subjects, 52% had a TKR while 48% had a THR. Obesity was significantly associated with the need for a TKR or THR when comparing the study group to adults of similar age in the general population (P< 0.0001). Seventy-two percent (146) of the study group was obese and 21% (42) overweight (BMI 25.0 to 29.9 kg/m$^2$) compared to only 26% (596) obese and 34% (732) overweight in the general population. Patients undergoing a TKR were significantly more likely to be obese (BMI>30 kg/m$^2$) than those having a THR, 83% (89) compared to 59% (57) (*P*< .0006). Our findings support those previously observed in the elderly population. Primary and secondary prevention programs aimed at reducing obesity are strongly recommended.

**Résumé** Nous avons réalise une étude rétrospective chez les patients âgés de 18 à 59 ans et ayant nécessité la mise en place d'une prothèse totale de hanche ou du genou de janvier 2002 à décembre 2004. 204 patients ont été étudiés : 52% pour une prothèse du genou, 48% pour une prothèse de hanche. L'obésité est un facteur significativement associé à la nécessité de la mise en place d'une prothèse totale du genou ou d'une prothèse de hanche. Si l'on compare ce groupe, à un groupe similaire de personnes du même âge dans la population générale (p<0.001). 70% soit 146 patients du groupe étudié étaient obèses et 21%, soit 42 patients, en surpoids (BMI 25.0–29.9 Kg/m$^2$) comparé à 26%, soit 596 patients obèses et 34% soit 732 patients en surpoids de la population générale. Les patients nécessitant un remplacement du genou étaient en surcharge pondérale plus importante que les patients nécessitant une prothèse de hanche (BMI> 30 kg/m$^2$) 83% soit 89 patients contre 59% soit 57 patients. Il nous apparaît donc important à la lumière de ces constatations de préconiser une prévention de réduction de l'obésité dans la population.

## Introduction

Obesity has doubled and reached epidemic proportions in the United States over the last 30 years [2]. Recent prevalence data show that 30%, or over 60 million adults, 20 years of age and over are classified as obese [3]. Another 35% of adults are overweight [2]. Obesity has many associated health risks including type 2 diabetes mellitus, hypertension, coronary artery disease, cancer, and destructive arthritis [7]. Men and women from all ethnic, socioeconomic, and age groups are affected.

Osteoarthritis (OA) is the most common joint disease and is one of the most prevalent symptomatic health problems for older individuals. It is well known that age tends to be an overriding risk factor for the development of OA [1]. In a younger age group, one would tend to think of secondary causes, including joint injury, aseptic necrosis, and joint dysplasias [1], contributing to the development of OA.

OA can affect any synovial joint but most commonly occurs in the hand, foot, knee, spine, and hip joints [6]. Several risk factors have been identified for OA including age, obesity, gender, prior joint trauma, and work or sports activity [1, 7, 11–13]. Of the aforementioned, age is the overriding risk factor for OA [1]. Studies have shown that

S. Harms · R. Larson
University of North Dakota School
of Medicine and Health Sciences,
Grand Forks, ND, USA

A. E. Sahmoun
Department of Internal Medicine, University of North Dakota
School of Medicine and Health Sciences,
Grand Forks, ND, USA

J. R. Beal (✉)
Department of Family Medicine,
UND School of Medicine and Health Sciences,
P.O. Box 9037 Grand Forks, ND 58202–9037, USA
e-mail: jrbeal@medicine.nodak.edu
Tel.: +701-777-3272
Fax: +701-777-3849

OA of the hip or knee affects approx. 5% of the population, with prevalence increasing with age as 9.5% of individuals older than 62 years being affected [1, 13]. Recent literature suggests that as individuals age, the chondrocyte function decreases, affecting the ability to synthesize appropriate aggrecans, leading to irregular proteoglycan aggregates that are less responsive to cytokines and mechanical forces [1].

Obesity has drawn interest in recent studies because of its modifiable status and its association with OA [1, 5, 8, 10–13]. Two dominant theories have been proposed to explain the association between obesity and the onset of OA. The biomechanical theory proposes that obesity leads to repetitive application of increased axial loading forces across the joint surface leading to degeneration of the articular cartilage and sclerosis of the subchondral bone. A second hypothesis is that excess fat may have a direct metabolic effect on cartilage by enhancing irregular growth and inhibiting repair of the articular cartilage [12].

A number of studies have focused on the relationship between obesity, OA, and total joint replacement among the elderly [5, 10, 11]. Marks and Allegrante [11] found a correlation between increasing BMI and the need for a THR in males and females age 23 to 94 years [11]. Additionally, Manek et al.[10] found a strong association between high BMI and the presence of knee OA in a study of female twins with a mean age of 54.5 years. Coggon et al. [5] found an increased relative risk of knee OA with increased weight. The relative risk reported for developing OA ranged from 0.1 (95% CI, 0.0 to 0.5) for normal individuals (BMI<20 kg/m$^2$) to 13.6 (95% CI, 5.1 to 36.2) for morbidly obese individuals (BMI>36 kg/m$^2$) [5]. However, few studies have examined the relationship between obesity and total joint replacement among individuals less than 60 years old.

The aim of this study was to investigate whether being overweight or obese is associated with the need for TKR or THR in non-elderly adults, i.e., those less than 60 years old. Also, we studied the relationship between being overweight or obese and the type of procedure performed, TKR or THR.

## Materials and methods

Since studies have shown an increased prevalence of OA and TKR/THR with age, we chose to focus our study on the non-elderly to reduce the impact of age as a causative factor in this study of total joint replacement. A total of 305 patients, aged 18 to 59 years, received a TKR (Current Procedural Terminology Code 27130) or THR (Current Procedural Terminology Code 27447) from 1 January 2002 to 31 December 2004 at MeritCare Medical Center in Fargo, ND or in the outreach facilities of Bemidji and Detroit Lakes, MN. Of these, 204 were included in our study with the remaining 101 patients being excluded because height or weight was missing. A patient's weight was considered valid if measured within 40 days prior to surgery and height was valid if within three years of the surgery date. Age, gender, and procedure performed were also documented.

Individual Body Mass Index (BMI) was calculated by dividing the weight in kilograms by the height in meters squared (kg/m$^2$). Individual BMI was categorized according to the Centers for Disease Control and Prevention (CDC) guidelines [4]. Patients were classified as underweight if their BMI was<18.5, normal weight if it was 18.5 to 24.9, overweight if it was 25.0 to 29.9, and obese if it was >30.

North Dakota Behavioral Risk Factor Surveillance System (BRFSS) data from 2002 to 2004 was used to generate an age-matched (18 to 59 years old) "general population" sample. BRFSS is an ongoing, state-based, random-digit-dialed telephone survey of the non-institutionalized U.S. population aged 18 years or older. From this sample the annual number and percentage of individuals in each BMI category was used to calculate a three-average with each category, which was used to compare to the study population.

Analyses were performed using SAS software V9.1 (SAS Institute, Cary, NC). A specific SAS procedure (PROC surveymeans) was used for the BRFSS data to compute weighted frequencies by taking into account the complex survey design. The data were compared and analyzed using a chi-square test. A $p$-value of less than 0.05 was considered to be significant.

## Results

The study group consisted of 204 subjects, with 41% (83) male and 59% (121) female. Of these, 52% (107) underwent TKR compared to 48% (97) THR. Males accounted for 29% (31) and females accounted for 71% (76) of the 107 TKR. Of the 97 THR, 54% (52) were male and 46% (45) were female (Table 1).

**Table 1** Age, gender, and BMI comparisons of total knee replacement and total hip replacement patients

| | Total knee replacement 52% ($n$ = 107) | Total hip replacement 48% ($n$ = 97) |
|---|---|---|
| Age: | | |
| Median (range) | 52 (32–59) | 51 (18–59) |
| Gender | | |
| Male | 29 (31) | 54 (52) |
| Female | 71 (76) | 46 (45) |
| BMI: | | |
| Median (range) | 35.4 (21.4–62) | 30.4 (22.3–48.4) |
| BMI*: | | |
| Normal (<24.9) | 5 (5) | 11 (11) |
| Overweight (25.0–29.9) | 12 (13) | 30 (29) |
| Obese (>30.0) | 83 (89) | 59 (57) |

*$P$<0.0006

**Table 2** BMI comparison of total knee replacement (TKR) or total hip replacement (THR) patients and general population

| BMI (kg/m$^2$) | TKR or THR patients 100% (204) | General population 100% (2161) |
|---|---|---|
| Normal (<24.9) | 8 (16) | 40 (833) |
| Overweight (25.0–29.9) | 21 (42) | 34 (732) |
| *Obese (≥30.0) | 72 (146) | 26 (596) |

*$P$<0.0001

Patients undergoing a TKR were significantly more likely to be obese (BMI>30 kg/m$^2$) than those having a THR, 83% (89) compared to 59% (57) ($P$<0.0006; Table 1). Obesity was strongly associated with the need for a TKR or THR when comparing the study group to similar-aged non-elderly adults in the general population ($P$<0.0001; Table 2). Seventy-two percent (146) of the study group was obese and 21% (42) overweight (BMI 25.0–29.9 kg/m$^2$) compared to only 26% (596) being obese and 34% (732) overweight in the general population (Table 2).

## Discussion

We found that obesity is strongly associated with the need for a total joint replacement among adults less than 60 years old. Seventy-two percent of our study group was classified as obese compared to only 26% of the general population. When analyzing our data specific to the type of procedure, TKR or THR, patients undergoing a TKR were significantly more likely to be obese than those having a THR, 83% compared to 59%. Others have found a similar relationship in elderly populations. Wendelboe et al. found an association between increasing BMI and the need for total joint replacement in elderly patients, aged 55 to 74 years [13]. Coggin et al. [5] studied subjects older than 45 years who had a TKR and found the median BMI to be 28.1 or overweight, whereas our study population showed an obese median BMI of 35.4. Additionally, Manek et al. [10] found a strong association between high BMI and the presence of knee OA in a study of female twins with a mean age of 54.5 years. Previous studies also showed moderate evidence of an association between hip OA and obesity [6, 8, 9, 11, 13]. Wendelboe et al. [13] also found a relationship between increasing BMI and THR surgery. Flugsrud et al. [6] also showed an increasing relative risk with an increasing BMI, both in males and females.

One possible explanation for the discrepancy between the BMI in the THR group when compared to TKR may be due to avascular necrosis of the hip. During data collection, we noted avascular necrosis of the hip to be a fairly common indication for having THR. Avascular necrosis would be a secondary cause of OA and necessitate the need for joint replacement regardless of their BMI.

We acknowledge some limitations regarding our study. First, all heights and weights were collected from the electronic patient record. We assumed that all heights and weights were measured; however, we cannot rule out the possibility that the person who entered the data chose to enter a patient's self-reported information. Most self-reported weight is noted for being underestimated, especially for females [13]. However, this would likely serve to further corroborate our findings rather than refute them. Secondly, it is possible that individuals in the general population sample could have undergone a total joint replacement at the study hospital and, thus, simultaneously were a part of our study group. Since our general population sample was randomized, this limitation could not be avoided. However, we feel the chance of an individual being included in both the study group and general population is slim, and thus the impact, if there was any, on the study findings is minimal.

In summary, our study found a strong association between obesity and the need for TKR or THR in non-elderly adults. These findings support those previously observed in the elderly population. As the prevalence of overweight and obese individuals continues to rise, an increase in the number of total joint replacements may rise accordingly. Primary and secondary prevention programs aimed at reducing obesity are strongly recommended in light of the continuing rise in the number of adults classified as overweight or obese.

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ORIGINAL CONTRIBUTION

Scan for Author Video Interview

# Total Knee Arthroplasty Volume, Utilization, and Outcomes Among Medicare Beneficiaries, 1991-2010

Peter Cram, MD, MBA
Xin Lu, MS
Stephen L. Kates, MD
Jasvinder A. Singh, MD, MPH
Yue Li, PhD
Brian R. Wolf, MD, MS

**Context** Total knee arthroplasty (TKA) is one of the most common and costly surgical procedures performed in the United States.

**Objective** To examine longitudinal trends in volume, utilization, and outcomes for primary and revision TKA between 1991 and 2010 in the US Medicare population.

**Design, Setting, and Participants** Observational cohort of 3 271 851 patients (aged ≥65 years) who underwent primary TKA and 318 563 who underwent revision TKA identified in Medicare Part A data files.

**Main Outcome Measures** We examined changes in primary and revision TKA volume, per capita utilization, hospital length of stay (LOS), readmission rates, and adverse outcomes.

**Results** Between 1991 and 2010 annual primary TKA volume increased 161.5% from 93 230 to 243 802 while per capita utilization increased 99.2% (from 31.2 procedures per 10 000 Medicare enrollees in 1991 to 62.1 procedures per 10 000 in 2010). Revision TKA volume increased 105.9% from 9650 to 19 871 while per capita utilization increased 59.4% (from 3.2 procedures per 10 000 Medicare enrollees in 1991 to 5.1 procedures per 10 000 in 2010). For primary TKA, LOS decreased from 7.9 days (95% CI, 7.8-7.9) in 1991-1994 to 3.5 days (95% CI, 3.5-3.5) in 2007-2010 ($P<.001$). For primary TKA, rates of adverse outcomes resulting in readmission remained stable between 1991-2010, but rates of all-cause 30-day readmission increased from 4.2% (95% CI, 4.1%-4.2%) to 5.0% (95% CI, 4.9%-5.0%) ($P<.001$). For revision TKA, the decrease in hospital LOS was accompanied by an increase in all-cause 30-day readmission from 6.1% (95% CI, 5.9%-6.4%) to 8.9% (95% CI, 8.7%-9.2%) ($P<.001$) and an increase in readmission for wound infection from 1.4% (95% CI, 1.3%-1.5%) to 3.0% (95% CI, 2.9%-3.1%) ($P<.001$).

**Conclusions** Increases in TKA volume have been driven by both increases in the number of Medicare enrollees and in per capita utilization. We also observed decreases in hospital LOS that were accompanied by increases in hospital readmission rates.

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TOTAL KNEE ARTHROPLASTY (TKA) is a common and safe procedure typically performed for relief of symptoms in patients with severe knee arthritis. Available data suggest that approximately 600 000 TKA procedures are performed annually in the United States at a cost of approximately $15 000 per procedure ($9 billion per year in aggregate).[1-4] While TKA does not typically reduce mortality, the procedure results in marked improvements in health-related quality of life and functional status and is highly cost-effective.[2,5] Total knee arthroplasty is now among the most common major surgical procedures performed in the United States.[6]

The increase in TKA can be viewed as an indication of the success of this procedure in safely reducing pain and improving functional status for an aging population.[7,8] However, the increase in TKA can also be viewed as yet another source of strain on government, insurers, individuals, and businesses struggling with unremitting growth in health care spending.[9-11] Despite the clinical and economic policy importance of TKA, there are few analyses evaluating recent trends over time in use of and outcomes associated with TKA.[1,12-14]

Thus, the primary objective of our study was to evaluate longitudinal

**See also pp 1217 and 1266.**

**Author Video Interview available at www.jama.com.**

**Author Affiliations:** Division of General Internal Medicine, Department of Internal Medicine (Dr Cram and Ms Lu) and Department of Orthopaedic Surgery (Dr Wolf), University of Iowa Carver College of Medicine, Iowa City; CADRE, Iowa City Veterans Administration Medical Center, Iowa City (Dr Cram); Departments of Orthopaedic Surgery (Dr Kates) and Community and Preventive Medicine (Dr Li), University of Rochester, Rochester, New York; and Department of Medicine, University of Alabama at Birmingham and Birmingham Veterans Affairs Medical Center (Dr Singh).
**Corresponding Author:** Peter Cram, MD, MBA, Division of General Internal Medicine, University of Iowa Carver College of Medicine, 200 Hawkins Dr, 6GH SE, Iowa City, IA 52242 (peter-cram@uiowa.edu).

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trends in primary and revision TKA volume, per capita utilization, and outcomes in the US Medicare population. The secondary objective was to examine patient and hospital factors associated with increased risk for hospital readmission given the growing likelihood of bundled payments for orthopedics in the near future.[15,16]

## METHODS

### Data

We linked 2 sequential Medicare Provider Analysis and Review (MedPAR) Part A data files (the first covering the period from 1991-2005 and the second from 2006-2010), each containing a 100% sample of hospitalizations for fee-for-service beneficiaries. These data were used to identify all enrollees aged 65 years and older who underwent primary or revision TKA between 1991 and 2010. Patients were identified using *International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)* procedure codes 81.54 for primary and codes 80.06, 81.55, 00.80, 00.81, 00.82, 00.83, and 00.84 for revision TKA.[17-20]

The Part A files contain a range of data collected from discharge abstracts for all hospitalized fee-for-service Medicare enrollees including patient demographics; *ICD-9-CM* codes for primary and secondary diagnoses and procedures; admission source (eg, emergency department or transfer from outside hospital); admission and discharge dates; discharge disposition (eg, home, nursing home, inpatient rehabilitation, transfer to another acute care hospital, dead); death occurring up to 3 years after discharge; each patient's unique Medicare beneficiary number allowing for identification of patient readmissions; and each hospital's unique 6-digit identification number. Comorbid conditions present on the index admission were identified using algorithms described by Elixhauser et al,[21,22] which consider 30 specific conditions and exclude comorbid conditions that may represent complications of care or that are related to the primary reason for hospitalization. This project was approved by the University of Iowa Institutional Review Board.

Our intention was to examine changes in volume, utilization, and outcomes of patients undergoing primary and revision TKA procedures. To generate appropriate analytical cohorts, we applied several inclusion and exclusion criteria (eFigure 1 and eFigure 2, available at http://www.jama.com). First, we excluded Medicare HMO enrollees because the MedPAR data are incomplete for enrollees in such plans.

Second, we limited our cohort to the first primary (or revision) TKA performed on a given patient during any 30-day period using methods we have described previously.[23] We also excluded bilateral or staged procedures that occurred within the 30-day window; this exclusion is necessary because Medicare data historically have not included sidedness for a specific procedure. Thus, for a patient who underwent 2 primary TKA procedures in close temporal proximity, it is impossible to know if this represented an initial primary procedure followed by an early complication requiring a second procedure or a planned bilateral (ie, staged) procedure.

Third, because primary TKA is most often an elective procedure whereas revision TKA can be either an elective or more urgent procedure, we applied separate exclusion criteria to the primary and revision TKA populations in accordance with prior studies as described below. For primary TKA (eFigure 1), we sequentially excluded patients admitted through the emergency department (n=18 497) and patients admitted after transfer from another acute care hospital (n=3295); these exclusion criteria were developed to select a population of primary elective TKA patients. The revision TKA population (eFigure 2) did not exclude these types of patients because revision TKA can be an emergent or unscheduled procedure and thus exclusion of these populations would not make sense.

### Statistical Analysis

We examined the demographic characteristics and prevalence of key comorbid conditions for patients who underwent TKA between 1991 and 2010; for simplicity, data are presented separately for each 4-year period (eg, 1991-1994, 1995-1998, etc). We examined changes in the mean number of comorbid conditions per patient during each 4-year period. We used analysis of variance for comparisons of continuous variables and the $\chi^2$ test for categorical variables and tested for differences in linear trends. All analyses were performed separately for primary and revision TKA patients.

We used graphical methods to plot the annual primary and revision TKA Medicare volume over time. We calculated per capita TKA utilization rates by dividing the number of procedures performed each year by the number of beneficiaries enrolled in the fee-for-service Medicare program and plotted these results graphically.

We compared linear trends in several important outcomes of interest for primary and revision TKA: hospital length of stay (LOS); discharge disposition; selected arthroplasty complications resulting in readmission within 30 days of discharge; and all-cause readmission rates within 30 days of discharge. Discharge disposition was categorized as home, skilled or intermediate care (which also incorporated outpatient rehabilitation), inpatient rehabilitation, and other. We examined changes in the rates of 6 separate adverse outcomes occurring during the index admission (mortality) or readmission within 30 days of discharge (mortality, pulmonary embolism, deep vein thrombosis, wound infection, postoperative sepsis, and myocardial infarction) that have been examined in prior studies of arthroplasty using administrative data.[20,24,25]

We also examined changes in rates of a composite outcome representing the occurrence of one or more of the individual adverse outcomes as well as all-cause readmission within 30 days of discharge. To evaluate the reasons for readmission among the primary and revision TKA cohorts, we applied the Agency for Healthcare Research and


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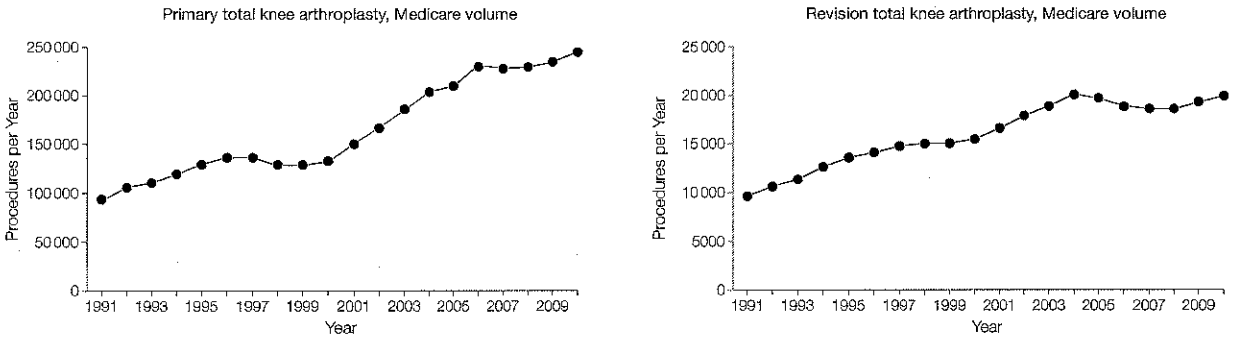
**Figure 1.** Primary and Revision Total Knee Athroplasty Medicare Volume Between 1991 and 2010




Y-axis shown in blue indicates range from 0 to 25 000 procedures per year.

Quality (AHRQ) Clinical Classification Software (CCS).[26] This software synthesizes more than 14 000 *ICD-9-CM* codes into 231 mutually exclusive clinically meaningful disease categories. For each 4-year study period, we examined the 5 most common categories associated with readmission and the proportion of all readmissions during each period that were associated with each category; this allowed us to examine how the causes of readmission have changed over time.

We used standard logistic regression to calculate risk-adjusted 30-day readmission rates and composite outcome [(observed/adjusted) × unadjusted 20-year rates] and used standard linear regression to calculate risk-adjusted hospital LOS [(observed −adjusted) + unadjusted 20-year LOS].[27] These models adjusted for age (categorized as 65-69 years, 70-74, 75-79, and ≥80 years), sex, race (categorized as white, black, and other), and comorbidities to account for the changing demographics of the TKA populations over time.[28] Race was included in these models to allow us to account for previously documented racial disparities in joint arthroplasty when calculating standardized utilization rates for our analysis.[29,30] We used graphical methods to plot discharge disposition, hospital LOS, readmission rates, and composite outcome between 1991 and 2010. All analyses were conducted separately for the primary and revision TKA cohorts.

We conducted several supplemental analyses of interest. Focusing on the most recent 4 years of data (2007-2010), we examined the relationship between patient and hospital factors and hospital readmission; as in prior analyses, primary and revision TKA were examined separately. We used bivariate methods to compare differences in patient and hospital factors among patients who did and did not experience readmission within 30 days of discharge. We then examined both patient-level and hospital-level factors that may have affected the 30-day readmission rate by employing a series of 4 standard logistic regression models that progressively adjusted for an increasing array of factors. In all models, the dependent variable was a binary variable with the value of 1 if a given patient was readmitted and 0 if not.

Model 1 adjusted for patient demographics alone (ie, age, race, sex); model 2 added adjustment for the number of comorbidities; model 3 added adjustment for hospital teaching status (major, minor, and nonteaching) and hospital procedural volume (calculated separately for the primary and revision TKA cohort and categorized by hospital volume quartiles); and model 4 added additional adjustment for each patient's hospital LOS, modeled in its log-transformed state. In all 4 models, we also included calendar year (2007, 2008, 2009, and 2010) to account for underlying temporal trends. We conducted several sensitivity analyses. In particular, we repeated our analyses after adding back excluded populations (eg, primary TKA cases admitted through the emergency department). We also repeated our analyses looking at 90-day outcomes rather than 30-day outcomes.

All $P$ values are 2-tailed, with $P < .05$ deemed statistically significant. All statistical analyses were performed using SAS version 9.2.

## RESULTS

Our final study population included 3 271 851 elective primary TKAs and 318 563 revision TKAs between 1991 and 2010. The total number of fee-for-service Medicare enrollees increased from 29 892 351 in 1991 to 39 250 746 in 2010, whereas the number of primary TKA procedures increased from 93 230 in 1991 to 243 802 in 2010 (an increase of 161.5%) (FIGURE 1). The number of revision TKA procedures increased from 9650 in 1991 to 19 871 in 2010 (an increase of 105.9%) (Figure 1).

During the same period, the per capita utilization of primary TKA increased by 99.2% (FIGURE 2) and the per capita utilization of revision TKA increased by 56.8% (Figure 2). For primary TKA, the mean (SD) age increased from 73.8 (5.8) years (95% CI, 73.8-73.8 years) in 1991-1994 to 74.2 (6.2) years (95% CI, 74.2-74.2 years) in 2007-2010, ($P < .001$). The preva-

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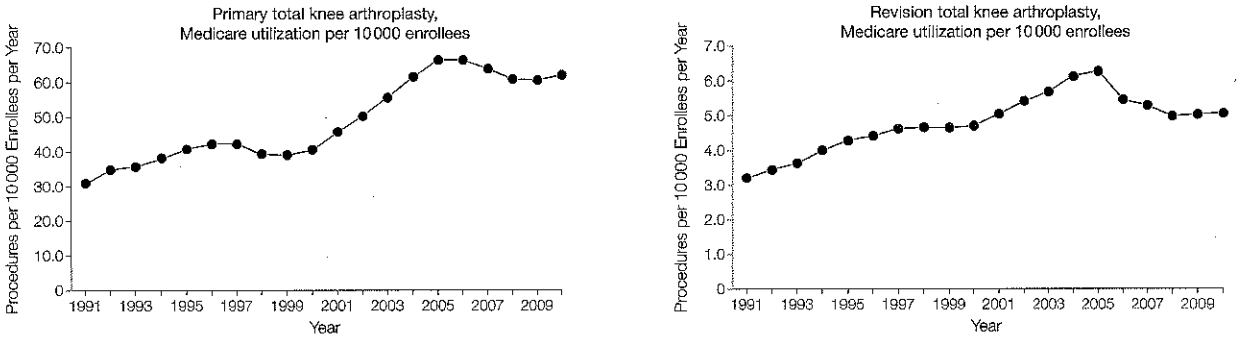
lence of diabetes increased from 10.5% (95% CI, 10.4%-10.6%) to 21.7% (95% CI, 21.6%-21.7%) and the prevalence of obesity increased from 4.0% (95% CI, 3.9%-4.0%) to 11.5% (95% CI, 11.4%-11.6%; $P<.001$ for each). Trends were similar for revision TKA (TABLE 1). In particular, the mean (SD) age increased from 74.2 (5.9) years (95% CI, 74.1-74.3 years) in 1991-1994 to 74.8 (6.5) years (95% CI, 74.7-74.8 years) in 2007-2010 ($P<.001$). The prevalence of diabetes increased from 11.0% (95% CI, 10.7%-11.3%) to 24.2% (95% CI, 23.9%-24.5%) and the prevalence of obesity increased from 3.7% (95% CI, 3.5%-3.8%) to 10.1% (95% CI, 9.9%-10.3%) ($P<.001$ for each).

For primary TKA, the mean hospital LOS declined from 7.9 days (95% CI, 7.8-7.9) in 1991-1994 to 3.5 days (95% CI, 3.5-3.5) in 2007-2010 (TABLE 2), a relative decline of 55.7% ($P<.001$). The percentage of patients discharged home after primary TKA declined from 67.5% (95% CI, 67.3%-67.6%) in 1991-1994 to 39.9% (95% CI,

**Figure 2.** Primary and Revision Medicare Total Knee Athroplasty Utilization Between 1991 and 2010




Y-axis shown in blue indicates range from 0 to 7 procedures per year per 10 000 enrollees. The range of variability (1 SD) in primary total knee arthroplasty (TKA); procedures per 10 000 Medicare enrollees for 1991 was 31.0 to 31.4; for 2010, 5.0 to 5.1. For revision TKA, the range of variability (1 SD; procedures per 10 000 Medicare enrollees) for 1991 was 3.2 to 3.3; for 2010, 5.0 to 5.1.

**Table 1.** Characteristics of Medicare Beneficiaries Receiving Primary and Revision Total Knee Arthroplasty (TKA) Between 1991 and 2010[a]

| | Primary TKA | | | | | Revision TKA | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Characteristics | 1991-1994 | 1995-1998 | 1999-2002 | 2003-2006 | 2007-2010 | 1991-1994 | 1995-1998 | 1999-2002 | 2003-2006 | 2007-2010 |
| No. of hospitalizations | 431 050 | 530 128 | 578 614 | 816 497 | 915 562 | 44 120 | 57 785 | 65 197 | 76 526 | 74 935 |
| Age, mean (SD), y | 73.8 (5.8) | 74.5 (5.9) | 74.7 (5.9) | 74.7 (5.9) | 74.2 (6.2) | 74.2 (5.9) | 75.2 (6.1) | 75.4 (6.2) | 75.3 (6.3) | 74.8 (6.5) |
| Women, No. (%) | 283 353 (65.7) | 346 827 (65.4) | 379 650 (65.6) | 535 181 (65.5) | 592 777 (64.7) | 26 772 (60.7) | 35 062 (60.7) | 38 948 (59.7) | 44 654 (58.4) | 43 535 (58.1) |
| Race, No. (%)[b] | | | | | | | | | | |
| White | 389 996 (90.5) | 487 200 (91.9) | 529 078 (91.4) | 744 882 (91.2) | 831 082 (90.8) | 39 850 (90.3) | 52 787 (91.4) | 58 781 (90.2) | 68 770 (89.9) | 66 981 (89.4) |
| Black | 21 515 (5.0) | 28 685 (5.4) | 30 563 (5.3) | 42 442 (5.2) | 49 477 (5.4) | 2531 (5.7) | 3704 (6.4) | 4606 (7.1) | 5413 (7.1) | 5581 (7.4) |
| Other | 7376 (1.7) | 10 774 (2.0) | 16 654 (2.9) | 25 908 (3.2) | 32 195 (3.5) | 622 (1.4) | 975 (1.7) | 1586 (2.4) | 2078 (2.7) | 2158 (2.9) |
| Missing | 12 163 (2.8) | 3469 (0.7) | 2314 (0.4) | 3265 (0.4) | 2808 (0.3) | 1117 (2.5) | 319 (0.6) | 224 (0.3) | 265 (0.3) | 215 (0.3) |
| Comorbidity, No. (%) | | | | | | | | | | |
| Diabetes | 45 158 (10.5) | 69 141 (13.0) | 89 230 (15.4) | 152 877 (18.7) | 198 241 (21.7) | 4863 (11.0) | 8660 (15.0) | 11 638 (17.9) | 16 358 (21.4) | 18 129 (24.2) |
| CHF | 14 732 (3.4) | 22 041 (4.2) | 24 940 (4.3) | 37 622 (4.6) | 35 652 (3.9) | 2173 (4.9) | 3966 (6.9) | 5147 (7.9) | 6909 (9.0) | 5893 (7.9) |
| Obesity | 17 092 (4.0) | 27 415 (5.2) | 35 684 (6.2) | 67 120 (8.2) | 105 251 (11.5) | 1619 (3.7) | 2906 (5.0) | 3956 (6.1) | 6115 (8.0) | 7555 (10.1) |
| Renal failure | 1742 (0.4) | 2383 (0.4) | 3443 (0.6) | 12 531 (1.5) | 37 335 (4.1) | 330 (0.7) | 556 (1.0) | 950 (1.5) | 2525 (3.3) | 5088 (6.8) |
| No. of comorbid conditions, mean (SD) | 1.2 (1.2) | 1.4 (1.3) | 1.6 (1.3) | 1.9 (1.4) | 2.1 (1.4) | 1.2 (1.2) | 1.6 (1.4) | 1.8 (1.4) | 2.2 (1.5) | 2.3 (1.5) |

Abbreviation: CHF, congestive heart failure.
[a] $P$ values (test for trend) are less than .001 for all comparisons except age (primary TKA, $P=.56$; revision TKA, $P=.46$).
[b] The race category of other includes Asian, Hispanic, North American Native, or other not specified individuals.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39.8%-40.0%) in 1999-2002 before increasing to 56.2% (95% CI, 56.1%-56.3%) in 2007-2010 (Table 2 and eFigure 3, available at http://www.jama.com); alternatively the percentage of patients discharged to inpatient rehabilitation increased from 14.6% (95% CI, 14.5%-14.7%) in 1991-1994 to 29.4% (95% CI, 29.3%-29.5%) in 1999-2002 before declining to 11.4% (95% CI, 11.3%-11.4%) in 2007-20120 and discharge to outpatient rehabilitation facilities increased steadily throughout the study period. Unadjusted mortality within 30 days after discharge decreased from 0.5% (95% CI, 0.4%-0.5%) in 1991-1994 to 0.3% (95% CI, 0.3%-0.3%) in 2007-2010, a 40% relative reduction ($P<.001$). Unadjusted rates of most other adverse outcomes remained relatively stable over the study period as did the rate of the composite outcome (Table 2).

In contrast, all-cause 30-day readmission rates increased from 4.2% (95% CI, 4.1%-4.2%) in 1991-1994 to 5.0% (95% CI, 4.9%-5.0%) in 2007-2010 ($P<.001$)(Table 2). In adjusted analyses, we found that although hospital LOS for primary TKA declined throughout the study period (eFigure 4), both 30-day all-cause readmission rates (eFigure 5) and rates of the composite outcome (eFigure 6) declined initially, but have been increasing in recent years. In an analysis of the diagnoses and conditions associated with readmission after primary TKA, we observed relatively little change over time (eTable 1) with surgical and cardiac complications being relatively common as well as gastrointestinal hemorrhage and infection, particularly in recent years.

For revision TKA, the mean hospital LOS declined from 8.9 days (95% CI, 8.8-8.9) in 1991-1994 to 5.0 days (95% CI, 5.0-5.0) in 2007-2010, a relative decline of 43.8% ($P<.001$; TABLE 3). Trends in discharge disposition after revision TKA (Table 3 and eFigure 3) demonstrated a similar pattern to that which was observed for primary TKA, a decline in discharges to home or inpatient rehabilitation and an increase in discharge to skilled care and outpatient rehabilitation. Mortality within 30 days of discharge increased modestly from 0.7% (95% CI, 0.6%-0.7%) in 1991-1994 to 0.9% (95% CI, 0.8%-0.9%) in 2007-2010 (a 28.6% relative increase) and readmission for wound infection, hemorrhage, sepsis, and myocardial infarction each increased by more than 100% ($P<.001$ for each). For revision TKA, the unadjusted rate of the composite outcome increased from 2.7% (95% CI, 2.6%-2.9%) in 1991-1994 to 5.3% (95% CI, 5.2%-5.5%) in 2007-2010 ($P<.001$). All-cause unadjusted readmission rates within 30 days of discharge increased from 6.1% (95% CI, 5.9%-6.4%) to 8.9% (95% CI, 8.7%-9.2%) during the study period (eFigure 5). The most common causes of readmission after revision TKA are displayed in eTable 2.

In adjusted analyses, revision TKA demonstrated a steady decrease in hos-

**Table 2.** Unadjusted Outcomes (LOS, Complication Rates, and 30-Day Readmission Rates) for Primary Total Knee Arthroplasty (TKA) Between 1991 and 2010[a]

| | Mean % (95% CI) | | | | |
|---|---|---|---|---|---|
| | 1991-1994 | 1995-1998 | 1999-2002 | 2003-2006 | 2007-2010 |
| No. of hospitalizations | 431 050 | 530 128 | 578 614 | 816 497 | 915 562 |
| LOS | | | | | |
| Mean, d (95% CI) | 7.9 (7.8-7.9) | 4.9 (4.9-5.0) | 4.3 (4.3-4.3) | 3.9 (3.9-3.9) | 3.5 (3.5-3.5) |
| Median, d (IQR) | 7 (6-9) | 4 (4-6) | 4 (3-5) | 3 (3-4) | 3 (3-4) |
| Discharge disposition | | | | | |
| Home | 67.5 (67.3-67.6) | 46.6 (46.4-46.7) | 39.9 (39.8-40.0) | 45.3 (45.2-45.4) | 56.2 (56.1-56.3) |
| Outpatient skilled/intermediate care/rehabilitation | 16.6 (16.5-16.7) | 29.1 (29.0-29.2) | 28.4 (28.2-28.5) | 26.1 (26.0-26.2) | 30.1 (30.0-30.2) |
| Inpatient rehabilitation | 14.6 (14.5-14.7) | 22.8 (22.7-23.0) | 29.4 (29.3-29.5) | 25.6 (25.5-25.7) | 11.4 (11.3-11.4) |
| Other | 1.3 (1.3-1.4) | 1.5 (1.4-1.5) | 2.4 (2.3-2.4) | 3.0 (3.0-3.0) | 2.3 (2.3-2.3) |
| Complications within 30 d of discharge | | | | | |
| Mortality | 0.5 (0.4-0.5) | 0.4 (0.4-0.5) | 0.4 (0.3-0.4) | 0.3 (0.3-0.3) | 0.3 (0.3-0.3) |
| Pulmonary embolism | 0.2 (0.2-0.2) | 0.2 (0.2-0.2) | 0.2 (0.2-0.2) | 0.2 (0.2-0.2) | 0.3 (0.3-0.3) |
| Deep vein thrombosis | 0.4 (0.4-0.4) | 0.4 (0.4-0.4) | 0.3 (0.3-0.3) | 0.3 (0.3-0.3) | 0.4 (0.4-0.4) |
| Wound infection | 0.7 (0.6-0.7) | 0.6 (0.6-0.6) | 0.6 (0.5-0.6) | 0.4 (0.4-0.4) | 0.4 (0.4-0.4) |
| Hemorrhage | 0.1 (0.1-0.1) | 0.1 (0.1-0.1) | 0.2 (0.2-0.2) | 0.2 (0.2-0.3) | 0.3 (0.3-0.3) |
| Sepsis | 0.1 (0.1-0.1) | 0.1 (0.1-0.1) | 0.1 (0.1-0.1) | 0.1 (0.1-0.2) | 0.2 (0.2-0.2) |
| Myocardial infarction | 0.2 (0.2-0.2) | 0.2 (0.2-0.3) | 0.3 (0.2-0.3) | 0.3 (0.3-0.3) | 0.3 (0.3-0.3) |
| Composite outcome[b] | 1.9 (1.9-2.0) | 1.9 (1.8-1.9) | 1.8 (1.7-1.8) | 1.7 (1.6-1.7) | 1.9 (1.9-1.9) |
| All-cause readmission at 30 d | 4.2 (4.1-4.2) | 4.1 (4.1-4.2) | 4.0 (4.0-4.1) | 4.5 (4.5-4.6) | 5.0 (4.9-5.0) |

Abbreviations: IQR, interquartile range; LOS, length of stay.
[a] $P$ values (test for trend) are less than .001 for all comparisons except for LOS ($P=.001$) and deep vein thrombosis ($P=.001$).
[b] Composite outcome is the occurrence of one or more of the following within 30 days of discharge: death, pulmonary embolism, deep vein thrombosis, wound infection, hemorrhage, sepsis, or myocardial infarction.

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pital LOS (eFigure 4) accompanied by an initial decline in readmissions that has reversed in recent years (eFigure 5) and by an increase in both unadjusted and adjusted rates of the composite outcome (eFigure 6).

In bivariate comparison of patients who were and were not readmitted within 30 days after primary TKA (TABLE 4), we found that patients who were readmitted were older than those who were not readmitted (mean age, 75.6 vs 74.1 years, $P<.001$), less likely to be women, more likely to be black, and had a higher number of comorbid conditions (mean number of conditions 2.1 among nonreadmitted vs 2.5 among readmitted, $P<.001$). Findings were generally similar for the revision TKA cohort (Table 4). In our regression analyses focusing on primary TKA readmissions (TABLE 5), several patient-level factors were associated with increased odds of hospital readmission including older age, black race, male sex, greater number of comorbid conditions, and longer hospital LOS during the index admission. Hospital factors including minor teaching and nonteaching status (as compared with major teaching) as well as greater primary TKA hospital volume were associated with decreased patient readmission rates (Table 5). Results for revision TKA were generally similar (Table 5). Results of sensitivity analyses (available by request from the authors) were similar to the main results described above.

## COMMENT

In an analysis of Medicare administrative data from 1991-2010, we identified a number of interesting trends related to TKA. First, we found a marked increase in the volume of primary TKA procedures being performed, an increase that appeared to be driven not only by an increase in the number of Medicare enrollees but also a substantial increase in the per-capita utilization of TKA procedures. Second, we observed changes in patients' discharge disposition over time with a decline in the use of inpatient rehabilitation and an increase in the use of outpatient rehabilitation. Third, we found a significant decrease in hospital LOS that was accompanied by increasing readmission rates over the past decade.

Primary Medicare TKA volume increased approximately 162% from 93 230 in 1991 to 243 802 in 2010 and revision volume increased 106% from 9650 in 1991 to 19 871 in 2010. These figures suggest that growth in primary and revision TKA volume is being driven by both an increase in the number of Medicare enrollees and an increase in per capita arthroplasty utilization. Our findings extend those of a limited body of prior research that has demonstrated increasing volume and per capita utilization of knee arthroplasty.[1,31,32] This growth is likely driven by a combination of factors including an expansion in the types of patients considered likely to benefit from TKA, an aging population, and an increasing prevalence of certain conditions that

**Table 3.** Unadjusted Outcomes (LOS, Complication Rates, and 30-Day Readmission Rates) for Revision Total Knee Arthroplasty (TKA) Between 1991 and 2010[a]

| | Mean % (95% CI) | | | | |
|---|---|---|---|---|---|
| | 1991-1994 | 1995-1998 | 1999-2002 | 2003-2006 | 2007-2010 |
| No. of hospitalizations | 44 120 | 57 785 | 65 197 | 76 526 | 74 935 |
| LOS | | | | | |
| Mean, d (95% CI) | 8.9 (8.8-8.9) | 6.0 (5.9-6.0) | 5.5 (5.5-5.6) | 5.3 (5.3-5.3) | 5.0 (5.0-5.0) |
| Median, d (IQR) | 7 (5-10) | 5 (4-6) | 4 (3-6) | 4 (3-6) | 4 (3-5) |
| Discharge disposition | | | | | |
| Home | 70.0 (69.6-70.4) | 50.8 (50.4-51.2) | 43.3 (43.0-43.7) | 44.9 (44.5-45.2) | 50.2 (49.8-50.5) |
| Outpatient skilled/intermediate care/rehabilitation | 17.5 (17.1-17.8) | 29.3 (28.9-29.7) | 30.0 (29.6-30.3) | 29.8 (29.4-30.1) | 33.8 (33.5-34.2) |
| Inpatient rehabilitation | 10.9 (10.6-11.2) | 18.2 (17.9-18.5) | 24.1 (23.7-24.4) | 20.7 (20.4-20.9) | 11.1 (10.9-11.3) |
| Other | 1.7 (1.5-1.8) | 1.7 (1.6-1.8) | 2.7 (2.5-2.8) | 4.7 (4.6-4.9) | 4.9 (4.7-5.0) |
| Complications within 30 d of discharge | | | | | |
| Mortality | 0.7 (0.6-0.7) | 0.7 (0.6-0.7) | 0.8 (0.7-0.9) | 0.8 (0.7-0.9) | 0.9 (0.8-0.9) |
| Pulmonary embolism | 0.2 (0.1-0.2) | 0.2 (0.1-0.2) | 0.2 (0.1-0.2) | 0.2 (0.1-0.2) | 0.3 (0.2-0.3) |
| Deep vein thrombosis | 0.3 (0.2-0.3) | 0.3 (0.2-0.3) | 0.3 (0.2-0.3) | 0.3 (0.3-0.4) | 0.4 (0.4-0.5) |
| Wound infection | 1.4 (1.3-1.5) | 1.5 (1.4-1.6) | 1.7 (1.6-1.8) | 2.2 (2.1-2.3) | 3.0 (2.9-3.1) |
| Hemorrhage | 0.1 (0.1-0.2) | 0.3 (0.3-0.4) | 0.5 (0.5-0.6) | 0.6 (0.6-0.7) | 0.7 (0.6-0.8) |
| Sepsis | 0.2 (0.1-0.2) | 0.3 (0.2-0.3) | 0.3 (0.3-0.4) | 0.6 (0.5-0.6) | 0.8 (0.7-0.8) |
| Myocardial infarction | 0.2 (0.2-0.3) | 0.3 (0.3-0.4) | 0.4 (0.3-0.4) | 0.4 (0.4-0.5) | 0.5 (0.4-0.5) |
| Composite outcome[b] | 2.7 (2.6-2.9) | 3.0 (2.9-3.2) | 3.6 (3.4-3.7) | 4.3 (4.2-4.5) | 5.3 (5.2-5.5) |
| All-cause readmission at 30 d | 6.1 (5.9-6.4) | 6.2 (6.0-6.4) | 6.5 (6.3-6.7) | 7.7 (7.5-7.9) | 8.9 (8.7-9.2) |

Abbreviations: IQR, interquartile range; LOS, length of stay

[a] $P$ values (test for trend) are less than .001 for all comparisons except LOS ($P=.005$).

[b] Composite outcome is the occurrence of one or more of the following within 30 days of discharge: death, pulmonary embolism, deep vein thrombosis, wound infection, hemorrhage, sepsis, or myocardial infarction.



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predispose patients to osteoarthritis, most notably obesity.[33]

It is important to note the apparent stabilization of joint arthroplasty utilization in recent years. Our findings extend the work of Bini and colleagues[34] who found evidence of slowing growth in joint arthroplasty utilization within the Kaiser-Permanente health care system between 2000 and 2009. It is unclear whether this slowing of joint arthroplasty growth is the result of the protracted US economic downturn, saturation of patient demand for arthroplasty, changes in reimbursement, or changes in provider beliefs about the risks and benefits of arthroplasty.[35,36]

The growth in TKA should prompt consideration of whether too many (or too few) of these procedures are being performed both in aggregate and among key patient subgroups defined by race, sex, or age.[30,37,38] Any effort to answer this question raises the issues of TKA indications and appropriateness. A number of clinical practice guidelines for TKA have been developed to guide clinicians and policy makers in evaluating appropriateness.[39-43] These guidelines typically suggest consideration of TKA for patients with severe functional limitation unresponsive to conservative management (ie, medications and physical therapy).

While Cobos et al[44] estimated that as many as 25% of TKA procedures performed in Spain might be considered inappropriate, few such studies have been performed in the United States.[12] Conducting studies investigating appropriateness has historically been difficult because of a lack of a national joint arthroplasty registry, although there have been encouraging developments recently to suggest that this may change.[45,46] Thus, it is difficult to determine the extent to which the growth in TKA utilization represents growth in appropriate use of a highly effective procedure or overuse of a highly reimbursed procedure for which indications still depend on clinical judgment. It is likely that both factors are at play.

Our finding of significant changes in patient's discharge dispositions following TKA over the 20-year study period is important and hints at the complexities of restraining cost growth. The increase in the percentage of TKA patients discharged to inpatient rehabilitation and skilled care during the 1990s is consistent with prior reports.[47] These reports typically relate the increased use of post–acute care to the implementation of the prospective payment system for acute care hospitals in 1983, which in turn created a powerful incentive for hospitals to reduce hospital LOS by rapidly discharging patients to post–acute care settings when patients were too ill to safely be discharged home.[48,49] However, the rapid increase in Medicare post–acute care spending in the 1990s prompted passage of the Balanced Budget Act (BBA) of 1997 and implementation of a prospective payment system for outpatient skilled care in 1998 and inpatient rehabilitation in 2002.[48,50] Our results are consistent with the anticipated effects of these policy changes, a reduction in the use of post–acute care and an increase in the percentage of patients being discharged home after TKA since 2004.

The finding of declining hospital LOS accompanied by increasing readmission rates mirrors results of a number of recent studies.[51,52] The results of our study as well as other publications suggest that there are limitations to what extent LOS can be reduced and that cost savings from further LOS reductions are unlikely to materialize.[51,52] In particular, there is an inherent tradeoff between shorter hospital LOS, greater

**Table 4.** Characteristics of Medicare Beneficiaries Receiving Primary and Revision Total Knee Arthroplasty (TKA) Who Did and Did Not Experience Readmission Within 30 Days of Discharge (2007-2010)[a]

| Characteristics | Primary TKA | | Revision TKA | |
|---|---|---|---|---|
| | No Readmission | Readmission | No Readmission | Readmission |
| Hospitalizations, No. (%) | 869 867 (95.0) | 45 695 (5.0) | 68 231 (91.1) | 6704 (8.9) |
| Age, y[b] | 74.1 (74.1-74.1) | 75.6 (75.6-75.7) | 74.7 (74.6-74.7) | 75.7 (75.5-75.9) |
| Sex, women[c] | 65.0 (64.9-65.1) | 60.5 (60.0-60.9) | 58.3 (57.9-58.6) | 56.3 (55.1-57.5) |
| Race[c] | | | | |
| White | 90.8 (90.8-90.9) | 89.7 (89.4-90.0) | 89.5 (89.3-89.7) | 88.3 (87.5-89.0) |
| Black | 5.3 (5.3-5.4) | 6.6 (6.4-6.9) | 7.3 (7.1-7.5) | 8.6 (7.9-9.2) |
| Other | 3.5 (3.5-3.6) | 3.3 (3.2-3.5) | 2.9 (2.8-3.0) | 2.9 (2.5-3.3) |
| Missing | 0.3 (0.3-0.3) | 0.3 (0.3-0.4) | 0.3 (0.2-0.3) | 0.3 (0.1-0.4) |
| Comorbidity[c] | | | | |
| Diabetes | 21.5 (21.4-21.5) | 25.4 (25.0-25.8) | 24.0 (23.7-24.3) | 26.3 (25.2-27.3) |
| CHF | 3.7 (3.7-3.8) | 7.4 (7.1-7.6) | 7.3 (7.1-7.5) | 13.7 (12.8-14.5) |
| Obesity | 11.5 (11.4-11.6) | 11.1 (10.8-11.4) | 10.2 (10.0-10.4) | 8.8 (8.1-9.5) |
| Renal failure | 3.9 (3.9-4.0) | 7.0 (6.8-7.2) | 6.4 (5.7-7.1) | 10.7 (8.4-12.9) |
| No. of comorbid conditions[b] | 2.1 (2.1-2.1) | 2.5 (2.5-2.5) | 2.3 (2.3-2.3) | 2.7 (2.6-2.7) |

Abbreviation: CHF, congestive heart failure

[a] *P* values test for bivariate association are less than .001 for all comparisons except obesity (primary TKA, $P<.01$), and sex (revision TKA, $P<.002$).

[b] Age and number of comorbid conditions are presented as mean (95% CI) unless otherwise specified.

[c] Sex, race, and comorbidity are presented as % (95% CI). The race category of other includes Asian, Hispanic, North American Native, or other not specified individuals.

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need for post–acute care, and higher readmission rates.

A number of other findings merit mention. Our finding of increased comorbidity over time likely reflects a combination of factors including increasingly aggressive coding practices and increasing prevalence of certain comorbidities (eg, diabetes and obesity).[53,54] The increasing rates of many surgical complications including myocardial infarction, infection, and hemorrhage particularly after revision TKA accompanied by a much smaller increase in mortality is interesting. It seems likely that many of these increases reflect more aggressive testing combined with detection bias resulting from newer more sensitive diagnostic tests (eg, troponin for myocardial infarction or D-dimer for deep vein thrombosis) rather than a true increase in surgical complications.[55] However it is also possible that the incidence of certain complications such as myocardial infarction may be increasing, perhaps as a consequence of a greater burden of obesity and diabetes.

Arguably, the most concerning complication is the increase in readmissions for infection in the revision TKA cohort. While there are well recognized limitations in administrative data for identifying surgical site infections,[56,57] our findings should not be discounted prematurely.[58,59] There are several potential explanations for increasing infection rates in the revision TKA population. One possibility is that the increase in infections represents an increase in revision TKAs being performed specifically to treat infected prostheses. If this were the case, the increase in revision TKA procedures performed would constitute infections that were "present on admission."[60,61] Alternatively, it is possible that the increase in infections represents a real increase in postoperative surgical infections after revision TKA perhaps as a consequence of the increasingly resistant organisms colonizing hospitals. It is also possible that reduced hospital LOS may lead to reduced vigilance for early signs of superficial wound infection in the

**Table 5.** Factors Associated With Increased Odds of Readmission for Primary and Revision Total Knee Arthroplasty (TKA) (2007-2010)

| | OR (95% CI) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Primary TKA | | | | Revision TKA | | | |
| | Model 1 | Model 2 | Model 3 | Model 4 | Model 1 | Model 2 | Model 3 | Model 4 |
| Age, y | | | | | | | | |
| 65-74 | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] |
| 75-84 | 1.5 (1.4-1.5) | 1.4 (1.4-1.5) | 1.4 (1.4-1.5) | 1.4 (1.4-1.4) | 1.2 (1.2-1.3) | 1.2 (1.2-1.3) | 1.2 (1.2-1.3) | 1.2 (1.1-1.2) |
| ≥85 | 2.0 (1.9-2.1) | 1.9 (1.9-2.0) | 1.9 (1.9-2.0) | 1.8 (1.8-1.9) | 1.6 (1.5-1.8) | 1.6 (1.5-1.7) | 1.6 (1.5-1.7) | 1.4 (1.3-1.5) |
| Race | | | | | | | | |
| White | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] |
| Black | 1.4 (1.3-1.4) | 1.3 (1.2-1.3) | 1.3 (1.2-1.3) | 1.2 (1.2-1.3) | 1.3 (1.1-1.4) | 1.2 (1.1-1.3) | 1.2 (1.1-1.3) | 1.1 (1.0-1.2) |
| Other | 1.0 (0.9-1.0) | 1.0 (1.0-1.1) | 1.0 (0.9-1.0) | 0.9 (0.9-1.0) | 1.0 (0.9-1.2) | 1.0 (0.9-1.2) | 1.0 (0.9-1.2) | 0.9 (0.8-1.1) |
| Sex | | | | | | | | |
| Women | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] |
| Men | 1.2 (1.2-1.3) | 1.3 (1.2-1.3) | 1.3 (1.2-1.3) | 1.3 (1.2-1.3) | 1.1 (1.0-1.2) | 1.1 (1.1-1.2) | 1.1 (1.1-1.2) | 1.1 (1.0-1.2) |
| No. of comorbidities | | | | | | | | |
| 0 | | 1 [Reference] | 1 [Reference] | 1 [Reference] | | 1 [Reference] | 1 [Reference] | 1 [Reference] |
| 1-2 | | 1.3 (1.3-1.4) | 1.3 (1.3-1.4) | 1.3 (1.2-1.3) | | 1.2 (1.1-1.4) | 1.2 (1.1-1.4) | 1.2 (1.0-1.3) |
| 3-4 | | 1.9 (1.9-2.0) | 1.9 (1.8-2.0) | 1.8 (1.7-1.8) | | 1.7 (1.5-1.9) | 1.7 (1.5-1.9) | 1.4 (1.3-1.6) |
| >4 | | 2.7 (2.6-2.8) | 2.7 (2.5-2.8) | 2.3 (2.2-2.5) | | 2.3 (2.0-2.6) | 2.3 (2.0-2.6) | 1.8 (1.6-2.1) |
| Teaching status | | | | | | | | |
| Major | | | 1 [Reference] | 1 [Reference] | | | 1 [Reference] | 1 [Reference] |
| Minor | | | 0.9 (0.9-1.0) | 0.9 (0.9-1.0) | | | 0.9 (0.8-0.9) | 0.9 (0.9-1.0) |
| Nonteaching | | | 0.9 (0.9-0.9) | 0.9 (0.9-0.9) | | | 0.8 (0.8-0.9) | 0.9 (0.9-1.0) |
| Hospital volume[a] | | | | | | | | |
| Quartile 1 | | | 1 [Reference] | 1 [Reference] | | | 1 [Reference] | 1 [Reference] |
| Quartile 2 | | | 0.8 (0.8-0.9) | 0.9 (0.8-0.9) | | | 0.9 (0.8-1.1) | 1.0 (0.8-1.1) |
| Quartile 3 | | | 0.8 (0.7-0.8) | 0.8 (0.8-0.9) | | | 0.9 (0.8-1.0) | 1.0 (0.8-1.1) |
| Quartile 4 | | | 0.7 (0.7-0.7) | 0.8 (0.7-0.8) | | | 0.8 (0.7-1.0) | 0.9 (0.8-1.1) |
| Ln (LOS) | | | | 1.9 (1.9-2.0) | | | | 2.1 (2.0-2.2) |
| Year | | | | | | | | |
| 2007 | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] | 1 [Reference] |
| 2008 | 1.0 (1.0-1.0) | 1.0 (1.0-1.0) | 1.0 (1.0-1.0) | 1.0 (1.0-1.0) | 1.0 (1.0-1.1) | 1.0 (1.0-1.1) | 1.0 (1.0-1.1) | 1.1 (1.0-1.1) |
| 2009 | 1.0 (0.9-1.0) | 0.9 (0.9-1.0) | 0.9 (0.9-1.0) | 1.0 (1.0-1.0) | 1.0 (1.0-1.1) | 1.0 (1.0-1.1) | 1.0 (1.0-1.1) | 1.1 (1.0-1.2) |
| 2010 | 1.0 (0.9-1.0) | 1.0 (0.9-1.0) | 1.0 (0.9-1.0) | 1.0 (1.0-1.0) | 1.0 (0.9-1.1) | 1.0 (0.9-1.1) | 1.0 (0.9-1.1) | 1.0 (1.0-1.1) |

Abbreviation: LOS, length of stay; OR, odds ratio
[a] eTable 3 lists hospital volume by quartile (available at http://www.jama.com).


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postoperative period resulting in higher rates of serious infectious complications. In either case, the increase in infection rates associated with revision TKA warrants close attention.

In addition, the increase in primary TKA utilization (99%) has been larger than the increase in revision TKA utilization (51%) over the past 20 years. It is possible that this reflects the durability of modern implants and improved surgical technique resulting in a reduced likelihood that patients undergoing primary TKA will require a revision procedure in the future.[62] Alternatively, it is possible that the rapid increase in primary TKA over the past 20 years will eventually result in a substantial increase in demand for revision TKA procedures as prosthetic devices wear over time, a possibility that would have significant clinical and economic implications.[35]

Our study has a number of limitations. First, our study was limited to fee-for-service Medicare beneficiaries who constitute approximately 60% of the TKA population.[14,31] Our findings should be extrapolated with caution to other populations including younger patients and Medicare managed care enrollees. Second, our study relied upon administrative data and thus we were unable to evaluate a number of important arthroplasty outcomes including functional status and patient satisfaction. Third, we lacked clinical detail and therefore were unable to determine the indications for TKA at the level of the individual patient. Likewise, we lacked chart review data for identification of TKA outcomes and complications. Fourth, we focused our analysis on TKA adverse outcomes resulting in hospital readmission within 30 days of discharge. We were unable to identify complications that did not result in an inpatient admission and our 30-day follow up interval would not capture certain late complications (eg, infection) that may become apparent over a longer time period.[25]

In summary, over the past 20 years, increases in TKA volume have been driven by both an increase in the number of Medicare enrollees and increase in per capita utilization. We also observed decreased hospital LOS that was accompanied by increased hospital readmission rates and rising rates of infections complications.

**Author Contributions:** Dr Cram and Ms Lu had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.
*Study concept and design:* Cram, Lu, Wolf.
*Acquisition of data:* Cram, Lu.
*Analysis and interpretation of data:* Cram, Lu, Kates, Singh, Li, Wolf.
*Drafting of the manuscript:* Cram, Lu, Kates.
*Critical revision of the manuscript for important intellectual content:* Cram, Singh, Li, Wolf.
*Statistical analysis:* Lu.
*Obtained funding:* Cram.
*Administrative, technical, or material support:* Cram, Lu, Singh, Li, Wolf.
*Study supervision:* Cram, Kates, Wolf.
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**Online-Only Material:** eFigures 1-6, eTables 1-3, and the Author Video Interview are available at http://www.jama.com.

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# Obesity and Total Joint Arthroplasty
# A Literature Based Review

A Workgroup of the American Association of Hip and Knee Surgeons (AAHKS) Evidence Based Committee*

*OrthoCarolina Hip and Knee Center, Charlotte, North Carolina*

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ABSTRACT

The prevalence of obesity in the population is unlikely to decline, and is likely to contribute to the increasing demand for hip or knee arthroplasty. Conflicting data exist on the risk and benefits of total joint arthroplasty in obese patients. The purpose of this manuscript is to define and identify areas of concern for obese patients undergoing total joint arthroplasty. A workgroup of total joint arthroplasty surgeons from the American Association of Hip and Knee Surgeons (AAHKS) was tasked with identifying key questions regarding obesity and total joint arthroplasty. The workgroup evaluated the available literature and sought to create a review regarding obesity and total joint arthroplasty to complement and guide the surgeon-patient discussion in addition to identifying areas of future research.

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Obesity has reached epidemic proportions with over 502 million people classified as obese worldwide [1]. In the United States, the age adjusted prevalence of obesity is 32% for men and 36% for women and is now a major health care concern [2]. Flegal et al demonstrated an alarming increase in the prevalence of obesity between 1999 and 2008, with the combined obesity and overweight prevalence of 68.0% [2]. Care for obese is costly to the health care system and may account for as much as 21% of all U.S. medical costs [3].

Both biomechanical and physiological mechanisms are compromised by obesity leading to the development of osteoarthritis [4]. Higher BMI results in elevated articular cartilage loading forces which may eventually cause tissue damage. In addition, adipose tissue releases adipokine, a protein that results in excess cartilage inflammation and degradation [5]. Thus obesity significantly contributes to a higher rate of osteoarthritis and ultimately total joint arthroplasty utilization. The risk of developing knee osteoarthritis is nearly four fold for obese men and five fold for obese women [6]. Individuals with a Body Mass Index (BMI) greater than 40 are 8.5 times more likely to need THA compared to matched non-obese individuals [7]. In 1990, Fehring et al [8] noted that 31% of their total joint arthroplasty patients were obese. In 2005, this proportion had increased to 52.1%. This compared to an overall population prevalence of obesity in the same year of 24%.

The notion that obese patients are at an increased risk for complications following total joint arthroplasty has been pointed out in the literature, but must be examined in context. Obesity risk assessment is compounded by the fact that obesity is rarely an isolated diagnosis, and tends to cluster with other co-morbidities that may independently lead to increased risk such as diabetes mellitus, coronary artery disease, hyperlipidemia, hypertension, and sleep apnea [9]. The majority of the current literature reports an increase in perioperative complications associated with total joint arthroplasty for obese patients. The benefits that total joint arthroplasty affords the obese, namely decreased pain and increased function, must then be balanced against the reported increased risk of perioperative morbidity. That risk/benefit needs to include the assessment of the possibility of timely weight loss as a reliable part of conservative care.

It has been predicted that by the year 2030 the demand for primary hip arthroplasty will exceed 500,000 cases and the demand for primary knee arthroplasty will be nearly 3.5 million cases [10]. Given the prevalence of obesity, a significant percentage of these cases will be in patients outside the normal BMI range. The prevalence of obesity is not likely to decline, and is likely that it will contribute to the increasing demand for hip or knee arthroplasty.

With these issues in mind, the purpose of this manuscript is to define and identify areas of concern for obese patients undergoing

* *Bryan D. Springer, MD, Javad Parvizi, MD, Matt Austin, MD, Henry Backe, MD, Craig Della Valle, MD, David J. Kolessar, MD, Stefan Kreuzer, MD, Rob Malinzak, MD, Bassam Masri, MD, Brian J. McGrory, MD, David Mochel, MD, Adolph Yates, MD.*

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Reprint requests: Bryan D. Springer, MD, OrthoCarolina Hip and Knee Center, 2001 Vail Avenue Suite 200A, Charlotte, NC 28207.

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total joint arthroplasty. A workgroup of total joint arthroplasty surgeons from the American Association of Hip and Knee Surgeons was tasked with identifying key questions regarding obesity and total joint arthroplasty. This is not a literature replete with prospective, randomized studies, nor do the cohort studies available lend themselves to formal meta-analysis. The workgroup evaluated the available literature and sought to create a review regarding obesity and total joint arthroplasty to complement and guide the surgeon-patient discussion in addition to identifying areas of future research.

## Methods

A workgroup of twelve surgeons was convened to identify issues related to total joint arthroplasty in obese patients. Each physician is an active member of the American Association of Hip and Knee Surgeons (AAHKS) including members of the Evidence Based Medicine (EBM) committee.

Four key areas of concern regarding obesity and total joint arthroplasty were developed. Each question was assigned to three members of the group. Each subgroup then evaluated the current literature with regards to the proposed questions and formulated a general consensus on the particular topic. Each topic was then circulated among the entire group for changes and/or additions to reach a final consensus among the group and formulate a single manuscript.

The four core areas that were addressed by the workgroup included:

1. A. What is the current definition and classification of obesity, and B. What impact does obesity have on the development of osteoarthritis and need for total joint arthroplasty?
2. Are perioperative medical and surgical complications increased following total joint arthroplasty in obese patients?
3. What are patient related outcomes following total joint arthroplasty in obese patients?
4. Can a threshold be determined for obese patients (BMI or other metrics) beyond which complications for obese patients are unacceptable and should preclude the utilization of total joint arthroplasty?

## Findings of the Workgroup

1. A. What is the current definition and classification of obesity?

Body mass index (BMI) is commonly used to determine the classification of adults into the categories of underweight, normal, and overweight. BMI is calculated according to height and weight of the individual utilizing the formula:

$$\text{BMI} = \text{weight(kg)}/\text{height}^2\left(m^2\right) \text{ or BMI} = \left[\text{weight(pounds)}/\text{height}^2\left(\text{inches}^2\right)\right]x703$$

Several criticisms of using BMI as a measure of obesity include the fact that it does not distinguish between weight associated with muscle versus weight associated with adipose tissue. In addition, it does not take into account the distribution of adiposity, nor does it allow for differences across populations and genders. It is, however, widely accepted as a measure of obesity due to the ease of data collection for large cohorts.

The World Health Organization (WHO) published on the global epidemic of obesity in 2000 [9]. The WHO classification of obesity is noted in Table 1. Class III obesity has been further categorized into the terms "Morbidly-Obese" and "Super-Obese" in the bariatric surgery literature [11]. Morbid obesity is defined as a BMI of 40.00–49.99 kg/m$^2$ and super obesity is defined as a BMI of ≥50.00 kg/m$^2$.

**Table 1**
World Health Organization Classification of Obesity [9].

| Classification | BMI (kg/m$^2$) | Risk of Comorbidities |
|---|---|---|
| Underweight | <18.50 | Low (but risk of other clinical problems increased) |
| Normal range | 18.50–24.99 | Average |
| Overweight: | ≥25.00 | |
| Preobese | 25.00–29.99 | Increased |
| Obese class I | 30.00–34.99 | Moderate |
| Obese class II | 35.00–39.99 | Severe |
| Obese class III | ≥40.00 | Very severe |

1 B. What is the impact that obesity has on the development of osteoarthritis and need for total joint arthroplasty?

The question of whether obesity is related to the development of osteoarthritis (OA) is complicated by the confounding fact that BMI is a reflection of overall weight rather than fat distribution. It may be weight alone, rather than fat composition that predisposes an individual to OA [12]. The variability of study designs in obesity/OA literature makes meta-analysis difficult. The methods of studies examining the correlation between obesity and OA have varied in their definitions of obesity as well as selecting cohorts for comparison (i.e. some studies compare the highest and lowest quintiles while others use groups based on BMI). The measured endpoints also differ between studies, with some reporting radiographic findings and some reporting arthroplasty as the endpoint. Obesity (BMI ≥30) has been strongly associated with the development of knee OA but not hip OA in several studies [13–15]. Some have reported a significant link between obesity and the development of osteoarthritis in both hip and knee OA, although the strength of association was stronger in knees as compared to hips [16,17].

Despite differences in definitions and study designs, some clear patterns have emerged from the published literature. The link between obesity and the risk of knee osteoarthritis was classically demonstrated by the Framingham Study group [18]. This study, published in 1988, predated the WHO obesity classification. The study design assessed the relative risk of OA among the heaviest quintile of weight with the lightest 3 quintiles, as measured at a baseline examination. The cohort was followed for 18 biennial examinations and knee radiographs were obtained at the 18th examination. The age-adjusted relative risk of men in the heaviest quintile was 1.51 (95% Confidence Interval (CI), 1.14–1.98). The age-adjusted relative risk of women in the heaviest quintile was stronger, 2.07 (95% CI 1.67–2.55).

A population based case–control study demonstrated that relative to a BMI of 20–24.9 kg/m$^2$, the risk of knee OA was 0.1% (95% CI 0–0.5) for a BMI <20 kg/m$^2$, increasing to 13.6 (95% CI 5.1–36.2) for a BMI of ≥36 kg/m$^2$ [19]. Similar data from longitudinal population studies exist in studies from Norway [13] and Sweden [16].

Given the higher incidence of OA in the obese, it is not unexpected that a correlation between obesity and the need for hip or knee arthroplasty exists as well [17,19–21]. The relative risk of women with a BMI ≥30 kg/m$^2$ requiring arthroplasty compared to women <22.5 kg/m$^2$ is greater for knee (10.51 (95% CI 9.52–11.62)) than for hip (2.47 (95% CI 2.25–2.71)) [20]. A study of male construction workers noted that BMI is a predictor of OA, even within a normal BMI range [21]. The relative risk of hip arthroplasty was more than double for patients with a BMI of 20–24 kg/m$^2$ as compared to patients with a BMI of 17–19 kg/m$^2$. An increase of BMI of 5 kg/m$^2$ nearly doubled the risk of knee arthroplasty. The age at which arthroplasty is performed may also be affected by BMI. Patients with a BMI ≥35 kg/m$^2$ may require arthroplasty 7 years earlier, on average, as compared to patients with a BMI ≤25 kg/m$^2$ [22].

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2. Are perioperative medical/surgical complications increased following total joint arthroplasty in the obese patient?

*Wound Healing/Infection*

Wound healing complications and infection, particularly deep infection, are among the most concerning complications for surgeons and patients alike. A deep infection may ultimately lead to resection or removal of the prosthesis, joint fusion, or amputation, and almost always requires reoperation. There is a clear increase in wound healing complications and deep infection in reports examining joint replacement surgery in the obese. In a single-center analysis of 7181 primary hip and knee arthroplasties for osteoarthritis, Jamsen and colleagues [23] demonstrated that the infection rate increased from 0.37% in patients with a normal body mass index to 4.66% in the morbidly obese group. Furthermore, Malinzak et al showed that in both hip and knee patients a BMI greater than 50 increased the odds ratio of infection to 21.3 [24].

In a study of 60 patients with an average BMI of 39.9, Nunez and co-workers [25] demonstrated almost twice the risk (11.6% vs. 6.6%) of in hospital wound problems as well as three times the rate of deep infections after total knee arthroplasty compared to controls (5.0% vs. 1.6%). Ersozlu et al confirmed that superficial infections were more common in morbidly obese and obese patients undergoing TKA [26].

In regard to total hip arthroplasty Lubbeke and colleagues have shown a dramatic risk of deep infection for obese women with BMI greater than 30 [27]. This group of patients had a 16.1 rate ratio for deep infection compared with non-obese women undergoing THA. Bozic et al further demonstrated that obesity is an independent predictor of periprosthetic infection in a large cohort of Medicare patients undergoing THA [28]. Namba et al reviewed 1071 THA surgeries and demonstrated that obesity was associated with a higher infection rate [29].

*Respiratory Complications*

There is no question that there is an association between obesity and obstructive sleep apnea (OSA) [5,30]. Sixty to 90% of OSA patients are obese, with indices of obesity such as BMI strongly and directly related to the severity of the OSA [31]. Obstructive sleep apnea is associated with general risks to a patient's health including cardiac disease, hypertension, and the risk of sudden death after surgery due to oversedation. In a study by Gupta et al [32], the authors noted that total joint surgery patients with OSA had a 39% risk of complications compared to 18% in the patients without OSA. Serious complications occurred in 24% of the patients with OSA compared with only 9% in the patients without OSA. In addition to sleep apnea, there might be higher risk in the obese patient for developing thrombosis and potentially a pulmonary embolism.

*Thromboembolic Disease*

Thromboembolic disease has been a major concern for orthopaedic patients for decades, and prevalence has been shown to increase with patient immobilization and surgical trauma [33]. Obese total joint patients often are slower to mobilize and usually require more invasive surgical exposure. Altintas et al demonstrated in their analysis that the most common risk factors for venous thromboembolism (VTE) in orthopaedic patients are obesity and prolonged immobilization [34]. Furthermore, obesity, history of deep vein thrombosis (DVT), delayed post-operative ambulation, and female sex were considered risk factors for VTE as determined by White et al [35]. Multiple reports identify obese patients as being at elevated risk for thromboembolic disease (TED) in the post-operative period [36–38]. The recent AAOS network meta-analysis regarding VTE, however, did not identify any risk factor other than previous thrombotic event as raising the risk higher than the already higher risk that undergoing joint arthroplasty already entails.

*Complications Specific to Total Joint Arthroplasty*

*Revision Surgery*

Chee and colleagues [39] compared 55 consecutive total hip arthroplasties (THA) performed on 53 morbidly obese patients with osteoarthritis with a matched group of 55 total hip arthroplasties in 53 non-obese patients, and followed them prospectively for five years. Survival at five years using revision surgery as an endpoint, was 90.9% for the morbidly obese and 100% for the non-obese patients. This was due to a higher rate of complications (22% vs. 5%, $P=0.012$) in the morbidly obese group, which included dislocation and both superficial and deep infection.

Spicer et al, evaluated the clinical and radiographic outcome of total knee arthroplasty (TKA) in 326 TKAs with BMI >30 and compared them to a matched group of 425 TKAs with BMI <30 [40]. There was no appreciable difference in the ten year survivorship and functional improvement appeared to be independent of BMI, but a subgroup of patients with BMI greater than 40 had a 5 fold increase in the rate of focal osteolysis on radiographs. Morbidly obese patients were found to be at higher risk of revision. Bordini et al, studied a population of subjects treated with cemented total knee arthroplasty between 2000 and 2005 [41]. A total of 9735 knee prostheses were implanted in 8892 patients; 18.9% of the patients were normal weight (BMI<25), 48.2% were overweight (25>Body Mass Index≤30), 31.1% were obese (30>BMI≤40), and 1.8% were morbidly obese (BMI>40). Mean and range of follow-up were respectively 3.1 and 1.5–6 years. While revision rates and complications were not statistically different among the groups, all showed higher trends in the morbidly obese groups. Foran et al demonstrated a statistically significant difference in survival, revision rates and complications in 78 TKA done in obese and morbidly obese patients when they were age matched to a group of nonobese patients [42]. In addition, they were able to demonstrate that these rates increased in the morbidly obese group (BMI >40) compared to nonobese.

*Component Malposition*

As technology has advanced and surgical technique has been enhanced, larger patients still pose significant surgical dilemmas for exposure and component positioning. Investigators at the Harris Laboratory [43] used postoperative radiographs on 2061 consecutive patients who received a THA or hip resurfacing from 2004 to 2008 to determine factors that correlated with malpositioned acetabular components. There was an increased risk of malpositioning for minimally invasive surgical approach, low volume surgeons, and obese patients. Jarvenpaa et al stratified patients as obese (BMI >30) and nonobese (BMI <30) for 100 patients undergoing total knee arthroplasty [44]. They found a statistically significant difference in post operative complications in the obese group compared to non-obese group. Technical errors were noted in 17 of the obese patients compared to 5 in the non-obese group ($P<0.007$). Ritter et al demonstrated that excessive varus or valgus alignment was detrimental to TKA survival, and that failures due to malalignment were increased with abnormal BMI [45].

*Prosthesis Loosening*

Clinical and radiographic success of total joint arthroplasty is also not as robust in obese patients. Aseptic acetabular failure has been shown to be related to obesity [46], and a pooled analysis demonstrated that aseptic loosening was increased in obese patients undergoing primary THA [47].

Amin et al, compared a group of 41 morbidly obese patients (BMI >40) to a matched cohort of 41 non-obese patients (BMI <30) undergoing total knee arthroplasty [48]. At less than four years after

operation, the morbidly obese had a higher incidence of radiolucent lines on post-operative radiographs (29% and 7%, respectively, $P=0.02$), a higher rate of complications (32% and 0%, respectively, $P=0.001$) including superficial and deep infections, and inferior survivorship using revision and pain as end-points (72.3% and 97.6%, respectively, $P=0.02$). Other authors have also noted a trend for obesity to influence the rate of aseptic loosening [49] and long term survival [42]. Ritter et al demonstrated that TKA survival was related to obesity, with greater obesity associated with increased failure and loosening [45].

*THA Dislocation*

Of the potential complications associated with THA, obese patients have higher dislocation rates. Lubbeke et al studied the gender differences in outcomes of obesity following total hip arthroplasty [27]. Of the 2,186 patients that underwent primary THA, 23.6% were in obese patients. Obese was defined as BMI >30 and was not stratified beyond this. The incidence rate of dislocation was 2.3× higher in the obese than non-obese and obese women were at the highest risk (rate ratio 3.0). Grant et al evaluated 255 males in a VA population undergoing primary THA and demonstrated an increased risk of dislocation in the morbidly obese group (BMI >40) compared to the obese and non-obese group (BMI >30) [50]. A pooled analysis demonstrated that dislocation was increased in obese patients undergoing primary THA [47]. Lastly, Davis et al recently showed a 4.42 times higher dislocation rate in THA patients with a BMI of greater than 35, compared with those with a BMI of less than 25 [51].

*Cost and Length of Stay*

Although not typically thought of as a complication, cost and length of stay (LOS) have to be considered in an era of relative health care fiscal contraction. These measures are sometimes a surrogate for "quality". In our current health care environment "zero-tolerance" is being invoked as policy for post-operative complications and surrogates for quality are derived from insensitive but easily retrieved parameters. An analysis of LOS, cost, and readmission rates is salient when considering surgery in the obese population.

Obesity has been implicated in increased length of stay for both hip and knee arthroplasty [52]. The relationship of body weight to increased length of stay and increased charges for hospital services for obese patients undergoing elective surgery has been well documented [52]. This is particularly an issue for the so-called "super-obese," those patients with a BMI greater than 45 [53]. In this grouping of patients with a BMI greater than 45, in house complications were 8.44 times more likely than non-obese patients, and the risk of in-hospital complications, complications within 1 year, readmission, and length of stay all increased measurably for each 5 unit increase in BMI. This relationship of increased cost and length of stay has also been demonstrated for total knee patients in the rehabilitation setting with a BMI greater than 30 [54].

*Association of Obesity and Outcomes Following Total Hip and Knee Arthroplasty*

The goal of Total Joint Arthroplasty (TJA) is to improve the physical function and quality of life in individuals with symptomatic osteoarthritis while minimizing the adverse effects and treatment risks to patients. Understanding the effect that factors such as obesity can have on the functional outcomes of surgery provides better probability of positive prognostic performance and reducing costs of clinical care [55].

*Total Knee Arthroplasty*

Many investigations have been conducted to develop a better insight into the adverse effects of obesity on both short-term and long-term outcomes of TKA [4,49,56–58]. This understanding provides surgeons and health care providers with more optimal post-operative rehabilitation guidelines and may help with lowering overall cost. In addition, patients are provided more realistic expectations about the outcomes of surgery which prepares them to overcome difficulties during post-op recovery [57].

Although previous studies have reported conflicting results regarding the association of obesity and the outcome of TKA, the reduction of excess BMI has been consistently recommended, especially in morbidly obese individuals [59]. Some studies indicate that obese individuals experience lower quality of life and performance after TKA [48,59–61] and significantly higher risk of post-op infections [29,56,62–64]. Stickles et al investigated the effect of obesity on 1011 primary TKA patients and concluded that the performance of the obese individuals quantified by Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and the Short Form-36 (SF-36) was significantly lower. Additionally, the 1-year follow up indicated that higher BMI negatively affected the ascending and descending capabilities in these individuals [61]. Smith et al used Hospital for Special Surgery (HSS) questionnaires to investigate the effects of obesity and concluded that TKA outcome was altered as depicted by lower HSS scores in obese individuals [65]. In a more recent study, HSS scores were used to assess the performance of 535 patients who underwent TKA. Results indicated significantly lower HSS scores in obese individuals compared to the peer-matched non-obese patients [66]. In 2012 Collins et al reported on 445 consecutive primary TKAs prospectively followed up to nine years. Clinical outcomes of non-obese (BMI <30) were compared to obese (BMI >30) patients. Significant improvements in outcome were seen and sustained in all groups nine years after TKA. However, lower function scores were seen at all follow-up periods prior to nine years in the highly obese subset group with BMI >35. No significant difference was found in revision or implant survival between obese and non-obese patients nine years after TKA [67].

There are, however, other investigations reporting contradictory findings with no significant differences observed between obese and non-obese individuals in regard to the outcome of TKA [42,49,68,69]. In addition Singh et al indicated that no significant association was detected between the perceived pain outcomes and patients BMI in a 2-year and 5-year primary TKA follow-up [57]. In an even more recent study, the British National Joint Registry assessed patient-reported outcome measures relating to TKA in 13,673 patients who fulfilled criteria for analysis. Preoperative and postoperative assessments using the Oxford Knee Score and general health EuroQol 5D questionnaires were carried out. The improvements in patient-reported outcome measures experienced by patients were similar, irrespective of BMI, although wound complications were significantly higher ($P<0.001$) at a rate of 17% in patients with BMI between 40 and 60 [70].

Despite contradictory findings, the aforementioned studies indicate the beneficial effects of TKA on the improvement of performance and quality of life. Investigations on the satisfaction level after TKA indicated no significant differences between obese and non-obese individuals [26,68,71,72]. Therefore TKA may be considered as the primary treatment for severe knee osteoarthritis in obese patients [58]. Expectations are for a steady, but slower improvement in the severe obese compared to non-obese patients post operatively [73]. There does appear to be a functional "glass ceiling" in obese patients, based on their co-morbid state rather than their joint arthroplasty [40,42].

*Total Hip Arthroplasty*

Increase in BMI has shown significant increase in the rate of THA utilization. Individuals with Class III obesity are 8.5 times more likely to need THA compared to matched non-obese individuals [7]. Stickles et al investigated the quality of life and performance of 592 patients

who underwent primary THA and concluded that WOMAC and SF-36 scores were significantly lower in obese individuals (WOMAC of 48.4 for nonobese vs. WOMAC of 39.9 for obese). They observed, however, no significant effect of obesity on the surgery satisfaction and pre to post-op physical and mental status changes, and concluded that higher BMI was not significantly associated with worse outcomes of THA in obese patients [61].

Additionally, Michalka et al have not reported significant differences in the short term outcome of THA in 191 patients (57 obese patients). They only reported that obese individuals had poorer performance in the 6 minute walk test (6MWT). It was argued that the 6MWT could not be conducted prior to the operation due to severe pain in the patients. Therefore no comparison could be made between the two groups with regards to overall improvement in this test. McCalden et al have also investigated 3290 THAs and reported similar outcome suggesting that obese patients enjoyed similar improvements in performance assessed by WOMAC, Harris hip score, and Short-form 12 in a 2-year follow-up study [74].

4. Can a threshold be determined for obese patients (BMI or other metrics) beyond which complications for obese patients are unacceptable and should preclude the utilization of total joint arthroplasty?

The current literature on obesity and its impact on total joint arthroplasty was reviewed. A short synopsis of relevant published articles on obesity and total joint arthroplasty is included in the appendix. Below is a summation of those articles. Given the body of work already presented, an attempt was made to determine if a threshold of Body Mass Index could be established, above which complications associated with total joint arthroplasty are unacceptably high.

There are several issues with the current literature that must be taken into consideration when trying to answer this question. Many of the current studies contain only small numbers of patients, particularly when evaluating patients with higher BMI and comparing them to a larger cohort of nonobese patients. Therefore, many studies are underpowered to be able to show a true difference in outcomes, complications or revision rates. The majority of studies do not stratify patients based on BMI. Most studies classify obesity as a dichotomous variable of obese (BMI >30) and nonobese (BMI ≤30).

In addition, and perhaps most importantly, the majority of studies do not further sub classify patients with associated comorbidities. It is well established that obese patients have an increased prevalence of associated conditions, such as diabetes, hypertension, cardiac disease, obstructive sleep apnea and malnutrition. Many of these comorbidities have been shown to be independent risk factors for the development of periprosthetic joint infection and perioperative complications.

Several recent studies published in 2012 have looked at threshold for BMI and associated complications following total joint arthroplasty and bear mentioning here. Schwarzkopf et al [53] evaluated the outcomes of "super-obese" patients undergoing total joint arthroplasty. This retrospective study determined that Super-obese patients had an odds ratio (OR) of 8.44 for developing inhospital complications. Most importantly, each incremental 5-U increase in BMI above 45 was associated with an increased risk of inhospital (OR, 1.69) and outpatient complications (OR, 2.71), and readmission (OR, 2.0). Length of stay was increased by 13.8% for each 5-U increase in BMI above 45. In addition, Kamath et al [75] determined that BMI >35 was an independent risk factor for unplanned admission to the intensive care unit following elective total hip arthroplasty.

Jamsen et al [23], determined in a multivariate analysis, morbid obesity (BMI >40) was an independent risk factor for the development deep periprosthetic infection. In addition, diabetes nearly doubled the risk for development of deep periprosthetic infection, and this effect was highest in the morbidly obese, diabetic group. Namba, et al [76], evaluated risk factors associated with surgical site infection in 30,491 total hip arthroplasties performed between 2001 and 2009. In a multivariate analysis, Body mass index >35 was associated with a 2.37× increased risk for development of surgical site infection.

**Critical Findings**

- Despite improvements in patient related outcome measures, all obese patients (BMI >30) undergoing total joint arthroplasty are at increased risk for perioperative complications and this needs to be discussed with every patients prior to considering total joint arthroplasty.
- For total knee arthroplasty, based on the current literature, it appears that the morbidly obese patients, defined as a BMI ≥40, are the threshold for which the majority of perioperative complications, including infection and revision rates appear to increase considerably. This needs to be discussed with every patient prior to surgery and strong consideration should be given to reducing weight (BMI <40) and minimizing associated comorbidities.
- The data for total hip arthroplasty appear to be less clear. There are fewer studies that report on obesity and total hip arthroplasty, and there is much less consensus on a threshold above which complications increase. It would seem reasonable to extrapolate data from the total knee arthroplasty group, and recommend that patients with a BMI >40 be counseled regarding weight loss prior to surgery, but a strong recommendation cannot be made.

Further studies are needed to subclassify obese patients to truly determine if a threshold exists. These studies must also take into consideration associated co-morbidities, with a critical question of: Does alteration of these associated comorbidities (diabetes, hypertension, hypercholesterolemia), in spite of obesity, improve outcomes and lower perioperative morbidity?

**Conclusions of the Work Group**

- Obesity as classified by World Health Organization, defined as BMI >30, has limitations regarding adipose tissue distribution, but remains the most useful and widely used classification system.
- There is clear evidence to suggest that obesity is associated with the development osteoarthritis in the knee, but evidence in the hip is less clear.
- Due to the association of obesity with the development of osteoarthritis, the obese population will be at greater risk for total joint arthroplasty and comprise an ever increasing segment of total joint arthroplasty population.
- Obesity has a strong association with other comorbid conditions that place these patients at increasing risk for perioperative complications following total joint arthroplasty. In addition to obesity alone, it is important that these modifiable comorbid conditions be managed appropriately prior to surgical intervention.
- The degree of functional improvement following total joint arthroplasty in the obese population remains controversial. It appears that obese patients have similar satisfaction rates as the nonobese population following total joint arthroplasty. As BMI increases (>40), however, the functional improvement becomes less and/or occurs more gradually and must be tempered with the associated increased complication profile.
- All obese patients (BMI >30) appear to be at risk for increasing perioperative complications following total joint arthroplasty. This becomes especially relevant as the number of associated comorbidities increases and their control less well regulated.

- The morbidly obese (BMI >40) and the super obese (BMI >50) have complication profiles that may outweigh the functional benefits of total joint arthroplasty. These patients should be counseled regarding these risks prior to any surgical intervention. It is our consensus opinion that consideration should be given to delaying total joint arthroplasty in a patient with a BMI >40, especially when associated with other comorbid conditions, such as poorly controlled diabetes or malnutrition.

This recommendation is tempered by the realization that there will be patients for whom all available means of weight loss have failed; there will also be patients for whom surgery is unavoidable due to truly crippling arthritis, fracture, and/or certain tumors. There should be full disclosure to such patients of the added risk and possibly diminished long term outcomes if surgery is considered.

Further Level I and Level II research is needed to adequately evaluate the impact that obesity has on total joint arthroplasty. In addition, it is important to determine if safe weight loss prior to total joint arthroplasty alters the outcomes of obese patients. It is the intention of this committee to continue to monitor the literature and periodically revisit and update the information provided.

**Acknowledgment**

The authors would like to thank Dr Mohammad Rasouli and Mitchell Maltenfort, PhD from the Rothman Institute and Amir Pourmoghaddam, PhD of Memorial Bone & Joint Research Foundation for their work and contribution to this publication.

**Appendix A. Appendix of Authors:**

The writing committee's affiliations are as follows: OrthoCarolina Hip and Knee Center, 2001 Vail Avenue Suite 200-A, Charlotte, NC 28207 (*B.D.S.*, Bryan.springer@orthocarolina.com); Rothman Institute, 925 Chestnut St., Philadelphia, PA 19107 (*J.P., M.A.*); Orthopedic Specialty Group, 75 Kings Highway Cutoff Suite, Fairfield, CT 06824 (*H.B.*); Midwest Orthopedics at Rush, 1611 W Harrison St., Chicago, IL 60612 (*C.D.V.*); Geisinger Orthopedic Institute, 1175 East Mountain Blvd., Wilkes-Barre, PA 18702 (*D.J.K.*); Memorial Bone and Joint Clinic, 1140 Business Center Dr., Ste 101, Houston, TX 77043 (*S.K.*); Franciscan Physician Network Joint Replacement Surgeons, 5255 E Stop 11 Rd., Ste. 300, Indianapolis, IN 46237 (*R.M.*); Vancouver General Hospital, 2775 Laurel St., 3rd Flr., Vancouver, BC V5Z1M9 (*B.M.*); Maine Medical Partners Orthopedics, 5 Bucknam Rd., Ste. 1D, Falmouth, ME 04105 (*B.J.M.*); OAD Orthopedics, 7 Blanchard Cir Ste 101, Wheaton, IL 6189 (*D.M.*); University of Pittsburgh Physical ORS, 3471 5th Ave, Pittsburgh, PA 15213 (Adolph Yates, MD).

**Appendix B. Appendix of Referenced Studies for Question #4: Obesity and Total Joint Arthroplasty:**

In 1993, Jiganti et al compared perioperative outcomes between obese and non-obese patients undergoing total joint arthroplasty [77]. Obesity was defined as >20% above ideal weight for height based on life insurance tables from 1983. Body Mass Index was not calculated and the non-obese group had more preoperative co-morbidities. The authors found no associated increase in perioperative complications for the obese patients.

Malinzak et al, demonstrated that obesity, diabetes and younger age were all risk factors for the development of deep periprosthetic infection following total joint arthroplasty [24]. Patients with BMI greater than 40 had a 3.2 times odds of infection and patients with BMI >50, a 18.3 times odds of infection compared to patients with BMI <40.

Namba et al demonstrated a 6.7× higher risk of infection for obese patients (BMI >30) undergoing primary TKA and 4.2× higher infection risk for obese patients undergoing primary THA compared to a nonobese cohort [29]. In addition, the obese patient population was found to have a higher rate of diabetes and hypertension.

*Obesity and Total Knee Arthroplasty*

A literature review by Samson et al, evaluated total knee arthroplasty in patients with morbid obesity (BMI >40) [78]. Eight comparative studies were reviewed and while there were overall improvements in outcome measures following total knee arthroplasty, the morbidly obese groups, all studies reported a greater prevalence of complication (10–30%), including a significantly higher prevalence of deep periprosthetic infection(3–9×) and wound complications.

Spicer et al, evaluated the clinical and radiographic outcome of total knee arthroplasty in 326 TKAs with BMI >30 and compared them to a matched group of 425 TKAs with BMI <30 [40]. There was no appreciable difference in the ten year survivorship and functional improvement appeared to be independent of BMI, a subgroup of patients with BMI >40, had 5× the rate of focal osteolysis on radiographs however.

Nunez evaluated quality of life outcomes in a stratified group of severely obese (BMI >35) and morbidly obese (>40) compared to a group of patients with BMI <35 undergoing total knee arthroplasty [26]. There were no differences in the health related quality of life outcomes between all groups. The study group (obese) however had more severe post-operative complications compared to the control group. These results were not stratified by BMI however.

Dewan et al evaluated 169 TKA stratified by BMI into 3 groups (<30 (85 patients), 30–39 (94 patients), >40 (41 patients) [60]. Success, complications and revisions were similar across all groups. The patients with BMI >40 however were 5.4× more likely to have patellofemoral radiolucencies, have quadriceps and hamstring weakness and have patellofemoral problems.

Bordini et al, studied a population of subjects treated with cemented total knee arthroplasty between 2000 and 2005 [41]. A total of 9735 knee prostheses were implanted in 8892 patients; 18.9% of the patients were normal weight (BMI <25), 48.2% were overweight (25>Body Mass Index≤30), 31.1% were obese (30>BMI≤40), and 1.8% were morbidly obese (BMI >40). Mean and range of follow-up were respectively 3.1 and 1.5–6 years. Implant failure was defined as the exchange of at least one component for whatever reason. While revision rates and complications were not statistically different among the groups, all showed higher trends in the morbidly obese groups. In addition, the small number of patient in the morbidly obese group (172) compared to the rest, should caution one's interpretation of these data.

Jarvenpaa et al stratified patients as obese (BMI >30) and nonobese (BMI <30) for 100 patients undergoing total knee arthroplasty [44]. They found a statistically significant difference in post operative complications in the obese group compared to nonobese group. In addition, technical errors were noted in 17 of the obese patients compared to 5 in the non-obese group ($P<0.007$).

Patel et al, evaluated 527 patients that underwent primary total knee arthroplasty [79]. Patients were stratified by BMI (<25, 25–29, 30–34, >35). BMI ranged from 16 to 50, with an average of 29. The authors concluded that BMI did not show any correlation with post op complications, however the data clearly shows a trend towards an increase in complication as the patients BMI increased.

Foran et al demonstrated a statistically significant difference in survival, revision rates and complications in 78 TKA done in obese and morbidly obese patients when they were age matched to a group of nonobese patients [42]. In addition, they were able to demonstrate that these rates increased in the morbidly obese group (BMI >40) compared to nonobese.

Amin et al, compared a group of 41 morbidly obese patients (BMI >40) to a matched cohort of 41 nonobese patients (BMI <30) undergoing total knee arthroplasty [48]. At less than four years after operation, the results were worse in the morbidly obese group compared with the non-obese, as demonstrated by inferior Knee

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Society Scores (mean knee score 85.7 and 90.5 respectively, $P=0.08$; mean function score 75.6 and 83.4, $P=0.01$), a higher incidence of radiolucent lines on post-operative radiographs (29% and 7%, respectively, $P=0.02$), a higher rate of complications (32% and 0%, respectively, $P=0.001$) including superficial and deep infections and inferior survivorship using revision and pain as end-points (72.3% and 97.6%, respectively, $P=0.02$).

Although Krushell et al state, that based on their results of 39 TKA in morbidly obese group (BMI >40), that total knee arthroplasty should continue to be offered as a treatment option, their study demonstrates a significantly higher rate of wound complications in the morbidly obese cohort [80]. In addition, overall patient's satisfaction scores were lower and radiographic review showed a trend toward higher incidence of radiolucent lines in the morbidly obese group.

*Obesity and Total Hip Arthroplasty*

Grant et al evaluated 255 males in a VA population undergoing primary THA and demonstrated an increased risk of dislocation and infection in the morbidly obese group (BMI >40) compared to the obese and nonobese group (BMI >30) [50].

Michalka et al stratified patients undergoing primary THA by BMI into nonobese (BMI <30), Obese (BMI 30–34) and morbidly obese (BMI >35) [81]. In 191 THAs, the authors were unable to identify any significant increase in complications in the obese or morbidly obese group. In addition all outcome measures and quality of life measure were equivalent. It should be noted however that there were only 21 patients in the morbidly obese group, question whether there was enough power in the study to determine a true difference.

Lubbeke et al studied the gender differences in outcomes of obesity following total hip arthroplasty [27]. Of the 2,186 patients that underwent primary THA, 23.6% were in obese patients. Obese was defined as BMI >30 and was not stratified beyond this. The obese group was younger and had a higher ASA scores. The incidence rate for infection was 4.7× higher in the obese group compared to non-obese, and was 16.1× higher in obese women. The incidence rate of dislocation was 2.3× higher in the obese than non-obese and obese women were at the highest risk (rate ratio 3.0).

Ibrahim et al found no statistically significant difference in complications, outcomes, or revision surgery in primary total hip arthroplasty when comparing 179 THAs in patients with BMI average of 22.5 to an obese group of 164 THAs with an average BMI of 33.3 [82]. It should be noted that there were no patients with a BMI >40 in the study.

McLaughlin et al stated that based on their analysis of THA in both obese and nonobese patients, THA should not be with held in the obese patient based solely on BMI [83]. They found no statistical difference in outcomes or revision rates comparing 109 nonobese patients to 100 obese patients. An interesting finding in this study was the high failure rate of the acetabular component at an average of 14 year follow up in both the obese (57%) on nonobese group (66%). Also of note, only 6 patients had BMI >35.

A recent meta-analysis evaluated outcomes and complications in 15 studies of primary THA in obese patients [47]. A pooled analysis demonstrated that dislocation, infection, aseptic loosening and venous thromboembolism were all increased in obese patients undergoing primary THA. Obese patients (BMI >30) were not further stratified.

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# STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

*Office of Health Care Access*

November 8, 2013

Barbara A. Durdy
Director, Strategic Planning
Hartford HealthCare Corporation
181 Patricia Genova Drive
Newington, CT 06111

Re: Certificate of Need Application, Docket Number 13-31851-CON
Hartford Hospital, Constitution Surgery Centers, LLC and Affiliated Physicians, collectively to be known as HHC Hartford Surgery Center, LLC
Establishment of an Ambulatory Surgery Center, to be located on the Campus of Hartford Hospital

Dear Ms. Durdy:

On October 11, 2013, the Office of Health Care Access ("OHCA") received completeness responses to the Certificate of Need ("CON") application of Hartford Hospital ("Hospital"), Constitution Surgery Centers, LLC ("CSC") and Affiliated Physicians' formed HHC Hartford Surgery Center, LLC ("New LLC") (collectively known as "Applicants") to establish an ambulatory surgery center ("ASC") on the campus of Hartford Hospital, at a total capital expenditure of $6,500,000.

OHCA has reviewed the responses and requests the following additional information pursuant to General Statutes §19a-639a(c).

1. Please explain why the "% Utilization" for projected FY2016 increases to 83% percent, considering the number of cases decreased between FY2015 and FY2016.

Pursuant to Section 19a-639a(c) of the Connecticut General Statutes, you must submit your response to this request for additional information not later than sixty days after the date that this request was transmitted. Therefore, please provide your written responses to OHCA no later than January 7, 2014, otherwise your application will be automatically considered withdrawn.

If you have any questions concerning this letter, please feel free to contact me at OHCA at (860) 418-7012.

Sincerely,

Steven Lazarus
Associate Health Care Analyst

**********
*** TX REPORT ***
**********

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STATE OF CONNECTICUT
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*OFFICE OF HEALTH CARE ACCESS*

**FAX SHEET**

**TO:** BARBARA DURDY

**FAX:** (860) 972-4650

**AGENCY:**

**FROM:** STEVEN LAZARUS

**DATE:** 11/8/13 **Time:**

**NUMBER OF PAGES:** 3
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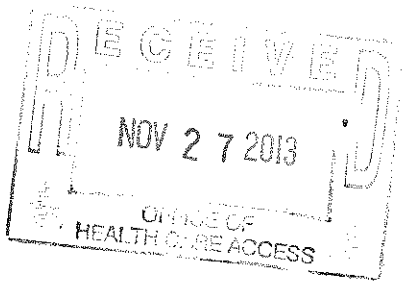
**Comments:** Please see the attached copy of the second Completeness Letter for DN: 13-31851-CON

*PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.*

SHIPMAN & GOODWIN LLP®
COUNSELORS AT LAW

Joan W. Feldman
Phone: 860-251-5104
Fax: 860-251-5211
jfeldman@goodwin.com

November 27, 2013




Steven Lazarus
Associate Health Care Analyst
Department of Public Health
Office of Health Care Access
410 Capitol Avenue, MS#13HCA
P.O. Box 340308
Hartford, CT 06134-0308

**RE: HHC Hartford Surgery Center, LLC**
**Completeness Letter Responses; Docket Number 13-31851-CON**

Dear Mr. Lazarus:

On behalf of HHC Hartford Surgery Center, LLC (the "Applicant"), enclosed please find the original and 3 hard copies of the Applicant's responses to your Certificate of Need Completeness Letter dated November 8, 2013. As requested, I have also included a CD with a scanned copy of the Applicant's entire response, and electronic versions of any Microsoft Word or Excel documents, as applicable.

Please do not hesitate to contact me at 860-251-5104 if you have any questions.

Sincerely,

Joan W. Feldman
HB

Joan W. Feldman

Enclosures

**000530 (11/27/13)**

3081634v3

1. Please explain why the "% Utilization" for projected FY2016 increases to 83% percent, considering the number of cases decreased between FY2015 and FY2016.

**The increase in projected outpatient operating room utilization from 76% in FY2015 to 83% in FY2016 reflects the planned closure of four (4) outpatient operating rooms in need of renovation and which are physically too small and ill-shaped to accommodate modern surgical and medical equipment. The closure of these four (4) operating rooms will reduce available outpatient operating room capacity (on annual basis) resulting in higher utilization in the remaining operating rooms as reflected on page 000445 of this Application.**

**Please also note that on pages 000423 and 000445 of this Application, the Applicant incorrectly stated that it plans on closing three (3) outpatient operating rooms. The Applicant actually intends on closing four (4) outpatient operating rooms if this Application were to be approved. Accordingly, we are also submitting a revised table to replace the table previously submitted as page 000445.**

Hartford Hospital
Outpatient Operating Room Capacity and Utilization
3 Year Projections

| FY 2014 Out-Patients | Capacity (in minutes) per year | Hours of Operation | Turnover Time | # Cases per year | Avg. Case Time | # of projected - actual minutes per year | % Utilization |
|---|---|---|---|---|---|---|---|
| Outpatient Surgical Suites | 1,820,487 | 7:45-3:30 | 30 Mins. Per Case | 12,141 | 113 | 1,371,933 | 75% |
| **FY 2015 Out-Patients** | **Capacity (in minutes) per year** | **Hours of Operation** | **Turnover Time** | **# Cases per year** | **Avg. Case Time** | **# of projected - actual minutes per year** | **% Utilization** |
| Outpatient Surgical Suites | 1,820,487 | 7:45-3:30 | 30 Mins. Per Case | 12,322 | 113 | 1,392,386 | 76% |
| **FY 2016 Out Patients** | **Capacity (in minutes) per year** | **Hours of Operation** | **Turnover Time** | **# Cases per year** | **Avg. Case Time** | **# of projected - actual minutes per year** | **% Utilization** |
| Outpatient Surgical Suites | 1,379,157 | 7:45-3:30 | 30 Mins. Per Case | 10,209 | 113 | 1,153,617 | 83% |

**Notes:**
**Includes new outpatient volume from newly recruited surgeons**
**FY2016 excludes orthopedic cases transitioning to proposed ASC (Bone and Joint Center)**
**Approximately (15% of total outpatient cases)**
**Decreased capacity in FY2016 reflects the closure of 4 outdated operating rooms**

# STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

*Office of Health Care Access*

December 12, 2013

VIA FACISIMILE ONLY

Barbara A. Durdy
Strategic Planning Director
Hartford HealthCare Corporation
181 Patricia Genova Drive
Newington, CT 06111

RE: Certificate of Need Application, Docket Number 13-31851-CON
Hartford Hospital, Orthopedic Associates of Hartford and Constitution Surgery Center
Proposal to Establish an Orthopedic Ambulatory Surgery Center on The Hartford Hospital Campus in Hartford to be known as HHC Hartford Surgery Center, LLC

Dear Ms. Durdy:

This letter is to inform you that, pursuant to Section 19a-639a (d) of the Connecticut General Statutes, the Office of Health Care Access has deemed the above-referenced application complete as of December 12, 2013.

If you have any questions regarding this matter, please feel free to contact me at (860) 418-7012.

Sincerely,

Steven W. Lazarus
Associate Health Care Analyst

**********
*** TX REPORT ***
**********

TRANSMISSION OK

| | |
|---|---|
| TX/RX NO | 3892 |
| RECIPIENT ADDRESS | 918609729025 |
| DESTINATION ID | |
| ST. TIME | 12/12 15:44 |
| TIME USE | 00'20 |
| PAGES SENT | 2 |
| RESULT | OK |

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH
*OFFICE OF HEALTH CARE ACCESS*

**FAX SHEET**

TO: BARBARA DURDY

FAX: 860-972-9025

AGENCY:

FROM: STEVEN LAZARUS

DATE: 12/12/13 Time:

NUMBER OF PAGES: 2
*(including transmittal sheet*

Comments:

Enclosed is the letter deeming CON Complete filed under 13-31851. Please feel free to contact me directly at 860-418-7012, with any questions you might have.

*PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.*

**********
*** TX REPORT ***
**********

TRANSMISSION OK

| | |
|---|---|
| TX/RX NO | 3890 |
| RECIPIENT ADDRESS | 918609724650 |
| DESTINATION ID | |
| ST. TIME | 12/12 15:26 |
| TIME USE | 00'20 |
| PAGES SENT | 2 |
| RESULT | OK |

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH
*OFFICE OF HEALTH CARE ACCESS*

**FAX SHEET**

TO: BARBARA DURDY

FAX: 860-972-4650

AGENCY:

FROM: STEVEN LAZARUS

DATE: 12/12/13 Time:

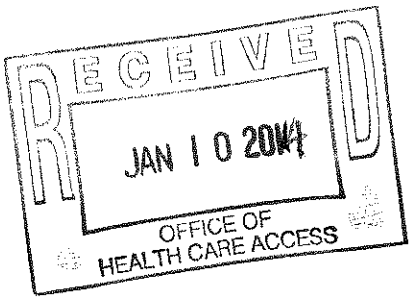
NUMBER OF PAGES: 2
*(including transmittal sheet*

Comments:

Enclosed is the letter deeming CON Complete filed under 13-31851. Please feel free to contact me directly at 860-418-7012. with any questions you might have.

*PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.*

**Sender's Direct Dial Number:**
**(203) 786-8316**




FACSIMILE COMMUNICATION

**Sender's Direct Fax Number:**
**(203) 772-2037**

**Date:** January 10, 2014

**FAX#:** 860-418-7053

**To:** Lisa Davis

**Company:** Office of Health Care Access

**From:** Jennifer Groves Fusco, Esq.

**Number of Pages** 3 (Including Cover Sheet)

**Subject:** Public Hearing Request
Docket No. 13-32851-CON

**Message:**

**Please contact Deb Alexa at (203) 786-8322 to report transmittal difficulties. Thank you.**

**IMPORTANT: THE DOCUMENT ACCOMPANYING THIS TELECOPY TRANSMISSION CONTAINS INFORMATION FROM THE LAW FIRM OF UPDIKE, KELLY & SPELLACY, P.C., WHICH IS CONFIDENTIAL AND LEGALLY PRIVILEGED. THE INFORMATION IS INTENDED ONLY FOR THE USE OF THE INDIVIDUAL OR ENTITY NAMED ON THIS TRANSMISSION SHEET. IF YOU ARE NOT THE INTENDED RECIPIENT, YOU ARE HEREBY NOTIFIED THAT ANY DISCLOSURE, COPYING, DISTRIBUTION, OR THE TAKING OF ANY ACTION IN RELIANCE ON THE CONTENTS OF THIS TELECOPIED INFORMATION IS STRICTLY PROHIBITED, AND THAT THE DOCUMENT SHOULD BE RETURNED TO THIS FIRM IMMEDIATELY. IF YOU HAVE RECEIVED THIS TELECOPY IN ERROR, PLEASE NOTIFY US BY TELEPHONE SO THAT WE CAN ARRANGE FOR THE RETURN OF THE ORIGINAL DOCUMENTS TO US AT NO COST TO YOU.**

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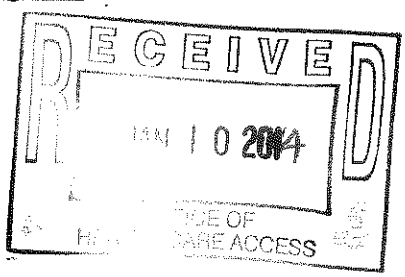
[ ] THIS WILL BE THE ONLY FORM OF DELIVERY OF THE TRANSMITTED DOCUMENT

UKS
MERITAS LAW FIRMS WORLDWIDE

Jennifer G. Fusco
(t) 203.786.8316
(f) 203.772.2037
jfusco@uks.com

January 10, 2014

VIA FACSIMILE, ELECTRONIC & REGULAR MAIL




Lisa Davis, MBA, BSN, RN
Deputy Commissioner
State of Connecticut
Department of Public Health
410 Capitol Avenue, P.O. Box 34038
MS #13HCA
Hartford, CT 06134-0308

Re: Public Hearing Request
Docket No. 13-32851-CON
Request by HHC Hartford Surgery Center, LLC for Permission to Establish an Orthopedic Ambulatory Surgery Center on Hartford Hospital Main Campus

Dear Deputy Commissioner Davis,

This office represents Surgical Care Affiliates, LLC ("SCA"), Connecticut Surgery Center, Limited Partnership ("CSC") and Hartford Surgery Center, LLC ("HSC"). Pursuant to Section 19a-639a of the Connecticut General Statutes, SCA, CSC and HSC herby request that the Office of Health Care Access hold a public hearing on Docket No. 13-31851-CON. This docket concerns a proposal by HHC Hartford Surgery Center, LLC (comprised of Hartford Hospital, Orthopedic Associates of Hartford and Constitution Surgery Center) to establish a freestanding orthopedic ambulatory surgery center ("ASC") on the Hartford Hospital main campus.

SCA, through its affiliates, owns, operates and manages a network of ASC's located throughout the United States. CSC and HSC (both SCA affiliates) operate licensed freestanding ASCs in the City of Hartford. SCA, CSC and HSC each has more than five (5) employees and is, therefore, entitled to request a public hearing under Section 19a-639a.

Thank you in advance for your consideration of this request.

Very truly yours,

Jennifer G. Fusco

JLG/dla

cc: Kristine Lowther

684331

## Greer, Leslie

**From:** Jennifer Groves Fusco <jfusco@uks.com>
**Sent:** Friday, January 10, 2014 3:04 PM
**To:** User, OHCA
**Subject:** Docket No. 13-32851-CON - Public Hearing Request
**Attachments:** 20140110145309144.pdf

Attached please find a request for public hearing on Docket No. 13-32851-CON (establishment of an ASC on the Hartford Hospital main campus). This request is also being faxed to OHCA and the original has been mailed. Please confirm receipt.

Thanks,
Jen

**Jennifer Groves Fusco, Esq.**
**Principal**
**Updike, Kelly & Spellacy, P.C.**
**One Century Tower**
**265 Church Street**
**New Haven, CT 06510**
**Office (203) 786.8316**
**Cell (203) 927.8122**
**Fax (203) 772.2037**
**www.uks.com**

**LEGAL NOTICE:** Unless expressly stated otherwise, this message is confidential and may be privileged. It is intended for the addressee(s) only. If you are not an addressee, any disclosure, copying or use of the information in this e-mail is unauthorized and may be unlawful. If you are not an addressee, please inform the sender immediately and permanently delete and/or destroy the original and any copies or printouts of this message. Thank you. Updike, Kelly & Spellacy, P.C.

MERITAS LAW FIRMS WORLDWIDE

Jennifer G. Fusco
(t) 203.786.8316
(f) 203.772.2037
jfusco@uks.com

January 10, 2014

VIA FACSIMILE, ELECTRONIC & REGULAR MAIL

Lisa Davis, MBA, BSN, RN
Deputy Commissioner
State of Connecticut
Department of Public Health
410 Capitol Avenue, P.O. Box 34038
MS #13HCA
Hartford, CT 06134-0308

Re: Public Hearing Request
Docket No. 13-32851-CON
Request by HHC Hartford Surgery Center, LLC for Permission to Establish an Orthopedic Ambulatory Surgery Center on Hartford Hospital Main Campus

Dear Deputy Commissioner Davis,

This office represents Surgical Care Affiliates, LLC ("SCA"), Connecticut Surgery Center, Limited Partnership ("CSC") and Hartford Surgery Center, LLC ("HSC"). Pursuant to Section 19a-639a of the Connecticut General Statutes, SCA, CSC and HSC herby request that the Office of Health Care Access hold a public hearing on Docket No. 13-31851-CON. This docket concerns a proposal by HHC Hartford Surgery Center, LLC (comprised of Hartford Hospital, Orthopedic Associates of Hartford and Constitution Surgery Center) to establish a freestanding orthopedic ambulatory surgery center ("ASC") on the Hartford Hospital main campus.

SCA, through its affiliates, owns, operates and manages a network of ASCs located throughout the United States. CSC and HSC (both SCA affiliates) operate licensed freestanding ASCs in the City of Hartford. SCA, CSC and HSC each has more than five (5) employees and is, therefore, entitled to request a public hearing under Section 19a-639a.

Thank you in advance for your consideration of this request.

Very truly yours,

Jennifer G. Fusco

JLG/dla

cc: Kristine Lowther



UPDIKE • KELLY • SPELLACY
UKS
MERITAS LAW FIRMS WORLDWIDE

## Greer, Leslie

**From:** User, OHCA
**Sent:** Monday, January 13, 2014 1:15 PM
**To:** barbara.durdy@hhchealth.org
**Cc:** Lazarus, Steven; Greci, Laurie; Hansted, Kevin; Riggott, Kaila; Martone, Kim
**Subject:** Docket No. 13-31851-CON - Public Hearing Request
**Attachments:** 20140110145309144.pdf

Barbara,
Attached is a hearing request from Updike, Kelly & Spellacy, P.C.
Leslie Greer

---

**From:** Jennifer Groves Fusco [mailto:jfusco@uks.com]
**Sent:** Friday, January 10, 2014 3:04 PM
**To:** User, OHCA
**Subject:** Docket No. 13-32851-CON - Public Hearing Request

Attached please find a request for public hearing on Docket No. 13-32851-CON (establishment of an ASC on the Hartford Hospital main campus). This request is also being faxed to OHCA and the original has been mailed. Please confirm receipt.

Thanks,
Jen

**Jennifer Groves Fusco, Esq.**
**Principal**
**Updike, Kelly & Spellacy, P.C.**
**One Century Tower**
**265 Church Street**
**New Haven, CT 06510**
**Office (203) 786.8316**
**Cell (203) 927.8122**
**Fax (203) 772.2037**
**www.uks.com**

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immediately and permanently delete and/or destroy the original and any copies or printouts of this message. Thank you. Updike, Kelly & Spellacy, P.C.

# STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH

Jewel Mullen, M.D., M.P.H., M.P.A.
Commissioner

Dannel P. Malloy
Governor
Nancy Wyman
Lt. Governor

TO: Kevin Hansted, Hearing Officer

FROM: Jewel Mullen, M.D., M.P.H., M.P.A., Commissioner

DATE: February 3, 2014

RE: Certificate of Need Application; Docket Number: 13-31851-CON
Hartford Hospital, Constitution Surgery Centers, LLC and Affiliated Physicians, collectively to be known as HHC Hartford Surgery Center, LLC
Establishment of an Ambulatory Surgery Center, to be located on the Campus of Hartford Hospital

---

I hereby designate you to sit as a hearing officer in the above-captioned matter to rule on all motions and recommend findings of fact and conclusions of law upon completion of the hearing.

Connecticut Department of Public Health

Phone: (860) 509-8000 • Fax: (860) 509-7184 • VP: (860) 899-1611
410 Capitol Avenue, P.O. Box 340308
Hartford, Connecticut 06134-0308
www.ct.gov/dph
*Affirmative Action/Equal Opportunity Employer*

# STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH
*Office of Health Care Access*

February 11, 2014

Barbara A. Durdy
Director, Strategic Planning
Hartford HealthCare Corporation
181 Patricia Genova Drive
Newington, CT 06111

RE: Certificate of Need Application, Docket Number 13-31851-CON
Hartford HealthCare Corporation
Establishment of an Ambulatory Surgery Center to be located on the Campus of Hartford Hospital

Dear Ms. Durdy,

With the receipt of the completed Certificate of Need ("CON") application information submitted by Hartford HealthCare ("Applicant") on December 12, 2013, the Office of Health Care Access ("OHCA") has initiated its review of the CON application identified above.

Pursuant to General Statutes § 19a-639a (f), OHCA may hold a hearing with respect to any Certificate of Need application.

This hearing notice is being issued pursuant to General Statutes § 19a-639a (f)

| | |
|---|---|
| Applicant: | Hartford HealthCare |
| Docket Number: | 13-31851-CON |
| Proposal: | Establishment of an Ambulatory Surgery Center to be located on the Campus of Hartford Hospital with an associated capital expenditure of $6,500,000 |

Notice is hereby given of a public hearing to be held in this matter to commence on:

Date: February 28, 2014

Time: 9:00 a.m.

Place: Department of Public Health, Office of Health Care Access
410 Capitol Avenue, Third Floor Hearing Room
Hartford, CT 06134

The Applicant is designated as party in this proceeding. Enclosed for your information is a copy of the hearing notice for the public hearing that will be published in the *Hartford Courant* pursuant to General Statutes § 19a-639a (f).

Sincerely,

Kimberly R. Martone
Director of Operations

Enclosure

cc: Henry Salton, Esq., Office of the Attorney General
Marianne Horn, Department of Public Health
Kevin Hansted, Department of Public Health
Wendy Furniss, Department of Public Health
Marielle Daniels, Connecticut Hospital Association

KRM: SWL:lmg

# STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH
*Office of Health Care Access*

February 11, 2014 Requisition # 44539

Hartford Courant
285 Broad Street
Hartford, CT 06115

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 **Wednesday, February 12, 2014.** 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 Kaila Riggott at (860) 418-7001.

KINDLY RENDER BILL IN DUPLICATE ATTACHED TO THE TEAR SHEET.

Sincerely,

Kimberly R. Martone
Director of Operations

Attachment

cc: Danielle Pare, DPH
Marielle Daniels, Connecticut Hospital Association

KRM:SWL:lmg

**Hartford Courant** **February 11, 2014**
**Notice of Public Hearing, Docket Number 13-31851-CON**

**PLEASE INSERT THE FOLLOWING:**

Office of Health Care Access Public Hearing

| | |
|---|---|
| Statute Reference: | 19a-638 |
| Applicant: | Hartford HealthCare Corporation |
| Town: | Hartford |
| Docket Number: | 13-31851-CON |
| Proposal: | Establishment of an Ambulatory Surgery Center to be located on the Campus of Hartford Hospital with a total capital expenditure of $6,500,000 |
| Date: | February 28, 2014 |
| Time: | 9:00 a.m. |
| Place: | Department of Public Health, Office of Health Care Access<br>410 Capitol Avenue, Third Floor Hearing Room<br>Hartford, CT 06134 |

Any person who wishes to request status in the above listed public hearing may file a written petition no later than February 21, 2014 (5 calendar days before the date of the hearing) pursuant to the Regulations of Connecticut State Agencies §§ 19a-9-26 and 19a-9-27. 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. If you require aid or accommodation to participate fully and fairly in this hearing, please phone (860) 418-7001.

* * * COMMUNICATION RESULT REPORT ( FEB. 11. 2014 4:49PM ) * * *

FAX HEADER:

| TRANSMITTED/STORED : FEB. 11. 2014 4:48PM<br>FILE MODE | OPTION | ADDRESS | RESULT | PAGE |
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REASON FOR ERROR
E-1) HANG UP OR LINE FAIL
E-2) BUSY
E-3) NO ANSWER
E-4) NO FACSIMILE CONNECTION

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
***OFFICE OF HEALTH CARE ACCESS***

***FAX SHEET***

**TO:** BARBARA DURDY

**FAX:** (860) 972-4650

**AGENCY:** HARTFORD HEALTHCARE CORPORATION

**FROM:** STEVE LAZARUS

**DATE:** 2/11/14

**NUMBER OF PAGES:** 5
*(including transmittal sheet*

**Comments:** DN: 13-31851-CON Notice of Public Hearing

***PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.***

***Phone: (860) 418-7001*** ***Fax: (860) 418-7053***

***410 Capitol Ave., MS#13HCA***
***P.O.Box 340308***
***Hartford, CT 06134***

## Greer, Leslie

**From:** ADS <ADS@graystoneadv.com>
**Sent:** Tuesday, February 11, 2014 12:00 PM
**To:** Greer, Leslie
**Subject:** Re: Hearing Notice DN: 13-31851-CON

Good day!

Thanks so much for your ad submission.
We will be in touch shortly and look forward to serving you.

*Consider adding **color** to your Chronicle of Higher Education print ads or upgrading to a Featured Job Banner online.*

PLEASE NOTE: New Department of Labor guidelines allow web based advertising when hiring foreign nationals. To provide required documentation Graystone will retrieve & archive verification for the 1st and 30th days of posting for $115.00/web site. If required, notify Graystone when ad placement is approved.

If you have any questions or concerns, please don't hesitate to contact us at the number below.

We sincerely appreciate your business.

Thank you,
Graystone Group Advertising

2710 North Avenue
Bridgeport, CT 06604
Phone: 800-544-0005
Fax: 203-549-0061

***E-mail new ad requests to: ads@graystoneadv.com***
http://www.graystoneadv.com/

---

**From:** <Greer>, Leslie <Leslie.Greer@ct.gov>
**Date:** Tuesday, February 11, 2014 11:42 AM
**To:** ads <ads@graystoneadv.com>
**Subject:** Hearing Notice DN: 13-31851-CON

Please run the attached hearing notice in the Hartford Courant by 2/12/14. For billing purposes, please reference requisition 44539. In addition, please forward me a copy of the "proof of publication" for my records when available.

Thank you,

*Leslie M. Greer*
CT Department of Public Health
Office of Health Care Access
410 Capitol Avenue, MS#13HCA
Hartford, CT 06134
Phone: (860) 418-7013
Fax: (860) 418-7053
*Website: www.ct.gov/ohca*

## Greer, Leslie

**From:** Laurie <Laurie@graystoneadv.com>
**Sent:** Tuesday, February 11, 2014 5:07 PM
**To:** Greer, Leslie
**Subject:** FW: Hearing Notice DN: 13-31851-CON
**Attachments:** 13-31851np Hartford Courant.doc

Your legal notice is all set to run as follows:

Hartford Courant, 2/12 issue - $337.12

Thanks,
Laurie Miller

Graystone Group Advertising
2710 North Ave., Ste 200, Bridgeport, CT 06604
Ph: 203-549-0060, ext 319, Fax: 203-549-0061,Toll free: 800-544-0005
email: laurie@graystoneadv.com
www.graystoneadv.com

---

**From:** <Greer>, Leslie <Leslie.Greer@ct.gov>
**Date:** Tuesday, February 11, 2014 11:42 AM
**To:** ads <ads@graystoneadv.com>
**Subject:** Hearing Notice DN: 13-31851-CON

Please run the attached hearing notice in the Hartford Courant by 2/12/14. For billing purposes, please reference requisition 44539. In addition, please forward me a copy of the "proof of publication" for my records when available.

Thank you,

*Leslie M. Greer*
CT Department of Public Health
Office of Health Care Access
410 Capitol Avenue, MS#13HCA
Hartford, CT 06134
Phone: (860) 418-7013
Fax: (860) 418-7053
*Website: www.ct.gov/ohca*
Please consider the environment before printing this message

# STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH
*Office of Health Care Access*

February 20, 2014

VIA FAX ONLY

Barbara A. Durdy
Director, Strategic Planning
Hartford HealthCare Corporation
181 Patricia Genova Drive
Newington, CT 06111

RE: Certificate of Need Application; Docket Number: 13-31851-CON
Hartford Hospital, Constitution Surgery Centers, LLC and Affiliated Physicians, collectively to be known as HHC Hartford Surgery Center, LLC
Establishment of an Ambulatory Surgery Center, to be located on the Campus of Hartford Hospital
Request for Pre-file

Dear Ms. Durdy:

The Office of Health Care Access ("OHCA") will hold a public hearing on Friday, February 28, 2014 at 9:00 a.m. at the Department of Public Health, Office of Health Care Access, Third Floor Hearing Room, 410 Capitol Avenue, Hartford, regarding the Certificate of Need ("CON") application identified above. Pursuant to the Regulations of Connecticut State Agencies § 19a-9-29 (e), any party or other participant is required to prefile in written form all substantive, technical, or expert testimony that it proposes to offer at the hearing. The Applicant's prefiled testimony must be submitted to OHCA no later than **12:00 pm, on Monday, February 24, 2014**.

All persons providing prefiled testimony must be present at the public hearing to adopt their written testimony under oath and must be available for cross-examination for the entire duration of the hearing. If you are unable to meet the specified time for filing the prefiled testimony you must request a time extension in writing, detailing the reasons for not being able to meet the specified deadline.

Please contact Steven W. Lazarus at (860) 418-7012, if you have any questions concerning this request.

Sincerely,

Kevin T. Hansted
Hearing Officer

* * * COMMUNICATION RESULT REPORT ( FEB. 20. 2014 1:45PM ) * * *

FAX HEADER:

| TRANSMITTED/STORED : FEB. 20. 2014 1:44PM<br>FILE MODE | OPTION | ADDRESS | RESULT | PAGE |
|---|---|---|---|---|
| 098 MEMORY TX | | 918602515211 | OK | 2/2 |

REASON FOR ERROR
E-1) HANG UP OR LINE FAIL
E-2) BUSY
E-3) NO ANSWER
E-4) NO FACSIMILE CONNECTION

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
***OFFICE OF HEALTH CARE ACCESS***

**FAX SHEET**

**TO:** JOAN FELDMAN

**FAX:** 860-251-5211

**AGENCY:**

**FROM:** STEVEN LAZARUS

**DATE:** 2/20/14 **Time:**

**NUMBER OF PAGES:** 2
*(including transmittal sheet*

**Comments:**

Please see the attached copy of the Request for Prefile for DN: 13-31851-CON.

***PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.***

***Phone: (860) 418-7001*** ***Fax: (860) 418-7053***

***410 Capitol Ave., MS#13HCA***
***P.O.Box 340308***
***Hartford, CT 06134***

* * * COMMUNICATION RESULT REPORT ( FEB. 20. 2014 1:44PM ) * * *

FAX HEADER:

| TRANSMITTED/STORED : FEB. 20. 2014 1:43PM<br>FILE MODE | OPTION | ADDRESS | RESULT | PAGE |
|---|---|---|---|---|
| 097 MEMORY TX | | 918609729025 | OK | 2/2 |

REASON FOR ERROR
E-1) HANG UP OR LINE FAIL
E-2) BUSY
E-3) NO ANSWER
E-4) NO FACSIMILE CONNECTION

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
***OFFICE OF HEALTH CARE ACCESS***

**FAX SHEET**

**TO:** BARBARA DURDY

**FAX:** 860-972-9025

**AGENCY:**

**FROM:** STEVEN LAZARUS

**DATE:** 2/20/14 **Time:**

**NUMBER OF PAGES:** 2
*(including transmittal sheet*

**Comments:**

Please see the attached copy of the Request for Prefile for DN: 13-31851-CON.

***PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.***

***Phone: (860) 418-7001*** ***Fax: (860) 418-7053***

***410 Capitol Ave., MS#13HCA***
***P.O.Box 340308***
***Hartford, CT 06134***

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**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
***OFFICE OF HEALTH CARE ACCESS***

**FAX SHEET**

**TO:** BARBARA DURDY

**FAX:** (860) 972-4650

**AGENCY:**

**FROM:** STEVEN LAZARUS

**DATE:** 2/20/14 **Time:**

**NUMBER OF PAGES:** 2
*(including transmittal sheet*

**Comments:** Please see the attached copy of the Request for Prefile for DN: 13-31851-CON.

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***410 Capitol Ave., MS#13HCA***
***P.O.Box 340308***
***Hartford, CT 06134***

## Greer, Leslie

**From:** Lazarus, Steven
**Sent:** Monday, February 24, 2014 7:37 AM
**To:** Feldman, Joan (JFeldman@goodwin.com); Durdy, Barbara (Barbara.Durdy@hhchealth.org)
**Cc:** Greer, Leslie
**Subject:** Request for Intervenor Status & Intervenor Pre-File
**Attachments:** 31851-Request for Intervenor.pdf

Good Morning Joan and Barbara,

Please see attached copy of the request for Intervenor Status and their pre-file testimony. It was by OHCA late Friday afternoon.

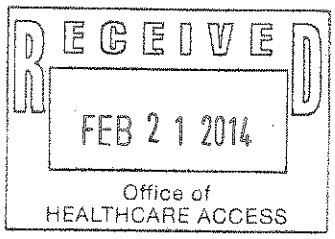
Steve

*Steven W. Lazarus*
Associate Health Care Analyst
Division of Office of Health Care Access
Connecticut Department of Public Health
410 Capitol Avenue
Hartford, CT 06134
Phone: 860-418-7012
Fax: 860-418-7053

Jennifer Groves Fusco
(t) 203.786.8316
(f) 203.772.2037
jfusco@uks.com

February 21, 2014

***VIA HAND DELIVERY***




Lisa A. Davis, M.B.A., B.S.N., R.N.
Deputy Commissioner
Office of Health Care Access
410 Capitol Avenue
Post Office Box 340308
Hartford, CT 06134-0308

***Re: HSC Hartford Surgery Center, LLC***
***Establishment of an Orthopedic Ambulatory Surgery Center on the Hartford Hospital Campus***
***Docket No. 13-31851-CON***

Dear Deputy Commissioner Davis:

This office represents Hartford Surgery Center, LLC ("HSC") and Connecticut Surgery Center, Limited Partnership ("CSC") in connection with the above-referenced docket. Enclosed are an original and four (4) copies of the following:

- Notice of Appearance of Updike, Kelly & Spellacy, P.C. on behalf of HCS;
- Petition of HSC To Be Designated as an Intervenor With Full Rights Including Right of Cross-Examination;
- Prefiled Testimony of Christian D. Ellison on behalf of HSC;
- Notice of Appearance of Updike, Kelly & Spellacy, P.C. on behalf of CSC;
- Petition of CSC To Be Designated as an Intervenor With Full Rights Including Right of Cross-Examination; and
- Prefiled Testimony of Christian D. Ellison on behalf of CSC.

These documents are being submitted in connection with the public hearing on this matter, scheduled for February 28, 2014 at 9:00 a.m. Mr. Ellison will be present at the hearing to adopt his prefiled testimony under oath and for cross-examination.

Should you require anything further, please feel free to call me at (203) 786-8316.

Very truly yours,

Jennifer Groves Fusco

Enclosures

cc: Christian D. Ellison
Joan Feldman, Esq.

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
**OFFICE OF HEALTH CARE ACCESS DIVISION**

| | |
|---|---|
| IN RE: CERTIFICATE OF NEED APPLICATION OF HHC HARTFORD SURGERY CENTER, LLC TO ESTABLISH AN ORTHOPEDIC AMBULATORY SURGERY CENTER ON THE HARTFORD HOSPITAL MAIN CAMPUS | DOCKET NO. 13-32851-CON |
| | FEBRUARY 21, 2014 |

**NOTICE OF APPEARANCE**

In accordance with Section 19a-9-28 of the Regulations of Connecticut State Agencies, please enter the appearance of Updike, Kelly & Spellacy, P.C. ("Firm") in the above-captioned proceeding on behalf of Hartford Surgery Center, LLC ("HSC"). The Firm will appear and represent HSC at the public hearing on this matter, scheduled for February 28, 2014.

Respectfully Submitted,

HARTFORD SURGERY CENTER, LLC

By: _____

JENNIFER GROVES FUSCO, ESQ.
Updike, Kelly & Spellacy, P.C.
265 Church Street
One Century Tower
New Haven, CT 06510
Tel: (203) 786-8300
Fax (203) 772-2037

**CERTIFICATION**

I hereby certify that a copy of the foregoing has been sent via United States mail, postage prepaid, and electronic mail, this 21st day of February, 2014 to the following:

Joan W. Feldman
Shipman & Goodwin, LLP
One Constitution Plaza
Hartford, CT 06103-1919
jfeldman@goodwin.com

Jennifer Groves Fusco, Esq.
Updike, Kelly & Spellacy, P.C.

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
**OFFICE OF HEALTH CARE ACCESS DIVISION**

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|---|---|
| IN RE: CERTIFICATE OF NEED APPLICATION OF HHC HARTFORD SURGERY CENTER, LLC TO ESTABLISH AN ORTHOPEDIC AMBULATORY SURGERY CENTER ON THE HARTFORD HOSPITAL MAIN CAMPUS | DOCKET NO. 13-32851-CON |
| | FEBRUARY 21, 2014 |

**PETITION OF HARTFORD SURGERY CENTER, LLC TO BE DESIGNATED AS AN INTEVENOR WITH FULL RIGHTS INCLUDING THE RIGHT OF CROSS-EXAMINATION**

In accordance with Section 4-177a of the Connecticut General Statutes and Section 19a-9-27 of the Regulations of Connecticut State Agencies, Hartford Surgery Center, LLC ("HSC"), which owns and operates an outpatient surgical facility located at 100 Retreat Avenue, Hartford, CT 06106 known as Hartford Surgery Center (the "Hartford ASC"), hereby petitions the Office of Health Care Access Division of the Department of Public Health ("OHCA") to be designated as an intervenor with full rights, including the right of cross-examination, in the Certificate of Need ("CON") proceeding under Docket No. 13-32851-CON.

This proceeding concerns the request of HHC Hartford Surgery Center, LLC ("HHCHSC") for permission to establish a freestanding orthopedic ambulatory surgical center on the main campus of Hartford Hospital (the "Proposed ASC"). HHCHSC is a joint venture comprised of Hartford

Hospital, Orthopedic Associates of Hartford, P.C. ("OAH") and Constitution Surgery Centers, LLC ("Constitution Surgery") (collectively the "Applicants").

As detailed herein and in the accompanying testimony of Christian D. Ellison, Senior Vice President, Operations at Surgical Care Affiliates, LLC (the parent company of HSC), HSC and the Hartford ASC would be adversely impacted by the approval of a facility for which there is no clear public need. The Proposed ASC will serve to further dilute the greater Hartford outpatient surgical market where there exists ample excess capacity, particularly at the Hartford ASC. Moreover, the Applicants have not shown that the Proposed ASC is a cost-effective solution to any capacity issues at their facilities. Nor have they demonstrated how the Proposed ASC will enhance access to care for Medicaid recipients and indigent persons.

*History of the Hartford ASC and Services Provided*

The Hartford ASC is a duly licensed outpatient surgical facility located at 100 Retreat Avenue in Hartford, directly across the street from the Hartford Hospital main campus. The Hartford ASC has been in operation for nearly 40 years. It was authorized pursuant to CONs issued by the former Commission on Hospital and Health Care in 1975 and 1979 (Docket Nos. 75-522 & 79-531). In 2007, ASC Acquisition LLC ( "ASC Acquisition" n/k/a Surgical Care Affiliates, Inc.), the parent company of Surgical Care Affiliates, LLC ("SCA"), acquired the Hartford ASC and the balance of the ambulatory surgery division of HealthSouth Corporation, which included three other Connecticut facilities (Docket No. 07-30955-CON).

HSC is currently owned by SunSurgery, LLC, an affiliate of SCA, and six (6) physician investors. SCA owns, operates and/or manages 185 surgical facilities, including freestanding ambulatory surgery centers ("ASCs"), in 34 states across the United States. This includes the Hartford and Connecticut Surgery Centers (the "Connecticut ASC") (collectively the "SCA ASCs"), both located in Hartford, Connecticut, as well as facilities located in Danbury and Trumbull, Connecticut.

The Hartford ASC is authorized for two (2) operating rooms and one (1) procedure room and offers service in the following surgical specialties: ENT; general surgery; gynecology; ophthalmology; oral surgery; orthopedics; plastic surgery; and podiatry. Historically, the Hartford ASC has performed well and its urban location offers easy access to residents of the City of Hartford and surrounding towns for their outpatient surgical procedures.

***HSC's Interests Will Be Adversely Affected by Approval of HHCHSC's CON Proposal***

The Applicants are asking OHCA to approve a CON for a new ASC in an area where there is ample excess capacity at existing providers. HHCHSC proposes to establish a freestanding orthopedic-only ASC on the Hartford Hospital main campus. The Applicants claim that the facility is necessary in order to accommodate their current and projected future surgical case volume. However, the Applicants' analysis of the "need" for the Proposed ASC is overly limited and, as such, it is flawed.

Simply put, there is no clear public need for the Proposed ASC. The Applicants based their claim of need on an analysis of capacity and utilization of their own facilities. These include

Hartford Hospital, an ASC owned and operated by OAH in Rocky Hill (the "OAH ASC") and an ASC owned by Hartford Hospital, OAH and Constitution Surgery in Glastonbury (the "Glastonbury ASC"). The Applicants did not consider, or provide OHCA with any information regarding, available outpatient surgical capacity at non-affiliated providers. As Mr. Ellison details in his testimony, there are 92 operating rooms at 11 different facilities in the area for which the Applicants provided absolutely no information or analysis. The Hartford ASC, for one, has substantial excess capacity that can be used to meet the outpatient surgical needs of the Applicants' physicians and their patients. This facility is currently operating at just sixty-five percent (65%) of optimal capacity (52% of maximum capacity) without consideration of an approved procedure room, which is not presently staffed and which could add substantial additional capacity. The Applicants have also overestimated capacity constraints at their facilities, including most notably the OAH ASC.

Allowing the Applicants to establish the Proposed ASC will result in the unnecessary duplication of services, which will be detrimental to all existing providers in the service area including the Hartford ASC. In order to justify the $6.5 million capital expenditure for the Proposed ASC, the Applicants will likely employ every strategy to increase physician participation and patient volume, including the recruitment of physicians who are currently utilizing facilities like the Hartford ASC.

In addition, there is nothing that precludes the Applicants from converting an approved single-specialty ASC to multi-specialty. If this were to happen, the Applicants would then be in a position to recruit physicians from all specialties, including those who perform their surgeries at the Hartford ASC in the areas of ENT, gynecology and podiatry, for example. Approximately eighty-

seven percent (87%) of physicians who practice at the Hartford ASC have privileges at Hartford Hospital. The loss of some or all of these physicians to the Proposed ASC would have a significant adverse impact on the Hartford ASC.

The Applicants have also failed to establish that the West Hartford Surgery Center (the "West Hartford ASC"), which functions as a Hartford Hospital Outpatient Department, is anywhere near capacity. The Applicants plan to shift volume from this underutilized facility to the Proposed ASC. Their plan to backfill the West Hartford ASC with volume from newly recruited surgeons appears unrealistic given the facility's low volume. It is more likely that Hartford Hospital will move forward with plans to recruit area gynecologists to perform surgeries in West Hartford. The Hospital has been actively recruiting the Hartford ASC's gynecologists for years and if these physicians were to move their cases to West Hartford it would have a devastating effect on the Hartford ASC.[1]

As Mr. Ellison's testimony will show, the last time OHCA approved a Hartford Hospital joint venture ASC (the Glastonbury ASC) it had a significant adverse impact on the Hartford ASC. The Hartford ASC lost nearly fifty percent (50%) of its case volume as a result of that facility being approved and is now struggling to perform the minimum number of cases required to keep its doors open. Approval of another ASC in the Hartford area, and the loss of additional business by the Hartford ASC, could be catastrophic. Accordingly, the interests of HSC, as owner of the Hartford ASC, are directly affected by this CON request.

[1] Gynecology is the primary surgical specialty at the Hartford ASC, account for fifty-three percent (53%) of the facility's total case volume in 2013.

*Summary of Evidence to Be Presented, Manner of Participation and Relief Sought*

HSC will ask OHCA to deny HHCHSC's request for permission to establish the Proposed ASC. There is no clear public need for the facility being proposed (Conn. Gen. Stat. §19a-639(3)). In addition, the Proposed ASC will result in the unnecessary duplication of services and it will adversely impact HSC and other existing providers (Conn. Gen. Stat. §19a-639(9)). This will be shown through the presentation of evidence regarding the Applicants' flawed analysis of outpatient surgical utilization/capacity in the service area of the Proposed ASC, including inaccuracies in the Applicants' analysis of utilization/capacity at their own facilities. HSC will also offer an analysis of utilization/capacity at the Hartford ASC and the financial impact of the potential loss of physicians and patients on the Hartford ASC.

There are also questions around the cost-effectiveness of this proposal and its relationship to the statutory goal of enhancing access to care for Medicaid recipients and indigent persons (Conn. Gen. Stat. §19a-639(6) & (10)). HSC will present evidence of more cost-effective means of remedying any outpatient surgical capacity issues that the Applicants are experiencing, including the addition of operating rooms to existing facilities. HSC will also present evidence to rebut the Applicants' claim that the Proposed ASC will be reimbursed at substantially lower rates than those paid for outpatient services provided a hospital setting. Lastly, HSC will provide evidence regarding the lack of Medicaid and uninsured patients proposed to be served by the Applicants and why this supports denial of the CON request.

If HSC is granted status, it intends to present this and other evidence and legal arguments in support of its positions. HSC respectfully requests that it be allowed to submit written testimony,

present evidence and arguments at the February 28, 2014 public hearing on this matter, cross-examine witnesses, and inspect and copy records pertaining to the proceeding. HSC's participation will furnish assistance to OHCA in determining whether there is a need for this proposal and what its impact will be on existing providers and evaluating Applicants' compliance with other CON statutory decision criteria. HSC has information directly relevant to HHCHSC's erroneous claims in this regard, which will be presented at the hearing. In addition, HSC's participation is in the interest of justice and will not impair the orderly conduct of these proceedings.

**WHEREFORE**, for the foregoing reasons, HSC respectfully requests its Petition to be Designated as an Intervenor With Full Rights be granted.

Respectfully Submitted,

HARTFORD SURGERY CENTER, LLC

By: _____

JENNIFER GROVES FUSCO, ESQ.
Updike, Kelly & Spellacy, P.C.
265 Church Street
One Century Tower
New Haven, CT 06510
Tel: (203) 786-8300
Fax (203) 772-2037

## CERTIFICATION

I hereby certify that a copy of the foregoing has been sent via United States mail, postage prepaid, and electronic mail, this 21st day of February, 2014 to the following:

Joan W. Feldman
Shipman & Goodwin, LLP
One Constitution Plaza
Hartford, CT 06103-1919
jfeldman@goodwin.com

Jennifer Groves Fusco, Esq.
Updike, Kelly & Spellacy, P.C.

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
**OFFICE OF HEALTH CARE ACCESS DIVISION**

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| IN RE: CERTIFICATE OF NEED APPLICATION OF HHC HARTFORD SURGERY CENTER, LLC TO ESTABLISH AN ORTHOPEDIC AMBULATORY SURGERY CENTER ON THE HARTFORD HOSPITAL MAIN CAMPUS | ) | DOCKET NO. 13-31851-CON |
| | | February 21, 2014 |

**PREFILED TESTIMONY OF CHRISTIAN D. ELLISON, SENIOR VICE PRESIDENT, OPERATIONS, SURGICAL CARE AFFILIATES, LLC, ON BEHALF OF HARTFORD SURGERY CENTER, LLC**

Good morning Hearing Officer Hansted and members of the OHCA staff. My name is Christian Ellison and I am a Senior Vice President, Operations at Surgical Care Affiliates, LLC ("SCA"), located in Deerfield, Illinois. SCA owns, operates and/or manages 185 surgical facilities, including freestanding ambulatory surgery centers ("ASCs"), in 34 states across the United States. This includes Hartford Surgery Center (the "Hartford ASC") and Connecticut Surgery Center (the "Connecticut ASC") (collectively the "SCA ASCs"), both located in Hartford, Connecticut, as well as facilities located in Danbury and Trumbull, Connecticut.[1]

Thank you for this opportunity to speak in opposition to the CON Application filed by HHC Hartford Surgery Center, LLC ("HHCHSC") for permission to establish an orthopedic ASC on the main campus of Hartford Hospital (the "Proposed ASC"). The Proposed ASC will be a joint venture between Hartford Hospital, Orthopedic Associates of Hartford, P.C. ("OAH") and Constitution

[1] SCA also owns a minority interest in an ASC in Norwalk.

Surgery Centers, LLC ("Constitution Surgery") (collectively the "Applicants"). My remarks today will focus on the lack of clear public need for the Proposed ASC given available capacity at area providers including the Hartford ASC. I will also discuss the significant adverse impact that a facility of this type and size, for which there is no clear public need, will have on existing providers such as the SCA ASCs. Lastly, I will touch upon the cost-effectiveness of the proposal, or lack thereof, and the relationship of the proposal to CON statutory decision criteria concerning access to care for Medicaid recipients and indigent persons.

***Relationship of SCA and the Hartford ASC***

As mentioned previously, I am a Senior Vice President, Operations at SCA, a position that I have held since June of 2013. My responsibilities include market development and operations leadership for 22 facilities in the northeastern United States, including the Hartford ASC. Prior to joining SCA I was a Senior Vice President, Corporate Development at Health Inventures, LLC ("Health Inventures"), an outpatient surgery center development and management company. I also served as Managing Director of Ascent Health Limited, a wholly owned subsidiary of Health Inventures located in the United Kingdom, where I led the development and operation of multi-specialty hospitals, a diagnostic imaging center and several ASCs. As such, I have extensive experience with both the development and operation of outpatient surgical facilities.

My employer SCA is the indirect owner of Hartford Surgery Center, LLC ("HSC"), which is the licensed operator of the Hartford ASC. SunSurgery, LLC ("SunSurgery"), an SCA affiliate, serves as the Managing Member of HSC, and six (6) physician partners own nine percent (9%) of the

facility. SCA ultimately controls operations at the Hartford ASC through SunSurgery. In my role as a Senior Vice President at SCA I oversee operations at the Hartford ASC. I have first-hand knowledge of the Hartford ASC, including its volume and available capacity, and I am aware of the impact that the Proposed ASC will have on this already fragile business. The facility's Administrator, Joanne Roche, is also here today to answer any question you may have.

*History of the Hartford ASC*

The Hartford ASC is a duly licensed outpatient surgical facility located at 100 Retreat Avenue in Hartford, directly across the street from the Hartford Hospital main campus. The Hartford ASC has been in operation for nearly 40 years. It was authorized pursuant to CONs issued by the former Commission on Hospital and Health Care in 1975 and 1979 (Docket Nos. 75-522 & 79-531). In 2007, ASC Acquisition LLC ( "ASC Acquisition" n/k/a Surgical Care Affiliates, Inc.), the parent company of SCA, acquired the Hartford ASC and the balance of the ambulatory surgery division of HealthSouth Corporation, which included three other Connecticut facilities (Docket No. 07-30955-CON). The Hartford ASC is authorized for two (2) operating rooms and one (1) procedure room and offers service in the following surgical specialties: ENT; general surgery; gynecology; ophthalmology; oral surgery; orthopedics; plastic surgery; and podiatry. Historically, the Hartford ASC has performed well and its urban location offers easy access to residents of the City of Hartford and surrounding towns for their outpatient surgical procedures.

Before the Hartford ASC was acquired by ASC Acquisition, HSC obtained approval from OHCA to syndicate sixty percent (60%) of its limited liability company interests to a group of

orthopedic surgeons organized as AMW Group, LLC ("AMW") (Docket No. 06-30738-RCN). AMW is comprised of three orthopedic hand surgeons (the "AMW Physicians"). The AMW Physicians purchased their interests in HSC in the summer of 2007, and their volume going forward accounted for almost half of all procedures performed at the Hartford ASC.

Less than a year later, in May of 2008, the AMW Physicians signed an agreement with Hartford Hospital to jointly develop an orthopedic ASC in Glastonbury (the "Glastonbury ASC"). HSC opposed the CON Application for the Glastonbury ASC based upon a lack of clear public need and the significant, measurable adverse impact that such a facility would have on the Hartford ASC's business. Despite this opposition, OHCA approved a CON for the competing facility (Docket No. 08-31164-CON). Once the new facility was built, the AMW Physicians relocated their non-hospital cases from the Hartford ASC to the Glastonbury ASC, causing the Hartford ASC to lose a substantial amount of business, just as HSC had predicted when it opposed the joint venture.[2] The AMW Physicians no longer hold an ownership interest in HSC.

Now, the Hartford ASC performs just 30 cases per week on average, often less. The facility is typically closed one day per week and when it is open, it does not always run both ORs given low patient volume. HSC predicted that approval of the Glastonbury ASC would have a significant adverse impact on its business and this turned out to be true. We urge OHCA not to approve another

[2] In 2008, the AMW Physicians performed 1,263 cases at the Hartford ASC, representing forty-three percent (43%) of the facility's total volume. In 2009, the AMW Physicians performed 1,341 cases at the Hartford ASC, representing forty-seven percent (47%) of the facility's total volume. Construction on the Glastonbury ASC was completed in 2010, and the AMW Physicians began redirecting their cases to the new facility. In 2010, they performed 776 cases at the Hartford ASC, representing thirty-two percent (32%) of the facility's total volume. By 2011, the AMW Physicians performed just 24 cases at the Hartford ASC, representing only two percent (2%) of the facility's total volume.

unnecessary Hartford Hospital joint venture ASC that could ultimately put the Hartford ASC out of business.

*No Clear Public Need for the Proposed ASC*

Hartford Hospital and its physician partners OAH are asking OHCA to approve a joint venture ASC in an area where there is ample excess capacity at existing providers. HHCHSC proposes to establish a freestanding orthopedic-only ASC on the main campus of Hartford Hospital.[3] It will have three (3) operating rooms, with two (2) additional ORs shelled for future use (CON App., p. 7). HHCHSC claims that the facility is necessary in order to accommodate surgical volume at Hartford Hospital, at a facility owned by OAH in Rocky Hill (the "OAH ASC") and at the Glastonbury ASC (which now appears to be owned by Hartford Hospital, OAH and Constitution Surgery) (CON App., p. 422). However, HHCHSC's analysis of the "need" for the Proposed ASC is overly limited and, as such, it is flawed.

***There is Ample ASC Capacity in the Greater Hartford Area and Therefore No Clear Public Need for The Proposed ASC***

A threshold issue in every CON application is whether there is a "clear public need" for the proposal (Conn. Gen. Stat. §19a-639(3)). The supposed "need" for the Proposed ASC is based largely upon the Applicants' claim that existing facilities are operating near, at or over capacity (CON App., pp. 7, 10 & 13). This claim is inaccurate in several respects. First, the Applicants' analysis of capacity is limited to those facilities ***associated with the Hartford Healthcare System and***

[3] Once approved, there is nothing that prohibits HHCHSC from converting the orthopedic-only ASC to a multi-specialty facility.

***OAH***. A more accurate assessment of capacity would look at ***all facilities within the service area*** of the Proposed ASC and not just those owned and operated by the Applicants. OHCA does not typically allow a provider, including a health system, to limit its needs analysis to internal capacity without considering the capacity of other existing providers in the service area.[4] If this analysis had been undertaken, it would have revealed substantial excess capacity at the Hartford ASC and likely at other providers in the area. Moreover, the capacity calculations provided by the Applicants for their own facilities are flawed or, at a minimum, misleading.

***Service Area Capacity***

The Applicants based their capacity analysis solely on outpatient surgical capacity/utilization at Hartford Hospital, the West Hartford Surgery Center, which functions as an outpatient department of the Hospital (the "West Hartford ASC"), the OAH ASC, and the Glastonbury ASC. Table 1c on page 15 of the CON Application shows the capacity/utilization of these facilities, as well as other hospitals within the Hartford Healthcare System. However, it omits any analysis of capacity/utilization at the numerous additional hospitals and freestanding ASCs that, by Applicants' own admission, operate within the service area of the Proposed ASC. In fact, Table 1c identifies as "Equipped for Proposal" but does not provide data for ***11 different facilities*** with a total of ***15 ASC operating rooms*** (both freestanding and hospital-based)[5] and ***77 hospital operating rooms***. This

[4] Section 4.6 of the Statewide Health Care Facilities & Services Plan (the "SHP") defines Primary Service Area in the context of outpatient surgery (SHP, p. 54, attached as Exhibit A). This was done, presumably, because an analysis of need in the Primary Service Area is relevant to a CON application for a new ASC. Any such analysis would necessarily include all existing providers within the Primary Service Area, not just providers within a healthcare system and their affiliated physicians.

[5] This number is 15, not 14 are reported by Applicants, because the Connecticut ASC has three (3) operating rooms, not two (2) as reported by Applicants (CON App., p. 15). An OR was added to the Connecticut ASC in March of 2011.

means there are a total of ***92 operating rooms*** in the service area whose capacity/utilization for outpatient procedures has not been analyzed. Assuming these operating rooms are available exclusively for outpatient procedures (which we understand is not the case with all hospital ORs) they represent 147,200 hours of capacity (assuming 1,600 hours per OR per year, which is 80% of maximum capacity as defined in the SHP, p. 55 attached as Exhibit A). Using the average case/clean-up time of 90 minutes set forth in the SHP, this represents 98,133 cases per year. The Applicants have ignored a substantial amount of capacity in the market and have done nothing to determine what percentage of this capacity is being utilized and what percentage is available to patients who might use the Proposed ASC.

I can speak to the capacity/utilization ratio at the Hartford ASC by way of example. The Hartford ASC has two (2) operating rooms, which at maximum capacity could accommodate 4,000 hours or 2,667 cases per year total (assuming 90 minutes per case). At "optimal utilization" as defined in the SHP (80% of maximum capacity) these operating rooms could together accommodate 3,200 hours or 2,133 cases per year. In 2013, the Hartford ASC performed only 1,380 surgeries (see Exhibit A). This means the facility is operating at just 52% of maximum capacity (65% of optimal capacity). The Hartford ASC in and of itself has the ability to accommodate an additional 753 to 1,287 cases per year. This does not include use of its approved procedure room, which if equipped as an operating room (as permitted by OHCA without CON approval – *see* Report No. 10-31563-DTR) would add another 1,067 to 1,333 cases worth of capacity to the facility each year. It is difficult to understand how the Applicants could conclude that "there is need for additional ambulatory operating room capacity in the ***Service Area***" (emphasis added) without having analyzed the

capacity/utilization of a majority (92 of 169) of the operating rooms located within the service area of the Proposed ASC (CON App., p. 15).

*Applicants' Capacity*

The Applicants' analysis of capacity at their own facilities is also misleading. The primary issue is the Applicants' representation that the OAH ASC is operating at one hundred eighty-two percent (182%) of optimal capacity (or 146% of maximum capacity) (CON App., p. 13). This calculation is based on the SHP standard time per case/clean-up of 90 minutes (CON App., p. 13) (see Exhibit A). However, it is our understanding that a significant number of the cases performed at the OAH ASC were pain management cases. The Applicants report that 4,570 of their cases in 2012 were orthopedic (CON App., p. 447), so presumably the remaining 3,214 cases (41% of total case volume) are pain management. Based on our experience at the SCA ASCs, these cases take approximately 15 to 20 minutes to complete and turn around versus the 90-minute average case/clean-up time used by the Applicants in their calculations. When discussing maximum capacity the SHP states that it "is the responsibility of the Applicant to provide sufficient documentation to establish the length the average case requires and the time required for clean-up" (SHP, p. 54, attached as Exhibit A). Here, it was incumbent upon the Applicants to disclose that the average case/clean-up time at the OAH ASC for pain management cases, which account for forty-one percent (41%) of the facility's volume, is far less than the average times contemplated in the SHP. Assuming OAH can complete and clean-up an average pain management case in 15 to 20 minutes, the capacity

of any operating room used for these cases could be four to six times what has been reported.[6] Based on the foregoing, the capacity constraints at OAH are likely far less dire than the Applicants have portrayed and do not necessarily support the need for a new ASC in Hartford to which OAH can shift orthopedic case volume.

In addition, per the Applicants' own admission the West Hartford ASC is operating at just seventy-one percent (71%) of optimal capacity (or 57% of maximum capacity) (CON App., p. 15). This proposal involves the shifting of 109 cases per year from the West Hartford ASC to the Proposed ASC (CON App., p. 11). This will result in the West Hartford ASC operating at just sixty-eight percent (68%) of optimal capacity (or 54% of maximum capacity). With these percentages, there is certainly no "clear public need" for an additional ASC to accommodate patients who would have their surgeries at the West Hartford ASC.

The Applicants claim that they will backfill volume at the West Hartford ASC with certain hearing-related procedures (CON App., p. 424). However, they also list gynecology as a surgical growth area (CON App., p. 424). The gynecological physicians who use both the Hartford and Connecticut ASCs have been encouraged by Hartford Hospital for many years to relocate their procedures to the West Hartford ASC. We suspect that this is part of the plan and, as discussed in more detail below, the loss of these types of surgeries would have a devastating impact on the Hartford ASC (as well as the Connecticut ASC). Furthermore, the Applicants' claim that there will be 480 incremental surgical cases brought to the West Hartford ASC on an annual basis by newly

[6] If pain cases take 15 minutes, then only 803.5 OR hours are required annually to accommodate 3,214 cases (3,214 x .25 = 803.5 hours). Assuming optimal OR utilization of 1,600 hours/year per the SHP (see Exhibit A), this means approximately 50% of an OR is required to accommodate OAH's pain management cases each year. Using a 20-minute turnaround time, pain management cases would require approximately sixty percent (60%) of an OR on an annual basis.

recruited surgeons is unrealistic (CON App., p. 424). This would represent a twenty-one percent (21%) incremental increase in case volume over 2012 numbers (CON App., p. 13), which seems excessive given the low volume at the West Hartford ASC.

Given the fact that there is ample excess capacity at the Hartford ASC, the West Hartford ASC and likely at other existing providers in the service area of the Proposed ASC, there is no clear public need for the $6.5 million facility being proposed by the Applicants. Allowing the Applicants to build such a facility will result in the unnecessary duplication of services, which is contrary to the intent of the CON statutes (see Conn. Gen. Stat. §19a-639(9)). In order for the Applicants to make a facility of this size and cost work financially, they will necessarily be looking recruit business from existing providers such as the Hartford ASC. Moreover, the Applicants' argument that patients and physicians prefer the convenience of an ASC setting does not support approval of this proposal. Convenience is not need. And even if it was, there are many "convenient" ASC options available to patients in the service area, including the Hartford ASC.

***Approval of the Proposed ASC Could Have a Significant Adverse Impact on the Hartford ASC***

Approval of the Proposed ASC without any limitations could have a significant adverse impact on the Hartford ASC. As previously noted, there is nothing in the CON statutes that precludes a single-specialty ASC from converting to multi-specialty. Assuming the Proposed ASC is approved, the Applicants could expand its scope of services to surgical specialties other than orthopedics, including those currently offered at the Hartford ASC.

*Potential Loss of Surgeons to the Proposed ASC*

There are 62 surgeons on the Medical Staff at the Hartford ASC and 54 of those surgeons (87%) currently hold privileges at Hartford Hospital. Many of these physicians, including partners and those who perform a significant percentage of their cases at the Hartford ASC, could be persuaded to utilize the Proposed ASC (assuming it converted to multi-specialty) instead of the Hartford ASC given the overlap in the service areas of the two facilities. HHCHSC would be able to sell interests in the Proposed ASC to these physicians (CON App., p. 420). Per its draft Operating Agreement, HHCHSC will have Class C members, which the Applicants describe as "physicians who have an ownership interest in the Proposed ASC who are not members of OAH" (CON App., p. 420). While the draft agreement contemplates that Class C members will be orthopedists and neurosurgeons, it could easily be amended to allow for the addition of physicians from other specialties.

The Applicants also claim that the proposal will have "little or no impact on existing providers in that ***most*** of the physicians that will be performing surgeries at the proposed ASC are currently performing their ambulatory orthopedic surgery at the Rocky Hill, Glastonbury and the Hospital's outpatient facilities" (emphasis added) (CON App., pp. 15-16). This leaves open the possibility that the Applicants will attempt to recruit additional physicians, possibly from specialties other than orthopedics, to supplement the Proposed ASC's case volume. Considering the Hartford ASC's low volume, the loss of any additional cases (let alone a significant number of cases) from physicians on its Medical Staff could have a devastating effect on the facility. The Hartford ASC

cannot absorb any real loss of business and continue to operate for the benefit of those it serves in the greater Hartford area.

***Potential Loss of Surgeons to the West Hartford ASC***

As mentioned previously, the West Hartford ASC is operating below capacity and will be operating at an even lower percent capacity if this proposal is approved due to case shift to the Proposed ASC (CON App., pp. 11 & 13). Gynecology is listed as a targeted growth area (CON App., p. 424). The gynecological physicians on the Medical Staff at the Hartford ASC have been urged by Hartford Hospital to relocate their cases to the West Hartford ASC. Gynecological surgeries represent a significant percentage of the case volume remaining at the Hartford ASC. In 2013, 732 of the facility's 1,380 total cases (53%) were gynecological cases. If the Hartford ASC lost just half of these cases (the vast majority of which are commercially insured), the financial loss to the facility would be approximately $439,000 (based on net revenue per case of $1,200). This number would obviously be greater if more cases were lost.[7] Either way, the impact on the Hartford ASC would be significant.

***The Proposed ASC is Not the Most Cost-effective Means of Addressing Any Capacity Constraints at Applicants' Facilities***

Assuming that the capacity constraints for outpatient surgery within the Hartford Healthcare System and at the OAH and Glastonbury ASCs are as serious as the Applicants portray, there are

[7] A shift of gynecological cases from the Hartford ASC to the West Hartford ASC would result in higher costs to patients and payers as well because the West Hartford ASC is a hospital outpatient department ("HOPD"). HOPDs are reimbursed for outpatient surgical procedures at higher rates than freestanding ASCs.

options for addressing these constraints (in addition to redirecting patients to existing providers with available capacity) that do not involve constructing an unneeded $6.5 million ASC.

***Applicants Can Add Operating Room Capacity to Their Existing Facilities***

Each of the facilities involved in the proposal (Hartford Hospital, the West Hartford ASC, the OAH ASC, and the Glastonbury ASC) has the option of adding one (1) operating room every three (3) years without CON approval (Conn. Gen. Stat. §19a-638(a)(13)). None of these facilities has notified OHCA of the addition of an operating room within the last three years. If each of the facilities were to add an operating room for a total of four (4) additional ORs, this would suffice to meet the capacity constraints that supposedly necessitate building a new facility with just three (3) operating rooms.

The addition of two (2) operating rooms between the OAH and Glastonbury ASCs would cover the facilities' present demands, which supposedly require a shift of 1,769 cases to the Proposed ASC by year three of the proposal (CON App., p. 11). By Applicants' own admission, the OAH and Glastonbury ASCs together require only an additional .48 of an OR to accommodate present orthopedic volume (CON App., p. 447). Combine this with OAH's OR needs for pain management (1/2 of an OR) and one (1) OR between the facilities would suffice without shifting any volume to the Proposed ASC.

Similarly, the addition of one (1) operating room at Hartford Hospital would cover the proposed shift of 1,069 cases (CON App., p. 11), and the renovation of the operating rooms slated for closure, if feasible, could help to accommodate the projected growth in surgical volume at the Hospital due to newly recruited surgeons. There is no need for any additional capacity at the West

Hartford ASC, as previously discussed. However, the addition of an operating room at that facility might help to alleviate any actual capacity constraints at Hartford Hospital or the OAH and Glastonbury ASCs. The cost of adding/renovating operating rooms would likely be significantly less than the $6.5 million capital expenditure being contemplated in connection with the Proposed ASC.

***Cost Savings from Shift of Cases to Hospital-owned ASC May Not be as Significant as Applicants Claim***

The Applicants claim that the reimbursement by patients and payers for procedures at the Proposed ASC will be approximately thirty-five percent (35%) lower than reimbursement for hospital-based outpatient surgical services (CON App., pp. 8 & 20).[8] This is not entirely accurate. While Medicare reimbursement for services in a freestanding ASC would be approximately one third the cost of hospital-based services, the same does not hold true for commercially insured services, particularly in an ASC where a hospital owns fifty-one percent (51%) of the facility. In SCA's experience, ASCs are generally able to obtain higher rates of reimbursement when they partner with a hospital or a health system than when they do not. This depends, of course, on the health system's presence in the market, but it is clear that Hartford Hospital has a significant presence in the healthcare market in Connecticut and, with that, considerable negotiating power. Note also that Medicare accounts for only sixteen percent (16%) of cases at the Proposed ASC, while commercial insurance accounts for sixty-three percent (63%) of cases (CON App., p. 20), making the overall impact on reimbursement less significant than Applicants have represented.

[8] The Applicants' stance on lowering outpatient surgery costs by shifting procedures to an ASC is at odds with Hartford Hospital's recent acquisition of a Constitution Surgery facility and conversion of that facility to a higher-cost HOPD (see Docket No. 10-31673-CON).

It would likely be more cost-effective to shift cases from hospital-based settings to ASCs without hospital partners. This would include the Hartford ASC, which has ample capacity to accommodate additional surgeries and would be amenable to undertaking any renovations, and purchasing any equipment, necessary to accommodate the needs of the Hartford Hospital and OAH physicians and their patients.

***Limitations on Patient Choice are Not In Best Interest of Patients and Payers***

Lastly, the realistic possibility that a facility like the Proposed ASC could put the Hartford ASC out of business is not in the best interests of patients or payers. This limits patient choice and can result in increased costs for patients and payers. In order to ensure that there are cost-effective options, and that the healthcare system in the region remains financially strong, OHCA should not approve a facility that could have a significant adverse impact on a low-cost existing provider such as the Hartford ASC (see Conn. Gen. Stat. §19a-639(4) & (5)).

***The Proposed ASC Does Not Enhance Access for Medicaid Recipients and Indigent Persons***

The Proposed ASC does not meet the CON statutory objective of enhancing access to care for Medicaid recipients and indigent persons. In reviewing a CON Application, OHCA must assess whether the proposal provides appropriate access for these patient populations (Conn. Gen. Stat. §19a-639(10)). The payer mix for the Proposed ASC is heavily weighted towards commercial, non-governmental payers (63.1% commercial insurance and 13.9% workers compensation) (CON App., p. 20). Medicaid recipients and the uninsured will make up only a fraction of the Proposed ASC's patients (5.6% Medicaid and 1.6% uninsured) (CON App., p. 20). This payer mix is based on the

current patient population at Hartford Hospital and the OAH facilities, both of which are located in the suburbs. OHCA should not approve a new ASC in an urban location, where many Medicaid recipients and indigent persons reside, if that facility will serve only a small percentage of these individuals.

*Conclusion*

This proposal fails to meet several of the statutory decision criteria for issuance of a CON. The Applicants have not shown a clear public need for the Proposed ASC because they have not conducted a complete assessment of the capacity and utilization of existing outpatient surgical providers in the greater Hartford area. The Hartford ASC has the capacity to accommodate a significant number of additional surgeries and this is likely the case with other facilities in the area as well.

Moreover, the Applicants' claim that the Proposed ASC will have no impact on existing providers is disingenuous. By their own admission, not all of the physicians who will utilize the Proposed ASC are associated with OAH. Whether there are other orthopedists being recruited, if the plan is to convert the facility to multi-specialty or to backfill the West Hartford ASC with gynecological cases, the Proposed ASC will have a potentially devastating impact on the Hartford ASC.

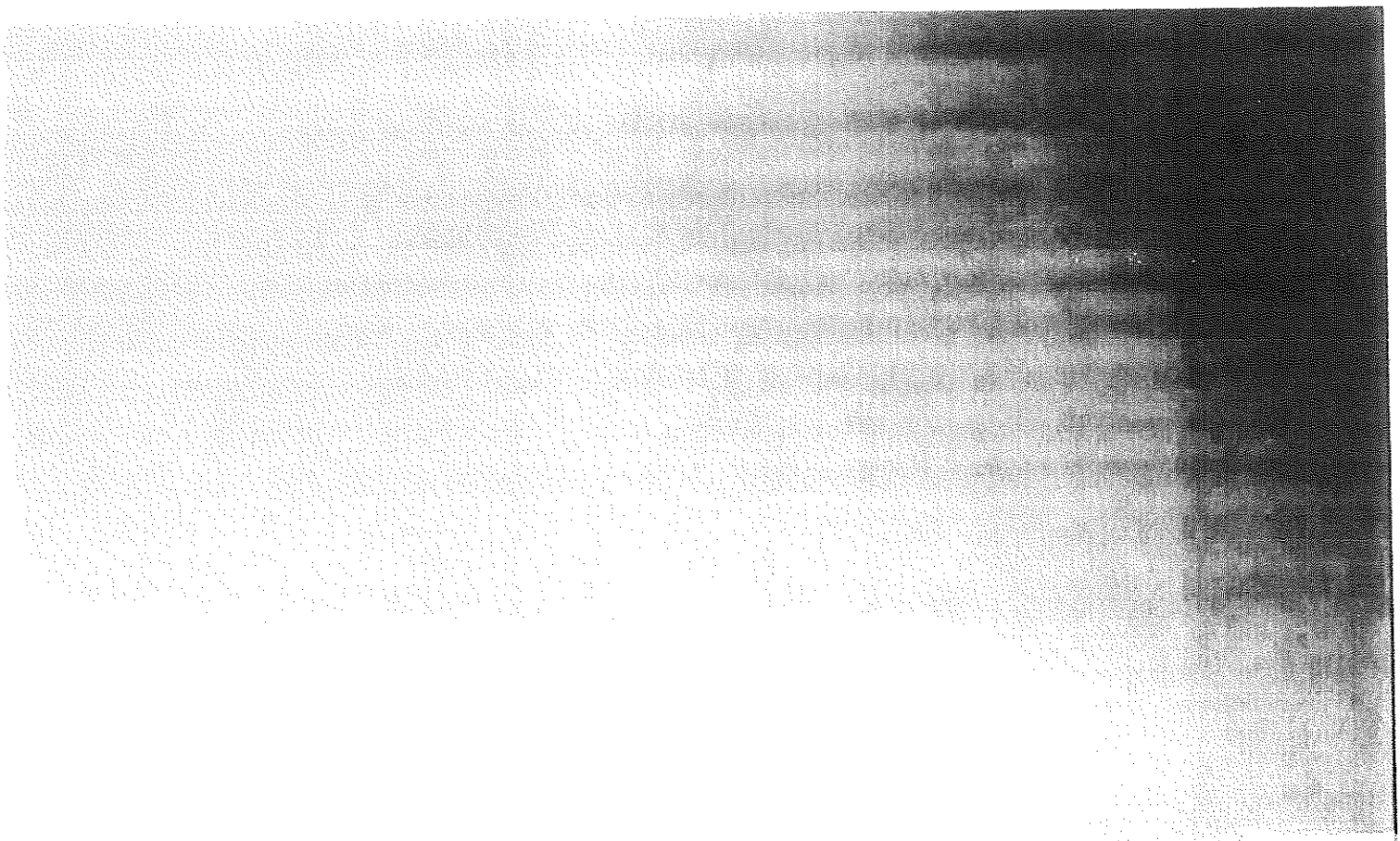
Lastly, the Proposed ASC is not the most cost-effective means of addressing any capacity constraints and despite its urban placement, it does not appear to be targeted at the Medicaid and indigent populations in Hartford.

For these reasons, HSC respectfully request that OHCA deny HHCHSC's CON request. I thank you for your time and am available to answer any questions you may have.

Respectfully Submitted,

Christian D. Ellison
Senior Vice President, Operations
Surgical Care Affiliates, LLC
On Behalf of Hartford Surgery Center, LLC

# EXHIBIT A



# SECTION 2

# 4.0 OUTPATIENT SURGERY

## 4.1 RELATIONSHIP TO CERTIFICATE OF NEED

Connecticut General Statutes Section 19a-638(a)(1) specifies a Certificate of Need is required for the establishment of a new health care facility and subsection (a)(5) specifically lists the establishment of an outpatient surgical facility, as defined in section 19a-493b, or as established by a short-term acute care general hospital. Facilities seeking authorization to establish a new outpatient surgical center are required to demonstrate that they meet clear public need as well as other criteria set forth in Connecticut General Statutes Section 19a-639.

## 4.2 OVERVIEW

Forty years ago, virtually all surgery was performed in a hospital. Since the early 1980s, however, there have been many changes in how surgical care is provided, due largely to advances in medical technology and changes in payment arrangements. The medical advances include new anesthesia that allow a patient to awaken more quickly after surgery, and better analgesics for pain control. In addition, minimally invasive and noninvasive procedures such as laser surgery, laparoscopy and endoscopy have been developed.[65] These advances allow many procedures formerly done in inpatient settings to be performed in outpatient surgical facilities.

Concerns about rising health care costs also have contributed to the growth of ambulatory surgery. The federal government expanded Medicare coverage to include services provided in outpatient surgical facilities (OSFs). The prospective payment system based on diagnosis-related groups (DRGs) that was adopted for hospital inpatient care created financial incentives for hospitals to shift less complex surgeries to an outpatient setting. Under impending health care reform, how lucrative payments to OSFs are, hospital-owned and privately, remains to be determined.[66]

Ambulatory surgical care is defined in the Connecticut Public Health Code as "surgical care not requiring overnight stay but requiring a medical environment exceeding that normally found in a physician's office".[67] This care may be delivered in a licensed outpatient surgical facility or at an acute care hospital's designated outpatient surgical center. Along with the elimination of an inpatient hospital admission, surgery in an outpatient setting makes better use of resources, especially the surgeon's time. Currently, approximately 70% of the surgeries in Connecticut are performed as ambulatory procedures.[68]

## 4.3 AMBULATORY SURGICAL PROCEDURES

The U.S. Department of Health and Human Services Centers for Medicare and Medicaid Services (CMS) reviews surgical procedures to determine those that are appropriate for the outpatient setting. The CMS also determines which procedures are eligible for reimbursement of services under Medicare or Medicaid. A major consideration for the inclusion or exclusion of a procedure is patient safety in an OSF environment.[69]

CMS follows an established set of eligibility standards. The general standards for covered surgical procedures are those surgical and other medical procedures that:

- Are commonly performed on an inpatient basis in hospitals, but may be safely performed in an OSF;
- Are not of a type that are commonly performed, or that may be safely performed, in physicians' offices;
- Are limited to those requiring a dedicated operating room and generally requiring a post-operative recovery room (not overnight);[70] and

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[65]Cullen, K.A, Hall, M.J. & Golosinky, A. (2009). Ambulatory surgery in the United States, 2006. National health statistics reports, 11. Revised. National Center for Health Statistics. Retrieved from http:www.cdc.gov/nchs/

[66]Cullen, et al.

[67]State of Connecticut, Public Health Code, 19-13-D56 (a) (2).

[68]OHCA Hospital Reporting System. 2012. 12 month filing, Report 450 - Hospital Inpatient & Outpatient Other Services Utilization & FTE Employees, as of April 11, 2012.

[69]Federal Register. Friday, March 28, 2003. Rules and regulations 68(60), 15271.

[70]Public Health, Ambulatory surgical services. 42 C.RR § 416. (2012).

- Are not cosmetic surgery and related services, except as required for the prompt repair of accidental injury or to improve the functioning of a malformed body member.[71]

Eligible surgical procedures are limited to the following specific standards:

- Those procedures that do not generally exceed a total of 90 minutes operating time and a total of four hours recovery time;
- Anesthesia must be local or regional or general anesthesia of 90 minutes or less;
- Those procedures that do not generally result in extensive blood loss or required major or prolonged invasion of body cavities or directly involved major blood vessels; or
- Those procedures that are not generally emergency or life-threatening in nature.[72]

## 4.4 OUTPATIENT SURGICAL FACILITIES (OSFs)

The acronym OSF is the term used in Connecticut law and regulation to refer to a particular type of licensed facility. The term ambulatory surgery center (ASC) is a specific term used in federal law and regulation that refers to a specific type of facility that must comply with CMS rules and accreditation standards. Connecticut has many ASCs that are licensed as OSFs, but not all OSFs are ASCs.

### 4.4.1 LICENSURE AND CERTIFICATION

#### 4.4.1.1 DPH Licensure

OSF is a distinct DPH licensure category. New OSFs require Certificate of Need authorization prior to applying for a license to operate. All facilities, regardless of the type and procedures performed and/or reimbursed[73], are subject to regular State and federal inspections.

#### 4.4.1.2 CMS Certification

To receive reimbursement through Medicare, the CMS requires OSFs to have Medicare certification. The majority of CMS' conditions for Medicare certification are concerned with patient safety. The CMS Ambulatory Surgery Center Quality Reporting Program requires each OSF to submit information to track whether patients are transferred or admitted directly to a hospital, including a hospital emergency department, upon discharge from the facility. This information can indicate a potentially preventable complication, serious medical error, or other unplanned negative outcome. A high rate of transfers or inpatient admission may be an indication of suboptimal care or provision of care to patients that should not have been treated in an ambulatory surgical setting.[74]

### 4.4.2 OSF TYPES AND OWNERSHIP

OSF ownership structures include hospital only; physicians only; hospital and physician joint venture; and corporate-hospital. OSFs based at acute care hospitals operate under the hospital's license and management and provide the same types of services as other outpatient surgical facilities. These facilities may be part of the main hospital, in a separate building on the hospital campus or in a building off the hospital campus. Those facilities located off the hospital campus are listed on the general hospital licenses as satellites.

Physician-owned OSFs provide physicians with more direct control over their surgical practices. They may schedule procedures at their convenience, assemble their surgical teams, ensure the equipment and supplies being used are best suited to their technique and design the OSF to suit their specialties. Physicians also benefit from the professional autonomy over their work environment and the quality of their care. These facilities are often referred to as "free-standing" as they are not hospital owned or hospital operated.

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[71] Public Health, Exclusions from Medicare and limitations on Medicare payment. 42 C.F.R § 411. (2012).

[72] Public Health, Ambulatory surgical services. 42 C.F.R § 416. (2012).

[73] For example, cosmetic surgery is licensed and regulated by the State of Connecticut, although CMS does not reimburse for many cosmetic procedures.

[74] Medicare Payment Advisory Committee. (2012). Report to the Congress: Medicare payment policy. Ambulatory surgical center services. 5(131-132).

Joint venture facilities owned by both hospitals and physicians became popular to help hospitals increase market share and stay profitable, and physicians to grow their surgical practices. In addition to the financial benefits, joint ventures enabled hospitals and physicians to provide patients with services in an efficient and convenient facility.[75] Health care reform may dictate which ownership structures remain and how profitable they will be.

## 4.4.3 FACILITIES AND OPERATING ROOMS

As of October 1, 2011, Connecticut had:

- 30 general or children's general hospital-based[76] multi-specialty OSFs;
- 16 multi-specialty hospital satellite OSFs;
- 2 single-specialty hospital satellite OSFs;
- 17 free-standing multi-specialty OSFs; and
- 44 free-standing single-specialty OSFs.

The locations and categories of the licensed OSFs are indicated in the maps in Appendices J, K and L. The categories are hospital-based, single-specialty and multi-specialty (Appendix J); hospital satellite, single-specialty and multi-specialty (Appendix K); and free-standing, single-specialty and multi-specialty (Appendix L). Each Connecticut acute care general hospital performs outpatient surgical procedures either within the main hospital or at a separate building on the hospital's main campus. Fifteen of the 30 hospitals have satellite outpatient surgical office locations, including the children's general hospital, Connecticut Children's Medical Center. Middlesex Hospital, in addition to the OSF on its main campus, has a second facility at its outpatient center 2 miles away. Hartford Hospital has two satellite OSFs, a multi-specialty OSF in West Hartford and a single-specialty OSF in Newington.

The 44 free-standing single-specialty OSFs in Connecticut have a total of 70 operating rooms. Almost half are dedicated to endoscopic procedures, and approximately 36% to cosmetic surgery and eye surgery. Twenty-two OSFs have a single operating room and are located in a physician's office. These facilities are not generally used daily as the surgeries are scheduled to meet the needs of patients and the physicians themselves. The most common practitioners with office-based operating rooms are plastic surgeons, ophthalmologists, orthopedic surgeons, pain management physicians and gynecologists. Reimbursement from a third-party payer may be provided depending on the patient's insurer, except in the case of cosmetic surgery. As most cosmetic procedures are elective, patients are generally self-pay, and pay for their procedures in advance.

The 17 multi-specialty free-standing OSFs have a total of 37 operating rooms, with a range of one to five operating rooms per facility. These facilities have many physicians that utilize block operating room times suitable to their surgical specialty. These facilities mostly operate on a regular five-day a week schedule with varying hours for the convenience of the physicians, staff and patients. It is common to combine two or more specialties with surgeries for each performed on the same day.

There are 15 hospital satellite OSFs with a total of 67 operating rooms, with a range of one to five operating rooms per facility. One of the facilities is a two-operating-rooms endoscopy center and one is a four-operating-rooms eye surgery center; the remaining facilities are multi-specialty with the number of operating rooms ranging from one to 12. It is difficult to determine the number of operating rooms dedicated to outpatient surgery when a hospital does not have a designated OSF within its main facility or on its main campus.

[75] Pizzo, J. & Redd, L. (2006). Hospital-Physician Joint Ventures: Maximizing the Potential. Health Care Financial Management Association.
[76] Connecticut acute care hospitals have an estimated 413 operating rooms available for surgery/surgical procedures.


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## 4.5 SURGERIES PERFORMED IN THE OUTPATIENT SETTING

Multi-specialty OSFs may be free-standing, hospital joint-venture, or wholly-owned hospital facilities. A vast array of surgical procedures is performed at these facilities. Common procedures performed in multi-specialty OSFs include:

- Colonoscopy and biopsy;
- Upper gastrointestinal endoscopy and biopsy;
- Gastrointestinal procedures, such as cholecystectomy, common duct exploration, tonsillectomy and adenoidectomy;
- Urinary procedures, such as ureteral catheterization and removal of ureteral stones;
- Musculoskeletal procedures, such as arthroscopic procedures on the knee, carpal tunnel release, reconstruction of cruciate ligaments in the knee;
- Cataract surgery and other eye procedures;
- Ear, nose or throat procedures, such as ear tube surgery;
- Inguinal and femoral hernia repair; and
- Gynecological procedures, such as breast biopsy and diagnostic dilatation and curettage.[77]

Endoscopy procedures are one of the common types of procedures performed in a single-specialty OSF. Endoscopic procedures are mainly non-operative procedures performed through a scope to observe the interior of organs in the body, such as the bronchi, esophagus, and colon.

## 4.6 STANDARDS/GUIDELINES

### DEFINITIONS

1. Section 19a-493b, (CGS) defines an OSF as "any entity, individual, firm, partnership, corporation, limited liability company or association, other than a hospital, engaged in providing surgical services or diagnostic procedures for human health conditions that include the use of moderate or deep sedation, moderate or deep analgesia or general anesthesia, as such levels of anesthesia are defined from time to time by the American Society of Anesthesiologists, or by such other professional or accrediting entity recognized by the Department of Public Health. An outpatient surgical facility shall not include a medical office owned and operated exclusively by a person or persons licensed pursuant to section 20-13, provided such medical office: (1) Has no operating room or designated surgical area; (2) bills no facility fees to third party payers; (3) administers no deep sedation or general anesthesia; (4) performs only minor surgical procedures incidental to the work performed in said medical office of the physician or physicians that own and operate such medical office; and (5) uses only light or moderate sedation or analgesia in connection with such incidental minor surgical procedures."
2. Nothing in this subsection shall be construed to affect any obligation to comply with the provisions of Section 19a-691, CGS, concerning anesthesia accreditation or Section 19-13-D56 of the Public Health Code concerning licensing of outpatient surgical facilities operated by corporations.
3. "Primary Service area" for an OSF is the area where approximately 75% of the facility's patients reside. Service area may be towns, zip codes, or other U.S. Census geographical type.
4. "Maximum Capacity" is the number of surgical cases that may be performed in a year based on Monday through Friday, eight hours per day, and 250 days per year. It is the responsibility of the Applicant to provide sufficient documentation to establish the length of time the average case requires and the time required for cleanup.
5. "Optimum utilization" is the percent of the maximum capacity that a facility can achieve under a regular work environment, considering the variation in procedures performed, the number of physicians utilizing the facility, and other factors.

[77] Agency for Healthcare Research and Quality. (2010). Hospital-Based Ambulatory Surgery, 2007. *Healthcare Cost and Utilization Project (HCUP) Statistical Brief #86.* Retrieved from http://www.hcup-us.ahrq.gov/reports/statbriefs/sb86.jsp

The following guidelines and/or standards for the establishment of an OSF will be considered by OHCA when considering a Certificate of Need request:

1. When an Applicant proposes to establish a new multi-specialty OSF, the case volume of single-specialty OSFs dedicated solely and exclusively for endoscopy may be excluded from the existing; volumes when establishing need for the multi-specialty OSF as required by Sec. 19a-639 (3), CGS.
2. Unless otherwise established by the Applicant and supported with documentation:
   - The capacity of the proposed facility will be based on eight (8) hours per day, five (5) days per week fifty (50) weeks per year for a total of 2,000 hours per year;
   - The optimal utilization for an operating room in an OSF is 80%;
   - The average time for an outpatient case will be sixty (60) minutes; and
   - Thirty (30) minutes will be allocated to cleanup between cases;
3. Unstaffed operating rooms are considered as available and shall be included in any calculations for capacity and utilization;
4. Delivery rooms for Caesarean sections and operating rooms specifically reserved for cardiac cases shall be excluded from calculations for capacity and utilization;
5. Proposed new OSFs must have written policies concerning access to care by persons who are underinsured or uninsured;
6. The Applicant must demonstrate the financial feasibility of the OSF within the first three (3) years of operations or within a reasonable time based on factors reported and supported by the Applicant;
7. The proposed new OSF will have in place at start of operations a transfer agreement with an acute care general hospital;
8. The Applicant must have in place at the start of operations a quality Assessment and Performance Improvement Program and be certified by Medicare or a national accrediting body for which CMS grants status to accredit ambulatory surgery centers;
9. The applicant must have in place at the start of operations a contract with a patient safety organization as defined at CGS § 19a-127o.

## OTHER FACTORS FOR CONSIDERATION

Supplemental to the current guidelines and principles, as listed in Section 19a-639, CGS, OHCA may consider the following factors when reviewing a Certificate of Need request:

1. Changes in technology and changes in medical treatment specialties;
2. Proposed service areas that include patients from those states that border Connecticut, i.e., Massachusetts, New York and Rhode Island;
3. Physician referral patterns;
4. Underserved populations;
5. Unique populations, specific clinical needs or performance of procedures more lengthy in nature;
6. Limited specialty programs where access to surgical services is limited; and
7. Atypical barriers to care based on cost, quality, financial access or geographic access.

## 4.7 CURRENT ISSUES PERTAINING TO OSFs

OSFs, as other healthcare facilities and providers, are operating under the strain of current economic conditions, including physician shortages and regulatory mandates. They will also be affected by the changes resulting from health care reform. Commercial insurers often base their procedure reimbursements on the rates paid under Medicare and Medicaid. Historically, Medicare and Medicaid have paid providers at lower rates than other third-party payers. In addition, mandated electronic reporting will likely increase operating expenses for OSFs.

With the aging of the population in Connecticut, most OSFs will require Medicare certification to obtain reimbursement for the services they provide to older patients. To receive Medicare certification, the OSFs will be required to meet Medicare's conditions of coverage, which specify standards for administration of anesthesia, quality evaluation, operating and recovery rooms, medical staff, nursing services and other areas.[78] Under the CMS' new quality reporting programs, those that fail to report the required information will face a reduction in their Medicare payments. As of October 1, 2012, OSFs are required to report data on patient burns, patient falls, wrong side of patient, procedure, implants, hospital admissions and transfers, and prophylactic IV antibiotic timing. In 2013 they will be required to report two additional measures: safe surgery checklist use in 2012 and 2012 volume of certain procedures. While these two measures will not be reported until 2013, OSFs must ensure they are using a safe surgery checklist and have a system in place by January 1, 2012 to capture surgical volume data.

[78]Federal Register. Wednesday, November 30, 2011. Rules and Regulations. 78(230), 74126-74127.



HSC000036
2/21/14

## CERTIFICATION

I hereby certify that a copy of the foregoing has been sent via United States mail, postage prepaid, and electronic mail, this 21st day of February, 2014 to the following:

Joan Feldman, Esq.
Shipman & Goodwin, LLP
One Constitution Plaza
Hartford, CT 06103-1919
jfeldman@goodwin.com

Jennifer Groves Fusco, Esq.
Updike, Kelly & Spellacy, P.C.

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
**OFFICE OF HEALTH CARE ACCESS DIVISION**

| | |
|---|---|
| IN RE: CERTIFICATE OF NEED APPLICATION OF HHC HARTFORD SURGERY CENTER, LLC TO ESTABLISH AN ORTHOPEDIC AMBULATORY SURGERY CENTER ON THE HARTFORD HOSPITAL MAIN CAMPUS | DOCKET NO. 13-32851-CON |
| | FEBRUARY 21, 2014 |

**NOTICE OF APPEARANCE**

In accordance with Section 19a-9-28 of the Regulations of Connecticut State Agencies, please enter the appearance of Updike, Kelly & Spellacy, P.C. ("Firm") in the above-captioned proceeding on behalf of Connecticut Surgery Center, Limited Partnership ("CSC"). The Firm will appear and represent CSC at the public hearing on this matter, scheduled for February 28, 2014.

Respectfully Submitted,

CONNECTICUT SURGERY CENTER,
LIMITED PARTNERSHIP

By: _____
JENNIFER GROVES FUSCO, ESQ.
Updike, Kelly & Spellacy, P.C.
265 Church Street
One Century Tower
New Haven, CT 06510
Tel: (203) 786-8300
Fax (203) 772-2037

**CERTIFICATION**

I hereby certify that a copy of the foregoing has been sent via United States mail, postage prepaid, and electronic mail, this 21st day of February, 2014 to the following:

Joan W. Feldman
Shipman & Goodwin, LLP
One Constitution Plaza
Hartford, CT 06103-1919
jfeldman@goodwin.com

Jennifer Groves Fusco, Esq.
Updike, Kelly & Spellacy, P.C.

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
**OFFICE OF HEALTH CARE ACCESS DIVISION**

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| IN RE: CERTIFICATE OF NEED APPLICATION OF HHC HARTFORD SURGERY CENTER, LLC TO ESTABLISH AN ORTHOPEDIC AMBULATORY SURGERY CENTER ON THE HARTFORD HOSPITAL MAIN CAMPUS | DOCKET NO. 13-32851-CON |
| | FEBRUARY 21, 2014 |

**PETITION OF CONNECTICUT SURGERY CENTER, LIMITED PARTNERSHIP TO BE DESIGNATED AS AN INTEVENOR WITH FULL RIGHTS INCLUDING THE RIGHT OF CROSS-EXAMINATION**

In accordance with Section 4-177a of the Connecticut General Statutes and Section 19a-9-27 of the Regulations of Connecticut State Agencies, Connecticut Surgery Center, Limited Partnership ("CSC"), which owns and operates an outpatient surgical facility located at 81 Gillett Street, Hartford, CT 06105 known as Connecticut Surgery Center (the "Connecticut ASC"), hereby petitions the Office of Health Care Access Division of the Department of Public Health ("OHCA") to be designated as an intervenor with full rights, including the right of cross-examination, in the Certificate of Need ("CON") proceeding under Docket No. 13-32851-CON.

This proceeding concerns the request of HHC Hartford Surgery Center, LLC ("HHCHSC") for permission to establish a freestanding orthopedic ambulatory surgical center on the main campus of Hartford Hospital (the "Proposed ASC"). HHCHSC is a joint venture comprised of Hartford

Hospital, Orthopedic Associates of Hartford, P.C. ("OAH") and Constitution Surgery Centers, LLC ("Constitution Surgery") (collectively the "Applicants").

As detailed herein and in the accompanying testimony of Christian D. Ellison, Senior Vice President, Operations at Surgical Care Affiliates, LLC (the parent company of CSC), CSC and the Connecticut ASC would be adversely impacted by the approval of a facility for which there is no clear public need. The Proposed ASC will serve to further dilute the greater Hartford outpatient surgical market where there exists ample excess capacity. Moreover, the Applicants have not shown that the Proposed ASC is a cost-effective solution to any capacity issues at their facilities. Nor have they demonstrated how the Proposed ASC will enhance access to care for Medicaid recipients and indigent persons.

***History of the Connecticut ASC and Services Provided***

The Connecticut ASC is a duly licensed outpatient surgical facility located at 81 Gillett Street in Hartford. The Connecticut ASC has been in operation for 30 years. It was authorized pursuant to a CON issued by the former Commission on Hospital and Health Care in 1983 (Docket No. 83-540). In 2007, ASC Acquisition LLC ( "ASC Acquisition" n/k/a Surgical Care Affiliates, Inc.), the parent company of Surgical Care Affiliates, LLC ("SCA"), acquired the Connecticut ASC and the balance of the ambulatory surgery division of HealthSouth Corporation, which included three other Connecticut facilities (Docket No. 07-30955-CON).

CSC is currently owned by Connecticut Surgical Center, LLC, an affiliate of SCA, and eighteen (18) physician investors. SCA owns, operates and/or manages 185 surgical facilities,

including freestanding ambulatory surgery centers ("ASCs"), in 34 states across the United States. This includes the Connecticut and Hartford Surgery Centers (the "Hartford ASC") (collectively the "SCA ASCs"), both located in Hartford, Connecticut, as well as facilities located in Danbury and Trumbull, Connecticut.

The Connecticut ASC is authorized for three (3) operating rooms and one (1) procedure room and offers service in the following surgical specialties: Gynecology; neurology; ophthalmology; orthopedics; pain management; podiatry; and urology. Historically, the Connecticut ASC has performed well and its urban location offers easy access to residents of the City of Hartford and surrounding towns for their outpatient surgical procedures.

***CSC's Interests Will Be Adversely Affected by Approval of HHCHSC's CON Proposal***

The Applicants are asking OHCA to approve a CON for a new ASC in an area where there is ample excess capacity at existing providers. HHCHSC proposes to establish a freestanding orthopedic-only ASC on the Hartford Hospital main campus. The Applicants claim that the facility is necessary in order to accommodate their current and projected future surgical case volume. However, the Applicants' analysis of the "need" for the Proposed ASC is overly limited and, as such, it is flawed.

Simply put, there is no clear public need for the Proposed ASC. The Applicants based their claim of need on an analysis of capacity and utilization of their own facilities. These include Hartford Hospital, an ASC owned and operated by OAH in Rocky Hill (the "OAH ASC") and an ASC owned by Hartford Hospital, OAH and Constitution Surgery in Glastonbury (the "Glastonbury

ASC"). The Applicants did not consider, or provide OHCA with any information regarding, available outpatient surgical capacity at non-affiliated providers. As Mr. Ellison details in his testimony, there are 92 operating rooms at 11 different facilities in the area for which the Applicants provided absolutely no information or analysis. Our sister facility the Hartford ASC, for one, has substantial excess capacity that can be used to meet the outpatient surgical needs of the Applicants and their patients. This facility is currently operating at just sixty-five percent (65%) of optimal capacity (52% of maximum capacity) without consideration of an approved procedure room, which is does not staff and which could add substantial additional capacity. The Applicants have also overestimated capacity constraints at their facilities, including most notably the OAH ASC.

Allowing the Applicants to establish the Proposed ASC will result in the unnecessary duplication of services, which will be detrimental to all existing providers in the service area. In order to justify the $6.5 million capital expenditure for the Proposed ASC, the Applicants will likely employ every strategy to increase physician participation and patient volume, including the recruitment of orthopedic physicians who currently utilize facilities like the Connecticut ASC. Because orthopedic cases represent forty-two percent (42%) of the Connecticut ASC's surgical volume, the loss of orthopedic physicians to the Proposed ASC could have a devastating effect on the facility.

In addition, there is nothing that precludes the Applicants from converting an approved single-specialty ASC to multi-specialty. If this were to happen, the Applicants would then be in a position to recruit physicians from all specialties, including those who perform their surgeries at the Connecticut ASC in the areas of pain management and gynecology, for example. There are currently

eleven (11) physicians who practice at the Connecticut ASC who have privileges at Hartford Hospital and it would not be difficult for these and other physicians be become credentialed at the Proposed ASC. The loss of some or all of these physicians, particularly orthopedists, to the Proposed ASC would have an adverse impact on the Connecticut ASC.

The Applicants have also failed to establish that the West Hartford Surgery Center (the "West Hartford ASC"), which functions as a Hartford Hospital Outpatient Department, is anywhere near capacity. The Applicants plan to shift volume from this underutilized facility to the Proposed ASC. Their plan to backfill the West Hartford ASC with volume from newly recruited surgeons appears unrealistic given the facility's low volume. It is more likely that Hartford Hospital will move forward with plans to recruit area gynecologists to perform surgeries in West Hartford. The Hospital has been actively recruiting the Connecticut ASC's gynecologists for years and if these physicians were to move their cases to West Hartford it would have a significant adverse impact on the Connecticut ASC. Accordingly, the interests of CSC, as owner of the Connecticut ASC, are directly affected by this CON request.

***Summary of Evidence to Be Presented, Manner of Participation and Relief Sought***

CSC will ask OHCA to deny HHCHSC's request for permission to establish the Proposed ASC. There is no clear public need for the facility being proposed (Conn. Gen. Stat. §19a-639(3)). In addition, the Proposed ASC will result in the unnecessary duplication of services and it will adversely impact CSC and other existing providers (Conn. Gen. Stat. §19a-639(9)). This will be shown through the presentation of evidence regarding the Applicants' flawed analysis of outpatient

surgical utilization/capacity in the service area of the Proposed ASC, including inaccuracies in the Applicants' analysis of utilization/capacity at their own facilities. CSC will also offer an analysis of utilization/capacity at the Connecticut ASC and the financial impact of the potential loss of physicians and patients on the Connecticut ASC.

There are also questions around the cost-effectiveness of this proposal and its relationship to the statutory goal of enhancing access for Medicaid recipients and indigent persons (Conn. Gen. Stat. §19a-639(6) & (10)). CSC will present evidence of more cost-effective means of remedying any outpatient surgical capacity issues that the Applicants are experiencing, including the addition of operating rooms to existing facilities. CSC will also present evidence to rebut the Applicants' claim that the Proposed ASC will be reimbursed at substantially lower rates than those paid for outpatient services provided a hospital setting. Lastly, CSC will provide evidence regarding the lack of Medicaid and uninsured patients proposed to be served by the Applicants and why this supports denial of the CON request.

If CSC is granted status, it intends to present this and other evidence and legal arguments in support of its positions. CSC respectfully requests that it be allowed to submit written testimony, present evidence and arguments at the February 28, 2014 public hearing on this matter, cross-examine witnesses, and inspect and copy records pertaining to the proceeding. CSC's participation will furnish assistance to OHCA in determining whether there is a need for this proposal and what its impact will be on existing providers and evaluating Applicants' compliance with other CON statutory decision criteria. CSC has information directly relevant to HHCHSC's erroneous claims in this

regard, which will be presented at the hearing. In addition, CSC's participation is in the interest of justice and will not impair the orderly conduct of these proceedings.

**WHEREFORE**, for the foregoing reasons, CSC respectfully requests its Petition to be Designated as an Intervenor With Full Rights be granted.

Respectfully Submitted,

CONNECTICUT SURGERY CENTER,
LIMITED PARTNERSHIP

By: _____

JENNIFER GROVES FUSCO, ESQ.
Updike, Kelly & Spellacy, P.C.
265 Church Street
One Century Tower
New Haven, CT 06510
Tel: (203) 786-8300
Fax (203) 772-2037

**CERTIFICATION**

I hereby certify that a copy of the foregoing has been sent via United States mail, postage prepaid, and electronic mail, this 21st day of February, 2014 to the following:

Joan W. Feldman
Shipman & Goodwin, LLP
One Constitution Plaza
Hartford, CT 06103-1919
jfeldman@goodwin.com

Jennifer Groves Fusco, Esq.
Updike, Kelly & Spellacy, P.C.

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| IN RE: CERTIFICATE OF NEED APPLICATION OF HHC HARTFORD SURGERY CENTER, LLC TO ESTABLISH AN ORTHOPEDIC AMBULATORY SURGERY CENTER ON THE HARTFORD HOSPITAL MAIN CAMPUS | ) | DOCKET NO. 13-31851-CON |
| | ) | February 21, 2014 |

**PREFILED TESTIMONY OF CHRISTIAN D. ELLISON, SENIOR VICE PRESIDENT, OPERATIONS, SURGICAL CARE AFFILIATES, LLC, ON BEHALF OF CONNECTICUT SURGERY CENTER, LIMITED PARTNERSHIP**

Good morning Hearing Officer Hansted and members of the OHCA staff. My name is Christian Ellison and I am a Senior Vice President, Operations at Surgical Care Affiliates, LLC ("SCA"), located in Deerfield, Illinois. SCA owns, operates and/or manages 185 surgical facilities, including freestanding ambulatory surgery centers ("ASCs"), in 34 states across the United States. This includes Connecticut Surgery Center (the "Connecticut ASC") and Hartford Surgery Center (the "Hartford ASC") (collectively the "SCA ASCs"), both located in Hartford, Connecticut, as well as facilities located in Danbury and Trumbull, Connecticut.[1]

Thank you for this opportunity to speak in opposition to the CON Application filed by HHC Hartford Surgery Center, LLC ("HHCHSC") for permission to establish an orthopedic ASC on the main campus of Hartford Hospital (the "Proposed ASC"). The Proposed ASC will be a joint venture between Hartford Hospital, Orthopedic Associates of Hartford, P.C. ("OAH") and Constitution

[1] SCA also owns a minority interest in an ASC in Norwalk.

Surgery Centers, LLC ("Constitution Surgery") (collectively the "Applicants"). My remarks today will focus on the lack of clear public need for the Proposed ASC given available capacity at area providers. I will also discuss the significant adverse impact that a facility of this type and size, for which there is no clear public need, will have on existing providers such as the SCA ASCs. Lastly, I will touch upon the cost-effectiveness of the proposal, or lack thereof, and the relationship of the proposal to CON statutory decision criteria concerning access to care for Medicaid recipients and indigent persons.

***Relationship of SCA and the Connecticut ASC***

As mentioned previously, I am a Senior Vice President, Operations at SCA, a position that I have held since June of 2013. My responsibilities include market development and operations leadership for 22 facilities in the northeastern United States, including the Connecticut ASC. Prior to joining SCA I was a Senior Vice President, Corporate Development at Health Inventures, LLC ("Health Inventures"), an outpatient surgery center development and management company. I also served as Managing Director of Ascent Health Limited, a wholly owned subsidiary of Health Inventures located in the United Kingdom, where I led the development and operation of multi-specialty hospitals, a diagnostic imaging center and several ASCs. As such, I have extensive experience with both the development and operation of outpatient surgical facilities.

My employer SCA is the indirect owner of Connecticut Surgery Center, Limited Partnership ("CSC"), which is the licensed operator of the Connecticut ASC. Connecticut Surgical Center, LLC ("CSCLLC"), an SCA affiliate, serves as the General Partner of CSC, and eighteen (18) physician

partners own thirty-five percent (35%) of the facility. SCA ultimately controls operations at the Connecticut ASC through CSCLLC. In my role as a Senior Vice President at SCA I oversee operations at the Connecticut ASC. I have first-hand knowledge of the Connecticut ASC and am aware of the impact that the Proposed ASC will have on this business. The facility's Administrator, Kris Gorman, is also here today to answer any question you may have.

*History of the Connecticut ASC*

The Connecticut ASC is a duly licensed outpatient surgical facility located at 81 Gillett Street in Hartford. The Connecticut ASC has been in operation for 30 years. It was authorized pursuant to a CON issued by the former Commission on Hospital and Health Care in 1983 (Docket No. 83-540). In 2007, ASC Acquisition LLC ( "ASC Acquisition" n/k/a Surgical Care Affiliates, Inc.), the parent company of SCA, acquired the Connecticut ASC and the balance of the ambulatory surgery division of HealthSouth Corporation, which included three other Connecticut facilities (Docket No. 07-30955-CON). The Connecticut ASC is authorized for three (3) operating rooms and one (1) procedure room and offers service in the following surgical specialties: Gynecology; neurology; ophthalmology; orthopedics; pain management; podiatry; and urology. Historically, the Connecticut ASC has performed well and its urban location offers easy access to residents of the City of Hartford and surrounding towns for their outpatient surgical procedures.

*No Clear Public Need for the Proposed ASC*

Hartford Hospital and its physician partners OAH are asking OHCA to approve a joint venture ASC in an area where there is ample excess capacity at existing providers. HHCHSC proposes to establish a freestanding orthopedic-only ASC on the main campus of Hartford Hospital.[2] It will have three (3) operating rooms, with two (2) additional ORs shelled for future use (CON App., p. 7). HHCHSC claims that the facility is necessary in order to accommodate surgical volume at Hartford Hospital, at a facility owned by OAH in Rocky Hill (the "OAH ASC") and at a facility in Glastonbury owned by Hartford Hospital and GSC Holding, LLC (which now appears to be owned by Hartford Hospital, OAH and Constitution Surgery) (CON App., p. 422) (the "Glastonbury ASC"). However, HHCHSC's analysis of the "need" for the Proposed ASC is overly limited and, as such, it is flawed.

*There is Ample ASC Capacity in the Greater Hartford Area and Therefore No Clear Public Need for The Proposed ASC*

A threshold issue in every CON application is whether there is a "clear public need" for the proposal (Conn. Gen. Stat. §19a-639(3)). The supposed "need" for the Proposed ASC is based largely upon the Applicants' claim that existing facilities are operating near, at or over capacity (CON App., pp. 7, 10 & 13). This claim is inaccurate in several respects. First, the Applicants' analysis of capacity is limited to those facilities ***associated with the Hartford Healthcare System and OAH***. A more accurate assessment of capacity would look at ***all facilities within the service area*** of the Proposed ASC and not just those owned and operated by the Applicants. OHCA does not

[2] Once approved, there is nothing that prohibits HHCHSC from converting the orthopedic-only ASC to a multi-specialty facility.

typically allow a provider, including a health system, to limit its needs analysis to internal capacity without considering the capacity of other existing providers in the service area.[3] If this analysis had been undertaken, it would have revealed substantial excess capacity at our sister facility, the Hartford ASC, and likely at other providers in the area. Moreover, the capacity calculations provided by the Applicants for their own facilities are flawed or, at a minimum, misleading.

*Service Area Capacity*

The Applicants based their capacity analysis solely on outpatient surgical capacity/utilization at Hartford Hospital, the West Hartford Surgery Center, which functions as an outpatient department of the Hospital (the "West Hartford ASC"), the OAH ASC, and the Glastonbury ASC. Table 1c on page 15 of the CON Application shows the capacity/utilization of these facilities, as well as other hospitals within the Hartford Healthcare System. However, it omits any analysis of capacity/utilization at the numerous additional hospitals and freestanding ASCs that, by Applicants' own admission, operate within the service area of the Proposed ASC. In fact, Table 1c identifies as "Equipped for Proposal" but does not provide data for ***11 different facilities*** with a total of ***15 ASC operating rooms*** (both freestanding and hospital-based)[4] and ***77 hospital operating rooms***. This means there are a total of ***92 operating rooms*** in the service area whose capacity/utilization for outpatient procedures has not been analyzed. Assuming these operating rooms are available

[3] Section 4.6 of the Statewide Health Care Facilities & Services Plan (the "SHP") defines Primary Service Area in the context of outpatient surgery (SHP, p. 54, attached as Exhibit A). This was done, presumably, because an analysis of need in the Primary Service Area is relevant to a CON application for a new ASC. Any such analysis would necessarily include all existing providers within the Primary Service Area, not just providers within a healthcare system and their affiliated physicians.

[4] This number is 15, not 14 are reported by Applicants, because the Connecticut ASC has three (3) operating rooms, not two (2) as reported by Applicants (CON App., p. 15). An OR was added to the Connecticut ASC in March of 2011.

exclusively for outpatient procedures (which we understand is not the case with all hospital ORs) they represent 147,200 hours of capacity (assuming 1,600 hours per OR per year or "optimal utilization," which is 80% of maximum capacity as defined in the SHP, p. 55, attached as Exhibit A). Using the average case/clean-up time of 90 minutes set forth in the SHP, this represents 98,133 cases per year. The Applicants have ignored a substantial amount of capacity in the market and have done nothing to determine what percentage of this capacity is being utilized and what percentage is available to patients who might use the Proposed ASC.

***Applicants' Capacity***

The Applicants' analysis of capacity at their own facilities is also misleading. The primary issue is the Applicants' representation that the OAH ASC is operating at one hundred eighty-two percent (182%) of optimal capacity (or 146% of maximum capacity) (CON App., p. 13). This calculation is based on the SHP standard time per case/clean-up of 90 minutes (CON App., p. 13) (see Exhibit A). However, it is our understanding that a significant number of the cases performed at the OAH ASC are pain management cases. The Applicants report that 4,570 of their cases in 2012 were orthopedic (CON App., p. 447), so presumably the remaining 3,214 cases (41% of total case volume) were pain management. Based on our experience at the SCA ASCs, these cases take approximately 15 to 20 minutes to complete and turn around versus the 90-minute average case/clean-up time used by the Applicants in their calculations. When discussing maximum capacity the SHP states that it "is the responsibility of the Applicant to provide sufficient documentation to establish the length the average case requires and the time required for clean-up" (SHP, p. 54, attached as Exhibit A). Here, it was incumbent upon the Applicants to disclose that the average

case/clean-up time at the OAH ASC for pain management cases, which account for forty-one percent (41%) of the facility's volume, is far less than the average times contemplated in the SHP. Assuming OAH can complete and clean-up an average pain management case in 15 to 20 minutes, the capacity of any operating room used for these cases could be four to six times what has been reported.[5] Based on the foregoing, the capacity constraints at OAH are likely far less dire than the Applicants have portrayed and do not necessarily support the need for a new ASC in Hartford to which OAH can shift orthopedic case volume.

In addition, per the Applicants' own admission the West Hartford ASC is operating at just seventy-one percent (71%) of optimal capacity (or 57% of maximum capacity) (CON App., p. 15). This proposal involves the shifting of 109 cases per year from the West Hartford ASC to the Proposed ASC (CON App., p. 11). This will result in the West Hartford ASC operating at just sixty-eight percent (68%) of optimal capacity (or 54% of maximum capacity). With these percentages, there is certainly no "clear public need" for an additional ASC to accommodate patients who would have their surgeries at the West Hartford ASC.

The Applicants claim that they will backfill volume at the West Hartford ASC with certain hearing-related procedures (CON App., p. 424). However, they also list gynecology as a surgical growth area (CON App., p. 424). The gynecological physicians who use both the Hartford and Connecticut ASCs have been encouraged by Hartford Hospital for many years to relocate their procedures to the West Hartford ASC. We suspect that this is part of the plan and, as discussed in

[5] If pain cases take 15 minutes, then only 803.5 OR hours are required annually to accommodate 3,214 cases (3,214 x .25 = 803.5 hours). Assuming optimal OR utilization of 1,600 hours/year per the SHP (see Exhibit A), this means approximately 50% of an OR is required to accommodate OAH's pain management cases each year. Using a 20-minute turnaround time, pain management cases would require approximately sixty percent (60%) of an OR on an annual basis.

more detail below, the loss of these types of surgeries would have a significant adverse impact on the Connecticut ASC (as well as the Hartford ASC). Furthermore, the Applicants' claim that there will be 480 incremental surgical cases brought to the West Hartford ASC on an annual basis by newly recruited surgeons is unrealistic (CON App., p. 424). This would represent a twenty-one percent (21%) incremental increase in case volume over 2012 numbers (CON App., p. 13), which seems excessive given the low volume at the West Hartford ASC.

Given the fact that there is ample excess capacity at the Hartford ASC (as discussed in my testimony filed on behalf of HSC), the West Hartford ASC and likely at other existing providers in the service area of the Proposed ASC, there is no clear public need for the $6.5 million facility being proposed by the Applicants. Allowing the Applicants to build such a facility will result in the unnecessary duplication of services, which is contrary to the intent of the CON statutes (see Conn. Gen. Stat. §19a-639(9)). In order for the Applicants to make a facility of this size and cost work financially, they will necessarily be looking recruit business from existing providers such as the Connecticut ASC. Moreover, the Applicants' argument that patients and physicians prefer the convenience of an ASC setting does not support approval of this proposal. Convenience is not need. And even if it was, there are many "convenient" ASC options available to patients in the service area.

***Approval of the Proposed ASC Could Have a Significant Adverse Impact on the Connecticut ASC***

Approval of the Proposed ASC without any limitations could have a significant adverse impact on the Connecticut ASC. First, the Connecticut ASC's business is largely focused on the specialty of orthopedics. There would be nothing to prevent the Proposed ASC from recruiting the

Connecticut ASCs orthopedic surgeons (including a number of their physician partners) and, in doing so, taking a substantial number of cases away from this facility. In addition, because there is nothing in the CON statutes that precludes a single-specialty ASC from converting to multi-specialty, the Applicants could expand the scope of services at the Proposed ASC to include other surgical specialties offered at the Connecticut ASC.

***Potential Loss of Surgeons to the Proposed ASC***

If OHCA approves the Proposed ASC, there is a very real risk that the Connecticut ASC could lose a significant percentage of its orthopedic business. Orthopedics is the "core" surgical subspecialty at the Connecticut ASC, accounting for 1,765 of 4,231 cases or forty-two percent (42%) of case volume in 2013. Of the facility's eighteen (18) partners, fourteen (14) are orthopedic surgeons. There are two (2) orthopedic surgeons in particular, both of whom are credentialed and perform procedures at Hartford Hospital, who are vulnerable to pressure from the Hospital to relocate cases to the Proposed ASC. These physicians account for approximately 30 cases per month (360 cases per year) at the Connecticut ASC. This represents approximately nine percent (9%) of the Connecticut ASC's annual case volume. Loss of this business would represent a financial loss of approximately $900,000, based upon average net revenue for these physicians' cases.

Moreover, while the orthopedists are particularly vulnerable, there are many other surgeons among the facility's 110 physicians, including those who perform a significant percentage of their procedures at the Connecticut ASC, who could also be persuaded to utilize the Proposed ASC (assuming it converted to multi-specialty) instead of the Connecticut ASC given the overlap in the service areas of the two facilities. There are currently eleven (11) surgeons on the Medical Staff at

the Connecticut ASC who hold privileges at Hartford Hospital. Credentialing these or other Connecticut ASC physicians to perform procedures at the Proposed ASC would not be an issue.

HHCHSC would be able to sell interests in the Proposed ASC to these physicians (CON App., p. 420). Per its draft Operating Agreement, HHCHSC will have Class C members, which the Applicants describe as "physicians who have an ownership interest in the Proposed ASC who are not members of OAH" (CON App., p. 420). While the draft agreement contemplates that Class C members will be orthopedists and neurosurgeons, it could easily be amended to allow for the addition of physicians from other specialties.

The Applicants claim that the proposal will have "little or no impact on existing providers in that ***most*** of the physicians that will be performing surgeries at the proposed ASC are currently performing their ambulatory orthopedic surgery at the Rocky Hill, Glastonbury and the Hospital's outpatient facilities" (emphasis added) (CON App., pp. 15-16). This leaves open the possibility that the Applicants will attempt to recruit additional physicians, possibly from specialties other than orthopedics, to supplement the Proposed ASC's case volume. The loss of case volume from physicians on its Medical Staff could have a significant adverse impact on the Connecticut ASC. Like the Hartford ASC, the Connecticut ASC cannot absorb a substantial loss of business (particularly commercially insured cases) and continue to operate for the benefit of those it serves in the greater Hartford area.

***Potential Loss of Surgeons to the West Hartford ASC***

As mentioned previously, the West Hartford ASC is operating below capacity and will be operating at an even lower percent capacity if this proposal is approved due to case shift to the

Proposed ASC (CON App., pp. 11 & 13). Gynecology is listed as a targeted growth area (CON App., p. 424). The gynecological physicians on the Medical Staff at the Connecticut ASC have been urged by Hartford Hospital to relocate their cases to the West Hartford ASC. Gynecological surgeries represent a significant percentage of case volume at the Connecticut ASC. In 2013, 343 of the facility's 4,231 total cases (8%) were gynecological cases. If the Connecticut ASC lost just half of these cases (most of which are commercially insured), the financial loss to the facility would be approximately $200,000 (based on net revenue per case of $1,131). This number would obviously be greater if more cases were lost.[6] Either way, the impact on the Connecticut ASC would be significant, particularly given the fact that these commercial cases help subsidize the many Medicaid and uninsured cases performed at the facility (approximately 10% of annual case volume).

***The Proposed ASC is Not the Most Cost-effective Means of Addressing Any Capacity Constraints at Applicants' Facilities***

Assuming that the capacity constraints for outpatient surgery within the Hartford Healthcare System and at the OAH and Glastonbury ASCs are as serious as the Applicants portray, there are options for addressing these constraints (in addition to redirecting patients to existing providers with available capacity) that do not involve constructing an unneeded $6.5 million ASC.

***Applicants Can Add Operating Room Capacity to Their Existing Facilities***

Each of the facilities involved in the proposal (Hartford Hospital, the West Hartford ASC, the OAH ASC, and the Glastonbury ASC) has the option of adding one (1) operating room every three

[6] A shift of gynecological cases from the Connecticut ASC to the West Hartford ASC would result in higher costs to patients and payers as well because the West Hartford ASC is a hospital outpatient department ("HOPD"). HOPDs are reimbursed for outpatient surgical procedures at higher rates than freestanding ASCs.

(3) years without CON approval (Conn. Gen. Stat. §19a-638(a)(13)). None of these facilities has notified OHCA of the addition of an operating room within the last three years. If each of the facilities were to add an operating room for a total of four (4) additional ORs, this would suffice to meet the capacity constraints that supposedly necessitate building a new facility with just three (3) operating rooms.

The addition of two (2) operating rooms between the OAH and Glastonbury ASCs would cover the facilities' present demands, which supposedly require a shift of 1,769 cases to the Proposed ASC by year three of the proposal (CON App., p. 11). By Applicants' own admission, the OAH and Glastonbury ASC together require only an additional .48 of an OR to accommodate present orthopedic volume (CON App., p. 447). Combine this with OAH's OR needs for pain management (1/2 of an OR) and one (1) OR between the facilities would suffice without shifting any volume to the Proposed ASC.

Similarly, the addition of one (1) operating room at Hartford Hospital would cover the proposed shift of 1,069 cases (CON App., p. 11), and the renovation of the operating rooms slated for closure, if feasible, could help to accommodate the projected growth in surgical volume at the Hospital due to newly recruited surgeons. There is no need for any additional capacity at the West Hartford ASC, as previously discussed. However, the addition of an operating room at that facility might help to alleviate any actual capacity constraints at Hartford Hospital or the OAH and Glastonbury ASCs. The cost of adding/renovating operating rooms would likely be significantly less than the $6.5 million capital expenditure being contemplated in connection with the Proposed ASC.

*Cost Savings from Shift of Cases to Hospital-owned ASC May Not be as Significant as Applicants Claim*

The Applicants claim that the reimbursement by patients and payers for procedures at the Proposed ASC will be approximately thirty-five percent (35%) lower than reimbursement for hospital-based outpatient surgical services (CON App., pp. 8 & 20).[7] This is not entirely accurate. While Medicare reimbursement for services in a freestanding ASC would be approximately one third the cost of hospital-based services, the same does not hold true for commercially insured services, particularly in an ASC where a hospital owns fifty-one percent (51%) of the facility. In SCA's experience, ASCs are generally able to obtain higher rates of reimbursement when they partner with a hospital or a health system than when they do not. This depends, of course, on the health system's presence in the market, but it is clear that Hartford Hospital has a significant presence in the healthcare market in Connecticut and, with that, considerable negotiating power. Note also that Medicare accounts for only sixteen percent (16%) of cases at the Proposed ASC, while commercial insurance accounts for sixty-three percent (63%) of cases (CON App., p. 20), making the overall impact on reimbursement less significant than Applicants have represented.

It would likely be more cost-effective to shift cases from hospital-based settings to ASCs without hospital partners. This would include the Hartford ASC, which has ample capacity to accommodate additional surgeries and would be amenable to undertaking any renovations, and purchasing any equipment, necessary to accommodate the needs of the Hartford Hospital and OAH physicians and their patients.

[7] The Applicants' stance on lowering outpatient surgery costs by shifting procedures to an ASC is at odds with Hartford Hospital's recent acquisition of a Constitution Surgery facility and conversion of that facility to a higher-cost HOPD (see Docket No. 10-31673-CON).

*The Proposed ASC Does Not Enhance Access for Medicaid Recipients and Indigent Persons*

The Proposed ASC does not meet the CON statutory objective of enhancing access to care for Medicaid recipients and indigent persons. In reviewing a CON Application, OHCA must assess whether the proposal provides appropriate access for these patient populations (Conn. Gen. Stat. §19a-639(10)). The payer mix for the Proposed ASC is heavily weighted towards commercial, non-governmental payers (63.1% commercial insurance and 13.9% workers compensation) (CON App., p. 20). Medicaid recipients and the uninsured will make up only a fraction of the Proposed ASC's patients (5.6% Medicaid and 1.6% uninsured) (CON App., p. 20). This payer mix is based on the current patient population at Hartford Hospital and the OAH facilities, both of which are located in the suburbs. OHCA should not approve a new ASC in an urban location, where many Medicaid recipients and indigent persons reside, if that facility will serve only a small percentage of these individuals.

*Conclusion*

This proposal fails to meet several of the statutory decision criteria for issuance of a CON. The Applicants have not shown a clear public need for the Proposed ASC because they have not conducted a complete assessment of the capacity and utilization of existing outpatient surgical providers in the greater Hartford area. Our sister facility, the Hartford ASC, has the capacity to accommodate a significant number of additional surgeries and this is likely the case with other facilities in the area as well.

Moreover, the Applicants' claim that the Proposed ASC will have no impact on existing providers is disingenuous. By their own admission, not all of the physicians who will utilize the Proposed ASC are associated with OAH. Whether there are other orthopedists being recruited, if the plan is to convert the facility to multi-specialty or to backfill the West Hartford ASC with gynecological cases, the Proposed ASC will have a potentially significant impact on the Connecticut ASC.

Lastly, the Proposed ASC is not the most cost-effective means of addressing any capacity constraints and despite its urban placement, it does not appear to be targeted at the Medicaid and indigent populations in Hartford.

For these reasons, CSC respectfully request that OHCA deny HHCHSC's CON request. I thank you for your time and am available to answer any questions you may have.

Respectfully Submitted,

Christian D. Ellison
Senior Vice President, Operations
Surgical Care Affiliates, LLC
On Behalf of Connecticut Surgery Center,
Limited Partnership

# EXHIBIT A

# SECTION 2

# 4.0 OUTPATIENT SURGERY

## 4.1 RELATIONSHIP TO CERTIFICATE OF NEED

Connecticut General Statutes Section 19a-638(a)(1) specifies a Certificate of Need is required for the establishment of a new health care facility and subsection (a)(5) specifically lists the establishment of an outpatient surgical facility, as defined in section 19a-493b, or as established by a short-term acute care general hospital. Facilities seeking authorization to establish a new outpatient surgical center are required to demonstrate that they meet clear public need as well as other criteria set forth in Connecticut General Statutes Section 19a-639.

## 4.2 OVERVIEW

Forty years ago, virtually all surgery was performed in a hospital. Since the early 1980s, however, there have been many changes in how surgical care is provided, due largely to advances in medical technology and changes in payment arrangements. The medical advances include new anesthesia that allow a patient to awaken more quickly after surgery, and better analgesics for pain control. In addition, minimally invasive and noninvasive procedures such as laser surgery, laparoscopy and endoscopy have been developed.[65] These advances allow many procedures formerly done in inpatient settings to be performed in outpatient surgical facilities.

Concerns about rising health care costs also have contributed to the growth of ambulatory surgery. The federal government expanded Medicare coverage to include services provided in outpatient surgical facilities (OSFs). The prospective payment system based on diagnosis-related groups (DRGs) that was adopted for hospital inpatient care created financial incentives for hospitals to shift less complex surgeries to an outpatient setting. Under impending health care reform, how lucrative payments to OSFs are, hospital-owned and privately, remains to be determined.[66]

Ambulatory surgical care is defined in the Connecticut Public Health Code as "surgical care not requiring overnight stay but requiring a medical environment exceeding that normally found in a physician's office".[67] This care may be delivered in a licensed outpatient surgical facility or at an acute care hospital's designated outpatient surgical center. Along with the elimination of an inpatient hospital admission, surgery in an outpatient setting makes better use of resources, especially the surgeon's time. Currently, approximately 70% of the surgeries in Connecticut are performed as ambulatory procedures.[68]

## 4.3 AMBULATORY SURGICAL PROCEDURES

The U.S. Department of Health and Human Services Centers for Medicare and Medicaid Services (CMS) reviews surgical procedures to determine those that are appropriate for the outpatient setting. The CMS also determines which procedures are eligible for reimbursement of services under Medicare or Medicaid. A major consideration for the inclusion or exclusion of a procedure is patient safety in an OSF environment.[69]

CMS follows an established set of eligibility standards. The general standards for covered surgical procedures are those surgical and other medical procedures that:

- Are commonly performed on an inpatient basis in hospitals, but may be safely performed in an OSF;
- Are not of a type that are commonly performed, or that may be safely performed, in physicians' offices;
- Are limited to those requiring a dedicated operating room and generally requiring a post-operative recovery room (not overnight);[70] and

[65]Cullen, K.A, Hall, M.J. & Golosinky, A. (2009). Ambulatory surgery in the United States, 2006. National health statistics reports, 11. Revised. National Center for Health Statistics. Retrieved from http:www.cdc.gov/nchs/

[66]Cullen, et al.

[67]State of Connecticut, Public Health Code, 19-13-D56 (a) (2).

[68]OHCA Hospital Reporting System. 2012. 12 month filing. Report 450 - Hospital Inpatient & Outpatient Other Services Utilization & FTE Employees, as of April 11, 2012.

[69]Federal Register. Friday, March 28, 2003. Rules and regulations 68(60), 15271.

[70]Public Health, Ambulatory surgical services. 42 C.F.R § 416. (2012).

- Are not cosmetic surgery and related services, except as required for the prompt repair of accidental injury or to improve the functioning of a malformed body member.[71]

Eligible surgical procedures are limited to the following specific standards:

- Those procedures that do not generally exceed a total of 90 minutes operating time and a total of four hours recovery time;
- Anesthesia must be local or regional or general anesthesia of 90 minutes or less;
- Those procedures that do not generally result in extensive blood loss or required major or prolonged invasion of body cavities or directly involved major blood vessels; or
- Those procedures that are not generally emergency or life-threatening in nature.[72]

## 4.4 OUTPATIENT SURGICAL FACILITIES (OSFs)

The acronym OSF is the term used in Connecticut law and regulation to refer to a particular type of licensed facility. The term ambulatory surgery center (ASC) is a specific term used in federal law and regulation that refers to a specific type of facility that must comply with CMS rules and accreditation standards. Connecticut has many ASCs that are licensed as OSFs, but not all OSFs are ASCs.

### 4.4.1 LICENSURE AND CERTIFICATION

#### 4.4.1.1 DPH Licensure

OSF is a distinct DPH licensure category. New OSFs require Certificate of Need authorization prior to applying for a license to operate. All facilities, regardless of the type and procedures performed and/or reimbursed[73], are subject to regular State and federal inspections.

#### 4.4.1.2 CMS Certification

To receive reimbursement through Medicare, the CMS requires OSFs to have Medicare certification. The majority of CMS' conditions for Medicare certification are concerned with patient safety. The CMS Ambulatory Surgery Center Quality Reporting Program requires each OSF to submit information to track whether patients are transferred or admitted directly to a hospital, including a hospital emergency department, upon discharge from the facility. This information can indicate a potentially preventable complication, serious medical error, or other unplanned negative outcome. A high rate of transfers or inpatient admission may be an indication of suboptimal care or provision of care to patients that should not have been treated in an ambulatory surgical setting.[74]

### 4.4.2 OSF TYPES AND OWNERSHIP

OSF ownership structures include hospital only; physicians only; hospital and physician joint venture; and corporate-hospital. OSFs based at acute care hospitals operate under the hospital's license and management and provide the same types of services as other outpatient surgical facilities. These facilities may be part of the main hospital, in a separate building on the hospital campus or in a building off the hospital campus. Those facilities located off the hospital campus are listed on the general hospital licenses as satellites.

Physician-owned OSFs provide physicians with more direct control over their surgical practices. They may schedule procedures at their convenience, assemble their surgical teams, ensure the equipment and supplies being used are best suited to their technique and design the OSF to suit their specialties. Physicians also benefit from the professional autonomy over their work environment and the quality of their care. These facilities are often referred to as "free-standing" as they are not hospital owned or hospital operated.

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[71] Public Health, Exclusions from Medicare and limitations on Medicare payment, 42 C.F.R § 411. (2012).

[72] Public Health, Ambulatory surgical services. 42 C.F.R § 416. (2012).

[73] For example, cosmetic surgery is licensed and regulated by the State of Connecticut, although CMS does not reimburse for many cosmetic procedures.

[74] Medicare Payment Advisory Committee. (2012). Report to the Congress: Medicare payment policy. Ambulatory surgical center services. 5(131-132).

Joint venture facilities owned by both hospitals and physicians became popular to help hospitals increase market share and stay profitable, and physicians to grow their surgical practices. In addition to the financial benefits, joint ventures enabled hospitals and physicians to provide patients with services in an efficient and convenient facility.[75] Health care reform may dictate which ownership structures remain and how profitable they will be.

## 4.4.3 FACILITIES AND OPERATING ROOMS

As of October 1, 2011, Connecticut had:

- 30 general or children's general hospital-based[76] multi-specialty OSFs;
- 16 multi-specialty hospital satellite OSFs;
- 2 single-specialty hospital satellite OSFs;
- 17 free-standing multi-specialty OSFs; and
- 44 free-standing single-specialty OSFs.

The locations and categories of the licensed OSFs are indicated in the maps in Appendices J, K and L. The categories are hospital-based, single-specialty and multi-specialty (Appendix J); hospital satellite, single-specialty and multi-specialty (Appendix K); and free-standing, single-specialty and multi-specialty (Appendix L). Each Connecticut acute care general hospital performs outpatient surgical procedures either within the main hospital or at a separate building on the hospital's main campus. Fifteen of the 30 hospitals have satellite outpatient surgical office locations, including the children's general hospital, Connecticut Children's Medical Center. Middlesex Hospital, in addition to the OSF on its main campus, has a second facility at its outpatient center 2 miles away. Hartford Hospital has two satellite OSFs, a multi-specialty OSF in West Hartford and a single-specialty OSF in Newington.

The 44 free-standing single-specialty OSFs in Connecticut have a total of 70 operating rooms. Almost half are dedicated to endoscopic procedures, and approximately 36% to cosmetic surgery and eye surgery. Twenty-two OSFs have a single operating room and are located in a physician's office. These facilities are not generally used daily as the surgeries are scheduled to meet the needs of patients and the physicians themselves. The most common practitioners with office-based operating rooms are plastic surgeons, ophthalmologists, orthopedic surgeons, pain management physicians and gynecologists. Reimbursement from a third-party payer may be provided depending on the patient's insurer, except in the case of cosmetic surgery. As most cosmetic procedures are elective, patients are generally self-pay, and pay for their procedures in advance.

The 17 multi-specialty free-standing OSFs have a total of 37 operating rooms, with a range of one to five operating rooms per facility. These facilities have many physicians that utilize block operating room times suitable to their surgical specialty. These facilities mostly operate on a regular five-day a week schedule with varying hours for the convenience of the physicians, staff and patients. It is common to combine two or more specialties with surgeries for each performed on the same day.

There are 15 hospital satellite OSFs with a total of 67 operating rooms, with a range of one to five operating rooms per facility. One of the facilities is a two-operating-rooms endoscopy center and one is a four-operating-rooms eye surgery center; the remaining facilities are multi-specialty with the number of operating rooms ranging from one to 12. It is difficult to determine the number of operating rooms dedicated to outpatient surgery when a hospital does not have a designated OSF within its main facility or on its main campus.

[75] Pizzo, J. & Redd, L. (2006). Hospital-Physician Joint Ventures: Maximizing the Potential. Health Care Financial Management Association.
[76] Connecticut acute care hospitals have an estimated 413 operating rooms available for surgery/surgical procedures.

## 4.5 SURGERIES PERFORMED IN THE OUTPATIENT SETTING

Multi-specialty OSFs may be free-standing, hospital joint-venture, or wholly-owned hospital facilities. A vast array of surgical procedures is performed at these facilities. Common procedures performed in multi-specialty OSFs include:

- Colonoscopy and biopsy;
- Upper gastrointestinal endoscopy and biopsy;
- Gastrointestinal procedures, such as cholecystectomy, common duct exploration, tonsillectomy and adenoidectomy;
- Urinary procedures, such as ureteral catheterization and removal of ureteral stones;
- Musculoskeletal procedures, such as arthroscopic procedures on the knee, carpal tunnel release, reconstruction of cruciate ligaments in the knee;
- Cataract surgery and other eye procedures;
- Ear, nose or throat procedures, such as ear tube surgery;
- Inguinal and femoral hernia repair; and
- Gynecological procedures, such as breast biopsy and diagnostic dilatation and curettage.[77]

Endoscopy procedures are one of the common types of procedures performed in a single-specialty OSF. Endoscopic procedures are mainly non-operative procedures performed through a scope to observe the interior of organs in the body, such as the bronchi, esophagus, and colon.

## 4.6 STANDARDS/GUIDELINES

### DEFINITIONS

1. Section 19a-493b, (CGS) defines an OSF as "any entity, individual, firm, partnership, corporation, limited liability company or association, other than a hospital, engaged in providing surgical services or diagnostic procedures for human health conditions that include the use of moderate or deep sedation, moderate or deep analgesia or general anesthesia, as such levels of anesthesia are defined from time to time by the American Society of Anesthesiologists, or by such other professional or accrediting entity recognized by the Department of Public Health. An outpatient surgical facility shall not include a medical office owned and operated exclusively by a person or persons licensed pursuant to section 20-13, provided such medical office: (1) Has no operating room or designated surgical area; (2) bills no facility fees to third party payers; (3) administers no deep sedation or general anesthesia; (4) performs only minor surgical procedures incidental to the work performed in said medical office of the physician or physicians that own and operate such medical office; and (5) uses only light or moderate sedation or analgesia in connection with such incidental minor surgical procedures."
2. Nothing in this subsection shall be construed to affect any obligation to comply with the provisions of Section 19a-691, CGS, concerning anesthesia accreditation or Section 19-13-D56 of the Public Health Code concerning licensing of outpatient surgical facilities operated by corporations.
3. "Primary Service area" for an OSF is the area where approximately 75% of the facility's patients reside. Service area may be towns, zip codes, or other U.S. Census geographical type.
4. "Maximum Capacity" is the number of surgical cases that may be performed in a year based on Monday through Friday, eight hours per day, and 250 days per year. It is the responsibility of the Applicant to provide sufficient documentation to establish the length of time the average case requires and the time required for cleanup.
5. "Optimum utilization" is the percent of the maximum capacity that a facility can achieve under a regular work environment, considering the variation in procedures performed, the number of physicians utilizing the facility, and other factors.

[77] Agency for Healthcare Research and Quality. (2010). Hospital-Based Ambulatory Surgery, 2007. *Healthcare Cost and Utilization Project (HCUP) Statistical Brief #86.* Retrieved from http://www.hcup-us.ahrq.gov/reports/statbriefs/sb86.jsp

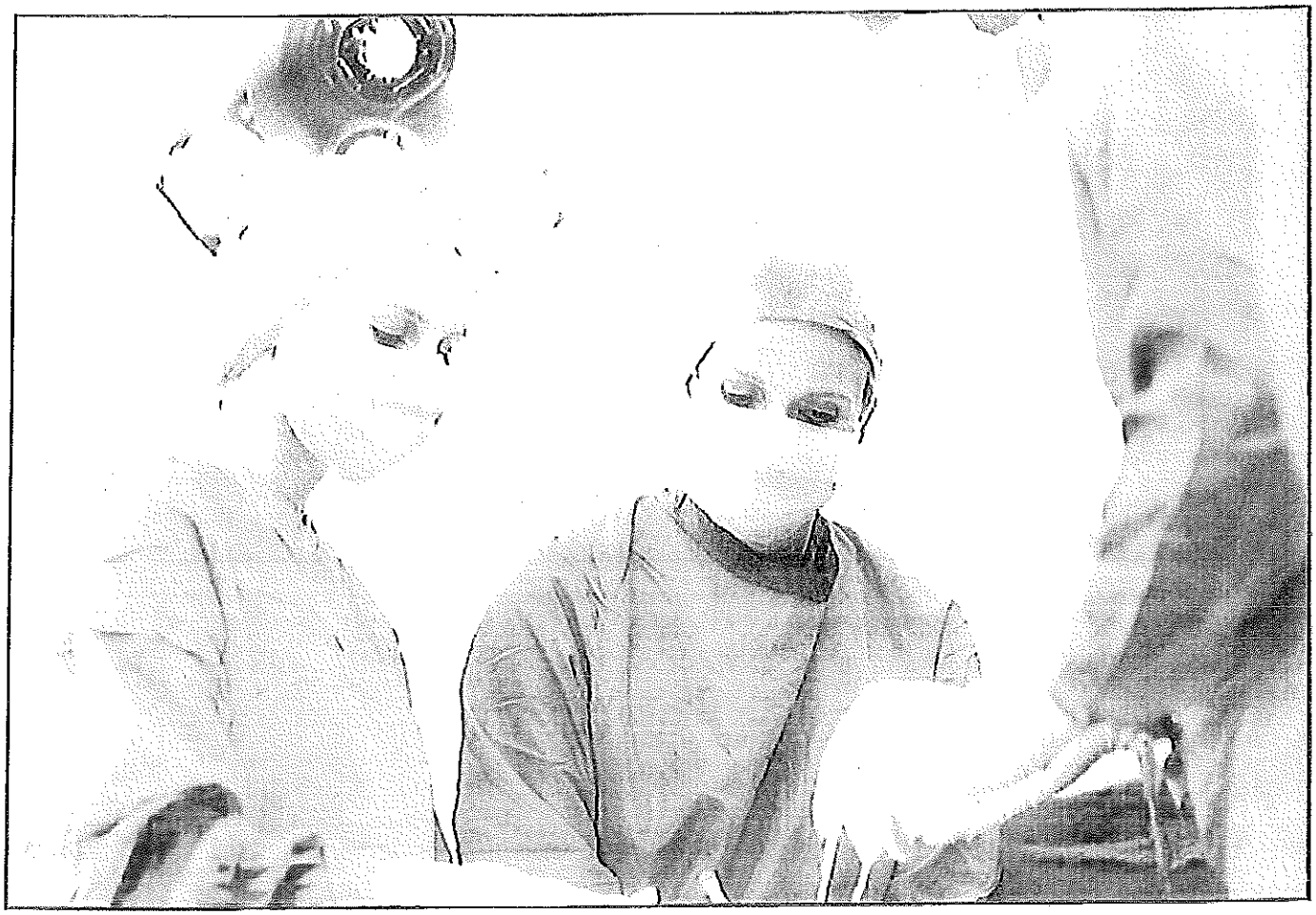
The following guidelines and/or standards for the establishment of an OSF will be considered by OHCA when considering a Certificate of Need request:

1. When an Applicant proposes to establish a new multi-specialty OSF, the case volume of single-specialty OSFs dedicated solely and exclusively for endoscopy may be excluded from the existing; volumes when establishing need for the multi-specialty OSF as required by Sec. 19a-639 (3), CGS.
2. Unless otherwise established by the Applicant and supported with documentation:
   - The capacity of the proposed facility will be based on eight (8) hours per day, five (5) days per week fifty (50) weeks per year for a total of 2,000 hours per year;
   - The optimal utilization for an operating room in an OSF is 80%;
   - The average time for an outpatient case will be sixty (60) minutes; and
   - Thirty (30) minutes will be allocated to cleanup between cases;
3. Unstaffed operating rooms are considered as available and shall be included in any calculations for capacity and utilization;
4. Delivery rooms for Caesarean sections and operating rooms specifically reserved for cardiac cases shall be excluded from calculations for capacity and utilization;
5. Proposed new OSFs must have written policies concerning access to care by persons who are underinsured or uninsured;
6. The Applicant must demonstrate the financial feasibility of the OSF within the first three (3) years of operations or within a reasonable time based on factors reported and supported by the Applicant;
7. The proposed new OSF will have in place at start of operations a transfer agreement with an acute care general hospital;
8. The Applicant must have in place at the start of operations a quality Assessment and Performance Improvement Program and be certified by Medicare or a national accrediting body for which CMS grants status to accredit ambulatory surgery centers;
9. The applicant must have in place at the start of operations a contract with a patient safety organization as defined at CGS § 19a-127o.

## OTHER FACTORS FOR CONSIDERATION

Supplemental to the current guidelines and principles, as listed in Section 19a-639, CGS, OHCA may consider the following factors when reviewing a Certificate of Need request:

1. Changes in technology and changes in medical treatment specialties;
2. Proposed service areas that include patients from those states that border Connecticut, i.e., Massachusetts, New York and Rhode Island;
3. Physician referral patterns;
4. Underserved populations;
5. Unique populations, specific clinical needs or performance of procedures more lengthy in nature;
6. Limited specialty programs where access to surgical services is limited; and
7. Atypical barriers to care based on cost, quality, financial access or geographic access.



## 4.7 CURRENT ISSUES PERTAINING TO OSFs

OSFs, as other healthcare facilities and providers, are operating under the strain of current economic conditions, including physician shortages and regulatory mandates. They will also be affected by the changes resulting from health care reform. Commercial insurers often base their procedure reimbursements on the rates paid under Medicare and Medicaid. Historically, Medicare and Medicaid have paid providers at lower rates than other third-party payers. In addition, mandated electronic reporting will likely increase operating expenses for OSFs.

With the aging of the population in Connecticut, most OSFs will require Medicare certification to obtain reimbursement for the services they provide to older patients. To receive Medicare certification, the OSFs will be required to meet Medicare's conditions of coverage, which specify standards for administration of anesthesia, quality evaluation, operating and recovery rooms, medical staff, nursing services and other areas.[78] Under the CMS' new quality reporting programs, those that fail to report the required information will face a reduction in their Medicare payments. As of October 1, 2012, OSFs are required to report data on patient burns, patient falls, wrong side of patient, procedure, implants, hospital admissions and transfers, and prophylactic IV antibiotic timing. In 2013 they will be required to report two additional measures: safe surgery checklist use in 2012 and 2012 volume of certain procedures. While these two measures will not be reported until 2013, OSFs must ensure they are using a safe surgery checklist and have a system in place by January 1, 2012 to capture surgical volume data.

[78]Federal Register. Wednesday, November 30, 2011. Rules and Regulations. 78(230), 74126-74127.

**CERTIFICATION**

I hereby certify that a copy of the foregoing has been sent via United States mail, postage prepaid, and electronic mail, this 21st day of February, 2014 to the following:

Joan Feldman, Esq.
Shipman & Goodwin, LLP
One Constitution Plaza
Hartford, CT 06103-1919
jfeldman@goodwin.com

Jennifer Groves Fusco, Esq.
Updike, Kelly & Spellacy, P.C.

SHIPMAN & GOODWIN LLP
COUNSELORS AT LAW

RECEIVED
FEB 24 2014
Office of
HEALTHCARE ACCESS

Joan W. Feldman, Esq.
Phone: (860) 251-5104
Fax: (860) 251-5211
jfeldman@goodwin.com

February 24, 2014

**VIA HAND DELIVERY**

Kimberly Martone
Director of Operations
Department of Public Health
Office of Health Care Access
410 Capitol Avenue, MS #13HCA
P.O. Box 34048
Hartford, Connecticut 06134-0308

Re: **IN THE MATTER OF THE ESTABLISHMENT OF AN ORTHOPEDIC AMBULATORY SURGERY CENTER ON THE HARTFORD HOSPITAL CAMPUS**
**DOCKET NO: 13-31851-CON**

Dear Ms. Martone:

Enclosed please find the Notice of Appearance form regarding the matter referenced above. If you have any questions, please do not hesitate to contact me.

Sincerely yours,

Joan W. Feldman

Jwf/tja
Enclosure

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
**OFFICE OF HEALTH CARE ACCESS**

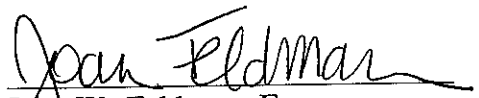
| | | |
|---|---|---|
| **IN THE MATTER OF THE** | : | **DOCKET NO. 13-31851-CON** |
| **ESTABLISHMENT OF AN ORTHOPEDIC** | : | |
| **AMBULATORY SURGERY CENTER ON** | : | |
| **THE HARTFORD HOSPITAL CAMPUS** | : | **February 24, 2014** |

# NOTICE OF APPEARANCE

Please enter the appearance of Shipman & Goodwin LLP on behalf of the Applicant in the above-referenced matter.

Respectfully Submitted,

HHC Hartford Surgery Center, LLC

By: 

Joan W. Feldman, Esq.
jfeldman@goodwin.com
Of Shipman & Goodwin LLP
One Constitution Plaza
Hartford, CT 06103-1919
Tel: 860-251-5104
Fax: 860-251-5211
Their Attorney

SHIPMAN & GOODWIN LLP®
COUNSELORS AT LAW

Joan W. Feldman, Esq.
Phone: (860) 251-5104
Fax: (860) 251-5211
jfeldman@goodwin.com

February 24, 2014

**VIA HAND DELIVERY**

Kimberly Martone
Director of Operations
Department of Public Health
Office of Health Care Access
410 Capitol Avenue, MS #13HCA
P.O. Box 34048
Hartford, Connecticut 06134-0308

Re: **IN THE MATTER OF THE ESTABLISHMENT OF AN ORTHOPEDIC AMBULATORY SURGERY CENTER ON THE HARTFORD HOSPITAL CAMPUS**
**DOCKET NO: 13-31851-CON**

Dear Ms. Martone:

Enclosed please find an original and five copies of our Pre-Filed Testimony of Jeffrey A. Flaks, Chief Operating Officer of Hartford HealthCare and Courtland G. Lewis, MD, Physician In Chief, Hartford Hospital Bone & Joint Institute along with support exhibits on behalf of the Applicant regarding the matter referenced above. If you have any questions, please do not hesitate to contact me.

Sincerely yours,

Joan W. Feldman

Jwf/tja
Enclosure

000535 (02/24/14)

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
**OFFICE OF HEALTH CARE ACCESS**

| | | |
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| **IN THE MATTER OF THE** | : | **DOCKET NO. 13-31851-CON** |
| **ESTABLISHMENT OF AN ORTHOPEDIC** | : | |
| **AMBULATORY SURGERY CENTER ON** | : | |
| **THE HARTFORD HOSPITAL CAMPUS** | : | **February 24, 2014** |

**PRE-FILED TESTIMONY OF JEFFREY A. FLAKS, CHIEF OPERATING OFFICER OF HARTFORD HEALTHCARE ON BEHALF OF THE APPLICANT**

Accompanying this cover sheet is the pre-filed testimony of Jeffrey A. Flaks on behalf of the Applicant in the above-captioned application.

Respectfully Submitted,

HHC HARTFORD SURGERY CENTER, LLC

By: _____

Joan W. Feldman, Esq.
jfeldman@goodwin.com
Of Shipman & Goodwin LLP
One Constitution Plaza
Hartford, CT 06103-1919
Tel: 860-251-5104
Fax: 860-251-5211
Its Attorney

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
**OFFICE OF HEALTH CARE ACCESS**

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|---|---|---|
| **IN THE MATTER OF THE ESTABLISHMENT OF AN ORTHOPEDIC AMBULATORY SURGERY CENTER ON THE HARTFORD HOSPITAL CAMPUS** | : | **DOCKET NO. 13-31851-CON** |
| | : | |
| | : | |
| | : | **February 24, 2014** |

**PRE-FILED TESTIMONY OF JEFFREY A. FLAKS, CHIEF OPERATING OFFICER, HARTFORD HEALTHCARE ON BEHALF OF THE APPLICANT**

Good morning, Attorney Hansted and staff of the Office of Health Care Access ("OHCA"). My name is Jeffrey A. Flaks and I am the Chief Operating Officer of Hartford HealthCare, the System Parent of Hartford Hospital (the "Hospital"), and until very recently, the President & Chief Executive Officer of Hartford Hospital. I am very grateful for this opportunity to be here with you today and share with you why the above-referenced Application is so important to the Applicant and the Hospital, and the reasons why we believe the proposed ambulatory surgery center should be approved by OHCA.

## I. Background.

In our Application for the ambulatory surgery center referenced above, we emphasized the following key factors as evidencing the strong need for the proposed single specialty orthopedic ambulatory surgery center:

- The demand for orthopedic surgery is expected to rise dramatically over the next decade.[1] In Connecticut alone, there is a projected 28% increase in outpatient orthopedic surgical cases;[2]

[1] See http://www.advisory.com/Research/Technology-Insights/Expert-Insights/2012/AAOS-2012-Four-imperatives-for-the-future-of-orthopedics.
[2] See http://www.advisory.com/Research/Health-Care-Advisory-Board/Tools/2010/Outpatient-Market-Forecaster

- There has been a 13% growth of outpatient and a 23% growth of inpatient orthopedic surgical cases associated with the Hospital-affiliated orthopedic surgeons in the last 36 months[3];

- The single specialty ambulatory surgery centers dedicated to orthopedics and affiliated with the Hospital are at capacity;

- The Hospital has added over 25 surgeons to its Medical Staff in the last 12 months, resulting in significant increases in its overall outpatient surgical volumes, significantly greater than that which was projected in our Application;[4]

- While demand for outpatient orthopedic ambulatory surgery will increase, we recognize that we must control our costs and be prepared to manage risk for orthopedic surgical procedures. In our Application, we demonstrate that performing orthopedic procedures in an ambulatory surgery setting is 35% less costly than performing the same procedures in the hospital setting. See CON Application at page 0008;

- The Hospital will need to provide greater value with lower revenue streams while at the same time differentiating its services in relation to the newest technologies; and
- The Institute model that I will describe to you will explain why it is so vital to have the proposed ambulatory surgery center physically imbedded within the Institute.

Now, in the context of these demands, the current Hartford HealthCare and Hospital leadership strongly believe that the Hospital must collaborate with its physicians to both co-develop and co-manage the project described herein for the purpose of providing a level of orthopedic services comparable to that being offered by some of the most renowned musculoskeletal centers in the Country (including by way of example, The Hospital for Special Surgery, New York University Hospital, The Cleveland Clinic and the Mayo Clinic).

While the Hospital has been diligently developing its orthopedic service line over the last seven years (e.g. the Hospital has recruited three talented fellowship-trained orthopedic surgeons and established a highly successful orthopedics ambulatory surgery center in

[3] See Dr. Lewis' pre-filed testimony Exhibit 35.
[4] See Dr. Lewis' pre-filed testimony Exhibit 36.

Glastonbury, CT, which is at capacity)[5] it is now, more than ever, convinced that a collaborative, multi-disciplinary and data-driven innovative approach to bone and joint disorders is in the best interests of its patients. In particular, Hartford HealthCare, the Hospital Board, the Hospital's senior management and relevant members of the Hospital's medical staff unequivocally and enthusiastically support a collaborative, integrated and multi-disciplinary approach to bone and joint disorders. Now and without further delay, I will describe to you the musculoskeletal institute, which will be beyond advanced, and will have, at its core, (subject to OHCA's approval) an ambulatory surgery center dedicated to bone and joint disorders.

## II. The Hospital's Plan for a Musculoskeletal Institute.

The health care industry literature is replete with evidence that the demand for orthopedic services will continue to grow for a number of reasons, including innovative techniques, the fact that individuals are living longer (resulting in more revisions) and that there is an obesity epidemic in our Nation.[6] As we discussed in our Application, health care reform is driving the demand for high quality, lower-cost orthopedic services. To achieve this balance and level of accountability, the Hospital must embrace innovative technology in collaboration with its orthopedic surgeons so that we may transform the infrastructure of our current orthopedic service line. To do so, the Hospital is in the planning stages of developing, on its main campus, a musculoskeletal center dedicated to the delivery of comprehensive inpatient and outpatient musculoskeletal services (the "Institute").

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[5] See utilization data for the first quarter of FY 2014 attached hereto as Exhibit 29.

[6] See Exhibit 30 at page 17 et seq. or http://www.advisory.com/Research/Marketing-and-Planning-Leadership-Council/Studies/2011/Orthopedics-Service-Line-Strategic-Outlook.

The Institute's primary objective will be to enhance the clinical experience of the orthopedic patient. Since musculoskeletal disorders typically involve more than one bodily system, the Institute will take a multi-discipline approach for diagnosis and treatment. The Hospital and its physicians strongly believe that a multi-disciplinary approach to musculoskeletal bone and joint disorders will contribute to better outcomes for the patient and greater operational efficiencies. Accordingly, Institute services will not only include orthopedic services, but will also include services relating to a wide range of bone and joint disorders, such as rheumatology, neurology, oncology, metabolic disorders, pain management, physical and rehabilitative medicine.

In addition, the Institute's services will utilize and incorporate state of the art technology, along with an operational commitment to data-driven innovation, all for the sole purpose of optimizing the patient experience, achieving the highest quality patient outcomes, and delivering high value musculoskeletal services to our payers and patients alike. In essence, the entire Institute and all of its interrelated and interdependent components, including the proposed ambulatory surgery center, will be grounded in certain operating principles and processes that embody a culture of safety, quality and innovation.

In addition, the Institute will commit significant staff and resources to conducting translational research relating to musculoskeletal disorders. With respect to the innovation component, industry experts from the information technology and biomedical engineering industry sectors have eagerly expressed strong interest in conducting orthopedics-related translational research at the Institute. One global industry innovator has already committed to

collaborating with the Hospital in developing data-driven systems focused on efficient patient management and quality improvements in the delivery of orthopedic services.

Additionally, the State of Connecticut recently awarded the Hospital a 15 million dollar grant to support a 30,000 square foot expansion of the Hospital's Center for Education Simulation and Innovation (known as "CESI"). CESI is a world class training facility that allows healthcare professionals to simulate different types of acute care crises and higher technology treatment. In connection with such grant, Governor Malloy stated,

> Hartford Hospital has an important role to play in Connecticut's resurgence in the bioscience and health services sectors. This expansion project is about investing in innovation, research and training-all the things we need to do as a state to stay competitive. While the project will certainly create good paying jobs with good benefits, this state of the art training facility is really about creating a Hartford Hospital that draws the world's top doctors and other healthcare professionals to our Capitol City for years to come.

See http://giving.harthosp.org/state-grant-for-cesi. The combination of CESI and the Institute, including the dedicated academic facilities imbedded within the Institute, will undoubtedly strengthen the Hospital's ability to attract talented physicians who desire residency or fellowship training experience in one of the many graduate medical education disciplines to be offered at the Institute.[7]

Most importantly, all Institute clinical services will be clinically integrated within one central location so that the patient can physically navigate within the Institute with ease and convenience. Essentially, there will be no reason for the patient to leave the premises of the Institute to receive any of their services. This is particularly advantageous for patients who by virtue of their musculoskeletal problems often have moderate to severe mobility limitations. For example, a patient who is seen for an orthopedic consultation, may immediately proceed to

[7] See Exhibit 31 attached hereto for a rendering of the Institute floor plan.

have a scan or undergo diagnostic laboratory tests, proceed to a rheumatology consult, return for infusion therapy, or have inpatient or outpatient surgery, and then return for rehabilitation, all of which will be proximately located in one central location with transportation assistance within the Institute should it be needed. Once again, the objective of a centralized location is to improve the patient experience so that a visit to the Institute neither stresses nor exhausts the patient, especially the elderly and those in pain.

More specifically, the Institute will encompass 135,000 square feet of space dedicated to providing diagnostic, treatment, research and educational services relating to musculoskeletal disorders, including radiology services, laboratory and other diagnostic services, research laboratories, simulation laboratories, motion laboratory teaching space, private inpatient rooms, dedicated inpatient operating rooms, physical medicine and rehabilitation space, medical office space and the proposed outpatient ambulatory surgery center. We attach hereto as Exhibit 32 a rendering of the Institute that was unavailable at the time of our Application submission. As you can see, the physical structure along with the presence of the Institute will contribute most positively to the City of Hartford and its economic development. It is thus, the hope and belief of the Hospital that by demonstrating real and substantial economic investment in the City that it will spur further economic growth in the City of Hartford, not to mention the State of Connecticut.

**III. The Need for the Proposed Dedicated Ambulatory Surgery Center.**

As I previously mentioned, the proposal to establish a three (3) operating room ambulatory surgery center dedicated to orthopedic surgery is an essential and critical component to the overall plan for the Institute. It is also representative of a model that can be

found in some of the leading musculoskeletal centers in our country. In the instant case, the Hospital is proposing that the ambulatory surgery center would have three (3) operating rooms (with shell space for two (2) additional operating rooms) that are purposefully designed to accommodate the needs of our surgeons who are performing the most sophisticated orthopedic surgical procedures, including but not limited to, minimally invasive techniques, joint replacement, hand surgery, trauma surgery, and back and spine surgery.

The imperatives of health care reform necessitate that the Hospital deliver greater value to its patients and payers alike, but at a lower cost. This can only be accomplished by transforming its existing delivery model to one that is well coordinated, efficient and focused on data-driven innovation.[8] In addition, the Institute model is based upon a recognition and commitment by Hartford HealthCare and the Hospital that if they are going to deliver state of the art orthopedic services at a quality and service level that is commensurate with leading musculoskeletal centers (and that which our community so deserves), they must align with their physicians, embrace the relevant research findings, and design surgical environments that are dedicated to orthopedic services. Better yet, we hope that the Institute becomes a destination facility for patients to receive orthopedic services.

Unlike other surgical specialties, we know that orthopedics requires uniquely designed operating rooms for the specialized tools and equipment required by the surgeons, including arthroscopic equipment, radioscopic visualization, boom-mounted systems for ease of movement and computerized monitoring. Generally, much of the surgical equipment is best used when it is attached to ceiling-mounted arms that can be adjusted to reach anywhere the

[8] Moreover, we fully expect to assume the financial risk for managing a patient's orthopedic surgery. Being able to care for a patient in an environment that is well managed will contribute to our overall success.

surgeon needs it to be situated (also making it easier to clean the rooms and reduce clutter). Our existing Hospital operating rooms do not afford us this type of space, nor can we take off line our existing ambulatory surgical space and exclusively dedicate it to orthopedics because of all our other competing demands as described in our Application and more particularly described in Dr. Lewis' pre-filed testimony.

Hospitals are increasingly employing operating rooms dedicated exclusively to orthopedics because they have proven to have a positive impact on patient throughput and thus, hospital revenues. As discussed in a recent study published in *The Journal of Arthroplasty*, all hospitals must find innovative ways to improve efficiency without compromising patient quality and safety. With dedicated orthopedic operating rooms and dedicated and experienced orthopedic staff, the hospital could more effectively manage operating room utilization, reduce down time and ultimately, improve the bottom line by allowing the Hospital to perform more surgeries.

> Process redesign in large teaching hospitals may substantially improve operational performance without compromising patient safety. These data demonstrate that using staff members familiar with orthopedic equipment and procedural needs can decrease operative time by an average of 19 minutes per operation, which extrapolates to a total average savings of just over 1.25 hours for a surgeon who performs 4 primary arthroplasty procedures per day. Unlike previous studies which have required additional staff to decrease both operative and non-operative times..., our study maintained the same amount of staff for each unit....The dedicated OR system significantly decreased operative time, anesthesia controlled time, and turnover time for TKA [total knee replacement] and THA [total hip replacement] procedures, without increasing complication rates.

See Exhibit 33 at page 1070 attached hereto for "Dedicated Orthopedic Operating Room Unit Improves Operating Room Efficiency", *The Journal of Arthroplasty*, 28 (2013) 1066-1071.e2.

We also know from our very own experience in our orthopedics dedicated ambulatory surgery center in Glastonbury that turnover time is less than it is in our Hospital operated general use ambulatory surgery centers. We believe the reason for this greater efficiency is

due to a unified dynamic team approach wherein the clinicians and staff are able to anticipate each other's needs in a seamless manner. Therefore, it is well established that by having our orthopedic operating room suites established and ready to go (without having to roll in equipment from other operating rooms), we can greatly improve turnover time between cases.

In a recent study examining the efficiency of a dedicated staff on operating room turnover time in hand surgery, the researchers found that dedicated staff made a measurable difference in operating room turnover time.

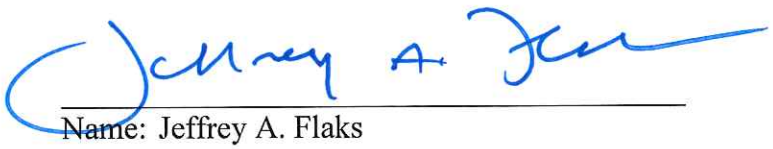
> Our study demonstrated that having consistent OR staff well versed in orthopedic surgery increased efficiency....With the frequency of use of wrist arthroscopy and microscopes, it is also feasible that dedicated orthopedic staff would be more competent with the setup, draping, and maneuvering of these devices to decrease perioperative time....Our results support the strategy of using orthopedic-specific staff for hand surgery to decrease OR turnover time.

One significant benefit to reducing turnover time and having more availability for orthopedic cases is that we can dedicate some of the outpatient operating room time to urgent trauma cases so those cases can be done without the delay that you have when you do not have dedicated space. See Exhibit 34 at page 110 attached hereto for "The Efficiency of a Dedicated Staff on Operating Room Turnover Time in Hand Surgery", *Scientific Article* (2014) ASSH.

Of course, the biggest beneficiary of greater operating room efficiencies will be the patient. A dedicated orthopedic ambulatory surgery center means shorter wait times for patients needing orthopedic surgery. It is our goal that once patients are informed that they require a surgical procedure that they will be scheduled with minimal wait time. If you are in pain or your mobility is limited, a shorter wait time makes a world of difference to the patient and their period of disability.

In summary, given the demands related to Health Care Reform, the Hospital fully understands that it must engage its physicians to embrace and prepare for present and future demands relating to high quality and low cost in the delivery of orthopedic services. While there are competing providers that may view this proposal as a threat to them, the real threat is if this proposal is denied and the community is deprived of access, innovation and higher value musculoskeletal services. We hope that you are equally convinced that the proposed ambulatory surgery center is an essential and critical component of the plan for the Institute as described herein.

I adopt the foregoing pre-filed testimony as my own.



Name: Jeffrey A. Flaks
Title: Chief Operating Officer
Hartford HealthCare

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**

**OFFICE OF HEALTH CARE ACCESS**

| | | |
|---|---|---|
| **IN THE MATTER OF THE** | : | **DOCKET NO. 13-31851-CON** |
| **ESTABLISHMENT OF AN ORTHOPEDIC** | : | |
| **AMBULATORY SURGERY CENTER ON** | : | |
| **THE HARTFORD HOSPITAL CAMPUS** | : | **February 24, 2014** |

**PRE-FILED TESTIMONY OF COURTLAND G. LEWIS, MD, PHYSICIAN IN CHIEF, HARTFORD HOSPITAL BONE & JOINT INSTITUTE ON BEHALF OF THE APPLICANT**

Accompanying this cover sheet is the pre-filed testimony of Courtland G. Lewis, M.D. on behalf of the Applicant in the above-captioned application.

Respectfully Submitted,

HHC HARTFORD SURGERY CENTER, LLC

By:

Joan W. Feldman, Esq.
jfeldman@goodwin.com
Of Shipman & Goodwin LLP
One Constitution Plaza
Hartford, CT 06103-1919
Tel: 860-251-5104
Fax: 860-251-5211
Its Attorney

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
**OFFICE OF HEALTH CARE ACCESS**

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**PRE-FILED TESTIMONY OF COURTLAND G. LEWIS, M.D., PHYSICIAN IN CHIEF, HARTFORD HOSPITAL BONE & JOINT INSTITUTE ON BEHALF OF THE APPLICANT**

Good morning, Attorney Hansted and staff of the Office of Health Care Access ("OHCA"). My name is Courtland G. Lewis, M.D. and I am the Physician in Chief of the Hartford Hospital Bone & Joint Institute (the "Institute) and a member of Orthopedic Associates of Hartford, P.C. I am very grateful for this opportunity to be here with you today and share with you why the above-referenced Application is so important to both the Applicant and Hartford Hospital (the "Hospital"), and the reasons why I believe the proposed ambulatory surgery center should be approved by OHCA.

## I. Health Reform.

I understand that OHCA is very well informed with respect to the impact that health care reform is having on the entire health care industry. Notwithstanding, I would very much appreciate the opportunity, if OHCA would so indulge me, to provide my perspective, as an orthopedic surgeon and Physician in Chief of the Institute, on the

specific impact that health care reform is having and will continue to have on the delivery of orthopedic services.

Muskuloskeletal disorders are the leading cause of adult disability and account for more than half of all chronic conditions for individuals over the age of 50. As the number of individuals over the age of 50 grows and the obesity epidemic persists, the demand for orthopedic services will also grow. See Exhibit 35 at page 2513 attached hereto for "The Impact of Disruptive Innovations in Orthopaedics", *Symposium: AJBS Carl T. Brighton Workshop on Health Policy Issues in Orthopaedic Surgery*, (2009) 467:2512-2520. Given both the actual and projected demand for orthopedic services, and the fact that orthopedic services will represent a large percentage of the health care dollar expenditures, orthopedic service providers must embrace new and innovative orthopedic service delivery models to lower costs and improve quality.

In particular, there are several driving forces that directly impact the need for providers of orthopedic services to transform their service delivery model to remain relevant and deliver what is viewed by both patients and payers alike as high quality and lower cost orthopedic services. First, whether reimbursement for orthopedic services is based upon a fee-for-service model, or other risk-based models (e.g., bundled payments, shared savings or population-health management models), hospitals and physicians will need to redesign their care delivery models to be capable of managing their costs without compromising patient safety or quality. Given the economic challenges on orthopedic service providers, (including but not limited to greater risk on longer-term outcomes, e.g., limits on total costs and readmission penalties), the Hospital and its orthopedic

surgeons have chosen to align so they can coordinate and standardize their care in order to avoid unnecessary costs and provide a higher level of service. See Exhibit 30 at page 16 attached hereto.

Specifically, the Applicant believes that the Hospital and its physicians must have a coordinated and collaborative approach throughout the orthopedic patient's surgical pathway, including pre-operative care, consultations, pain management and rehabilitation in order to reduce complications, lower costs and improve overall quality. Simply put, the traditional silo approach to the delivery of orthopedic patient care services must become a thing of the past.

Second, since new technological advances in orthopedics are constantly being developed, decisions regarding technological investment will need to be planned and coordinated in order to obtain adequate profit margins and ensure overall financial stability. The Institute model, (as described to you by Mr. Flaks in his testimony), will require that purchase decisions relating to technological innovations be made jointly by the Hospital and its physicians so that they can collectively evaluate the incremental value of new technology and appropriately balance patient access to such technology without jeopardizing the bottom line.

> ...[B]oth the future health and viability of the U.S. economy and its population are intimately related to the thoughtful and responsible adoption of new healthcare technologies.

See Exhibit 35 at page 2512 attached hereto. The Proposal in the instant case, which involves the Hospital and its orthopedic surgeons aligning to operate the Institute, (and jointly owning the ambulatory surgery center), is a model that the Applicant strongly

believes will result in the most responsible and judicious decision-making with respect to the purchase of premium technology and the overall management of the Institute, and in particular, the proposed ambulatory surgery center.

## II. Why the Proposed Ambulatory Surgery Center Is Needed and Critical to the Institute's Success.

While the Applicant is not before OHCA to request approval for the Institute model, it is important that the Applicant adequately describe the Institute model so that OHCA can more fully appreciate the role that the proposed ambulatory surgery center will have with respect to the overall success of the Institute. The Institute will be operated as a separate division within the Hospital, and as such, will be accountable for its own clinical and operational outcomes.[1] Specifically, it will have its own dedicated staff and its own standardized processes and procedures for the clinical care and operations related to the delivery of orthopedic services. In addition, all services and components within the Institute (including the proposed ambulatory surgery center) will be data driven to support and direct current and future operations, and ideally, predict where the Institute needs to be in terms of advancing its orthopedic services care delivery model.

Most importantly and integral to the Institute's success, will be a purposeful change in the culture and the processes relating to each episode of care. By having maximum control over the operational and clinical environment within the Institute, the Hospital and its physicians will be able to utilize, for example, Six Lean Sigma principles

[1] While the proposed ambulatory surgery center will operate as a separate cost center within the Institute, all of the Institute's operational policies and procedures will apply to the proposed ambulatory surgery center.

and other performance improvement strategies to improve its performance capability, implement reliable improvement systems, focus on utilization of resources, focus on quality improvement and safety, and most importantly, enhance patient satisfaction.[2]

With respect to the Institute's ability to deliver high quality, accessible and lower cost orthopedic services, the proposed ambulatory surgery center will play a critical role in such capability and success. There is already ample evidence that many orthopedic procedures can be provided to patients more cost-effectively when provided in an ambulatory surgical setting (versus inpatient setting) without sacrificing safety, quality, or patient satisfaction. See Exhibit 35 at page 2516. Specifically, as the Institute continues to innovate with respect to the most cost-effective and safest processes for the delivery of orthopedic services, it is expected and planned that the proposed ambulatory surgery center will become the clinical focal point for many more surgical procedures than that which are currently being performed in an inpatient setting.

> ...[t]he greatest opportunities to improve the healthcare system as a whole and the care provided to the population is to focus on and modify the healthcare delivery systems currently in place. Recently, there has been increased awareness that the current hospital system in the United States fails the individual patient in many regards as a result of the fragmented provision of care by multiple providers in a myriad of settings. In response to this, there has been an emphasis on patient-centered or patient-focused care as a low-technology solution to the existing problems. Single-specialty hospitals and ambulatory surgery centers...have consistently enjoyed high patient volumes and high patient satisfaction rates, in part because of their ability to deliver focused, efficient, high-quality patient-centered care.

[2] The Hospital has already hired an experienced industrial engineer to be a full-time staff member of the Institute to implement the application of the Six Lean Sigma principles.

See Exhibit 35 at page 2516-2519 attached hereto. In sum, the Institute's operational and clinical objectives will be entirely focused on employing evidence-based innovative strategies to provide orthopedic services to a greater number of patients, at a lower cost and with better patient outcomes. The Applicant firmly believes that the proposed single-specialty ambulatory surgery center, imbedded within the Institute, is the only way to successfully conduct its research, innovation and achieve the desired results as previously described.

If you refer to the schematic drawing depicting the Institute's proposed ambulatory surgery center floor plan, you will see that the proposed ambulatory surgical center is located near the inpatient operating rooms. See Exhibit 31 attached hereto. This floor plan was intentionally designed this way so that the proposed ambulatory surgery center is proximate to the inpatient operating rooms in order to safely evaluate the performance of new procedures (that have historically been performed in an inpatient operating room setting) in the lower cost ambulatory surgical setting. Therefore and by way of example, if the Applicant were to perform a procedure for the first time in the proposed ambulatory surgery center, the clinicians would have immediate access to the Institute's inpatient operating rooms and its staff should they require the additional resources and the backup support of the inpatient operating rooms.

> ...[i]t appears that ASCs, rather than being static entities, are constantly innovating, streamlining, and incorporating technologic advances in surgical devices, techniques, and anesthesia protocols to expand the conditions for which same-day surgery is safe and appropriate.

See Exhibit 35 at page 2517 attached hereto.

Moreover, in order to manage the proposed outpatient ambulatory surgical center, it must be on the same campus and integrated within the walls of the Institute. Each of the service components offered by the Institute will be interrelated and in many instances, operationally co-dependent. The Applicant strongly believes that if all of the direct and indirect staff members of the proposed ambulatory surgery center are not Institute staff, and or the processes not tightly managed and standardized by the Institute, the overall success of the Institute and the proposed ambulatory surgery center will be significantly compromised.

Finally, with respect to the demand and the need for this proposed ambulatory surgery center, the Applicant has indicated in its Application that both the ambulatory surgery centers in Glastonbury and Rocky Hill are at full capacity. See Exhibit 29 attached hereto. Therefore, the Applicant strongly believes that the utilization statistics more than

[Rest of page left intentionally blank]

supports an additional single specialty ambulatory surgery center dedicated to orthopedics. Moreover, if you refer to Exhibit 36 attached hereto it is amply clear that the volumes that we projected for outpatient surgeries in our Application for fiscal year 2014 are significantly understated based upon actual experience to date. Therefore, based upon this new data, there is absolutely no question that any existing capacity that the Hospital has in its operating rooms will be in great demand based upon the volumes associated with the new surgeons who have recently joined the Hospital. See Exhibit 36 attached hereto.

For all the foregoing reasons, respectfully request that OHCA approve the proposed ambulatory surgery center and should you have any questions, I would be most pleased to try to answer them.

I adopt the foregoing pre-filed testimony as my own.

Name: Courtland G. Lewis, M.D.
Title: Physician In Chief
Hartford Hospital Bone & Joint Institute

**Glastonbury Surgery Center**
**Operating Room Utilization**
**FY 2010 through FY2013**

**Cases and Operating Rooms - Glastonbury ASC (4 ORs)**
**Surgical Cases**

| | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|
| Total Orthopedic Surgery | 607 | 2,081 | 3,011 | 3,260 |
| | | | | |
| Minutes of Surgery / Cleanup | 54,630 | 187,290 | 270,990 | 293,400 |
| OR Need Calculated | 0.57 | 1.95 | 2.82 | 3.06 |
| Number of ORs Required | 1 | 2 | 3 | 4 |

OHCA Facility Plan Guidelines
Unless otherwise supported by documentation from Applicant:

Capacity of the proposed facility will be based on 8 hours per day, 5 days per week for a total of 2,000 hours per year

Optimal utilization of an OR = 80%
Average time per case = 60 minutes
Cleanup time = 30 minutes per case

Optimal OR utilization in minutes = 96000 minutes per OR

**Additional OR time utilized by Pain Cases**

**Cases and Operating Rooms - Glastonbury ASC (4 ORs)**
**Pain cases**

| | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|
| Pain Cases | - | - | - | 562 |
| | | | | |
| Minutes of Surgery / Cleanup | - | - | - | 16,860 |
| OR Need Calculated | 0.00 | 0.00 | 0.00 | 0.18 |
| Number of ORs Required | 0 | 0 | 0 | 1 |

OHCA Facility Plan Guidelines
Unless otherwise supported by documentation from Applicant:

Capacity of the proposed facility will be based on 8 hours per day, 5 days per week for a total of 2,000 hours per year

Optimal utilization of an OR = 80%
Average time per case = 15 minutes
Cleanup time = 15 minutes per case

Optimal OR utilization in minutes = 96000 minutes per OR

**OASC Rocky Hill ASC**
**Operating Room Utilization**
**FY 2010 through FY2013**

**Cases and Operating Rooms - OASC Rocky Hill ASC (4 ORs)**
**Surgical Cases**

| | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|
| Total Orthopedic Surgery | 4,716 | 4,585 | 4,570 | 3,662 |
| | | | | |
| Minutes of Surgery / Cleanup | 424,440 | 412,650 | 411,300 | 329,580 |
| OR Need Calculated | 4.42 | 4.30 | 4.28 | 3.43 |
| Number of ORs Required | 5 | 5 | 5 | 4 |

OHCA Facility Plan Guidelines
Unless otherwise supported by documentation from Applicant:

Capacity of the proposed facility will be based on 8 hours per day, 5 days per week for a total of 2,000 hours per year

Optimal utilization of an OR = 80%
Average time per case = 60 minutes
Cleanup time = 30 minutes per case

Optimal OR utilization in minutes = 96000 minutes per OR

**Additional OR time utilized by Pain Cases**

**Cases and Operating Rooms - OASC Rocky Hill ASC (4 ORs)**
**Pain cases**

| | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|
| Pain Cases | 2,213 | 3,253 | 3,214 | 3,955 |
| | | | | |
| Minutes of Surgery / Cleanup | 66,390 | 97,590 | 96,420 | 118,650 |
| OR Need Calculated | 0.69 | 1.02 | 1.00 | 1.24 |
| Number of ORs Required | 1 | 2 | 2 | 2 |

OHCA Facility Plan Guidelines
Unless otherwise supported by documentation from Applicant:

Capacity of the proposed facility will be based on 8 hours per day, 5 days per week for a total of 2,000 hours per year

Optimal utilization of an OR = 80%
Average time per case = 15 minutes
Cleanup time = 15 minutes per case

Optimal OR utilization in minutes = 96000 minutes per OR

The Advisory Board Company

Marketing and Planning Leadership Council

# Orthopedics: Service Line Strategic Outlook

- State of the Service Line
- Growth & Marketing
- Innovation & Technology
- Reform & Care Redesign

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000559 (02/24/14)

# Marketing and Planning Leadership Council


**Project Director**
Patricia Wynn

**Contributing Consultant**
Leah Reidy

**Design Consultant**
Matt Starchek

**Managing Director**
Shay Pratt



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*Key Considerations for Program Structure and Effectiveness*

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**Contact Us**

For additional information on **Crimson Market Advantage** please visit our website: www.advisory.com

or email us at Beyond@advisory.com

## *Drive Referral-Based Growth Through Physician Analytics*

### A High Stakes (and Frustrating) Challenge

Despite surging interest in managing physician referrals, hospitals and health systems are unable to answer these critical questions:

- Are we capturing both the quantity and quality of referrals from our market?
- How can I segment the referring physician community to discover leakages or missed growth opportunities?
- What is the best approach to redirect these referrals to my organization?
- How do we track progress and document ROI for our business development and physician marketing efforts?

### An Innovative Solution

By leveraging hospital and exciting new third-party data, our proprietary methodology provides unprecedented insight into these strategic priorities:

- Capture both the quantity and quality of referrals .
- Segment the referring physician community to discover leakages or missed growth opportunities
- Utilize best practice strategy in physician outreach.
- Track progress and document ROI of business development and physician marketing efforts

## *Expand Your Physician Referral Network*

Working with members of our founding cohort, we are confirming that this visibility represents a breakthrough in identifying growth opportunities, targeting physician outreach, and informing physician alignment efforts.

- On average, a hospitals referral network is up to 30% larger than currently recognized.
- Members using our approach are surfacing up to four times greater referral leakages, translating into millions of dollars in revenue opportunity.

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# Orthopedics: Service Line Strategic Outlook

The purpose of this publication is to provide hospital and health system strategists, planners, marketers, orthopedic specialists, and service line leaders a detailed analysis of the near-term forecast for orthopedic services, with a particular focus on growth strategy, technology adoption, and accountable care implications. Organizations are encouraged to use the questions on the right to guide conversations for service line planning and growth strategy.

Members may also access Marketing and Planning Leadership Council experts for real-time planning and growth strategy discussions. To do so, please contact your Advisory Board account manager or Shay Pratt, Managing Director, at pratts@advisory.com.

## *Key Questions for Orthopedics Service Line Planning*

### I

### State of the Service Line

- What is orthopedics' contribution to the hospital?
- Which product lines are the greatest contributors?
- What are the recent growth and reimbursement trends?
- What are the most important issues facing the service line?

### II

### Growth & Marketing

- What is the competitive landscape for orthopedics?
- What are the drivers and barriers of profitable growth?
- How are hospitals aligning with physicians to achieve growth?
- How should programs organize and market themselves?

### III

### Innovation & Technology

- What are the disruptive technologies in orthopedics?
- Will any technologies drastically shift the site-of-service, volumes or finances of the service line?
- How can programs use innovation to grow volumes?

### IV

### Reform & Care Redesign

- Which payment reforms affect the orthopedic service line?
- How should the orthopedic service line evolve to assume quality, cost, and utilization risk?
- How are organizations re-designing care to prosper under both fee-for-service and accountable payment models?

Source: Marketing and Planning Leadership Council interviews and analysis.

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# Executive Summary

**State of the Service Line**

Long a pillar of growth and profitability for hospitals and health systems, the orthopedics service line provided attractive per-case economics and close to $25 billion in inpatient and outpatient contribution profits in 2010. While the economic downturn has softened volume growth for many programs, both inpatient and outpatient orthopedics services are expected to grow respectably through 2015, driven by an aging population, growth in revisions, and intensifying market competition.

However, the rate of profitable volume growth is increasingly challenged in recent years by several trends, including margin-eroding high-cost innovations, outmigration to ambulatory surgery, and increasing payer scrutiny of procedure appropriateness. In addition, in the wake of the Patient Protection and Affordable Care Act (PPACA) of 2010, hospitals will increasingly be held accountable for delivering high-quality, low-cost orthopedics care. As a result, institutions will need to address three key competencies: developing a focused growth and marketing strategy, crafting adoption principles for premium technology, and transforming the orthopedics service line infrastructure to succeed under increased performance risk.

**Growth & Marketing**

Three major factors will continue to drive absolute volume growth for the service line. First, baby boomers are now approaching the optimal age for joint replacement. Second, rising obesity rates place pressure on joints, increasing the need for earlier interventions. Finally, the robust growth across the past 10 years in both joint replacements and sports medicine services will set the stage for repeat procedures in the decade ahead. However, before aggressively pursuing volume growth in any service area, institutions must first assess their own profitability, given the variability of per-procedure costs across the country. To do so, organizations will need to align with high-value specialists who demonstrate consistent and efficient inpatient care. Hospitals must then communicate their high-quality, patient-centered, comprehensive service offering to the marketplace, not only continuing to develop relationships with key referring physicians, but also marketing orthopedics directly to consumers through a diverse set of communications channels.

**Innovation & Technology**

Across the last decade, orthopedics programs have been hit with a barrage of new implants for spine, joint replacement and trauma procedures. As new product introductions are not often met with a commensurate increase in reimbursement, programs must assess premium technology investments to ensure procedural margins. In particular, orthopedic specialists, planners, and service line leaders must evaluate the purported incremental quality benefits of new technologies, along with their potential to expand markets for key demographics.

**Reform & Care Redesign**

The PPACA introduces a number of risk-based payment experiments, such as bundled payments and shared savings, that increase performance risk for hospital-based orthopedics. As payment reforms place increased risk on longer term outcomes and per capita costs, institutions may need to extend the purview of the service line across a broader care continuum. This means standardizing the approach to consultation, pre-operative education and pain management, as well as rehabilitation and discharge. Value-based purchasing, bundled payments, and readmissions penalties will all require institutions to optimize the pathway for orthopedic surgery in an effort to reduce complications and costs and improve quality and efficiency.

**Editor's Note on Spine Procedures:** The orthopedics service line is typically defined to include joint replacements, sports medicine, hand and foot procedures, and orthopedic trauma. Although some organizations consider spine procedures within the orthopedics purview, the majority of hospitals organize spine services in the neurosciences service line. As such, the Marketing and Planning Leadership Council will provide a more detailed analysis of growth strategy for spine services in a forthcoming publication on the outlook for neurosciences, to be published in December 2011.

Marketing and Planning Leadership Council
September 2011

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# State of the Service Line

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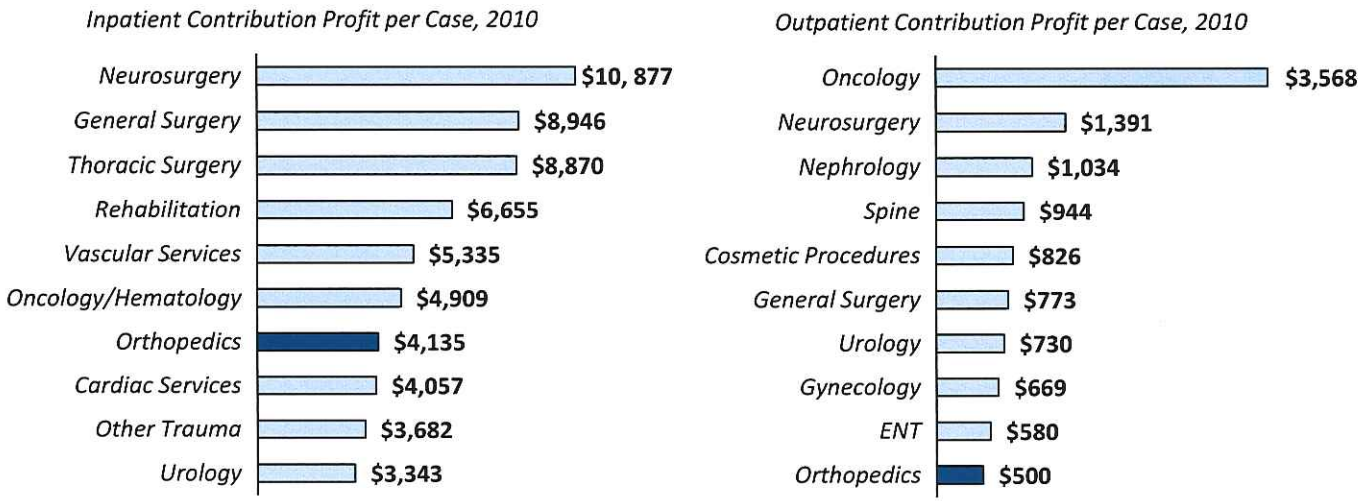
# A Pillar of Hospital Profitability

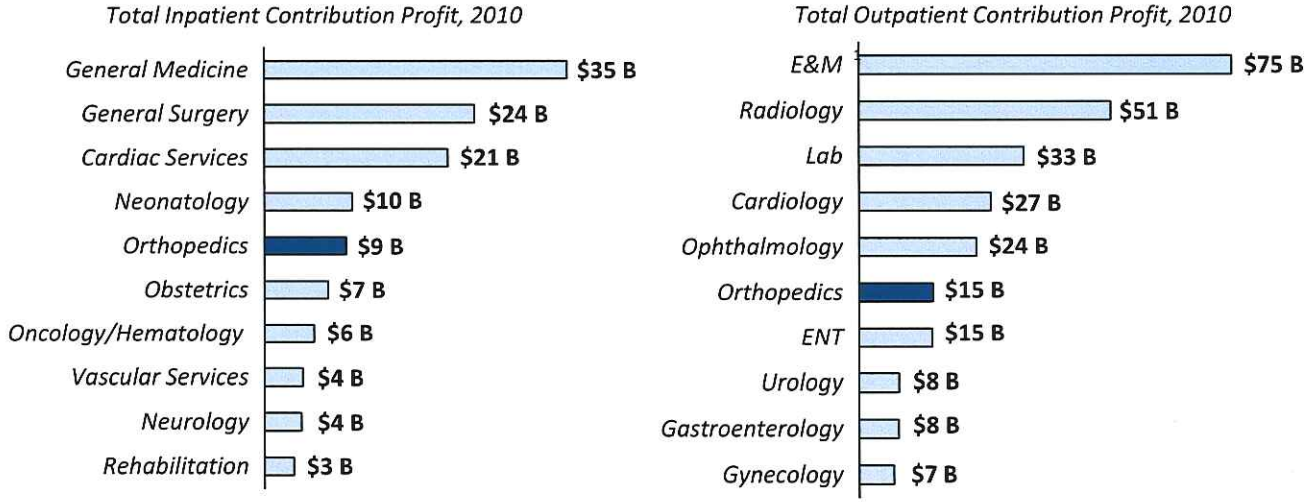
The orthopedics service line continues to contribute substantially to hospitals' book of business. Nationally, the service line ranks in the top five for total contribution profit when combining inpatient and outpatient services.

While many institutions view orthopedics as a reliable profit center under fee-for-service economics, ensuring consistent profitability can be challenging. With soaring implant costs, wavering reimbursement, and intensifying competition, the service line requires careful management to ensure its continued success.

## Top Ten Service Lines by Contribution Profit per Case




## Top Ten Service Lines by Total Contribution Profit




Source: Advisory Board National Model.

1 Evaluation and Management

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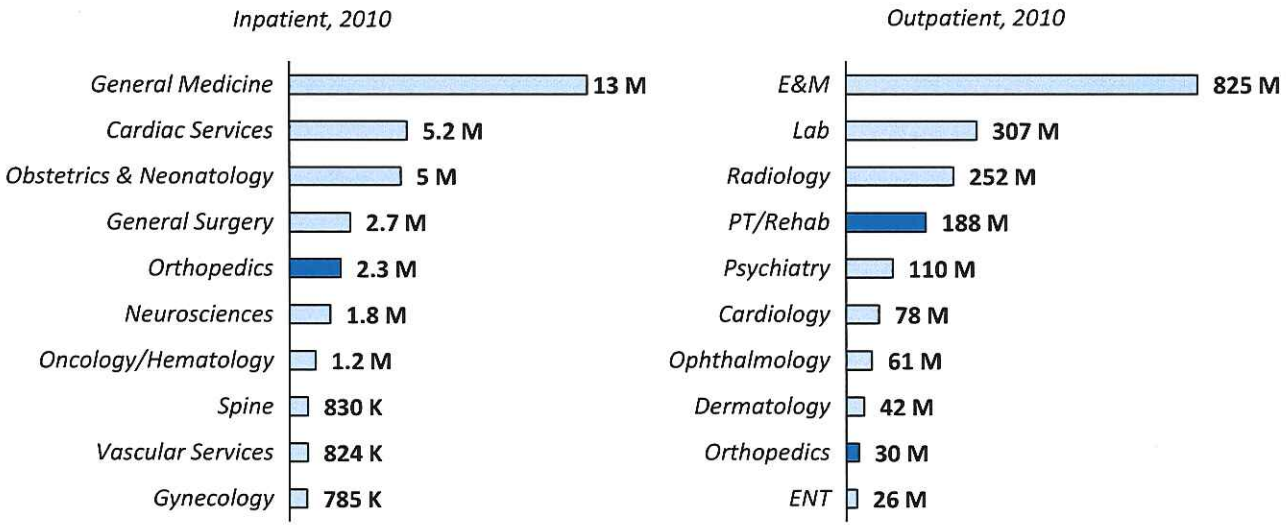
# A Major Volume Contributor

Given the financial value of orthopedics, many have prioritized the service line as a central component of overall growth strategy. Unlike many other procedural businesses, orthopedics is expected to grow substantially in coming years, with aging baby boomers expecting to continue an active lifestyle well into their later years.

The Advisory Board forecasts positive growth for orthopedics across the next 10 years, with 14 percent growth in inpatient orthopedics (mainly joint replacement) and 38 percent growth in outpatient orthopedics (mainly sports medicine).

**Top Ten Service Lines by Volume**




**Poised for Growth: 10-year Volume Forecasts**

| 14% | 38% |
|---|---|
| Inpatient Orthopedics | Outpatient Orthopedics |

Source: Advisory Board Data and Analytics Group.

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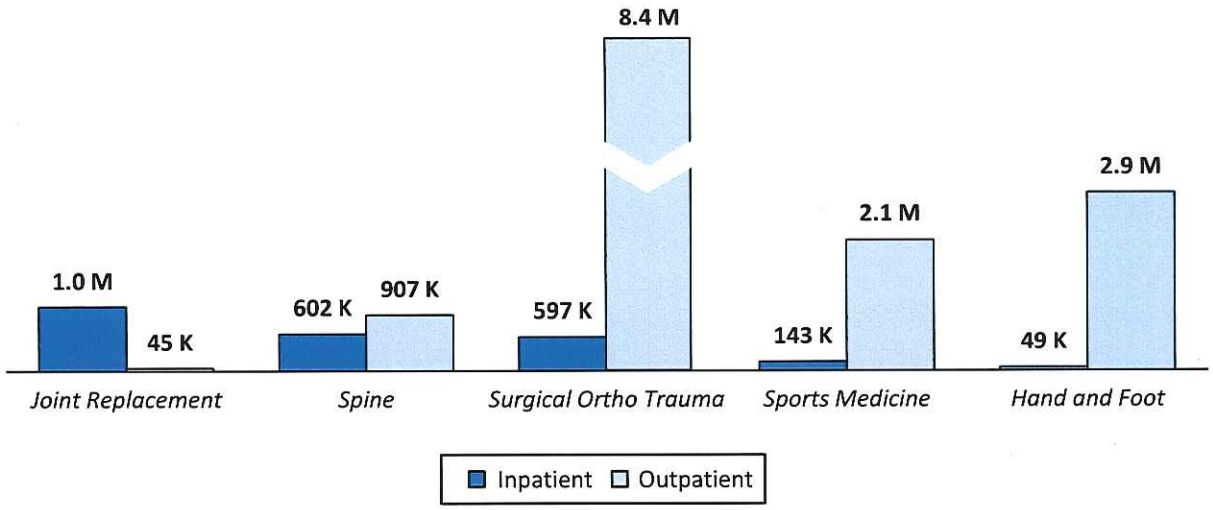
# Unbundling the Orthopedics Product Portfolio

While the orthopedics service line can encompass many services—including joint replacement, spine surgery, rheumatology, sports medicine, trauma, extremity care, and pain management—for most institutions, joint replacement is the largest strategic priority. On the inpatient side, joint replacement leads in volume and contribution profit, and competition, though fervent, is restricted to the hospital setting.

Outpatient orthopedics is considerably more crowded; sports medicine includes both hospital and ambulatory surgery center providers. The enormous volumes associated with outpatient sports medicine procedures, however, keep arthroscopic repair procedures in the spotlight.

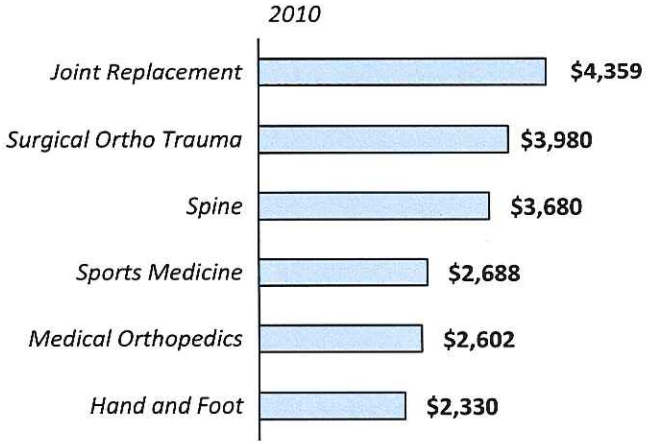
**Orthopedics Product Lines by Volume**

*2010*



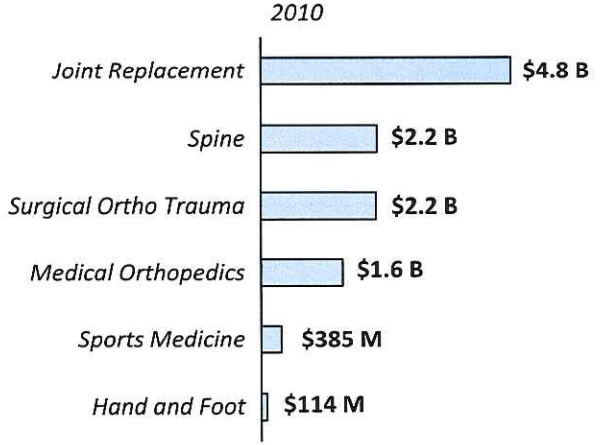

**Product Lines by Inpatient Contribution Profit per Case**

*2010*




**Product Lines by Inpatient Total Contribution Profit**

*2010*




Source: Advisory Board National Model.

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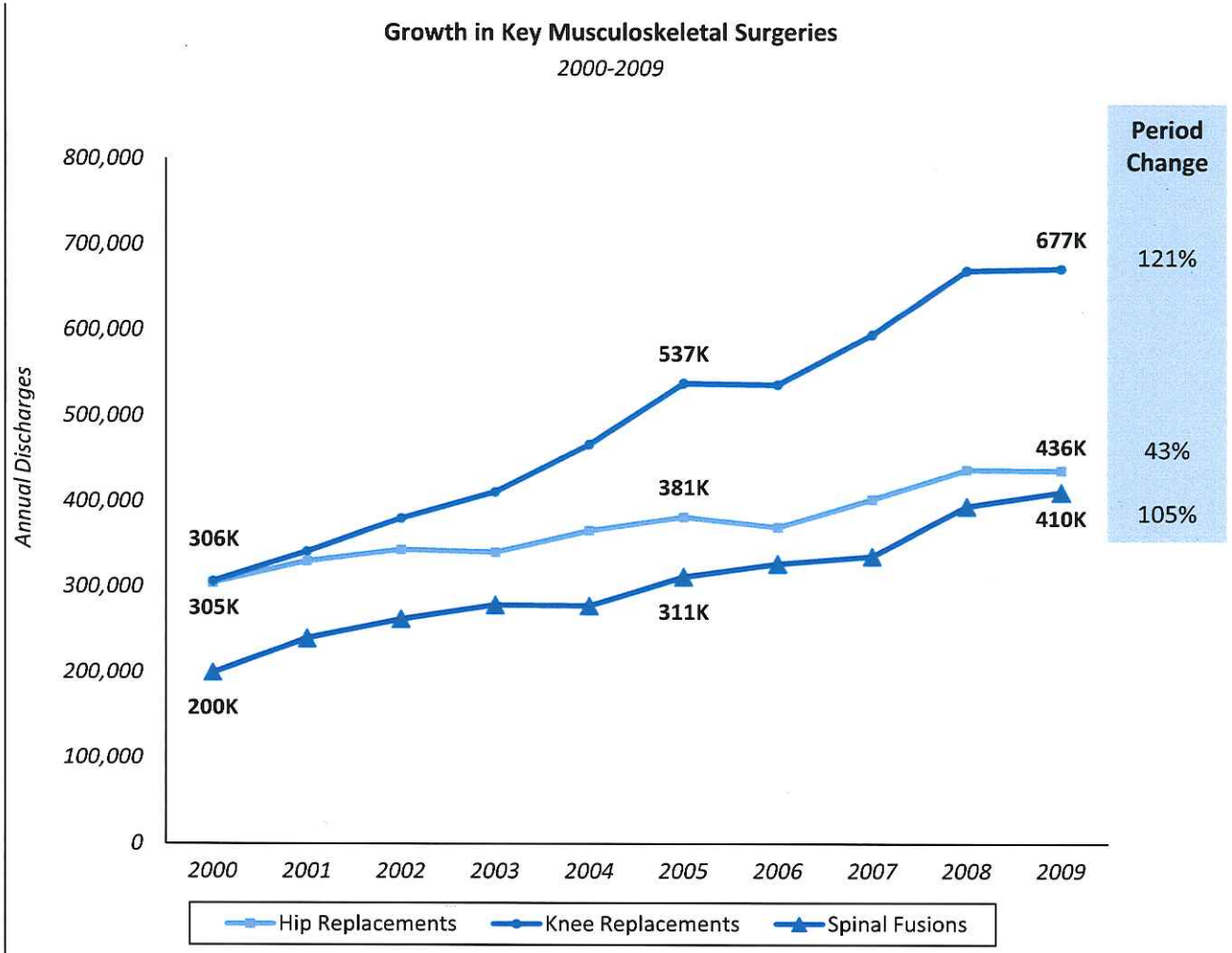
# A Dominant Driver of Growth Across the Past Decade

Growth projections for orthopedics, while positive, fall well below growth rates from the previous 10 years. From 2000 to 2009, total hip replacement volumes increased 43 percent and knee replacement and spinal fusion volumes more than doubled.

Growth was driven by the aging population, improvements in technology, and expansion of minimally invasive surgical techniques. Additionally, higher-impact activities and comorbidities such as obesity compelled younger patients to consider joint replacement and spinal fusions.




Source: HCUPnet, available at: http://hcupnet.ahrq.gov/HCUPnet.jsp, accessed June 29, 2011.

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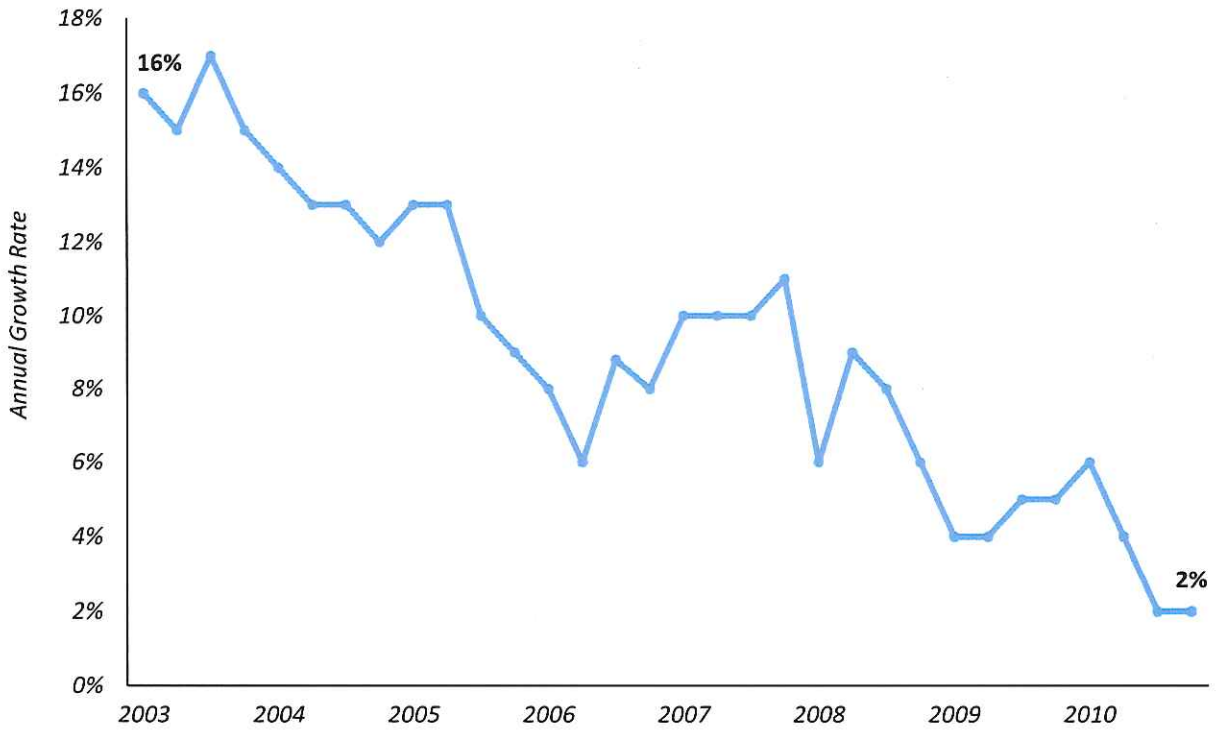
# Double-Digit Growth Rates a Thing of the Past

The rate of growth in orthopedics has slowed considerably, especially in the past two years, due to the economic slowdown. Recent data suggest the specialty has moved to an annual growth rate well in the single digits.

Slow to moderate growth will likely remain as long as unemployment remains high and consumers experience financial uncertainty. According to some industry analysts, every 3 percent rise in unemployment results in a 1 percent decline in elective procedures nationally. Since common elective joint replacement and spine procedures are typically scheduled as many as six months in advance, these slower growth rates will likely continue across 2011 and 2012, even with demographics providing a natural buoy to utilization.

**Total Joint Replacement: National Growth Rates by Quarter**

*2000-2009*




Source: Stewart, K, "Orthopedic Market Update: Not Worse, But Not Better," DeutscheBank, February 22, 2011.



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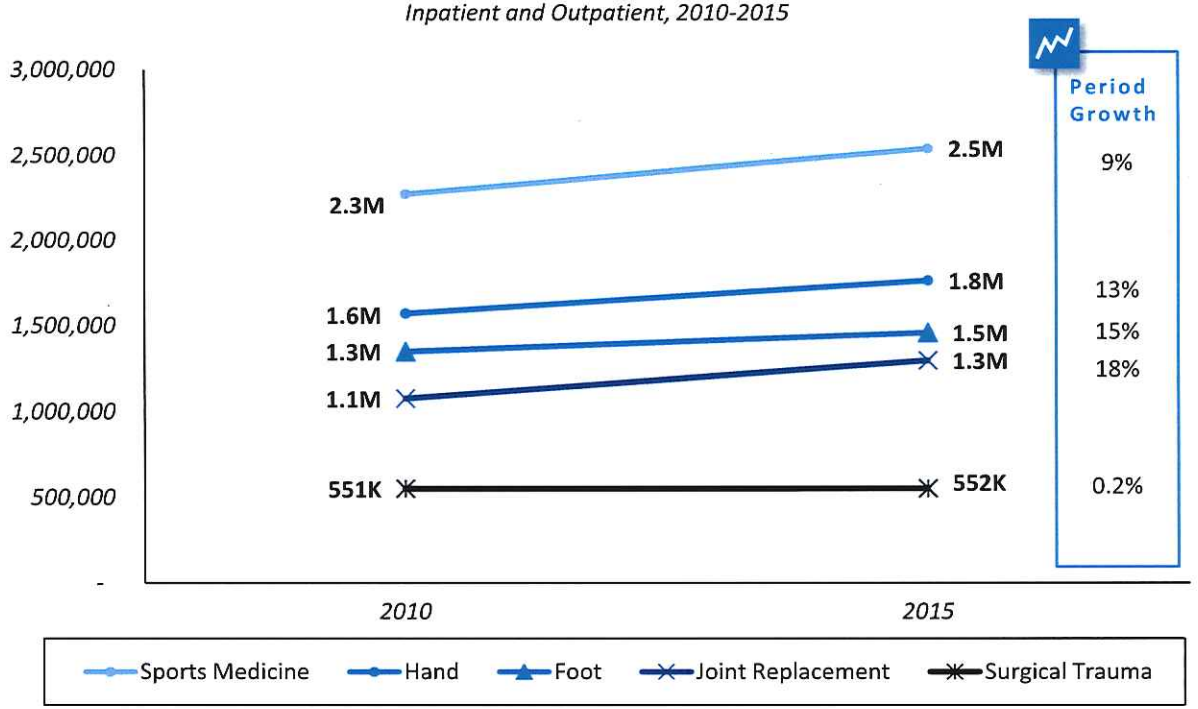
# Still Strong Underlying Demand

Strong growth in orthopedics is expected to continue once the economy rebounds and the labor market improves, sustained by technology improvements in joint replacements coupled with more younger patients opting for the procedures. Additionally, long-term evidence from international joint registries is validating the clinical success and cost-effectiveness of joint replacement. These findings are likely to reassure patients and insurers as they consider joint replacement as a treatment for end-stage osteoarthritis.

**Orthopedics Product Line Volume Forecasts**

*Inpatient and Outpatient, 2010-2015*




## Drivers of Profitable Growth

- Aging population
- Increasing obesity rates
- Revisions following past replacement, sports medicine procedures
- Increasing competition

## Barriers to Profitable Growth

- Economy-related slowdown in volume
- High-price technologies eroding profits
- Outmigration to ambulatory surgery
- Increasing scrutiny over appropriateness
- Heightened focus on outcomes, value

Source; Advisory Board National Forecasting Model, Marketing and Planning Leadership Council research and analysis.

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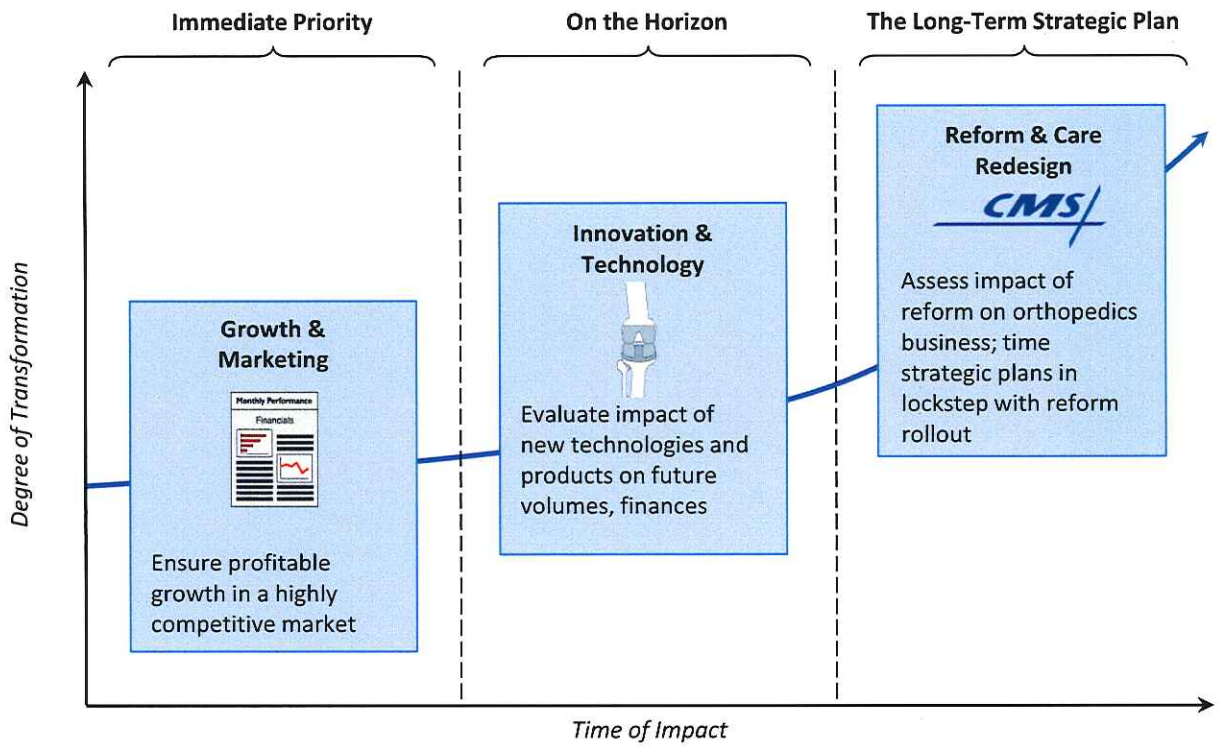
# Today's Strategic Priorities for Orthopedics

As institutions look to develop strategic plans for orthopedics, three major considerations must be addressed. First, slower rates of growth and an increasingly competitive market require institutions to set a deliberate plan for orthopedics growth.

Next, institutions must consider and assess the impact technologies and innovation will have on the orthopedics business. While many technologies purport to drive future growth, they also may hamper per-case economics given premium pricing.

Finally, orthopedics programs must begin to consider the impact accountable payment initiatives and risk-based incentives will have on orthopedics strategy. While most organizations will continue to operate in a fee-for-service environment for the near term, orthopedics business strategy could fundamentally shift as new risk-based payment models develop. Programs must consider these changes today, but ensure strategic plans evolve in lockstep with new incentives.

**Timeline of Strategic Considerations for the Orthopedics Service Line**




Source: Marketing and Planning Leadership Council insights and analysis.



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# Growth & Marketing

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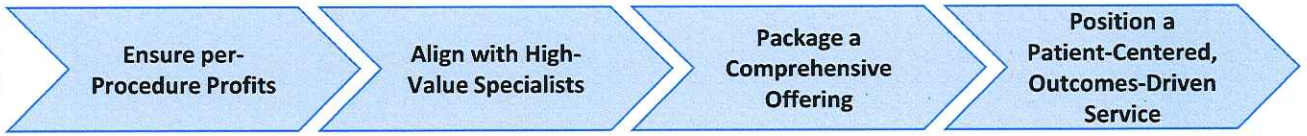
# Developing a Disciplined Approach to Orthopedics Growth Strategy

Buoyed by strong demographics and cultural expectations for a high quality of life and activity in later years, orthopedics should experience significant growth across the next decade. However, given a low barrier to entry, resulting in a sizable number of providers and intense competition, as well as variable margins, careful management will be required to ensure market differentiation and profitability.

Programs should focus on four core strategies for growth: (1) ensure per-procedure profits, (2) align with high-value specialists, (3) package a comprehensive orthopedics offering, and (4) position a patient-centered, outcomes-driven service.

**Key Imperatives for Orthopedics Growth Strategy**




Given profit variability, any growth plan should start with an assessment of institutional orthopedic economics and a plan for reducing orthopedic implant costs

The active support of surgeons is critical to reduce orthopedic implant costs, elevate clinical quality, and achieve competitive advantage and volume growth

As orthopedics care increasingly becomes a commodity business, differentiation achieved by constructing a coherent package of services for patients that extends across the continuum of care

Once a comprehensive, quality-driven program is built, it must actively communicate its patient-centered, outcomes-driven approach to care

Source: Marketing and Planning Leadership Council insights and analysis.

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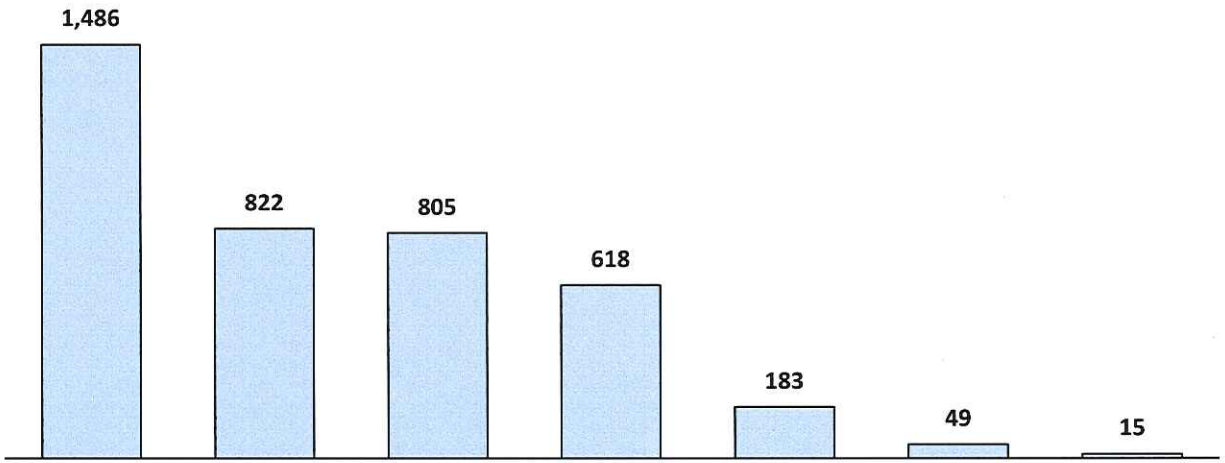
# Low Barriers to Entry Create Competitive, Commoditized Orthopedics Market

Since orthopedics typically does not require extensive capital or technology investments, barriers to entry are low for new providers. The vast majority of acute care hospitals now offer orthopedic surgery and many programs face difficulty securing competitive advantage. The orthopedics business is relatively mature and commoditized, with high success rates and few high-end, high-volume differentiating procedures.

One way institutions look to differentiate their programs is to focus on niche or specialized offerings. High-end sports medicine, trauma, foot, and upper-extremity surgeries can differentiate an orthopedics program as comprehensive. However, joint replacement surgeries typically account for approximately half of program volume, and providers should focus service line planning efforts on these product lines given the volume and profit potential.

**Provider Segmentation by 2010 Orthopedic Volumes**

n = 3,978[1]




**An Even Distribution**

47% Average Percent of Total Orthopedic Volumes Accounted for by Joint Replacement

**The Joint Benchmark**

203 Average Number of Joint Replacements for Facilities with Greater Than 10 Total Joint Replacements

1 Excludes programs with fewer than 10 orthopedic volumes. Orthopedic volumes defined using Advisory Board Inpatient Service Line Definition, which does not include spine.

Source: MEDPAR FYs 2003, 2008, 2010.

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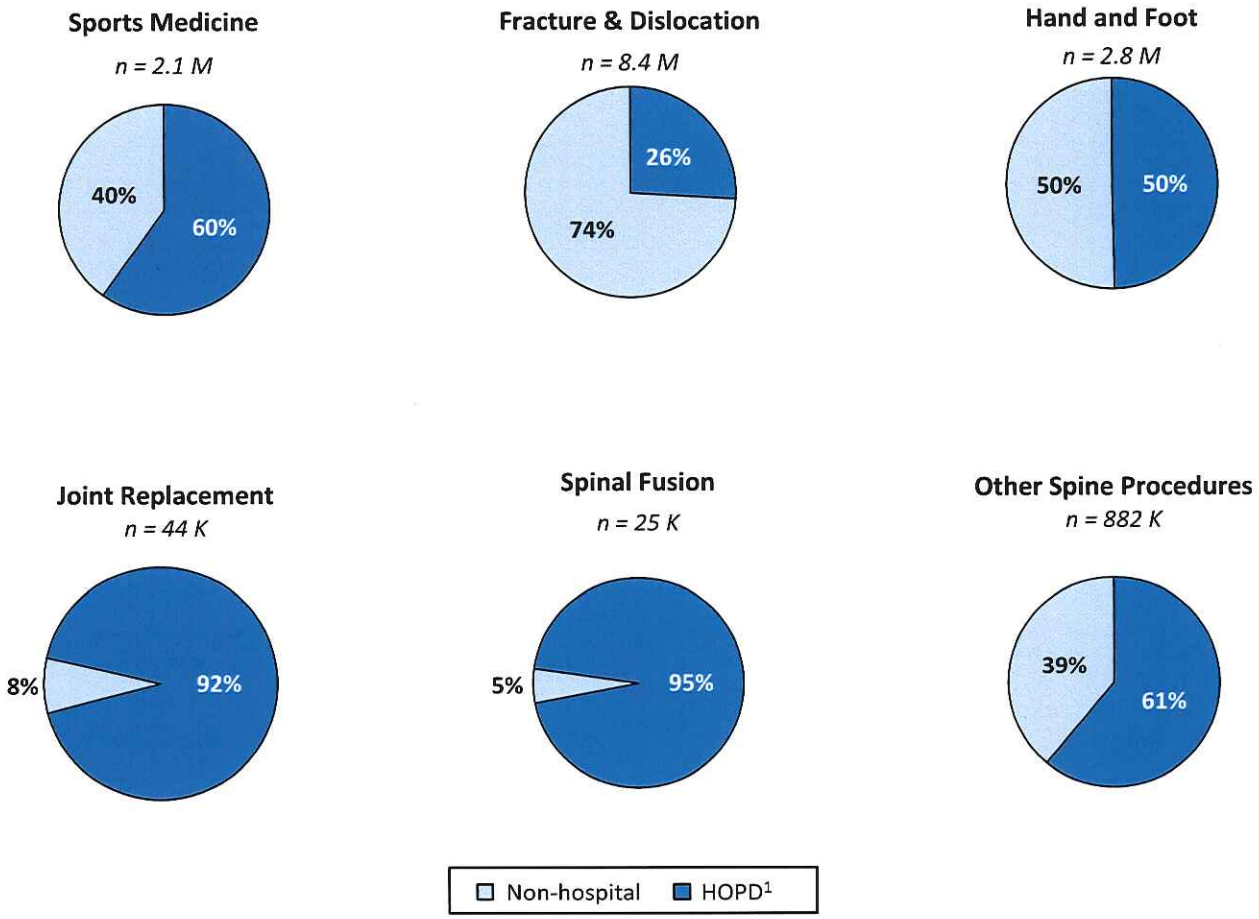
# Outpatient Business Saturated with Non-hospital Providers

Technological and care innovations are enabling certain surgical cases to be done in 23-hour or same-day care settings. At the same time, financial incentives and the desire for greater efficiency are driving business outside the hospital altogether to freestanding surgery center settings.

While the joint replacement business is increasingly commoditized with hospital providers, surgical outmigration for outpatient orthopedics primarily affects the sports medicine and spine sub-service lines. This trend is expected to continue over the next several years may diminish operating margins for some programs.

**Outpatient Product Lines by Site-of-Service**




1 Hospital outpatient department.

Source: Marketing and Planning Leadership Council insights and analysis.

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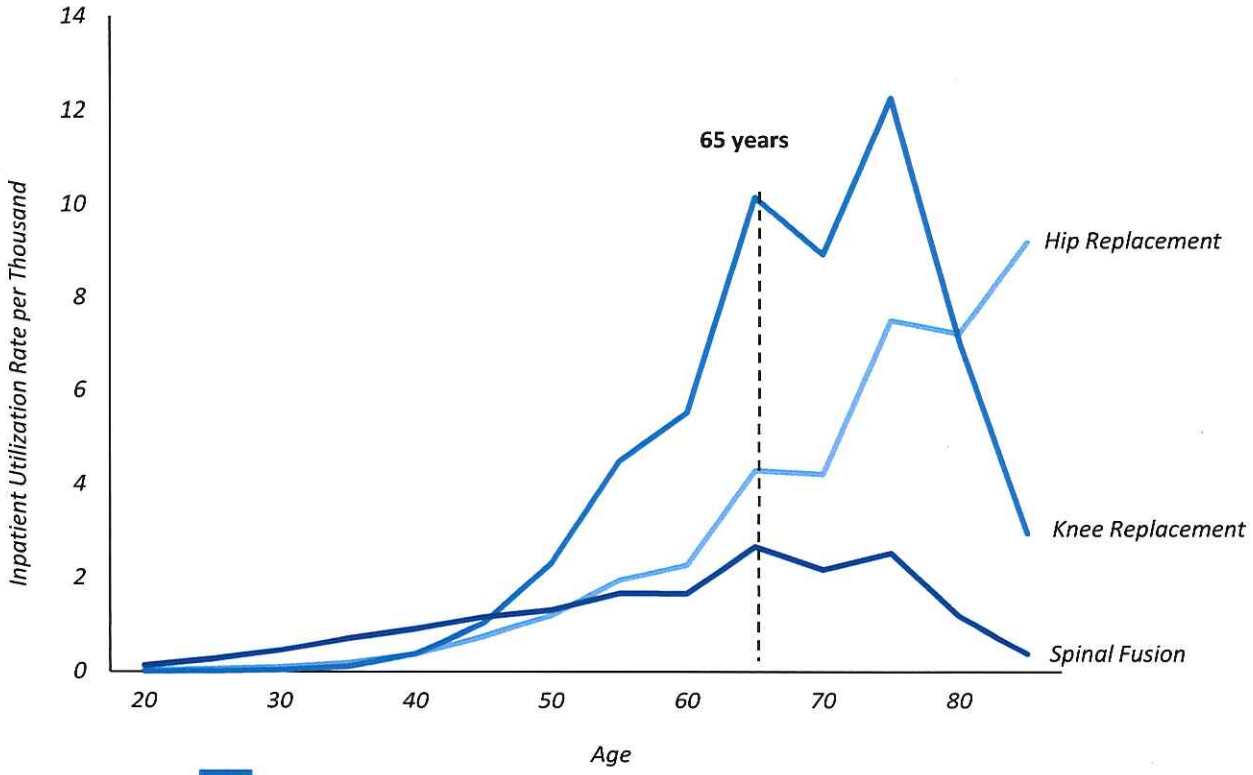
000578 (02/24/14)

# Graying Baby Boomers Entering the Sweet Spot for Joint Replacement

While orthopedics competition intensifies, the overall orthopedics business continues to be poised for growth. Three major factors will continue to drive absolute volume growth for the service line. First, baby boomers are now approaching the optimal age for joint replacement. Second, rising obesity rates place pressure on joints, increasing the need for earlier interventions. Finally, the robust growth across the past 10 years in both joint replacements and sports medicine arthroscopies will set the stage for repeat procedures in the decade ahead.

Overall, osteoarthritis affects roughly 15 percent of adults aged 25 and older and 34 percent of those over 65. This equates to approximately 27 million individuals affected with the disease. While the vast majority do not require joint replacements right away, there is still ample latent demand for the service. As individuals enter into Medicare eligibility, joint replacement becomes more likely. The average age for a spinal fusion is 56; it is 66 for a knee replacement and 70 for a hip replacement. The rapid graying of the population will therefore contribute significantly to the rise in orthopedics; the fastest growing age co-hort, those older than 65, is expected to grow 38 percent across the next 10 years.

**Orthopedic Surgical Volumes Across Age Cohorts**




**Increase in US Population by Age Cohorts: 2010-2020**

| 5% | 38% |
|---|---|
| 45-64 year olds | 65+ year olds |

Source: CDC, accessed June 27, 2011, available at: http://www.cdc.gov/arthritis/basics/osteoarthritis.htm; Marketing and Planning Leadership Council interviews and analysis.

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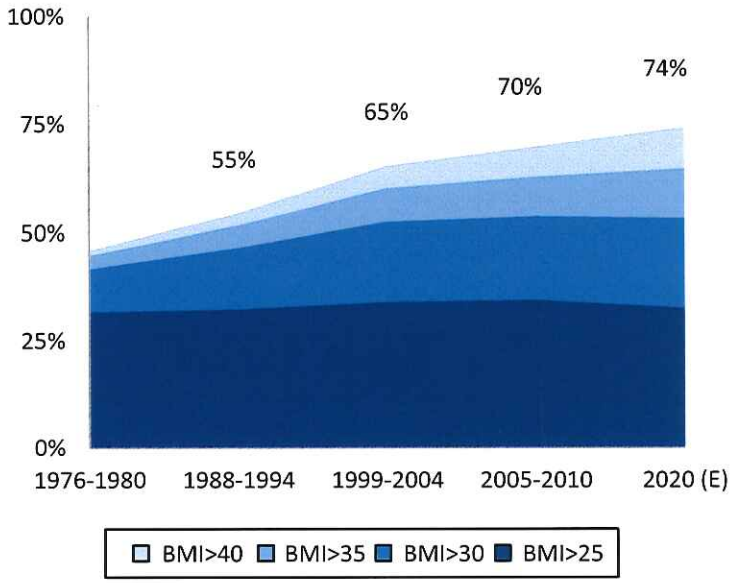
# Rise in Obesity Driving Increased Osteoarthritis

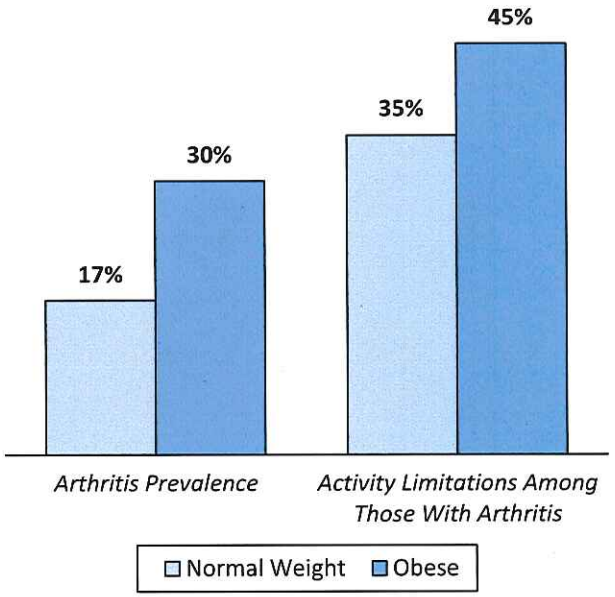
According to the Centers for Disease Control and Prevention (CDC), arthritis is the most common cause of disability and costs the United States approximately $128 billion annually. While demographics are increasing the overall number of orthopedic patients, the obesity epidemic is accelerating the rate of osteoarthritis development. Every 10 additional pounds of body weight exerts 30 to 60 pounds of force on the knees while walking.

This growing obesity problem impacts not only the prevalence of arthritis, but also the activity limitations for those with the disease and the complexity of the joint replacement surgery when performed on them. Between 1991 and 1992 and 2007 and 2008, obesity prevalence in total hip replacement increased from 2.2 to 7.6 percent, respectively. Many physicians note that this increase in the obesity rate impacts the safety and efficacy of the joint replacement procedure, as well as the time required to complete the case. In data presented in June 2011, 10 additional BMI points increased the complication rate of joint replacement by 284 percent, and a 5 percent increase in BMI lowered functional outcomes scores by 96 percent.

**Percentage of the Population by BMI**




**Obesity's Impact on Arthritis**




### A Direct Correlation

"There is a direct correlation between obesity and arthritis. At our specific practice, in the 1990s the number of patients who were obese was low. But now about 50 percent of the patients we operate on are obese."

*Orthopedic Surgeon*
*Large Orthopedic Practice in the Southeast*

Source: Ruhm CJ, "Current and Future Prevalence of Obesity and Severe Obesity in the United States," NBER Working Paper, Number 13181; Centers for Disease Control and Prevention, accessed June 28, 2011, available at: http://www.cdc.gov/chronicdisease/resources/publications/aag/arthritis-text.htm#chart1; ORTHO SuperSite, "Keeping Up with Future Demand for Joint Arthroplasty Will Prove Challenging," accessed June 30, 2011, available at: http://www.orthosupersite.com/view.aspx?rid=80218; "Overweight Is A High Risk Factor For Complications In Hip And Knee Replacement: Experts Urge Obese Patients To Reduce Weight Before Surgery," http://www.medicalnewstoday.com/releases/227108.php, accessed July 25, 2011. Marketing and Planning Leadership Council interviews and analysis.

1 Projected figures for 2010 and 2020.

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000580 (02/24/14)

# Recent Robust Growth to Drive Revisions in the Years Ahead

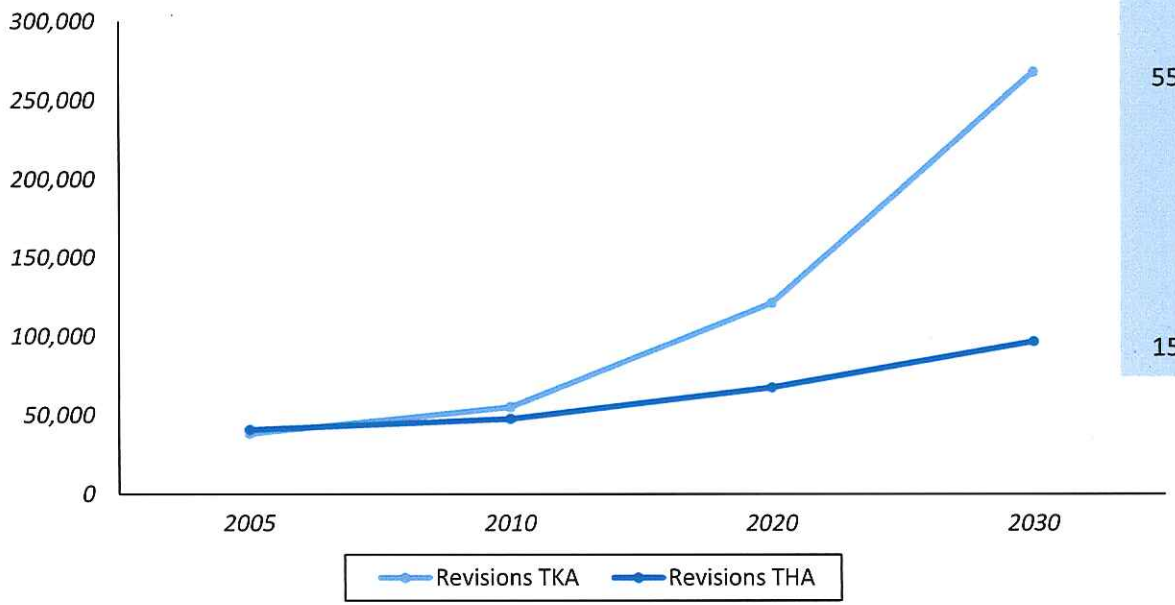
With the volume growth of the orthopedics service line across the past 10 years, there will likely be significant demand for revision surgeries given the nature of the materials utilized in joint replacement. An aggregation of worldwide registry data demonstrated that for both hip and knee replacements, revision rates were approximately six percent at five years, and 12 percent after 10 years.

A study presented at the 2011 Annual Meeting of the American Academy of Orthopedic Surgeons attempted to assess whether key demographic factors contributed to revisions. The results demonstrated that patients ages 65 to 75 years had a 47 percent greater risk of revision than patients older than 75, and men had a 20 percent higher risk of revision compared with women. Patients whose total hip replacements were performed by low-volume surgeons were also at a higher risk of revision.

While revision surgeries will contribute to the overall growth of the orthopedics service line, growth through revision surgeries is not ideal. Revisions are reimbursed at the same rate as primary joint replacements, with higher complication rates and procedure times. Fewer surgeons are trained to complete revisions on a routine basis, threatening physician supply as demand increases.

**Annual and Projected Number of Joint Replacement Revisions**

*Based on 1990 to 2003 Data from the Nationwide Inpatient Sample*




| Period Change |
|---|
| 557% |
| 152% |

**Growth through Revisions a Profits Wild Card**

"A general orthopedic surgeon is usually reluctant to perform revision surgery because it is much more complicated and much more time-consuming, plus it is not reimbursed very well."

*Orthopedic Surgeon*
*Large Orthopedic Practice in the Southeast*

Source: Kurtz S et al., "Projections of Primary and Revision Hip and Knee Arthroplasty in the United States from 2005 to 2030," *Journal of Bone & Joint Surgery*, 2007;89:780-785; Cram P et al., "Clinical Characteristics and Outcomes of Medicare Patients Undergoing Total Hip Arthroplasty, 1991-2008," JAMA, April 2011, 305: 1560-1567; ORTHO SuperSite, "Keeping Up with Future Demand for Joint Arthroplasty Will Prove Challenging," accessed June 30, 2011, available at: http://www.orthosupersite.com/view.aspx?rid=80218; Marketing and Planning Leadership Council interviews and analysis;.

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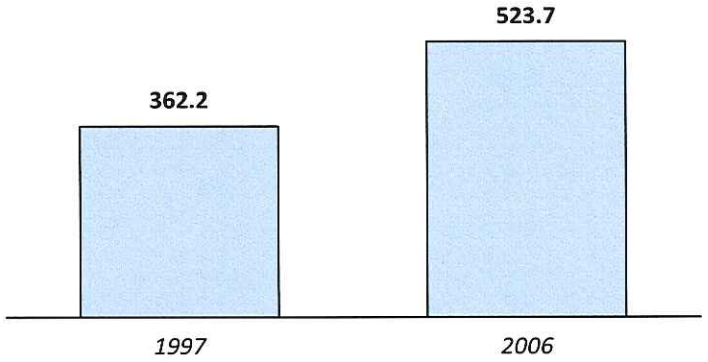
# Active "Weekend Warriors" Eventually Will Require Replacements After Arthroscopy

For the past 10 years, baby boomers have been positioned in the demographic sweet spot for sports medicine procedures, with arthroscopic repair utilization spiking for individuals between 40 and 55 years of age. Even among Medicare patients, the rate of knee arthroscopy has grown significantly across the past 10 years, with a 45 percent increase in the rate of arthroscopies between 1997 and 2006.

Arthroscopy can be used to treat acute injuries associated with torn cartilage and ligaments, or as an early intervention for patients with osteoarthritis. While these interventions are highly effective, many patients will eventually require a joint replacement given the weakened joint. One study reported that in Medicare patients, those treated with arthroscopy for osteoarthritis (arthropathy) required a total joint replacement in 10 percent of cases one year after surgery and in 33 percent of cases nine years after surgery. Injury patients exhibit similar demand for replacement. While these rates are likely higher in the Medicare population, the increase in an active population requiring arthroscopies, combined with the increased demand among younger patients to maintain an active lifestyle, will ultimately continue to drive increased joint replacement volumes.

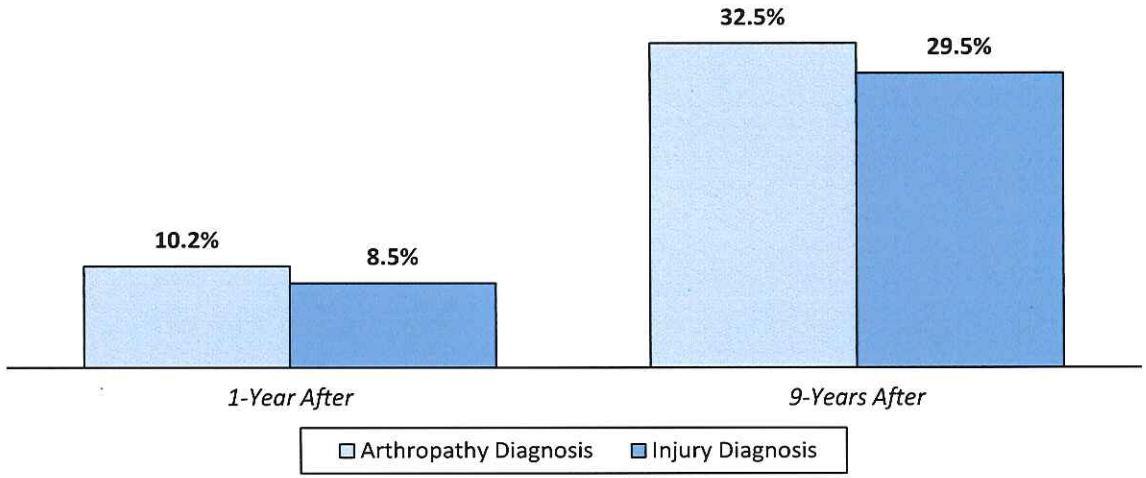
**Prevalence of Knee Arthroscopy per 100,000 Medicare Patients**

*n = 78,137 patients*




**Patients Undergoing Knee Replacement After Arthroscopy**

*n = 78,137 patients*




Source: Kim S et al., "Temporal Relationship Between Knee Arthroscopy and Arthroplasty: A Quality Measure for Joint Care?" *The Journal of Arthroplasty*, February 2011, 26:187-191;

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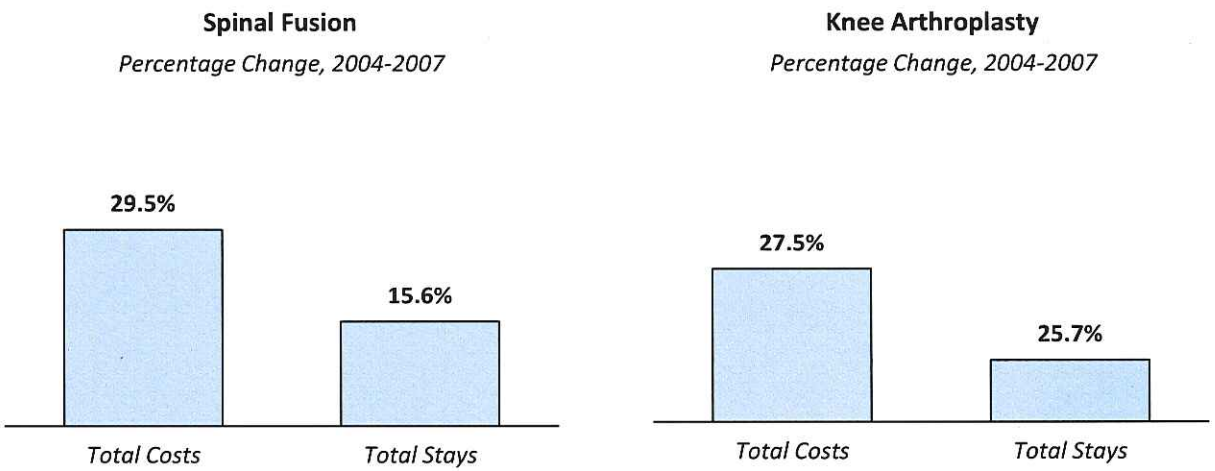
000582 (02/24/14)

# Rapidly Increasing Orthopedic Costs Erode Margins, Increase Payer Scrutiny

As institutions look to capitalize on the growth expected in orthopedics across the next decade, they will need to do so with a careful eye toward cost given eroding margins and payer scrutiny. A study published in 2010 by the Agency for Healthcare Research and Quality (AHRQ) examined the top procedures with the most rapidly increasing hospital costs. Among the procedures examined, knee replacement had the highest aggregate change of cost of $9.2 billion between 2004 and 2007, and spinal fusion was the second highest of all those examined, with procedural costs rising at nearly double the rate of the volume of procedures themselves.

*Rapidly Increasing Costs in Common Orthopedic Procedures*




**Procedures with the Most Rapidly Increasing Hospital Costs, 2004–2007**

- 2010 AHRQ Study examined rising costs of inpatient hospital care
- Among the procedures examined, knee arthroplasty had the highest aggregate change in cost ($9.2 billion) and spinal fusion had the second highest aggregate cost in 2007 ($8.9 billion)
- Of the 29.5 percent increase in total cost for spinal fusion, 12.8 was due to increase in mean cost of hospital stays. Of the 27.5 percent increase for knee arthroplasty, 26 percent was due to volume growth, rather than cost increases

Source: Statistical Brief #82. Healthcare Cost and Utilization Project (HCUP). March 2010. Agency for Healthcare Research and Quality, Rockville, MD.

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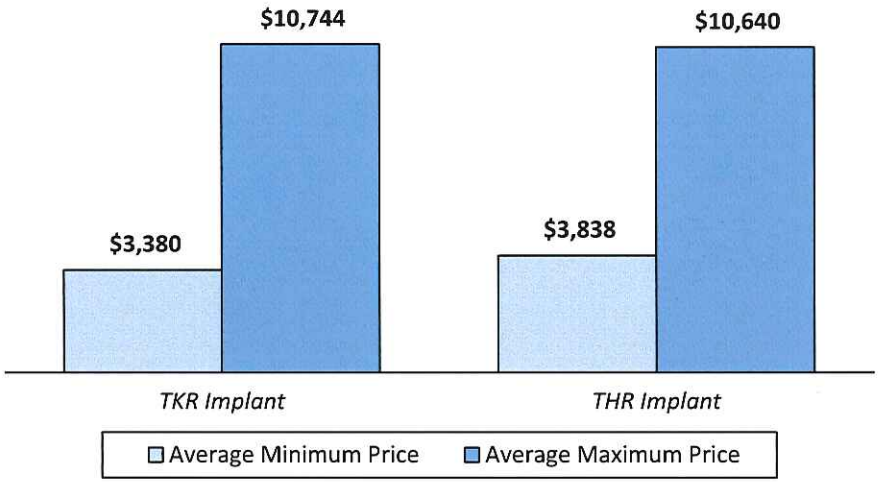
# Profitability Must Be Ensured Before Large-Scale Growth Efforts

Before aggressively pursuing volume growth, institutions must first assess their own profitability, given the variability of per-procedure costs across the country. While costs have risen precipitously across the past five years, due both to higher prices and a higher portion of premium devices used, hospital revenue for orthopedic procedures has remained relatively constant, with joint replacement reimbursement increasing by just 0.4 percent between 2010 and 2011. As list prices for orthopedic implants have risen 278 percent between 1991 and 2011, hospital payment has only risen by 38 percent and physician payment has actually declined by 33 percent. Institutions must assess individual profitability by procedure and by physician given the vast variability among hospitals and even physicians within the same facility.

**Range of Average Implant Cost per Case**

*N = 61 Hospitals*




## Study in Brief: Costs and Cost Management Strategies for Hip and Knee Replacement Implants

- Average implant costs showed a threefold difference across 61 hospitals
- Higher-volume hospitals experienced lower implant costs per case
- Hospitals using more costly implants experienced higher non-implant-related costs
- Restricting physician choice to a limited number of implant vendors was not associated with lower implant costs in this study

Source: Bozic, K. "Costs and Cost Management Strategies for Hip and Knee Replacement Implants." AAOS Annual Meeting Paper Presentations, San Diego, CA, 16 February 2011.



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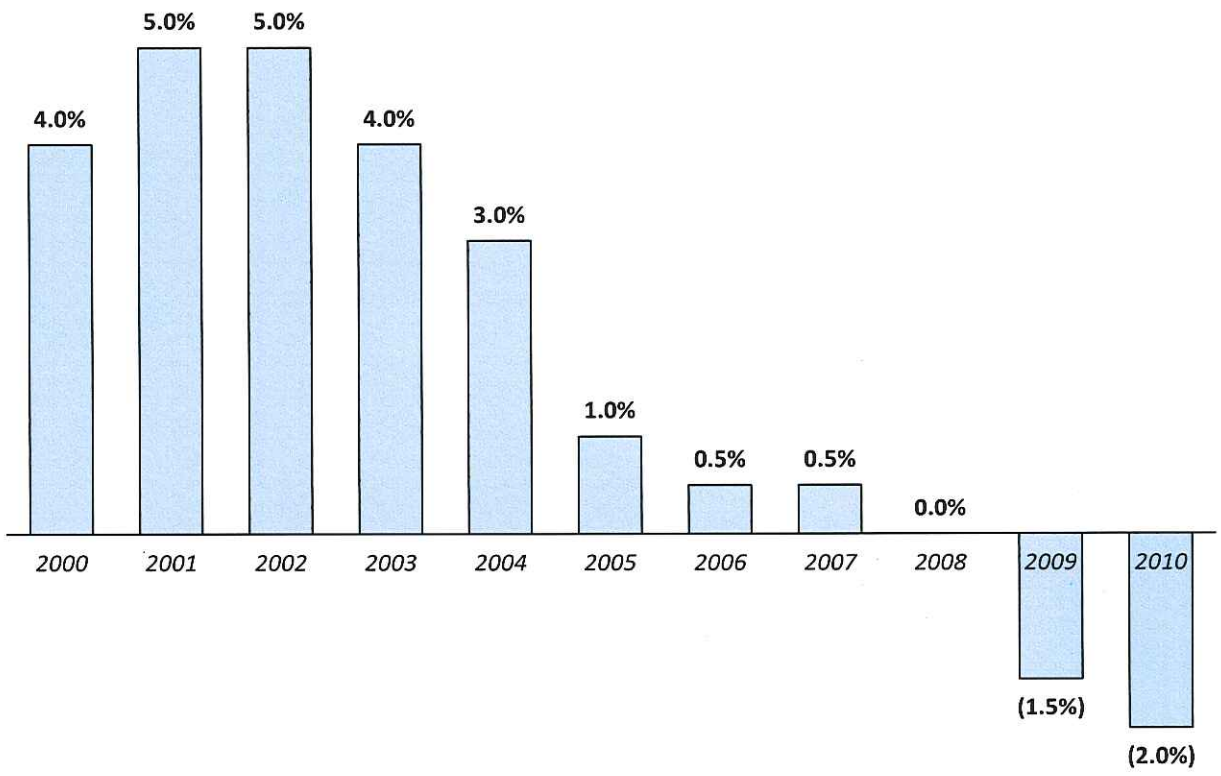
# Economy Pressuring Implant Pricing

While the economy has dampened short-term growth expectations, one bright side may be the impact the economy has had on hospitals' negotiating power with orthopedic vendors. The uncertain economic environment brought urgency to the need to reduce orthopedic implant costs, establishing a burning platform to align hospitals and physicians together in an unprecedented manner.

Many institutions reported both increased formal and informal alignment with physicians during the downturn, which served to break long-standing allegiances many physicians had with orthopedic vendors. The result was the first estimated declines in orthopedics pricing in the past 10 years. While volumes are likely to rebound, institutions should look to maintain these savings and not allow implants to reach pre-recession price levels.

**Estimated Percentage Change in Joint Replacement Pricing**

*2000-2010*




Source: Stewart, K, "Orthopedic Market Update: Not Worse, But Not Better," DeutscheBank, February 22, 2011.

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# Imperative to Partner with Physicians to Achieve Meaningful Device Cost Savings

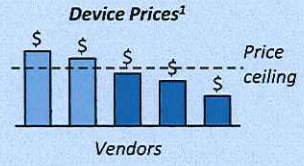
Physician alignment is critical for successful contracting with vendors. Hospitals have a favorable negotiating position if physicians are willing to adjust their vendor selection to control hospital costs. Because the process should ultimately focus on assessing the clinical merits of devices and the value associated with their cost, physicians should be at the core of value analysis.

The ideal process starts by compiling clinical data on the products; demonstrating that value analysis is a process intended to drive selection of the highest quality products, not just to generate cost savings. After a full clinical assessment of products is completed, financial information should be shared with physicians.

The success of these value analysis interactions and the collective strategy of the group will ultimately determine the best course of action for reducing implant costs. Different hospitals have used a variety of strategies to develop contracts with orthopedic implant vendors. As a first step in preserving physician choice of implant, many hospitals have established an all-comer price ceiling, or capitated pricing agreement. Progressive institutions with strong physician alignment have pursued standardization strategies or, in select cases, online reverse auctions.

**Device Cost Reduction Strategies**

**Establish All-Comer Price Ceiling**




- Hospital, physicians set maximum price for each device
- All vendors willing to meet price request able to contract with hospital at specified price levels

**Consolidate Approved Devices and Vendors**

- Physicians reduce number of devices, vendors to consolidate market share
- Obtain preferential pricing in exchange for volume guarantees

**Organize Online Reverse Auction**

- Hospital hosts electronic reverse auction
- Vendors bid on sale price, see blinded bids from other vendors
- Encourages price competition without volume guarantees

*Increased Aggressiveness,*
*Increased Need for Strong Physician Alignment*

1) Illustrative data.

Source: Marketing and Planning Leadership Council interviews and analysis.

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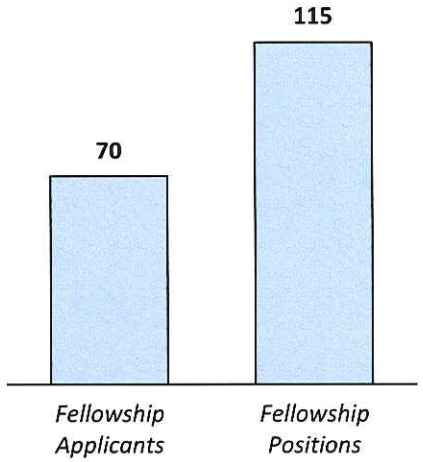
# Patients Not the Only Ones Aging—Orthopedics Surgeons Set for Shortage

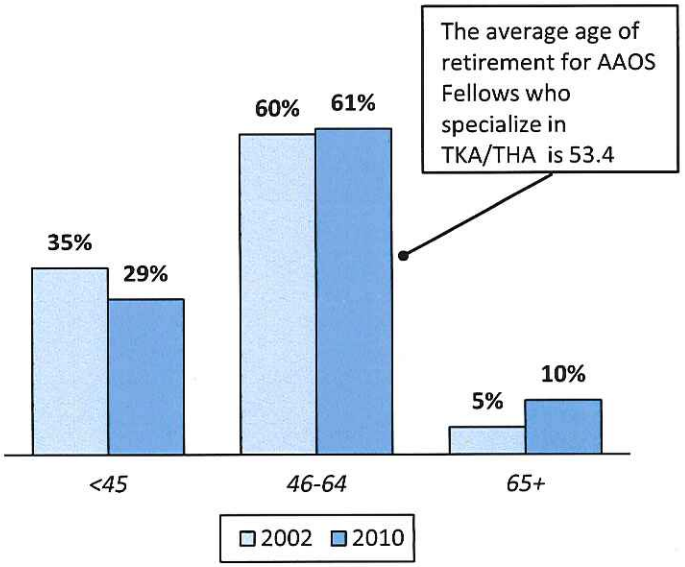
The second imperative to achieving profitable growth is to align with high value specialists, or those specialists with a focus on high-quality, low-cost, efficient care. To craft a successful and sustainable orthopedic strategy, hospitals and health systems, without exception, need to achieve better alignment with orthopedic surgeons. The active support of surgeons is critical to achieving every major strategic goal for hospital orthopedics programs, including reducing orthopedic implant costs, elevating clinical quality, and achieving competitive advantage and volume growth.

However, while volumes are poised to increase, providers will also face a supply shortage of orthopedic surgeons. Given the high proportion of Medicare patients among the joint replacement patient population, joint replacements are becoming less lucrative for surgeons. Thus, orthopedic surgeons are increasingly looking to sub-specialties such as sports medicine and spine surgery, as these specialties have more predictable hours, less physically demanding procedures, and more lucrative reimbursement. Recently total joint fellowships have remained unfilled, while a majority of orthopedic surgeons near retirement.

**Number of Total Joint Fellowship Positions Versus Number of Applicants**




**Distribution of Orthopedic Surgeons by Age Group**




Source: Hariri S et al., "A Resident Survey Study of Orthopedic Fellowship Specialty Decision Making and Views on Arthroplasty as a Career," *The Journal of Arthroplasty*, December 2010; Turkelson C et al., "State-Level Changes in in AAOS Orthopaedic Fellows," AAOS, April 2010; Iorio, R et al., "Orthopaedic Surgeon Workforce and Volume Assessment for Total Hip and Knee Replacement in the United States: Preparing for an Epidemic," *Journal of Bone and Joint Surgery*, 2008, 90:1598-1605; Marketing and Planning Leadership Council Interviews and analysis.

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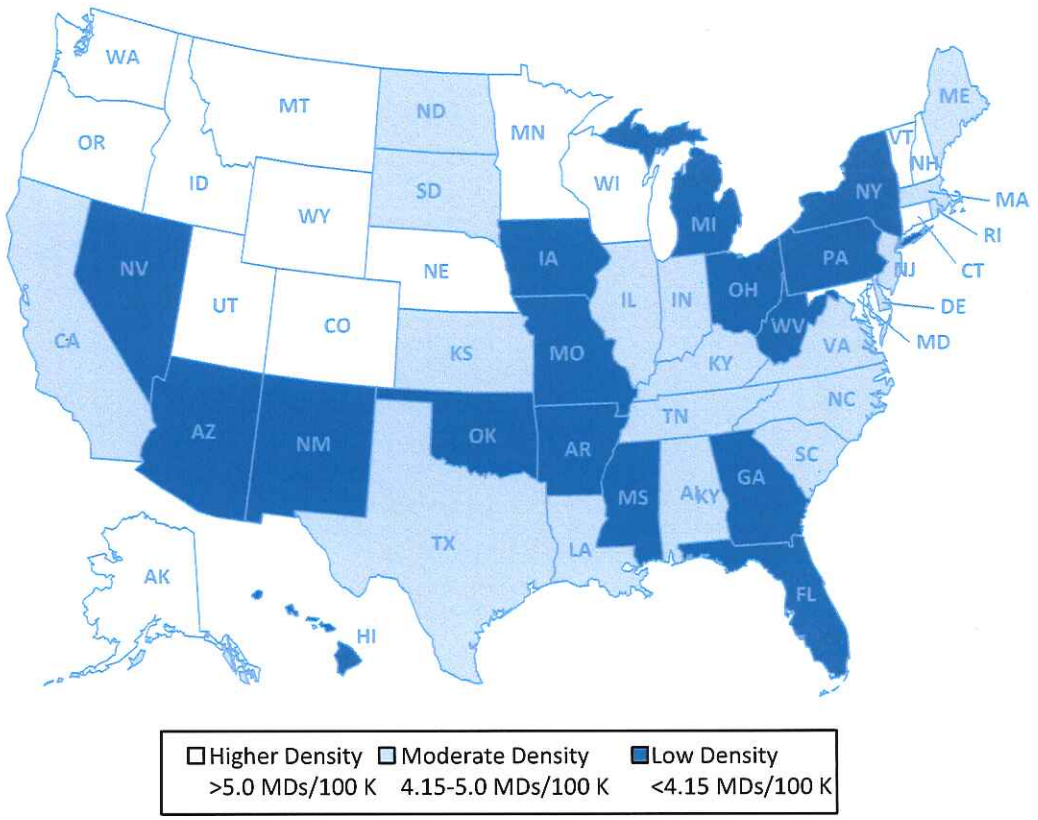
# Regional Demographics Exacerbate Local Physician Shortage Potential

Across the next five years, approximately 2,000 orthopedic surgeons performing total joint replacements will enter the workforce; conservative estimates—an average 65-year old retirement assumption—suggest during the same period 1,900 surgeons will retire. A more aggressive (and potentially realistic) retirement age of 59 years predicts 4,200 surgeons will retire by 2016.

While nationwide estimates predict a severe physician shortage in the years ahead, local dynamics may differ. In 2010, the national density of orthopedic surgeons was 5.67 for every 100,000 people. When analyzed for just the population over 65, the national density of orthopedic surgeons drops to 4.33 nationally. Given the prevalence of joint replacement in this age group, variation among states in the over-65 population will greatly impact overall physician supply. Given their aging populations and trend toward older surgeons, Arkansas and Florida will likely face the most severe shortage in the years ahead.

**Orthopedic Surgeon Density for 65+ Population, 2010**

*Number of Orthopedists per 10,000 People Over 65*




Source: Turkelson, et al. "State-level Changes in AAOS Orthopaedic Fellows," AAOS, April 2010. Fehring et al, "Joint Replacement Access in 2016: A Supply Side Crisis," *The Journal of Arthroplasty*, Vol 25 No 8, 2010.

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# Fiercely Independent Orthopedic Surgeons Easing Toward Employment

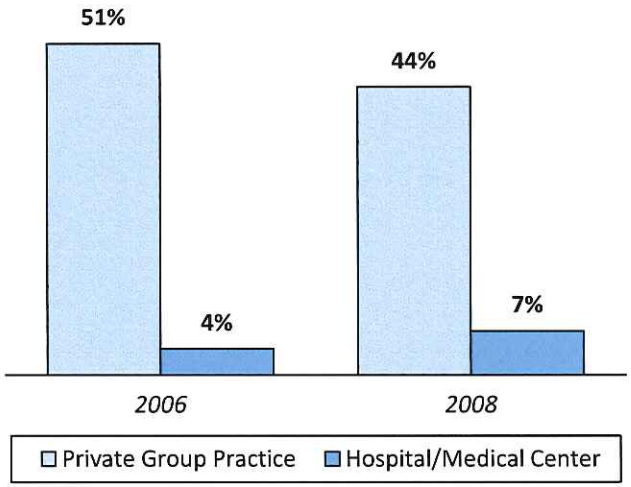
Given the vital strategic necessity for hospitals to align with orthopedic surgeons, many have taken a more formal approach to strengthening ties with their physicians. Across the past five years many institutions have begun to employ orthopedic surgeons—something mostly unheard of five years ago for a traditionally highly independent physician specialty.

Orthopedic surgeon employment is still relatively low compared to other surgical specialties such as cardiac surgery or neurosurgery. However, as institutions look to secure growth amidst a physician shortage and ensure profitability as risk-based payment more closely ties financial success to quality and cost management performance, many will need to consider more formal relationships with orthopedic surgeons.

**2008 AAOS Orthopedic Census Report**

*Orthopedic Surgeon Practice Setting Reporting*

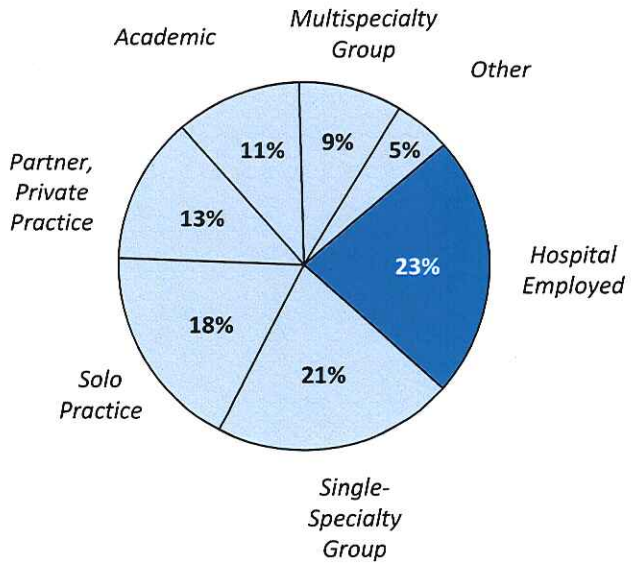
n = ~9,500




**2011 Medscape Orthopedic Surgeon Compensation Report**

*Orthopedic Surgeon Practice Setting Reporting*

n = 15,924*




*Across all specialties. Survey reports that the overall number of responses by specialty mirrors the AMA breakdown of specialties.

Source: Source: AAOS, "Orthopedic Surgeon Quick Facts," accessed June 29, 2011, available at: http://www.aaos.org/research/stats/Surgeonstats.asp; AAOS, "Orthopaedic Practice in the US 2005-2006," accessed June 29, 2011, available at: http://www2.uic.edu/stud_orgs/prof/surgeons/events/2006CensusPublic.pdf; Medscape, "Medscape Orthopedics Productivity Report: 2011 Results," accessed June 29, 2011, available at: http://www.medscape.com/features/slideshow/compensation/2011/orthopaedics; Marketing and Planning Leadership Council interviews and analysis,

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# Comanagement Allows Partnership on Strategy Without Full Salary for Surgeons

Given the highly independent nature of orthopedic surgeons and the financial risk associated with full-fledged employment, many institutions are seeking other ways to more formally align with surgeons. Comanagement can potentially align surgeon incentives with hospital strategic priorities by partnering with physicians on service line management and setting specific performance metrics that are tied to physician bonuses. In orthopedics, the most common performance metrics focus on operational measures, such as correct documentation and on-time starts, and clinical measures, such as infection rates and technology usage.

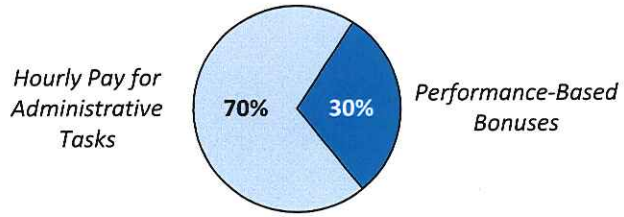
**Clinical Co-management**

**11%**

Percentage of hospitals reporting use of comanagement agreements with orthopedic surgeons

**Comanagement Compensation Structure**

*Contract Combines Guaranteed, Variable Compensation*



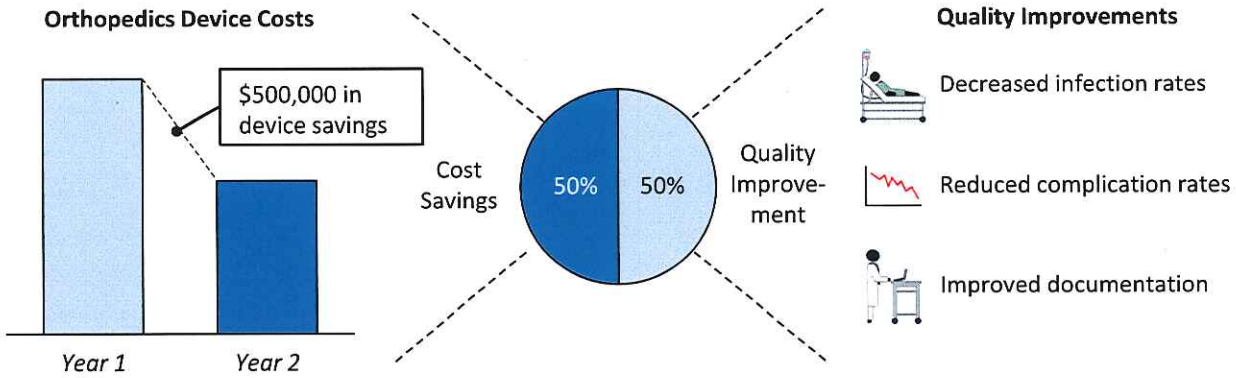

**Sample Orthopedics Performance Metrics**

**Clinical Measures:**
- Prophylactic use of antibiotics
- Consistent use of on-agreement prostheses and technology
- Appropriate care measures
- In-house mortality rate
- Surgical site infection within 30 days
- Cooperation in device value analysis teams, quality improvement efforts
- Readmissions rate

**Operational Measures:**
- Correct documentation
- On-time starts & turnaround times
- Use of electronic medical record
- Outreach to, coordination with referring physicians

**Proposed Returns on Comanagement Contract**

*Improved Performance Recoups Contract Value*




Source: HealthLeaders Intelligence, "Physician Alignment in an Era of Change," available at: http://content.hcpro.com/pdf/content/256536.pdf, accessed March 22, 2011; Marketing and Planning Leadership Council interviews and analysis.

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# Center-Based Product Packaging the Differentiator in Increasingly Commoditized World

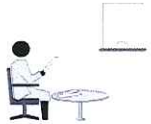
In the current economic environment, hospitals cannot afford to lose profitable orthopedic volumes to competitors. Unfortunately, as innovation in orthopedics technology slows and orthopedics care increasingly becomes a "commodity" business, referring primary care physicians and their patients have more opportunity to choose among many regional hospitals in making a decision about where they receive treatment.

To differentiate themselves in an increasingly competitive environment, institutions should organize a patient-centered and comprehensive product offering that constructs a coherent package of services for patients and extends across the continuum of care. Providers are increasingly compelled to compete on quality and convenience. It is not enough, however, to simply self-designate as a "center of excellence." The hospitals that increase market share will be those that have truly developed efficient intake processes, assembled multidisciplinary care teams, committed to patient and family education, and trained staff in customer service.

**Components of a Comprehensive Joint Program's Continuum of Care**

**Patient Intake**

**Pre-operative Planning**



**Post-operative Care**

**Elevating Awareness**

- Easy-Intake Joint Pain Seminars: Organizing informational community outreach seminars to direct patients to tangible next step
- Advanced Technology Promotion: Utilizing communication channels to promote availability of new technologies targeting a younger demographic
- Alumni Development: Cultivating "graduates" of joint replacement program to build goodwill, word of mouth

**Enhancing Patient Satisfaction**

- Patient Education: Structuring pre- and post-operative patient education to reinforce expectations
- Hip and Knee Hotel Model: Designing facility and operational services to present high-end "hotel-like" offering

**Decreasing Length of Stay, Readmissions**

- Rapid Recovery Protocols: Scheduling rehab and post-op recovery toward accelerated timeline
- Next-Generation Pain Management: Utilizing multimodal and regional anesthesia techniques to improve pain management
- Family Coaching: Involving family members in pre-discharge rehab
- Group Rehabilitation: Delivering PT and other rehab activities collectively
- Organized Discharge Planning and Post-Acute Relationships: Planning education and effective two-way communication with post-acute care to prevent readmissions

Source: Marketing and Planning Leadership Council interviews and analysis.

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# Formal Certification Aligning Providers Toward Quality, Process Improvement

As the commodization of orthopedics continues, institutions are increasingly looking for more formal ways to differentiate themselves. Self-designation as a "center of excellence" has become ubiquitous and does not necessarily connote the high-quality care that outcomes-conscious referring physicians and increasingly savvy consumers demand.

As competition heightens and risk-based payment looms, many institutions are exploring formal designation as a certified center of excellence. Formal certification programs lay out specific goals and criteria programs must achieve to be certified as a center of excellence. While some providers previously viewed formal certification as bureaucratic and unnecessary for growing volume, many are now using the certification process to align physicians, staff and administrators toward a common goal of high-quality, efficient care. While payers and referring physicians have not yet begun actively steering patients to designated centers in large numbers, certification may be the rallying call institutions use to build a quality-driven program. Programs can then actively market the certification and ultimately be prepared if robust patient steerage begins in earnest.

**Criteria for Formal "Center of Excellence" Certification Programs**

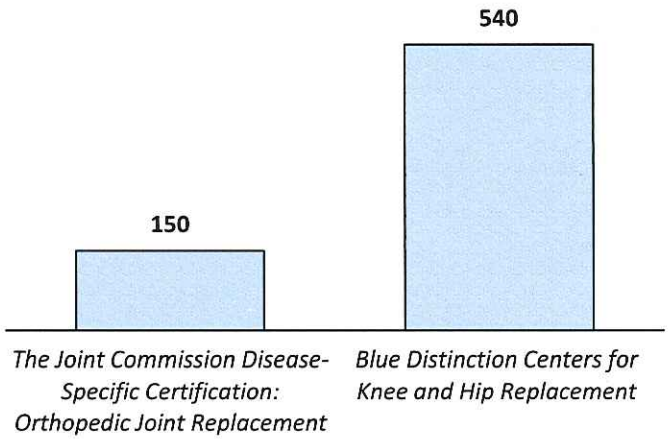
**The Joint Commission Disease-Specific Certification: Orthopedic Joint Replacement**

- Compliance with consensus-based national standards
- Effective and consistent use of appropriate, evidence-based clinical practice guidelines for hip, knee, or shoulder replacement
- Collection and analysis of a minimum of four performance measures specific to the hip, knee, or shoulder replacement patient population, two of which must be clinical in nature

**Blue Distinction Centers : Hip and Knee Replacement**

- At least 100 total hip and total knee joint replacement surgeries (primary and revision) per year, with a minimum of 25 each total hip and total knee replacements
- Comprehensive quality management program, pre-operative patient education, processes that support transitions of care, clinical outcomes that meet objective thresholds (e.g., complication rates and length of stay)

**Number of Certified Programs**




Source: "Blue Distinction Fact Sheet" available at: http://www.bcbs.com/innovations/bluedistinction/blue-distinction-fact-sheet.pdf, accessed July 22, 2011. "Disease-Specific Care Certification: Joint Replacement" available at: http://www.jointcommission.org/certification/orthopedic_joint_replacement.aspx, accessed July 22, 2011.

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000592 (02/24/14)

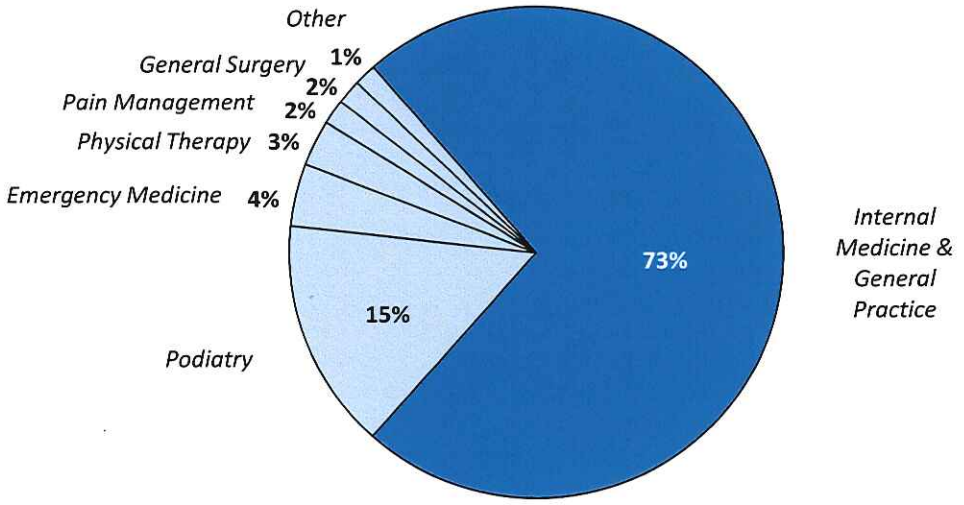
# Primary Care, Podiatry the Key Referrers

As organizations build comprehensive, quality-driven programs, they will need to actively communicate their differentiation to referring physicians and consumers to gain competitive advantage. Primary care physicians (PCPs) drive the lion's share of referrals to the orthopedic specialty. Podiatrists, however, may be an under-targeted referral source.

While many primary care physicians have long-standing referral relationships with individual surgeons, increasingly primary care physicians are seeking out organizations that empirically demonstrate high-quality, low-cost services and serve as a partner in the continued care of their patients. To build a relationship and communicate the quality of orthopedic care, physician liaisons have proven to be effective. Even small shifts in referral patterns with a single physician can produce a significant return. For example, if one orthopedic surgeon increases the number of joint surgeries at a hospital by about 18 cases, that can generate about $70,000 in additional contribution profit, enough to cover a typical liaison salary.

**Top Referring Specialties to Orthopedic Surgery[1]**

n = 253,000 Patient Records




## Key Steps to Building Referral Relationships

- Segment referring physicians into "loyalists," "splitters," and "new referrers," and target outreach effort to each group. Consider using physician referral analysis tools and dedicated physician liaisons to build continuous relationships with referring physicians
- First shore up loyalist business, focusing on service ethic and education about comprehensiveness of offerings; use information about why loyalists refer in future marketing efforts to non-loyalist physicians
- Next, target splitters, typically defined as those physicians who refer only 40 to 60 percent of their patients to one hospital; with splitters, listen to top-of-mind priorities and concerns, consider physician-to-physician conversations and sharing clinical outcomes data where applicable
- With new referrers, create a standardized approach to follow-up; send a welcome packet to the physician's office and notify the liaison responsible for that physician to add him or her to the target list

1) Excludes those patients referred by "orthopedic surgery" or with no referral specialty named.

Source: Marketing and Planning Leadership Council interviews and analysis.

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# Disparate Orthopedics Markets Require Tailored Marketing Messages, Channels

While physician referrals will continue to be the mainstay of program growth, orthopedics is one of the few specialties where patients actively seek treatment independent of their primary care physician's referral. Given the ubiquity of the procedure among specific age cohorts and social groups, many patients rely on word-of-mouth recommendations for physicians and hospitals as they seek orthopedic treatment.

To capitalize on this, many hospitals actively market their integrated orthopedic service offerings directly to patients, touting their multidisciplinary approach to patient care, the expertise of their physicians, and the newest treatments offered. Many leading programs look to create a program buzz via a strong online presence, traditional media outlets, and local community services.

Given the segmented markets for orthopedics, programs should take care to orient both the marketing message and the channel through which it is delivered to the specific target audience. Younger, active baby boomers are more likely to utilize social media, while the current Medicare generation will more likely turn to traditional channels such as formal advertisements or personal recommendations.

## *Marketing Channels for Orthopedics Programs*

### Social Media Presence

*Targeting Active Baby Boomers*

- Document successful patient testimonials; engage two-way communication with question/answer features, either on personal website or on Facebook
- Embed video on orthopedics' webpage or create dedicated YouTube site with success stories from past patients, pre-operative educational videos from program physicians, webcasts of surgeries

### Alumni Network

*Targeting Medicare Generation*

- Patients over 65 less likely to utilize social media, more likely to learn about programs through the traditional "social network," person-to-person recommendations
- Create database to keep in contact with both sports medicine and joint replacement patients; host alumni reunion events; feature alumni during pre-operative education sessions

### Local Sports Services

*Targeting Athletes and Sports Enthusiasts*

- Provide athletic trainers to local sports teams, including high school sports; educate local athletes about injury prevention and program offerings
- Offer preseason physicals for athletes, Saturday morning clinics during sports seasons
- Consider sponsoring professional sports teams and local athletic events

### Bone Health Education

*Targeting At-Risk Populations*

- Host educational seminars to at-risk patients for either sports injuries or osteoarthritis; targets include golfers, skiers, gardeners, tennis enthusiasts, physical labor professionals
- Build educational program around "bone health" or "injury prevention," but introduce key program attributes and physicians and collect patient contact information for continued mailings

Source: Marketing and Planning Leadership Council interviews and analysis.

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# Innovation & Technology



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# Orthopedics Innovation Targeting Younger Patient Demographic

Across the last decade, orthopedics programs have been hit with a barrage of new implants for spine, joint replacement, and trauma procedures. With each addition of a new "premium" device, program margins typically suffer. Orthopedic margin erosion typically results from a shift toward a higher product mix, not necessarily price increases on current products. As new product introductions are not often met with a commensurate increase in reimbursement in orthopedics, programs must subsume the cost increases associated with usage of premium technologies.

That being said, premium orthopedic implants purport to tap into a younger patient population. Design improvements on both hip and knee technology allow surgeons to treat a younger demographic by extending the technology's useful life, creating a more natural feel for younger, more active patients, and even by intervening during earlier stages of the disease. While these technologies can bring new patients into the system through targeted advertising to prospective patients, few have demonstrated empirical benefits over the well-tested and highly effective traditional joint replacements.

**Evolution of Orthopedic Innovation**

| Extending Technology's Useful Life | Creating a More Natural Feel | Intervening in Earlier Stages of Disease |
|---|---|---|
| **Hip Bearing Surfaces**<br>Hard-on-hard articulating surfaces within hip implants reduce wear, extend longevity | **Mobile-Bearing Knees**<br>Permit slight axial rotation to re-create natural knee movement<br><br>**High-Flexion Knees**<br>Allow a higher degree of knee bending for highly active patients<br><br>**Gender-Specific Knees**<br>Streamline implant design for the "unique" anatomy of women<br><br>**Custom Knees**<br>Use pre-surgery imaging to create custom cutting guides or custom implants individualized to specific patient's anatomy | **Hip Resurfacing**<br>Bone-preserving technique covers osteoarthritis-affected hip joint surfaces with metal implants; easier to revise than hip replacement procedure<br><br>**Unicompartmental Knees**<br>Bone- and muscle-sparing knee replacement technique treats early stage osteoarthritis that covers only one knee compartment<br><br>**Biologics**<br>Cell-based or tissue-based interventions that promote natural healing of tendons, ligament or bone, thus reducing or delaying the need for total joint replacement |

Source: Marketing and Planning Leadership Council interviews and analysis.

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# Hard-on-Hard Bearing Surfaces Losing Favor

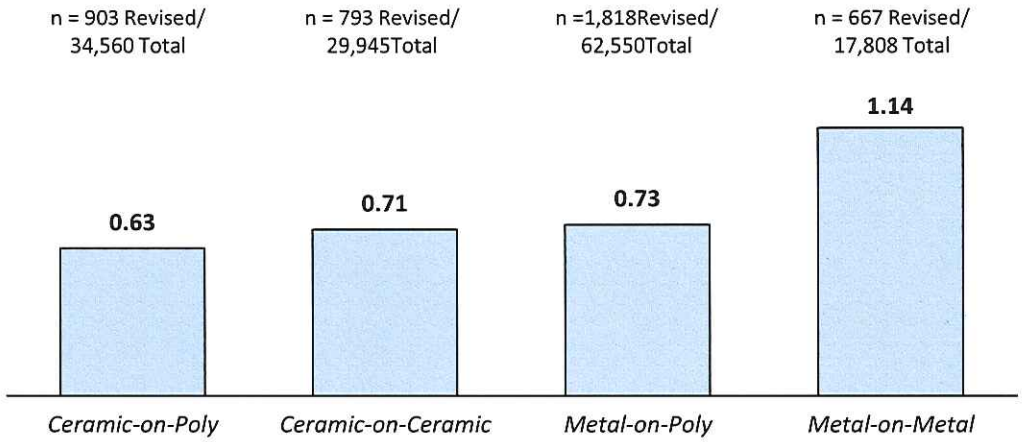
For hip replacement, premium implants include innovative bearing surfaces used to extend the useful life of the implant. Hard-on-hard articulating surfaces, namely metal-on-metal (MOM) and ceramic-on-ceramic (COC) implants, purport to increase the wear resistance of the implant over time, thus extending the time before a revision implant will be required.

Cross-linked polyethylene, or plastic irradiated to increase wear, has become the standard of care for hip replacement, though its wear rate of 0.1 millimeters (mm) per year does not equate with the 0.01 mm for metal-on-metal or 0.0001 mm for ceramic-on-ceramic. That being said, premium implants themselves are not without risk.

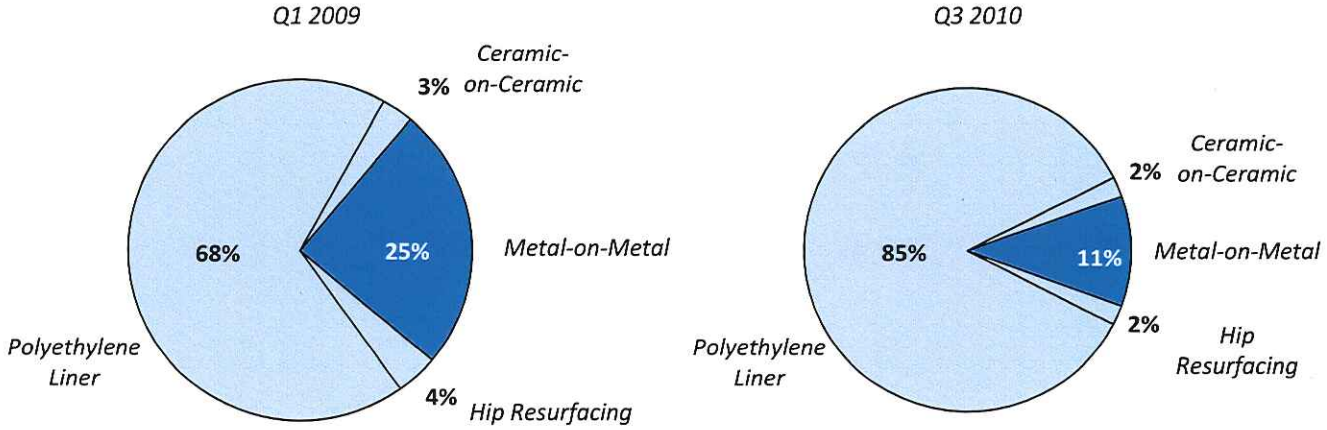
Recent reports concerning metal-on-metal implants highlight the accumulation of metal ions in vitro leading to complications and possible revisions. In December 2010, the Food and Drug Administration issued a patient advisory and ordered all manufacturers of metal-on-metal hip implants to submit data to a post-market surveillance study. This controversy has directly impacted volumes; from their peak of 37 percent of all total hips implanted in 2007, MOM utilization accounted for 11 percent of hip implants toward the end of 2010.

**Revision Rates of Primary Total Hip Replacement by Bearing Surface[1]**

*Australian Orthopedic Association National Joint Replacement Registry 1999-2009*




**Change in Hip Replacement Bearing Surface Use**




1 Revisions per 100 Observed Years; 95% Confidence Interval.

Source: "Hip and Knee Arthroplasty 2010 Annual Report," accessed July 20, 2011; *Orthopedics Network News*, January 2011 Newsletter: Vol. 22, Number 1; Crawford, et al., "Metal-on-Metal: Is it Worth the Risk?" *Journal of Arthroplasty*, 2010. Vol 25. No. 1.

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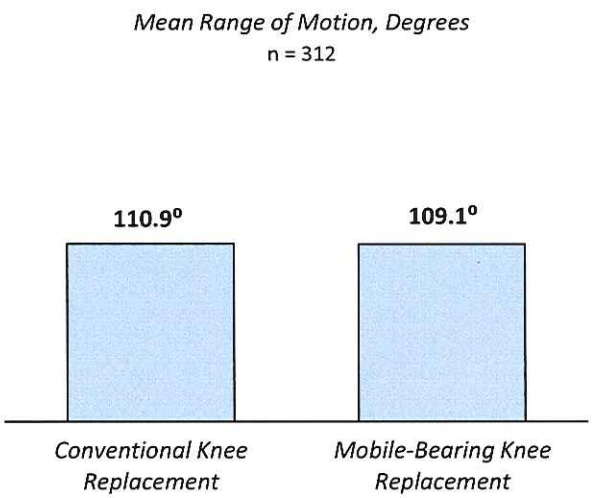
# Increased Mobility Coming at an Increased Cost (With Limited Evidence of Benefit)

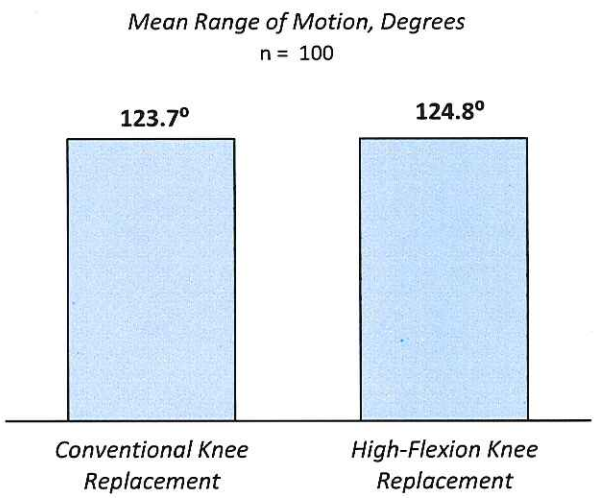
Premium knee implants focus on recreating the natural feel and fit of the knee joint. Two premium implants, mobile-bearing knees and high-flexion knees, intend to allow more natural knee movement rather than the strict flexion and limited rotation allowed through a traditional knee replacement. These innovations theoretically allow younger, more active patients to return to sports-related activities, such as tennis, or those from non-western cultures who may need a greater degree of flexion for activities of daily living (e.g., kneeling for religious services).

While athletic patients looking to return to sports may seek out these premium implants, most studies have shown no significant difference in range of motion between high-flexion, mobile-bearing, and conventional implants. Interestingly, according to one study[1] high flexion knees may actually provide greater benefit to those patients who have a more limited range of motion before surgery.

**Mobile-Bearing Versus Conventional Knee Replacement**




**High-Flexion Versus Conventional Knee Replacement**




### Mobile-Bearing Knee Replacement

- A next-generation knee construct that includes a moving tibia base plate that permits slight rotation, in addition to the standard axis of movement
- The goal is to improve restoration of natural knee motion by allowing increased axial rotation of the knee
- May offer more "normal" knee motion, and could, in theory, extend survivorship of knee implants by improving load bearing
- Increasingly used in select, high-demand patients

### High-Flexion Knee Replacement

- A next-generation knee construct that features longer condyles in the femoral component, thus permitting a greater degree of flexion in the joint
- The goal is to allow high flexion from 130 degrees to 155 degrees
- While it is designed to improve bending, several studies have shown no significant improvement over conventional knees
- Sometimes used in select, high-demand patients

1 http://www.orthosupersite.com/view.aspx?rid=82351

Source: Gioe, TJ et al. "Mobile and fixed-bearing (all-polyethylene tibial component) total knee arthroplasty designs. A prospective randomized trial," *The Journal of Joint and Bone Surgery*, 91 (9), 2009. Luo et al. "High-Flexion vs Conventional Prostheses Total Arthroplasty: A Meta-Analysis." *The Journal of Arthroplasty*. 2010.

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# From Gender-Specific to Patient-Specific: Paying for Marketing Cachet?

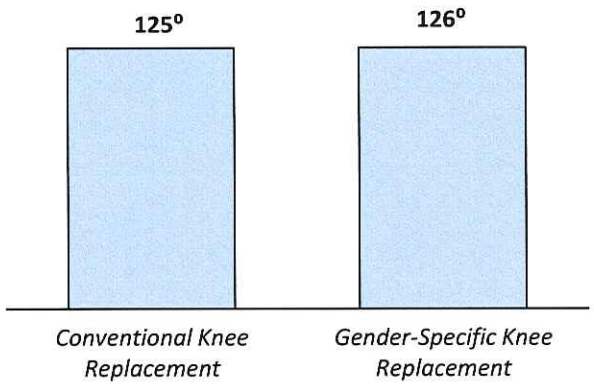
When gender-specific implants for women made a splash in orthopedics with their debut in 2006, women flocked to practices demanding the implant that was shaped especially for the "unique" anatomy of women. Since then, enthusiasm for the devices has dampened, but women still seek out the device due to aggressive marketing efforts.

Similarly, custom-fit knees, either through custom-cutting guides or custom implants, purport to capitalize on the unique anatomy of individual patients to create a more natural fit. Ideally this would create a "perfect fit" for the patient, optimizing functional outcomes and minimizing pain. Although it appears custom cutting guides are as safe and effective as conventional knee implants, they do not seem to offer any noticeably superior clinical outcomes.

The technology also promises to increase operational efficiency; if the surgeon knows exactly which instruments to use and where to cut, the procedure can be completed more quickly and OR staff can predetermine the right mix of implants and tools. Not all surgeons have found that these blocks significantly reduce time in surgery or supply needs; even for those that do, few see a return large enough to recoup these implants' premium price.

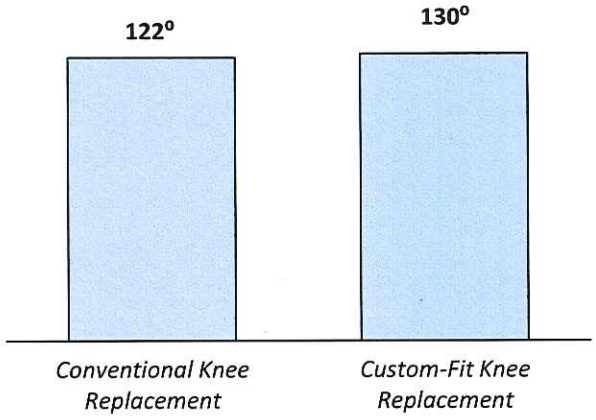
**Conventional Versus Gender-Specific Knee Replacement**

*Mean Range of Motion, Degrees*




**Conventional Versus Custom-Fit Knee Replacement**

*Mean Range of Motion, Degrees*




### Gender-Specific Knee Replacement

- Metal-on-polyethylene implants contoured to fit the anatomical shape of women's knees
- According to manufacturer Zimmer, because the bone in the front of a woman's knee is less prominent than in a man's, conventional implants could prove too thick for women. This thickness may contribute to a "bulky" feeling and result in pain and a decrease in the range of motion
- The gender-specific artificial knee has a thinner profile, theoretically giving women a more "natural" feeling, though this has not borne out in clinical results

### Custom-Fit Knee Replacement

- Implants customized to individual patient's anatomy, either through custom cutting blocks or through custom-made implants
- The price point for custom cutting guides and custom implants is several thousand dollars higher than a standard TKR, and insurers have yet to offer incremental reimbursement
- Products include: Custom-Cutting Guides: Biomet Signature, Stryker OtisKnee, Zimmer Patient Specific Instrumentation (PSI), Smith & Nephew Visionaire; Custom Implant: ConforMIS

Source: Spencer et al. "Initial Experience with Custom-fit Total Knee Replacement: Intra-operative Events and Long-leg Coronal Alignment" *International Orthopedics*, 2009. "Gender Bender: Do Gender Knee Implants Provide Better Outcomes?" American Academy of Orthopedics Surgeons Press Release, August 18, 2010.

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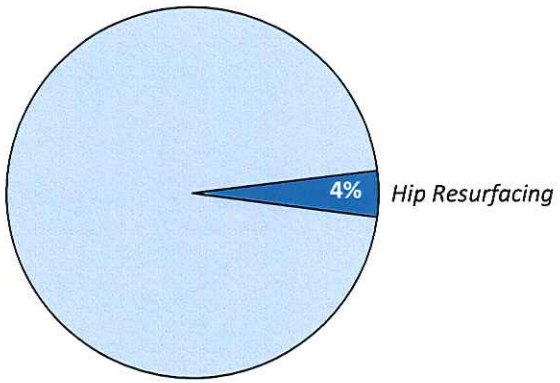
# Resurfacing: Targeting a Younger Demographic Through Earlier Intervention

Another mechanism orthopedic manufacturers have enlisted to target a younger patient demographic is to intervene earlier in the progress of osteoarthritis. Some technologies allow resurfacing the joint—rather than completely replacing it—in younger, active patients.

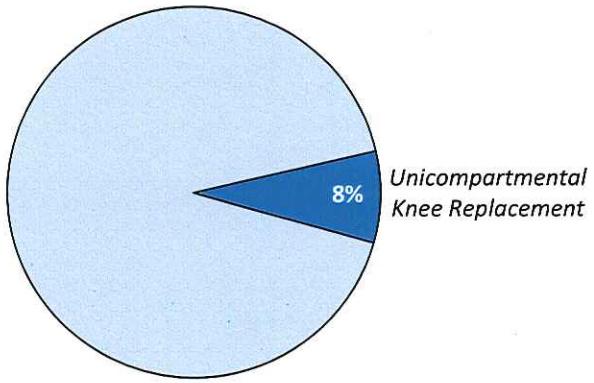
In the hip, a metal-on-metal resurfacing construct allows surgeons to preserve a greater proportion of the patient's natural bone, thus making future revisions easier in younger, more active patients. Though more commonly referred to as unicompartmental or bicompartmental knee replacement, the knee joint can also be resurfaced in an effort to retain as much bone as possible. In patients with centralized osteoarthritis, surgeons can replace individual compartments of the knee.

Patients often actively seek out these procedures. Outcomes, however, can be mixed, especially for those surgeons with less experience. Mako's RIO system uses a robotic arm to assist with unicompartmental knee replacement. Some programs have adopted the RIO hoping to capture this previously untapped market, but with a $900,000 price tag, institutions must generate hundreds of additional procedures to ever recoup the investment; the average user completes 50 procedures annually, with many seeing far fewer.

**Percentage of Hip Replacements Resurfaced**



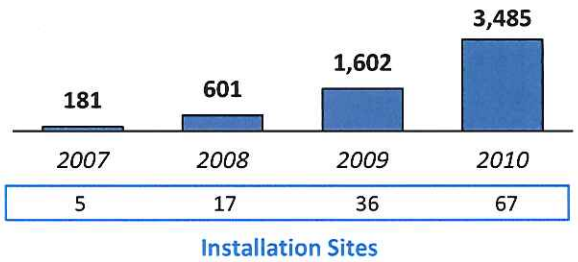

**Percentage of Knee Replacements Resurfaced**




## Mako Surgical's RIO system

- Intraoperative, stereotactic guidance technology used to assist unicompartmental knee replacement
- Robotic arm provides passive resistance to surgeon, allowing a more precise reproducible procedure
- Primarily indicated for unicompartmental knee replacement, but recently gained approval for use in hip replacements

**Procedures Performed Using Mako RIO**




Source: Riddle et al. "Yearly Incidence of Unicompartmental Knee Arthroplasty in the United States". 2007; Mendenhall et al.,"Orthopedics Network News January 2011 Newsletter": Vol. 22, Number 1; MAKO Surgical Corps Quarterly Reports 2007-2010.

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# True Market Disruption—Biologics for "Joint Preservation"—Still Years Away

Joint replacements are so successful, technological innovations generally improve procedural outcomes only at the margins, with no blockbuster disruptions across the past 10 years. While the technologies previously discussed can potentially expand into new patient populations or increase market share, the volume impact is typically small and likely at the expense of margin erosion.

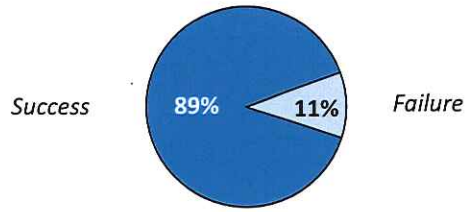
The true disruptor in orthopedics would be a business that preserves the natural joint—one that obviates or delays the need for a joint replacement. While still far on the horizon, biologic innovations could eventually dampen the need for joint replacements in the future. But given the robust market demand for joint replacement, and the difficulty associated with developing these innovations, few biologic applications are ready for bedside use. Widespread biologic usage is still several years away from adoption.

## *Orthopedic Biologic Innovations on the Horizon*

### Meniscus Repair & Replacement

*Example: Use of Biological Transplants*

Meniscus Allograft Survival Rate, n = 45 patients

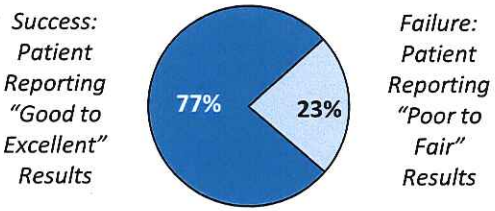



- Damaged meniscus is most often removed, rather than repaired, which accelerates development of osteoarthritis in the joint
- Biological meniscus replacement may encourage tissue regrowth, delaying progression of arthrosis prolonging time to joint replacement

### Acute Cartilage Damage

*Example: Autologous Chondrocyte Implantation*

Patient Pain Follow-Up Following Carticel Injection, n = 154




- Damaged knee cartilage cannot heal on its own, eventually increasing wear on the joint
- Biological autologous cell injections regenerate the articular cartilage in the knee after being injected during a surgical procedure, hopefully prolonging the time to joint replacement

### Fracture Treatment

*Example: Use of Mesenchymal Stem Cell Injections*

- 10 to 20 percent of the approximately 8 million annual bone fractures fail to heal adequately
- In animal studies, autologous adult mesenchymal stem cells potent with a regenerative growth factor (IGF-I) are attracted to the fracture site and improve the healing process
- In a study presented in June 2011 at The Endocrine Society Annual Meeting, mice treated with stem cells enriched with IGF-1 had more bone bridging the fracture gap, and the new bone was three to four times stronger than compared to controls left to heal on their own or those that received stem cells only

Source: Stone, et al., "Meniscus Allograft Survival in Patients with Moderate to Severe Unicompartmental Arthritis: A 2- to 7-Year Follow-up," *The Journal of Arthroscopic and Related Surgery*, Vol 22, No 5, May 2006; "Future of Cartilage and Meniscus Repair," *In Vivo*, July/August 2008. "Study of the Treatment of Articular Repair (STAR), available at http://www.carticel.com/healthcare/about/star-study-research.aspx, accessed July 22, 2011; "Mesenchymal Stem Cells and Fracture Healing," available at: http://www.orthosupersite.com/view.aspx?rid=31441, accessed July 22, 2011.

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# Reform & Care Redesign

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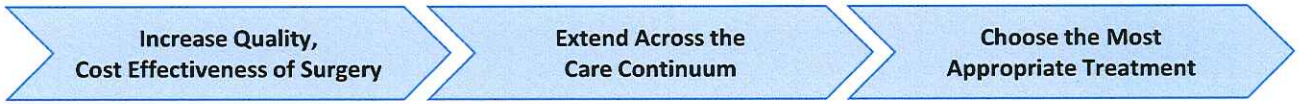
# Health Reform Forcing New Strategic Priorities for Orthopedics

The Patient Protection and Affordable Care Act (PPACA), signed into law in March 2010, charges CMS with launching a number of risk-based payment experiments such as bundled payments and shared savings. These payment models introduce new cost, quality, or utilization risks on hospital care.

As institutions look to develop their five-year orthopedics strategic plans, hospital planners and service line leaders must consider the impact these new payment incentives will have on overall orthopedics growth strategy. Under either fee-for-service or risk-based payment, institutions must strive to increase the quality and cost effectiveness of surgical care. However, as payment reforms place increased risk on longer term outcomes and per capita costs, institutions may need to consider extending the purview of the service line across a broader care continuum. Shared savings models in particular represent potentially the most seismic incentive change. These payment methodologies reward accountable care organizations (ACOs) for restricting orthopedic surgery volumes to the most appropriate cases.

**New Imperatives for Orthopedics Under Reform**




**Comparative Effectiveness**
American Joint Replacement Registry in development; expectation that 90 percent of providers will eventually submit outcomes data

**Value-Based Purchasing**
Six surgical care improvement measures and eight patient satisfaction measures mean orthopedic quality tied directly to hospital financial success

**Bundled Payments**
Discount the total reimbursement delivered, but package the payment into one lump sum to align disparate providers toward the goal of care coordination and ultimately cost reduction

**Episodic Bundling**
30-day (or longer) bundled payments will require organizations to assume risk not only for the surgical care, but the post-acute care and readmissions

**Readmissions Penalties**
Orthopedics is not yet one of the proposed conditions penalized under the Medicare Hospital Readmissions Reduction Program, though it could be included after 2014

**Medicare Shared Savings Program**
Organizations voluntarily creating accountable care organizations will be rewarded for slowing, rather than growing, high-cost procedural offerings such as orthopedic surgery, restricting utilization to only appropriate cases

Source: Marketing and Planning Leadership Council interviews and analysis.

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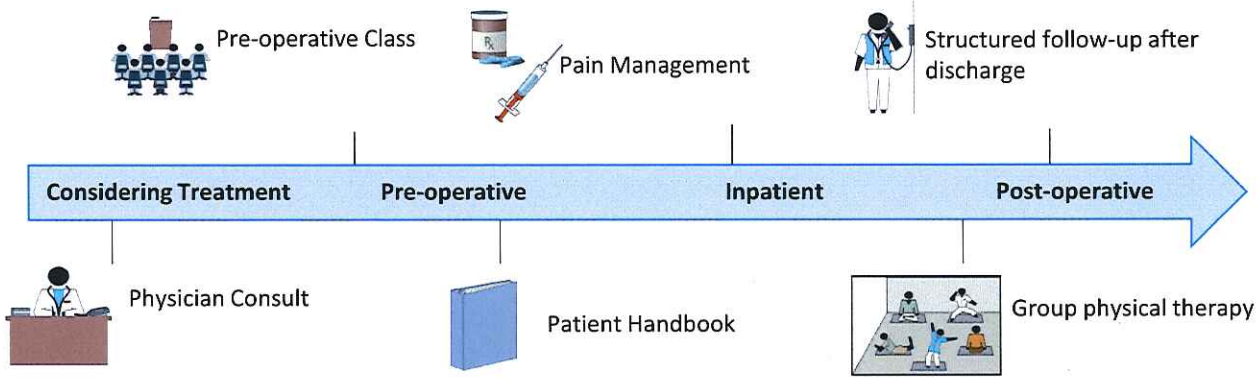
# New Imperative to Extend Purview Across the Care Continuum

Future orthopedics' payments may be tied more closely to the cost and quality of care delivered, not only within the acute care episode, but also before and after treatment.

To provide more efficient and high-quality surgeries, institutions must extend care across the continuum. This means standardizing the approach to consultation, pre-operative education, and pain management, as well as rehabilitation and discharge. Value-based purchasing, bundled payments, and readmissions penalties will all require institutions to map out and optimize the pathway for orthopedic surgery in an effort to reduce complications and costs, and to improve quality and efficiency.

Further afield, shared savings programs may change how hospitals view the care continuum for orthopedics, moving away from only considering the disease in late-stage osteoarthritis, moving upstream to consider primary prevention and longitudinal disease management.

**The Continuum of Care for Late-Stage Osteoarthritis Patients**




**Treatment Options Through Progression of Osteoarthritis**

| Preliminary | Intermediate | End-stage |
|---|---|---|
| • Weight loss to minimize stress and load-bearing on the joint<br>• Exercise to enhance range of motion and naturally lubricate the joint | • Cortisone injections to dull the pain<br>• Arthroscopy to remedy soft tissue ailments which may be exacerbating osteoarthritis<br>• Cartilage repair therapies<br>• Aggressive pain control through medication management | • Joint replacement when conservative therapy has failed and osteoarthritis has reached "end-stage" level |

Source: Marketing and Planning Leadership Council research and analysis.

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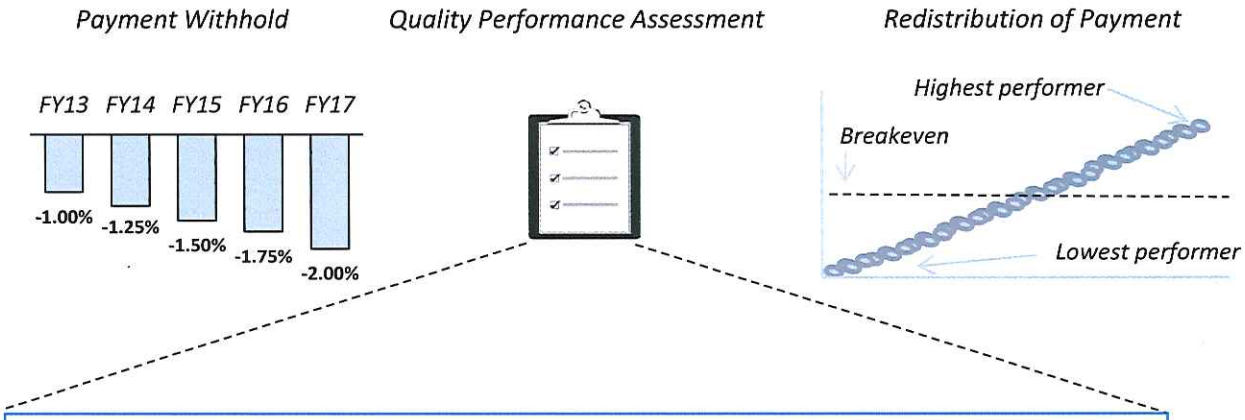
# Orthopedics Quality Strongly Tied to Value-Based Purchasing Success

One of the first rollouts of the Patient Protection and Affordable Care Act, value-based purchasing will tie hospitals' financial success to inpatient quality performance. Under the mandatory program, hospitals with commensurately higher care quality and patient satisfaction will be rewarded with higher Medicare payments. According to the rule, incentives will be funded by a 1 percent cut in base operating DRG payments—totaling about $850 million in the first year—for each discharge in FY 2013, reaching 2 percent by FY 2017. About 30 percent of bonuses will be determined by patient scores, while clinical measures will determine the rest. The program will take effect in FY 2013 and apply to payments for discharges occurring on or after October 1, 2012.

Under value-based purchasing, the quality and perception of orthopedics surgeries will have an outsized impact on overall hospital financial performance, with six surgical care improvement measures and eight patient satisfaction measures (including pain management) relevant to orthopedics.

**The Mechanics of Value-Based Purchasing**




## Quality Metrics Affecting Orthopedics Under Value-Based Purchasing

### Surgical Care Improvement Measures

- Prophylactic antibiotic received within one hour prior to surgery
- Antibiotic selection for surgical patients
- Antibiotics discontinued within 24 hours after surgery
- Appropriate surgery patients who received beta blocker during perioperative period
- Surgery patients with recommended VTP[1] ordered
- Surgery patients receiving appropriate VTP within 24 hours of surgery

### Patient Satisfaction (HCAHPS) Measures

- Communication with nurses
- Communication with doctors
- Responsiveness of hospital staff
- Pain management
- Communication about medicines
- Cleanliness and quietness of hospital environment
- Discharge information
- Overall rating of hospital

1) Venous thromboembolism prophylaxis.

Source: Centers for Medicare and Medicaid Services; Marketing and Planning Leadership Council interviews and analysis.

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# Some Institutions Beginning to Experiment with Longer-Term Outcomes Tracking

Beyond hospital-based quality, government officials have focused much discussion and deliberation around long-term outcomes, especially in orthopedics. Given the elective nature of many orthopedics surgeries, and the controversy surrounding utilization of some procedures such as spinal fusion, progressive programs are beginning to track survey-based outcomes data to document functional status improvements. While these data can be utilized in marketing efforts and payer negotiations, there are currently no direct incentives to pay for what could ultimately be an expensive endeavor.

In terms of process, while some mail or e-mail these surveys to patients, a few innovative institutions have begun collecting these data using tablet computer surveys administered in the waiting room during follow-up appointments.

**Methods for Evaluating Outcomes for Orthopedic Procedures**

| Outcomes Tracking Tool | Key Attributes | Metrics Tracked |
|---|---|---|
| **Short Form – 36 (SF-36)** | 36-question patient survey that focuses on a patient's physical and mental state | • Bodily pain<br>• Limitations due to physical/mental health<br>• Mental health<br>• Overall health<br>• Physical functioning<br>• Social functioning |
| **Western Ontario and McMaster Universities Osteoarthritis Index** | 24-question survey originally designed to assess arthritis in the knee and hip, though now used for various joint-specific interventions such as total joint replacement | • Pain<br>• Physical function<br>• Stiffness |
| **Harris Hip Score** | 8-question survey and physical examination administered by a physician | • Hip function<br>• Level of activity<br>• Pain Physician examination<br>• Range of movement |
| **Knee Society Clinical Rating System** | Survey split into two portions: a physician-administered knee score based on clinical parameters and a functional score based on patient perception of knee performance | • Function<br>• Level of activity<br>• Pain<br>• Range of motion<br>• Stiffness/Swelling of joint |
| **The Oxford Hip Score** | 12-question survey that focuses on hip functionality and pain | • Function<br>• Pain |

Source: Ashby, E., "Outcome Measures for Orthopedic Interventions on the Hip," *Journal of Bone and Joint Surgery,* May 2008; Wright, R., "Knee Sports Injury Outcome Measures," *Journal of Knee Surgery,* 18 (1) (January 2005); Busija, L. "Magnitude and Meaningfulness of Change in SF-36 Scores in Four Types of Orthopedic Surgery," *Health Quality of Life Outcomes,* 31 (6), July 2008; Mahomed N., "The Harris Hip Score: Comparison of Patient Self-report with Surgeon Assessment," *Journal of Arthroplasty,*16 2001; Insall, J., "Rationale of the Knee Society Clinical Rating System," *Clinical Orthopaedics,* (248), November 1989.

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# American Joint Replacement Registry Poised to Make Its Debut

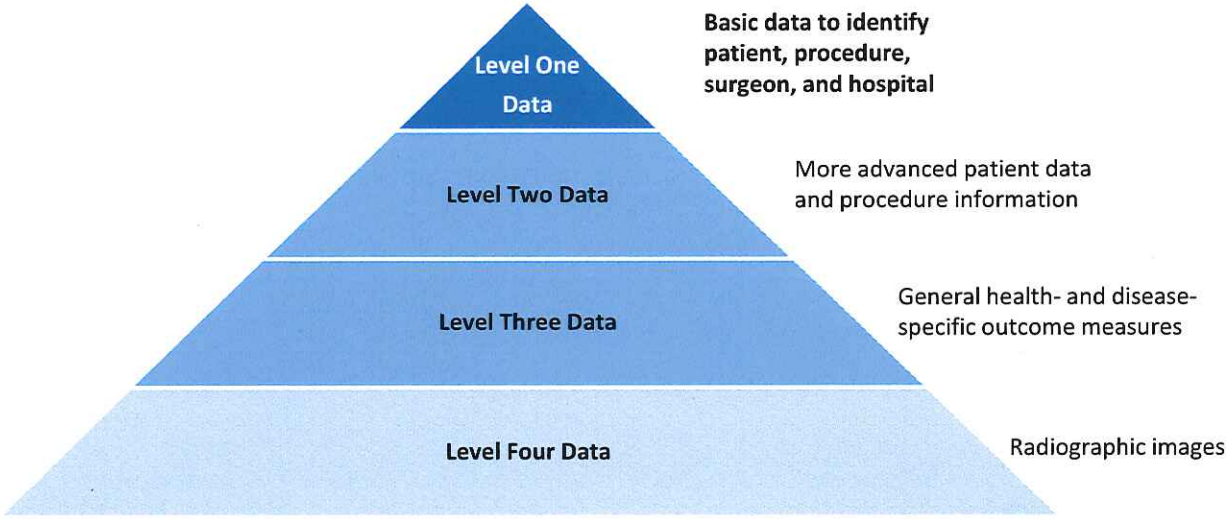
Responding to the discussion about long-term outcomes in orthopedics, a National Joint Replacement Registry has been approved by the American Academy of Orthopedic Surgeons (AAOS). The registry's mission is to use data collection to reduce morbidity and mortality, improve patient safety and quality, aid medical decision making, reduce medical spending, and advance orthopedic bioengineering.

The registry launched in fall 2010, and while it currently is accepting only level one data—basic patient and surgery identifiers—it ultimately will collect outcomes-related clinical information. The registry is designed to assess the most effective technologies and techniques, thus improving orthopedic quality and reducing the need for short- and long-term revision surgeries. According to AAOS, a modest two percent decrease in the U.S. revision rate would yield a savings of $65.2 million in one year.

Most institutions should wait for participation in the national registry before pursuing robust outcomes tracking programs in earnest, unless fervent competition or aggressive payers require more immediate action.

**American Joint Replacement Registry**

*Planned Rollout of Data Collection Elements*




**American Joint Replacement Registry Goals**

| 16 | 90% | $1.3B |
|---|---|---|
| Hospitals involved in the pilot phase, which began collecting Tier 1 data in December 2011 | Participation goal for all hospitals in the United States performing TJR by year 5 | Estimated potential savings across 20 years due to a 2% decrease in revision surgeries |

Source: Lewallen, D. "American Joint Replacement Registry Informational Session." AAOS Annual Meeting Paper Presentations. San Diego, CA. 16 February 2011; American Joint Replacement Registry Fact Sheet, available at: http://orthodoc.aaos.org/ajrr/AJRR%20Fact%20Sheet_AJRR.pdf, accessed July 18, 2011.

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# Value-Stream Mapping to Standardize Care for Quality, Cost Gains

While the quality of care will increasingly be tied to payment, the cost of care is an evergreen concern for providers, both under fee-for-service reimbursement as well as new payment methodologies. One way that progressive organizations are looking to improve the quality, cost, and efficiency of care is to standardize care delivery wherever possible.

Organizations are increasingly using Lean principles and value stream mapping as a technique to unite constituencies across the care continuum in process improvement and care standardization.

## Sample Orthopedics Value Stream Mapping Process

| Prioritize Care Pathways for Development | Analyze Internal Data and EBM[1] | Form Multi-Disciplinary Taskforce | Develop Plan for Standardization | Implement Plan and Track Adherence |
|---|---|---|---|---|
| • Total volumes<br>• Variability of pathway<br>• Profitability<br>• Growth potential | • Internal assessment of care delivery process, outcomes, cost<br>• External review of EBM | • Engage all providers across pathway from diagnosis to "cure"<br>• Schedule 1 to 3 day summit to review data | • Identify flashpoints across pathway<br>• Prioritize targets for standardizing<br>• Set timeline and metrics of success | • Engage stakeholders in change effort<br>• Monitor adherence<br>• Revisit standards as evidence, experience develops |

### 10-Month Lean TJR Results

| | |
|---|---|
| 29% | Reduction in average length of stay (3.4 to 2.4 days) |
| 40% | Reduction in average OR turnaround times (27 to 16 minutes) |
| 50% | Reduction in skilled nursing facility (SNF) utilization |

### Data Gathered

- Procedure volumes
- Cost variability
- Outcomes variability
- Reimbursement
- Profitability
- Patient flow data
- Growth potential
- Referral patterns
- Evidence-based medicine

### Plan of Action During Value Streaming Kickoff

- *Analyze current state*
  - Identify processes of focus
  - Find process inefficiencies
- *Determine ideal state*
  - Explore options for process optimization
  - Alter process for optimal efficiency
- *Finalize new standards*
  - Prioritize standards for implementation
  - Set standardization timelines
  - Determine evaluation metrics

### Standardization Priorities

- Implant costs
- Order sets
- Total hip replacement length of stay
- OR turnover time
- Imaging utilization
- Discharge protocols
- Pre-op education

Source: Mohan, V. "Integration of Lean Manufacturing Principles Optimizes TJR Perioperative Efficiency and LOS," AAOS Annual Meeting Paper Presentations. San Diego, CA. 18 February 2011.

1) Evidence-based medicine

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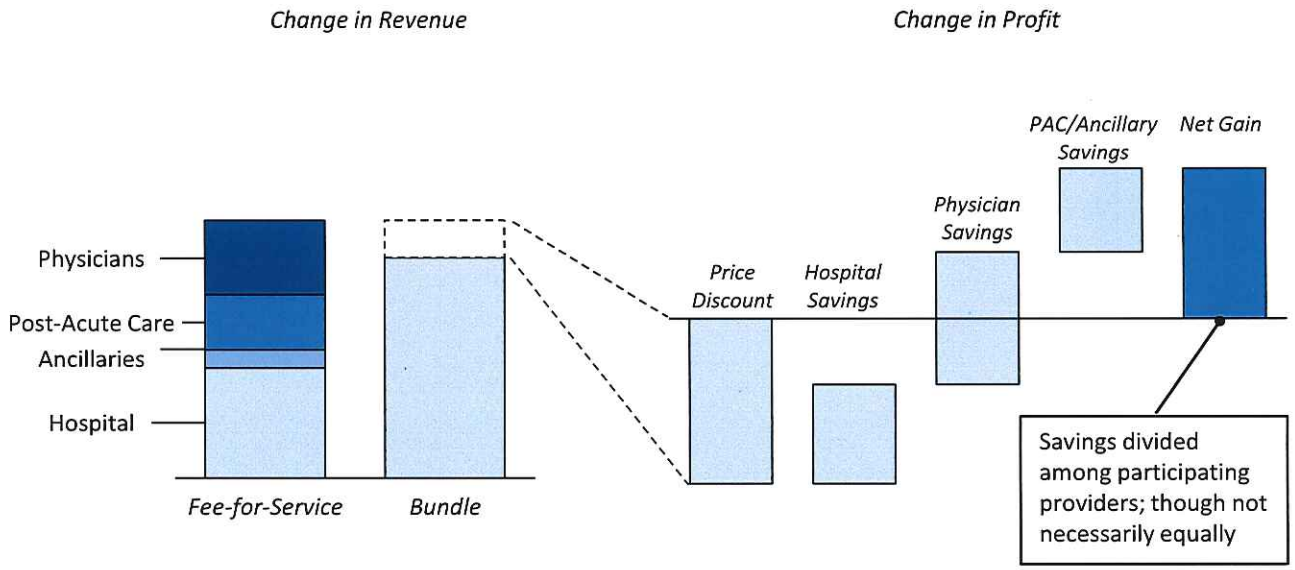
# Bundled Payments Shifting Risk onto Providers, but Providing Aligned Incentives

Bundled payments will place even more emphasis on margin improvement. Whether focused on inpatient care or longer term care episodes, bundled payments typically discount the total reimbursement delivered, and package hospital and physician payments into one lump sum to align disparate providers toward the goal of care coordination and ultimately cost reduction.

The Medicare Acute Care Episode (ACE) demonstration included orthopedic surgeries in its pilot, and participating organizations looked to orthopedic devices, length of stay reductions, and ancillary cutbacks for cost savings. Under episodic bundling, post-acute care usage and readmissions will also be included in the payment bundle.

While bundled payments may place some revenue at risk, organizations can use the model to strengthen hospital-surgeon relationships. An organization can potentially overcome strained relations with independent physicians and provide an added gainsharing incentive to reduce episodic costs and improve margins. Surgeons may be unwilling to create multiple bundling contracts with several hospitals, allowing an opportunity to tighten relationships without formal employment.

**The Mechanics of Bundled Payments**




**Orthopedic ACE Success at Hillcrest Medical Center**

| 10% | 57% | 20% |
|---|---|---|
| Reduction in Total Orthopedics Cost | Improvement in Orthopedics Medicare Margins | Improvement in Orthopedics All-Payer Margins |

Source: Dobbs, S, "The Medicare ACE Demonstration Project: Testing A New Bundled Payment System at Hillcrest Medical Center," presentation to Healthcare Financial Management Association, 2010; Health Care Advisory Board interviews and analysis.

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# Reduced Reimbursement, Burgeoning Volumes Force Continued Vigilance on LOS

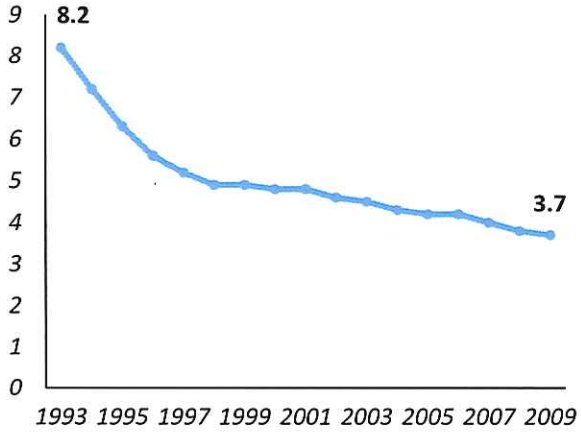
One key process improvement effort for orthopedics continues to be improving length of stay. As per-case revenues decrease from both health care reform and the growing Medicare population, efficiency gains are increasingly necessary to reduce costs and increase throughput.

Hospitals and surgeons have reduced length of stay (LOS) for joint replacement by more than 50 percent since 1993. However, LOS has plateaued around three to four days for most organizations.

However, some progressive organizations have pushed the reduced LOS even further, focusing on innovations in surgical technique, peri-operative care protocols and pain management. Minimally invasive surgical techniques in particular allow surgeons to avoid cutting muscles and tendons, which allows for quicker healing and less pain for the patient. A handful of organizations are pioneering minimally invasive joint replacements as outpatient procedures, but these programs are still uncommon.

**Total Joint Replacement Length of Stay**

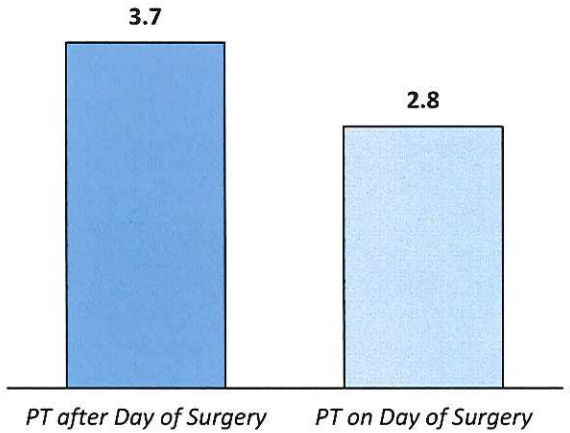
*1993-2009*




**Impact of Physical Therapy on Hospital Stay**

*Average LOS for Patients Receiving TJR*

n = 128




| Factors Impacting Length of Stay |
|---|
| Surgical Approach: Minimally Invasive or Traditional |
| Patient's Post-operative Pain |
| Length of Time Before Initiating Rehabilitation |
| Patient's Pre-op Health Level / Comorbidities |
| Peri-operative Care Protocols |

Source: HCUP-net, accessed July 18, 2011; Huddleston, J., AAOS Annual Meeting Paper Presentations; San Diego, CA, 18 February 2011.

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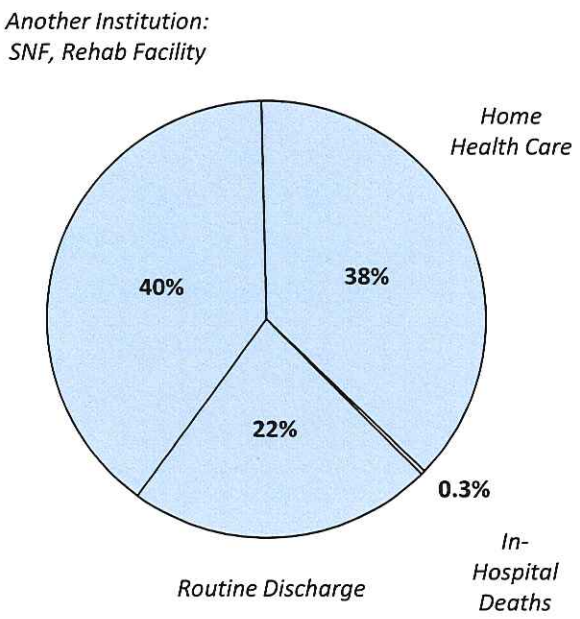
# Alignment with Post-Acute Care Becoming Critical

While improving LOS can reduce costs and improve throughput, episodic bundling and readmissions penalties may prove risky for those institutions looking to reduce LOS by any means possible. Under episodic bundles, post-acute providers will be included under the lump sum payment, meaning that lower acuity post-acute care is one opportunity for savings, as is a reduction in readmissions.

Recovering orthopedic patients frequently utilize post-acute care, with 40 percent discharged to another institution such as a skilled nursing facility (SNF) or rehab, and nearly 40 percent more being discharged with home health care assistance. As institutions accept bundled payments with these organizations, better care coordination becomes essential. Orthopedics service line directors should focus efforts on formalizing discharge planning, standardizing referral guidelines, and partnering with post-acute providers to share data and facilitate ongoing communication.

**Promoting Appropriate Post-Acute Care Through Discharge Planning**

*Discharge Status for Joint Replacement Admissions*
*2009*
*n = 1.1 M*




**Keys to Successful Orthopedic Discharge Plans**

- Create Formal Discharge Planning Process
- Standardize Referral Guidelines to Post-Acute Care
- Track Patient Follow-up
- Pre-schedule Post-operative Visit
- Enable Data Sharing with Post-Acute Care
- Facilitate Ongoing Communication

1) MS-DRGs: 461, 462, 466-470.

Source: Marketing and Planning Leadership Council research and analysis.

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# Majority of Orthopedics Readmissions Tied to Non-orthopedics Diagnoses

While orthopedic readmissions are not among Medicare's initial targets for the Hospital Readmissions Reduction Program, bundled payments ultimately will place increased risk on orthopedic readmissions. Current fee-for-service economics encourage focused efforts on reducing LOS without necessarily addressing the cost of post-acute care; one large study suggests that as LOS in hip replacement diminished, 30-day readmissions rates and use of expensive post-acute care rose dramatically.

Both hip and knee replacements are prone to readmissions, although the majority of all-cause readmissions likely stems from non-orthopedic causes such as congestive heart failure or ischemic heart disease.

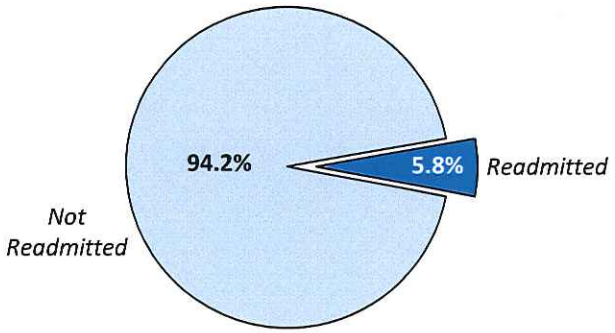
As institutions look to curb orthopedic readmissions, special care should be taken to not only discharge patients appropriately, but also understand the patient's comorbidities and address the patients post-surgical needs holistically.

**THR 30-day Readmissions Rates**

| '99-'00 | '07-'08 |
|---|---|
| 4.8% | 8.5% |

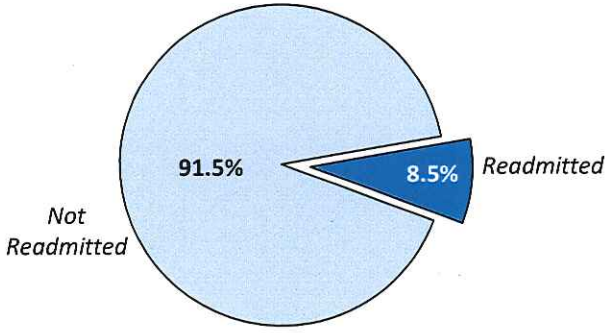
**Total Knee Replacement 30-Day Readmissions**

n = 4,057



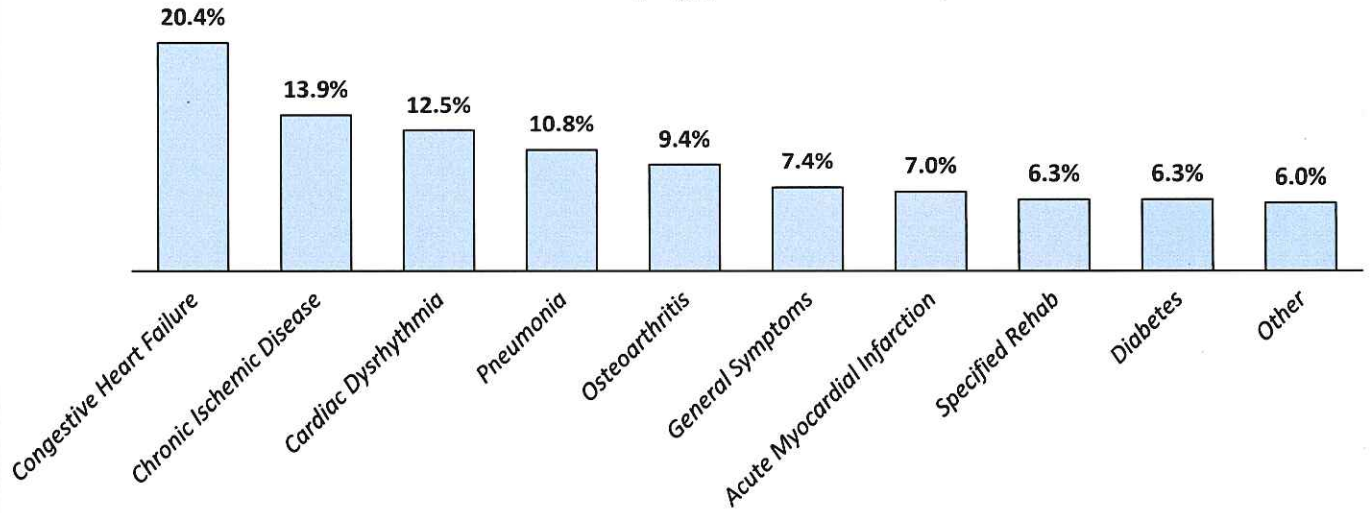

**Total Hip Replacement 30-Day Readmissions**

n = 1.5 M




**Most Common Diagnoses Among Total Knee Replacement 30-day Readmissions**

n = 4,057[1]




Source: Vorhies, J. et al., "Decreased Length of Stay After TKA Is Not Associated With Increased Readmission Rates in a National Medicare Sample," *Clinical Orthopedics and Related Research*, July 1, 2011; Cram et al., "Clinical Characteristics and Outcomes of Medicare Patients Undergoing Total Hip Arthroplasty, 1991-2008" *JAMA*, 305(15), 2011.

1) Venous thromboembolism was not one of the top 10 causes of readmission.

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# Widespread Utilization Variability Suggests Opportunity to Slow Volume Growth

Penalizing readmissions is Medicare's first step toward realigning incentives to reduce unnecessary and wasteful volume. Medicare is also targeting potentially unnecessary preference-sensitive elective procedures through shared savings programs and accountable care organizations (ACOs).

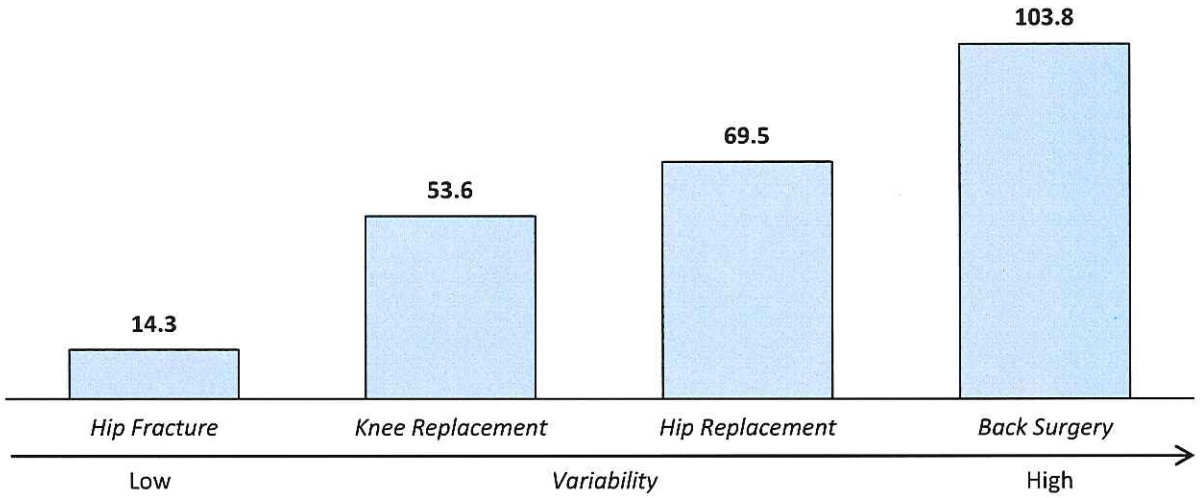
While most payment reforms address hospital-based quality and cost of care, Medicare's Shared Savings Program provides an incentive to lower the per capita spending for a population across time, thus shifting incentives away from procedural growth and toward prevention.

Given the elective nature of most procedures in orthopedics, as incentives shift physicians and hospitals may be encouraged to manage down utilization. The national variability of these procedures suggests there may be an opportunity to slow the growth of these procedures in high utilizing areas.

However, the Medicare Shared Savings Program is currently voluntary. Most institutions will continue to operate under fee-for-service economics, and should therefore continue to prioritize growth until the organization formally receives the majority of its payment under a utilization risk scenario.

**Regional Variability in Use Rates for Common Orthopedics Procedures**

*Systematic Components of Variation*[1]




**Range in Regional Variability for Orthopedic Procedures**

| 4x | 5x | 7x |
|---|---|---|
| THR: Hip Fracture | TJR: Hip Fracture | Back Surgery: Hip Fracture |

1 Higher number implies higher variability. The authors state "Systematic Components of Variation (SCV) are measures that allow comparisons of variation among procedures with different mean rates. The numerator is the number of patients with the indicated procedure; the denominator is the number of enrolled patients in traditional Medicare living in those regions."

Source: Fisher et al., "Trends and Regional Variation in Hip, Knee, and Shoulder Replacement," A Dartmouth Atlas Surgery Report, available at: http://www.dartmouthatlas.org/downloads/reports/Joint_Replacement_0410.pdf, accessed July 28, 2011.

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# Conservative Therapy, Not Prevention, Likely to Slow Orthopedic Utilization

As incentives shift from encouraging volume growth to slowing utilization, organizations must redesign care pathways to encourage more appropriate and conservative treatment. While long-term lifestyle changes such as weight reduction and exercise may prevent osteoarthritis, once patients feel symptoms it is too late to reverse the disease. That being said, surgery is the last-stage option for osteoarthritis pain.

Institutions looking to promote appropriate care should potentially employ a multidisciplinary approach that begins with conservative treatments, pain management, and physical therapy before surgery.

While potentially dampening the rate of per capita surgeries, conservative care pathways may surprisingly foster overall volume growth, even under fee-for-service incentives. Given the rapid growth of orthopedics and the potential shortage of physicians, effective triage protocols may increase efficiency of surgeons, reducing the number of patients physicians must see to generate a surgical candidate. Additionally, the comprehensive approach and patient-centered pathway may differentiate a center, ultimately driving overall volume growth.

**Points of Entry for Orthopedic Intake Consults**

*Surgeon*

- 1 to 2 surgeons meet patients as they enter the spine center
- Surgeon takes full patient history and performs surgery as needed
- Limited use of pain management and physical medicine

*Physiatrist*

- Physiatrist first meets patients as they as enter the orthopedic center
- Physiatrist takes patient history and employs nonsurgical approaches to care first, deferring patients to surgery only when nonsurgical care is not successful
- Usually used as a triage mechanism in higher-volume centers to maintain effective use of surgeons' time

*Nurse Coordinator*

- Nurse or physician assistant acts as care coordinator as patients enter the orthopedics center
- Care coordinator takes patient history and refers patient to physiatrist or surgeon, as appropriate
- Emphasis on comprehensive care allows patient to meet with physiatrists, surgeons, chiropractors, etc.

**Call Center Components to Ensure Appropriate Triage**

- Pre-authorization
- Decision algorithms
- Risk stratification tools
- Triage software
- Dedicated call center nurse

Source: Marketing and Planning Leadership Council interviews and analysis.



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# Patients Must Ultimately Be the Decision Makers in Opting for Conservative Therapy

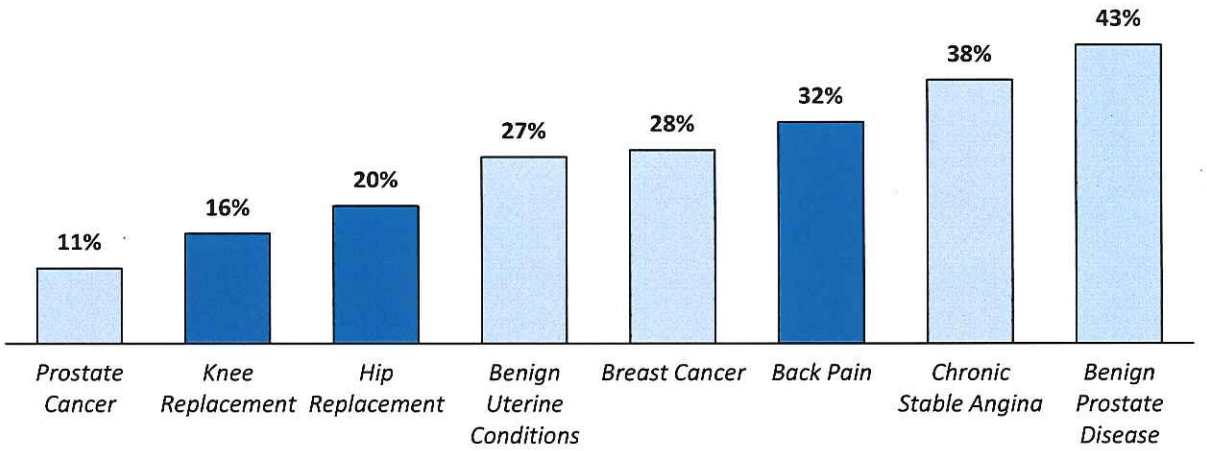
Ultimately, organizations participating in the Medicare Shared Savings Program or other utilization risk-based payment programs will encourage patients to consider conservative treatment options and move forward with surgery only as a last resort. When patients are presented with conservative options along with surgery, a number do self-select non-invasive treatment. Under a shared-decision making pilot, approximately one out of every five joint replacement patients and one out of every three back pain patients chose conservative options. While the vast majority still choose surgery, given the high cost associated with these procedures there is room for cost savings for a payer or an accountable care organization under a shared savings arrangement.

It is important to note, however, that under Medicare's Shared Savings Program, patients will still be able to seek out other providers, and bonuses will be tied to patient satisfaction measures. Institutions aggressively pushing conservative care without keeping patients at the center of the decision could lose not only the bonus, but also the contribution profit of performing the case at their institution.

**Claims-Validated Shift Rate Among Patients Participating in Shared Decision Making**

*Percentage of Patients Shifting to More Conservative Therapy Than Was Initially Planned*

n = 5,335 patients




| ***Treatment Shift Savings*** | | | | | | | |
|---|---|---|---|---|---|---|---|
| $91 K | $3.7 M | $2.7 M | $2.6 M | $43 K | $2 M | $2.8 M | $555 K |

**Case in Brief: Treatment Decision Support**

- Service provided by OptumHealth, part of UnitedHealth Group
- Treatment Decision Support service provides nurse coaching to help patients evaluate treatment options and find high quality providers

Source: OptumHealth Care Solutions: Product Sheet, 2007, available at: http://www.optumhealth.com/content/Files/DS_TDS_Product%20Sheet_FINAL.pdf, accessed March 27, 2009; "Voice of the Consumer: Empowered to Chose, Finding an Alternative to Surgery Puts Patient in Charge of Her Health," *Hub Magazine (UnitedHealth Group), Summer 2008*, available at: http://www.hubmagazine.net/articles.php?ID=179, accessed March 27, 2009; UnitedHealth Group, 2007 Summary Annual Report, 2007.



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Schematic Design Approval
The Floor Plan developed by the departmental user groups, planners and designers constitutes the interpretation of the Space Program and Departmental needs.
The Signatures below reflect the acceptance of this Agreement and allows the Design Development phase of work to proceed.

This signifies that the floor plan/room arrangement is fixed and changes to these items shall be made only through the authorization of the hospital administration.

DEPARTMENT NAME: Surgery

The signatures below reflect the acceptance of the agreement and allow the Design Development Phase of work to proceed.

| | | |
|---|---|---|
| | Dr. Case E. | Date 11/19/13 |
| | Dr. B.J.S. | Date 11/19/13 |
| | Dr. M-h S. | Date 11/19/13 |
| | Dr. Gott R. | Date 11/25/13 |
| | Holy S. | Date 11/15/13 |
| | Kim H. | Date 11/18/13 |
| | Trish | Date 11/27/13 |
| | | Date |
| | | Date |
| | | Date |

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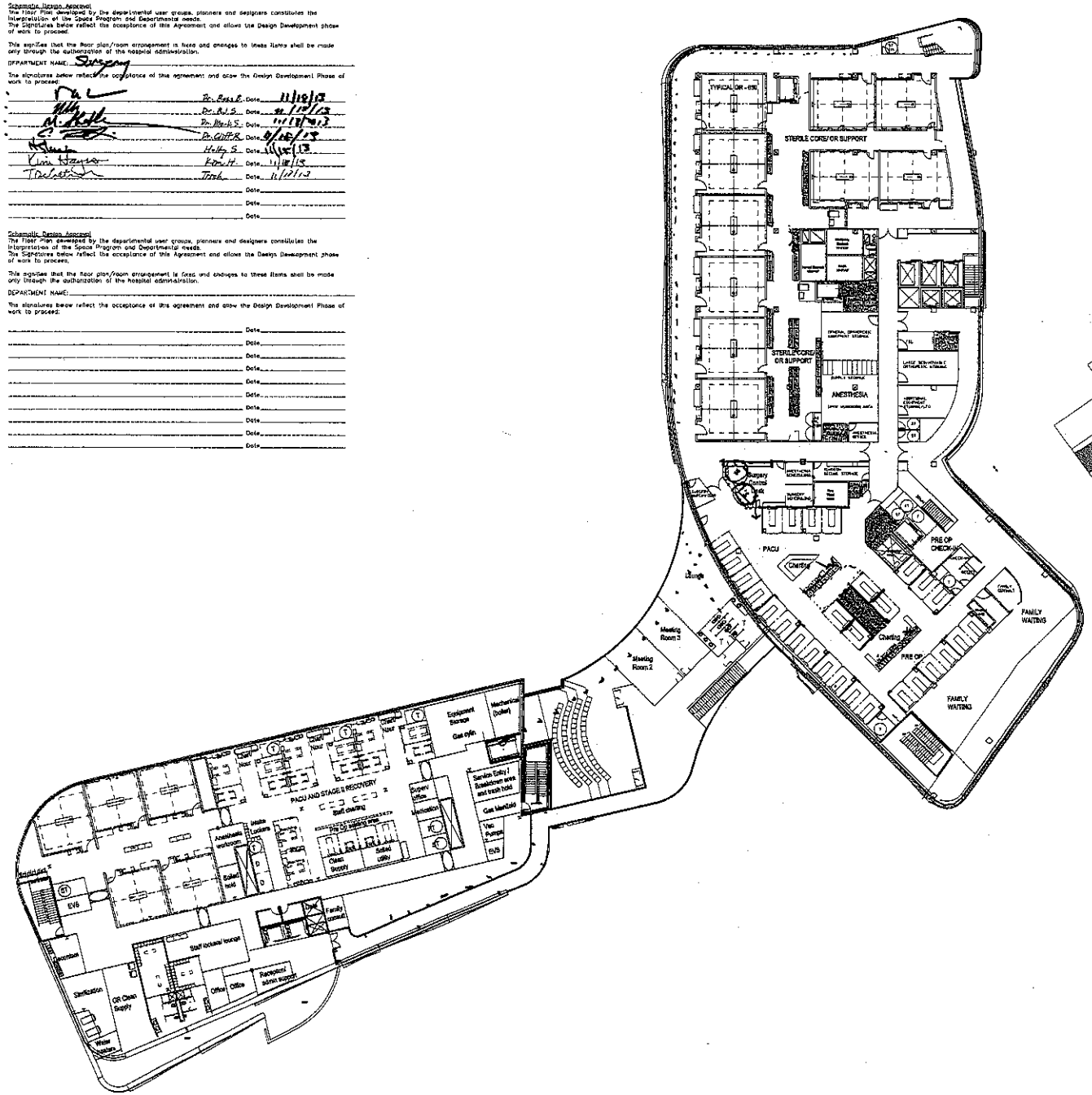


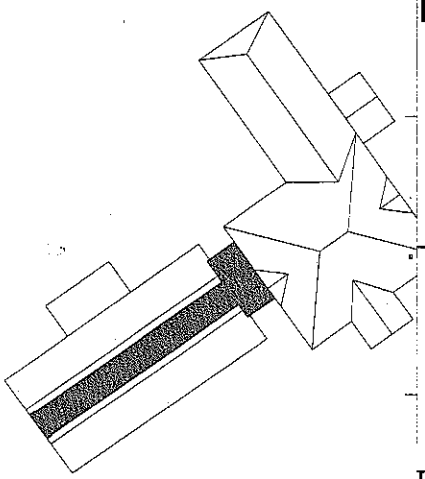

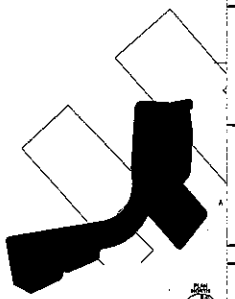

KEY PLAN

HDR
Architecture Engineering Planning, P.C.
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Perkins + Will
215 Park Avenue South, 4th Floor
New York, NY 10003

BR+A
Bard, Rao + Athanas Consulting Engineers
311 Arsenal Street
Watertown, MA 02472

PROJECT FOR
HARTFORD HOSPITAL
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-Medical Office Bldg
-Ambulatory Service Center

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# Dedicated Orthopedic Operating Room Unit Improves Operating Room Efficiency

Travis J. Small DO [a], Bishoy V. Gad MD [a], Alison K. Klika MS [a], Loran S. Mounir-Soliman MD [b], Ryan L. Gerritsen BA [a], Wael K. Barsoum MD [a]

[a] Department of Orthopaedic Surgery, Cleveland Clinic, Cleveland, Ohio
[b] Department of General Anesthesiology, Cleveland Clinic, Cleveland, Ohio

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ABSTRACT

We investigated the effectiveness of dedicated orthopedic operating rooms (OR) on minimizing time spent on perioperative processes to increase OR throughput in total knee and hip arthroplasty procedures. The use of a dedicated orthopedic unit that included 6 ORs with staff allocated only for those ORs was compared to the use of a traditional staffing model. After matching to simulate randomization, each group consisted of 422 procedures. The dedicated orthopedic unit improved average anesthesia controlled time by 4 minutes ($P<.001$), operative time by 7 minutes ($P=.004$) and turnover time by 8 minutes ($P<.001$). An overall improvement of 19 minutes per procedure using the dedicated unit was observed. Utilizing a dedicated orthopedic unit can save time without increasing adverse events.

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The health-care system currently faces many challenges including diminishing resources, increasing costs and changes in reimbursement [1–4]. These economic pressures require hospitals to frequently evaluate operating room (OR) processes to improve efficiency without undermining patient safety and care. System design is cited as the most effective method for improving OR procedures [5–8] and increasing OR capacity. Effectively managing OR processes is critical for maximizing OR utilization, diminishing resource downtime and facilitating an effective team dynamic. The classic system of running an OR involves placing staff (e.g., anesthesia, surgical technicians and nurses) wherever needed. Sharing staff amongst various specialties is referred to as a traditional OR staffing model. In contrast, a dedicated OR is considered to be an OR unit with committed staff to only one specialty with specific cases. Other studies have analyzed multidisciplinary team assessment to improve process [6,9–12] and using parallel processing to improve operative and non-operative times [7].

Improving OR utilization requires understanding of 3 parameters: time required for surgery, case scheduling, and minimizing time between surgeries [5]. First, technological advances and improvements in surgical technique may decrease time required for surgery [5], while process improvements may also decrease surgical time. Secondly, time required for surgery is often thought of as surgeon and procedure dependent. However, studies have shown that there are consistent relationships established amongst surgeons for each procedure [13,14]. Estimation for procedure time serves as an effective tool to improve scheduling difficulties [15–18]. Lastly, analyzing sources of increased non-operative time subdivided into anesthesia controlled time (ACT) and turnover time (TOT), through a multidisciplinary (nursing, anesthesia, and surgical team) approach has proven effective in previous studies [6,7]. All of these parameters must be investigated to fully maximize patient throughput.

Our institution has decreased both operative and non-operative time by making system improvements using high throughput processes which led to an increase in contribution margin (difference between direct cost and revenue) of 19.6% over a 2-year period [7]. This was accomplished through redesign of the operative system to include perioperative induction rooms [15], and block rooms for regional anesthesia [8]. Other improvements were achieved by adding dedicated circulating nurses and enhancing communication between OR technicians with handheld radios [19]. These successful maneuvers can be attributed to a multidisciplinary approach consisting of orthopedic surgeons, anesthesiologists, nurses, nurse managers, and support staff [6,8]. A limitation in this design was that it concentrated added resources on only one room each day.

The primary objective of this study was to determine whether the use of a dedicated orthopedic unit, encompassing an average of 6 rooms per day, would decrease overall OR time, including ACT, operative time, and TOT. A secondary goal of the study was to compare amount, type and severity of complications for traditional

Supplementary material available at www.arthroplastyjournal.org.

The Conflict of Interest statement associated with this article can be found at http://dx.doi.org/10.1016/j.arth.2013.01.033.

Reprint requests: Alison Klika, MS, Research Program Manager, Department of Orthopaedic Surgery, Cleveland Clinic – A41, 9500 Euclid Ave., Cleveland, OH 44195.

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and dedicated orthopedic units. We hypothesized that the dedicated orthopedic unit would allow for decreased OR time, without increasing complication rates.

## Materials and Methods

The Institutional Review Board reviewed and approved the study. A process improvement commission was created in 2008 by the surgical operations department of a tertiary medical center to reorganize the flow of orthopedic ORs performing total knee arthroplasty (TKA) and total hip arthroplasty (THA) procedures. Beginning on April 1, 2009, the total joints orthopedic ORs at our Institution began to function as an isolated unit (i.e., dedicated OR) from other services. The unit remained "dedicated" until 7:30 pm at which time staffing and call responsibilities were shared with the rest of the surgical suite. The 6 dedicated ORs were allocated nurses, anesthesiologists, orthopedic surgeons and OR technicians who exclusively performed primary total joint arthroplasty procedures. At preset intervals, the anesthesia staff from the orthopedic team rotated through different subspecialty anesthesia services. In addition, measures were taken to avoid penalizing OR staff for being efficient by prohibiting staff members from floating to other cases outside the dedicated OR, unless by choice. Once staff completed their assigned tasks in the OR they were either delegated to educational or service work, or allowed to go home. Patient flow into and out of the dedicated OR was similar to traditional OR services as described by Krupta [5]. There were no changes in anticoagulation protocols or standard of care protocols between the two time periods.

Cases for a retrospective review were identified using our operating room information system to query Current Procedural Terminology codes [20] for primary TKA (27447) and primary THA (27130) cases from 2 time periods. Cases from September 1, 2008 to February 28, 2009 defined the control group (i.e., traditional), and cases from September 1, 2009 to February 28, 2010 defined the dedicated OR group.

Time interval definitions by the American Association of Clinical Directors Procedural Times [21] were used to define the metrics. The sequence of time intervals is summarized in Fig. 1. Specific parameters studied were patient in room (PIR) times, procedure start times (PST), and patient out of room times (POR). PIR to PST was referred to as ACT, PST to POR was called operative time, and POR from the first case to PIR of the second case was referred to as turnover time (TOT). Intervals between PIR and POR, PST and POR, PIR for one case to PIR of the following case, and POR from one case to PIR of the following case were then examined. Data were collected and analyzed for the each cohort as a whole, then as TKA and THA subgroups. PIR 1 to PIR 2 intervals of greater than 500 minutes (8 hr 20 min) were excluded due to unrealistic room TOT and OR times. These were likely non-contiguous cases, meaning that the long TOT was due to a case ending the previous day and a new case being the first case of the following surgical day. All cases greater than 500 minutes and negative times were excluded as these were most likely due to errors in computer reporting, CPT recording, or inexplicably long cases due to non-procedure related complications.

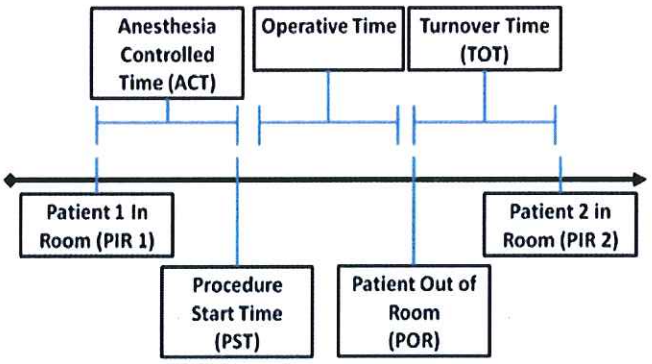


**Fig. 1.** Summary of OR times in linear time format.

Acute and in-house complications were recorded for all patients. In-house complications were defined as any adverse event that occurred immediately after surgery until discharge from the hospital. Acute complications were defined as any readmission within 90 days of the surgical date following discharge from the hospital. Any patient that did not have contact with his/her surgeon within 90 days was excluded from the study (n = 12 control; n = 5 dedicated). Complications were categorized based on type (i.e., infection, hematomas/deep vein thrombosis, fractures, mechanical failures, other) and severity (grade 1 to 5) of the complication following Dindo et al. [22]. Complications listed as 'other' consisted of arthrofibrosis and emergency room visits as well as unrelated procedures of transurethral prostectomy, CHF exacerbation, laparscopic cholesycectomy, and sickle-cell crisis. Grade 1 complications were defined as any deviation from normal post-operative course excluding the following treatments: antiemetics, antipyretics, analgetics, diuretics, electrolytes, and physiotherapy. Grade 2 complications required any drugs other then allowed in grade one complications including blood transfusions and total parenteral nutrition. Grade 3 complications required surgical, endoscopic and/or radiographic intervention. Grade 4 complications were life-threatening including CNS complications requiring IC/ICU management. Grade 5 complications included death of the patient.

### *Statistical Methods*

Baseline characteristics were first evaluated to determine areas of statistical significance between groups so that they could be appropriately adjusted for in the models. Descriptive statistics were computed comparing the OR groups (traditional vs dedicated). Subgroup analyses evaluating TKA and THA procedures were also evaluated. Categorical data were compared using chi-square tests for measures of association. The Fisher's exact test was applied for expected cell counts<5 and the Cochran Mantel–Haenszel chi-square tests were used for ordinal data. Continuous data were compared using the student's t-tests for normally distributed data; non-normal data were compared using the non-parametric Wilcoxon tests.

Since dedicated and traditional ORs differed significantly for some of the demographic and comorbidity variables; in order to make appropriate comparisons a propensity matching analysis was performed. Demographics utilized for matching consisted of: age, body mass index (BMI), gender, surgeon, laterality, and indications for surgery (Table 1 and Appendix 1). Comorbidities applied for matching were hypertension, diabetes, osteoporosis, cancer, hyperlipidemia, coronary artery disease, congestive heart failure, lung disease, tobacco use, alcohol use, and illicit drug use as well as American Society of Anesthesiologists (ASA) Classification (Tables 2, 3 and Appendixes 2, 3). Logistic regression was used to estimate a propensity score (PS), which represents the probability a patient would be in the treatment group (i.e. dedicated OR) rather than the control group (i.e., traditional OR) [23]. Propensity scoring removed any significant variations between the two groups to simulate randomization. Greedy 1 to 1 matching techniques were then used to pair patients who were in dedicated OR with those were in traditional OR by choosing the patients with the nearest PS [24]. Comparisons of perioperative times and complications were made between the PS-matched patients with Chi-square or Fisher's exact test or Wilcoxon rank sum test where appropriate. The process was repeated for both the TKA and THA subgroups.

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**Table 1**
Demographics by OR Group: After Matching.

| | Total Knee Arthroplasty | | |
|---|---|---|---|
| | Traditional OR (N=233) Mean±SD or N (%) | Dedicated OR (N=233) Mean±SD or N (%) | *P* Value |
| Age (years) | 65.7±11.0 | 65.4±11.0 | 0.76 |
| BMI | 32.4±7.2 | 32.6±7.2 | 0.77 |
| Gender (Female=266) | 134 (57.5) | 132 (56.7) | 0.85* |
| Surgeon | | | |
| Fellowship-trained (418) | 208 (89.3) | 210 (90.1) | 0.76* |
| Non-fellowship-trained (48) | 25 (89.3) | 23 (9.9) | |
| Laterality | | | |
| Left (230) | 117 (50.2) | 113 (48.5) | 0.71* |
| Right (236) | 116 (49.8) | 120 (51.5) | |
| Indications | | | |
| Osteoarthritis (448) | 225 (96.6) | 223 (95.7) | 0.63* |
| AVN/Osteonecrosis (1) | 0 (0.0) | 1 (0.43) | 0.99** |
| RA (12) | 6 (2.6) | 6 (2.6) | 0.99* |
| Other (5) | 2 (0.86) | 3 (1.3) | 0.99** |
| | Total Hip Arthroplasty | | |
| | Traditional OR (N=157) | Dedicated OR (N=157) | *P* Value |
| Age (years) | 59.5±14.0 | 59.0±13.0 | 0.78 |
| BMI | 30.2±6.6 | 30.3±6.6 | 0.89 |
| Gender (Male=168) | 83 (52.9) | 85 (54.1) | 0.82* |
| Surgeon | | | |
| Fellowship-trained (279) | 139 (88.5) | 140(89.2) | 0.86* |
| Non-fellowship-trained (35) | 18(11.5) | 17(10.8) | |
| Laterality | | | |
| Left (151) | 76 (48.4) | 75 (47.8) | 0.91* |
| Right (163) | 81 (51.6) | 82 (52.2) | |
| Indications | | | |
| Osteoarthritis (257) | 128 (81.5) | 129 (82.2) | 0.88* |
| AVN/Osteonecrosis (34) | 17 (10.8) | 17 (10.8) | 0.99* |
| RA (4) | 2 (1.3) | 2 (1.3) | 0.99** |
| Other (17) | 9 (5.7) | 8 (5.1) | 0.80* |

Student's t-test, unless noted otherwise.
Note: There were 2 surgeons who did not perform any THA procedures.
* Chi-square test.
** Fisher's exact test.

## Results

There were 475 cases (n=200 primary THA; n=275 primary TKA) in the traditional OR control group spanning 181 OR days (Appendix 1). In the dedicated OR study group, 529 cases (n=215 primary THA; n=314 TKA) spanning 181 OR days were performed (Appendix 1). Turnover time was recorded for 164 cases in the control group and 209 cases in the dedicated group from the total cases as described above. Before PS matching there were differences between the number of TKA procedures performed by adult

**Table 2**
Comorbidities by OR Group: After Matching.

| | Total Knee Arthroplasty | | |
|---|---|---|---|
| | Traditional OR (N=233) N (%) | Dedicated OR (N=233) N (%) | P Value* |
| Medical history | | | |
| Hypertension (326) | 165 (70.8) | 161 (69.1) | 0.69 |
| Diabetes (93) | 48 (20.6) | 45 (19.3) | 0.73 |
| Osteoporosis (13) | 7 (3.0) | 6 (2.6) | 0.78 |
| Cancer (81) | 42 (18.0) | 39 (16.7) | 0.71 |
| Hyperlipidemia (211) | 105 (45.1) | 106 (45.5) | 0.93 |
| Coronary artery disease (79) | 41 (17.6) | 38 (16.3) | 0.71 |
| Congestive heart failure (19) | 9 (3.9) | 10 (4.3) | 0.81 |
| Lung disease (56) | 26 (11.2) | 30 (12.9) | 0.57 |
| Social history | | | |
| Tobacco use (225) | 112 (48.1) | 113 (48.5) | 0.93 |
| Alcohol use (221) | 108 (46.4) | 113 (48.5) | 0.64 |
| Illicit drugs use (4) | 2 (0.86) | 2 (0.86) | 0.99** |
| ASA classification | | | |
| 2 (n=199) | 98 (42.1) | 101 (43.4) | 0.87+ |
| 3 (n=252) | 128 (54.9) | 124 (53.2) | |
| 4 (n=15) | 7 (3.0) | 8 (3.4) | |

* Chi-square test, unless noted otherwise.
** Fisher's exact test.
+ Cochran-Mantel-Haenszel test.

**Table 3**
Comorbidities by OR Group: After Matching.

| | Total Hip Arthroplasty | | |
|---|---|---|---|
| | Traditional OR (N = 157) N (%) | Dedicated OR (N = 157) N (%) | *P* Value* |
| Medical history | | | |
| Hypertension (160) | 79 (50.3) | 81 (51.6) | 0.82 |
| Diabetes (29) | 13 (8.3) | 16 (10.2) | 0.56 |
| Osteoporosis (5) | 2 (1.3) | 3 (1.9) | 0.99** |
| Cancer (31) | 15 (9.6) | 16 (10.2) | 0.85 |
| Hyperlipidemia (108) | 55 (35.0) | 53 (33.8) | 0.81 |
| Coronary artery disease (34) | 17 (10.8) | 17 (10.8) | 0.99 |
| Congestive heart failure (1) | 0 (0.00) | 1 (0.64) | 0.99** |
| Lung disease (38) | 18 (11.5) | 20 (12.7) | 0.73 |
| Social history | | | |
| Tobacco use (167) | 82 (52.2) | 85 (54.9) | 0.73 |
| Alcohol use (163) | 81 (51.6) | 82 (52.2) | 0.91 |
| Illicit drugs use (4) | 2 (1.3) | 2 (1.3) | 0.99** |
| ASA classification | | | |
| 1 (n = 9) | 6 (3.8) | 3 (1.9) | 0.64+ |
| 2 (n = 149) | 74 (47.1) | 75 (47.8) | |
| 3 (n = 148) | 73 (46.5) | 75 (47.8) | |
| 4 (n = 8) | 4 (2.6) | 4 (2.6) | |

* Chi-square test, unless noted otherwise.
** Fisher's exact test.
+ Cochran-Mantel-Haenszel test.

reconstruction fellowship-trained surgeons and non-fellowship trained surgeons ($P = 0.022$) (Appendix 1). Before matching there was a difference in TKA patients for osteoporosis ($P = 0.027$), and the THA group had differences in diabetes ($P = 0.011$) and lung disease ($P = 0.030$) (Appendixes 2 and 3). The final overall PS matched cohort simulated a randomized control trial to eliminate the differences between cohorts consisted of 780 patients (n = 390 paired traditional OR unit procedures, n = 390 dedicated OR unit procedures). The TKA subgroup consisted of 466 patients (n = 233 paired traditional OR, n = 233 dedicated OR). The THA subgroup consisted of 314 patients (n = 157 paired traditional OR, n = 157 dedicated OR).

Time improvements were found in combined TKA and THA groups, including ACT (4.0 minutes, $P<.001$), operative time (7.0 minutes, $P=.012$), and TOT (8.0 minutes, $P<.001$) (Table 5). When considering the TKA only subgroup, ACT (3.0 minutes, $P<.001$) and TOT (5.5 minutes, $P<.001$) were reduced in the dedicated subgroup compared to the traditional subgroup (Table 5). Patients receiving THA had improvements in ACT (4.0 minutes, $P=.010$), operative time (9.0 minutes, $P=.019$), and TOT (5.0 minutes, $P=.017$) (Table 4).

In the TKA subgroup, there were more hematoma complications (n = 17, 7.3%) in the traditional OR group compared to the dedicated OR group (n = 6, 2.6%; $P=0.019$) (Table 5). The subgroup of THA procedures had an increase in total complications for the traditional OR (n = 22, 14.0%) compared to the dedicated OR group (n = 10, 6.4%; $P=.025$ (Table 5). In terms of severity of complications, the traditional OR group had more severe complications compared to the dedicated OR group ($P=.03$) (Table 5). The traditional OR had one

**Table 4**
Perioperative Times by OR Group: After Matching.

| | Total Hip and Knee Arthroplasty | | | |
|---|---|---|---|---|
| | Traditional OR (N = 422) Median (25th Percentile, 75th Percentile) | Dedicated OR (N = 422) Median (25th Percentile, 75th Percentile) | Improvement | *P* Value ++ |
| Anesthesia controlled time (min) | 47.0 (40.0, 56.0) | 43.0 (36.0, 52.0) | 4.0 | <0.001 |
| Operating room time (min) | 141.0 (119.0, 161.0) | 134.0 (113.0, 154.0) | 7.0 | 0.012 |
| | Traditional OR (N = 147) | Dedicated OR (N = 167) | | |
| Turnover time (min) | 42.0 (32.0, 48.0) | 34.0 (26.0, 43.0) | 8.0 | <0.001 |
| | Total Knee Arthroplasty | | | |
| | Traditional OR (N = 233) | Dedicated OR (N = 233) | Improvement | *P* Value ++ |
| Anesthesia controlled time (min) | 44.0 (39.0, 52.0) | 41.0 (35.0, 47.0) | 3.0 | <0.001 |
| Operating room time (min) | 137.0 (119.0, 157.0) | 137.0 (117.0, 157.0) | 0.0 | 0.95 |
| | Traditional OR (N = 74) | Dedicated OR (N = 82) | | |
| Turnover time (min) | 39.5 (32.0, 48.0) | 34.0 (24.0, 41.0) | 5.5 | <0.001 |
| | Total Hip Arthroplasty | | | |
| | Traditional OR (N = 157) | Dedicated OR (N = 157) | Improvement | *P* Value ++ |
| Anesthesia controlled time (min) | 51.0 (42.0, 59.0) | 47.0 (38.0, 55.0) | 4.0 | 0.010 |
| Operating room time (min) | 141.0 (117.0, 163.0) | 132.0 (108.0, 154.0) | 9.0 | 0.019 |
| | Traditional OR (N = 61) | Dedicated OR (N = 75) | | |
| Turnover time (min) | 42.0 (32.0, 47.0) | 34.0 (27.0, 45.0) | 5.0 | 0.017 |

++ Non-parametric Wilcoxon rank sum test data.

**Table 5**
Complications by OR Group: After Matching.

| | Total Knee Arthroplasty | | |
|---|---|---|---|
| | Traditional OR (N=233) N (%) | Dedicated OR (N=233) N (%) | *P* Value* |
| Infection (n=21) | 9 (3.9) | 12 (5.2) | 0.50 |
| Fracture (n=1) | 0 (0.00) | 1 (0.43) | 0.99** |
| Hematoma (n=23) | 17 (7.3) | 6 (2.6) | 0.019 |
| Mechanical failure (n=0) | 0 (0.00) | 0 (0.00) | N/A |
| Other (n=47) | 19 (8.2) | 28 (12.0) | 0.17 |
| Total | | | |
| 1 (90) | 43 (18.5) | 47 (20.2) | 0.72+ |
| 2 (1) | 1 (0.43) | 0 (0.00) | |
| Grade of severity | | | |
| 1 (22) | 9 (3.9) | 13 (5.6) | 0.91+ |
| 2 (53) | 27 (11.6) | 26 (11.2) | |
| 3 (16) | 8 (3.4) | 8 (3.4) | |
| 4 (0) | 0 (0.00) | 0 (0.00) | |
| 5 (0) | 0 (0.00) | 0 (0.00) | |
| | Total Hip Arthroplasty | | |
| | Traditional OR (N=157) | Dedicated OR (N=157) | *P* Value* |
| Infection (n=5) | 5 (3.2) | 0 (0.00) | 0.061** |
| Fracture (n=1) | 1 (0.64) | 0 (0.00) | 0.99** |
| Hematoma (n=7) | 5 (3.2) | 2 (1.3) | 0.45** |
| Mechanical failure (n=0) | 0 (0.00) | 0 (0.00) | N/A |
| Other (n=19) | 11 (7.0) | 8 (5.1) | 0.48** |
| Total (n=32) | 22 (14.0) | 10 (6.4) | 0.025 |
| Grade of severity | | | |
| 1 (9) | 6 (3.8) | 3 (1.9) | 0.03+ |
| 2 (14) | 9 (5.7) | 5 (3.2) | |
| 3 (8) | 6 (3.8) | 2 (1.3) | |
| 4 (1) | 1 (0.64) | 0 (0.00) | |
| 5 (0) | 0 (0.00) | 0 (0.00) | |

* Chi-square test, unless noted otherwise.
** Fisher's exact test.
\+ Cochran-Mantel-Haenszel test.

grade 4 complication in the THA subgroup compared to zero in the dedicated OR subgroup.

## Discussion

Process redesign in large teaching hospitals may substantially improve operational performance without compromising patient safety. These data demonstrate that using staff members familiar with orthopedic equipment and procedural needs can decrease operative time by an average of 19 minutes per operation, which extrapolates to a total average savings of just over 1.25 hours for a surgeon who performs 4 primary arthroplasty procedures per day. Unlike previous studies which have required additional staff to decrease both operative and non-operative times [25–27], our study maintained the same amount of staff for each unit. With the additional time gained from a dedicated OR unit, staff can be offered efficiency incentives, more time off, or time to do other activities.

Several studies have looked to improve OR throughput by adjusting parameters either directly or indirectly involved with OR processes [5,15–19]. With regards to non-operative time Smith et al. [7] reported a parallel process that involved using a procedural block room for total joint arthroplasty ORs which led to substantially increased OR throughput. Also, Harders et al. [10] showed that process redesign decreased non-operative time from 65 to 42.2 minutes when comparing similar cases at a large tertiary county-owned hospital. Their report illustrated process improvements resulting in a significant decrease in operative time with a precisely selected group of predictably routine operations, including anterior cruciate ligament reconstructions, total and reverse shoulder arthroplasties, and laparoscopic cholecystectomies. Non-operative time encompasses activities which engage the entire OR team. Our study demonstrated an improvement in non-operative time parameters with ACT improving by 4 minutes ($P<.001$) and TOT by 8 minutes ($P<.001$). An estimated 12 minute improvement per case should not be minimized as these savings may provide the opportunity to add an additional procedure or for staff to leave work early, which could ultimately increase employee satisfaction and decrease staff turnover.

Operative time has traditionally been viewed as being related to a surgeon's proficiency for a particular procedure. This study is the first in the current orthopedic literature to suggest a surgeon's interaction with his/her team substantially reduces operative time due to familiarity of anesthesiologists, nurses and support staff with particular surgical needs. This improved surgical time may also be due to effect of working in a high throughput environment causing the surgical team to work more efficiently. Improved times may be obtained with continued use of the system as employees become more experienced within the dedicated unit.

The increase in efficiency did not compromise patient care as shown by the complication rate comparisons. The complications in the traditional OR were significantly higher for hematomas in TKA procedures, which consisted of deep vein thrombosis, pulmonary embolism, and surgical wound hematomas. Total complications in THA patients were significantly lower and less severe in the dedicated OR compared to the traditional unit. Our high rate of complications could be due to the inclusion of any patient admitted within 90 days of surgery (i.e. emergency room visit, possibly unrelated surgical procedure/condition).

There are a few limitations to this study. First, this model is not as applicable to operations that are un-predictable, challenging, or require difficult intra-operative decision making. It is suggested that a dedicated OR unit for complicated cases be designed to accommodate for difficult surgical needs. Additionally, these results may not be

germane to situations in which there cannot be a dedicated OR where anesthesiologists, nurses and technicians who are familiar with primary TKA and THA can be isolated. Our study occurred over two different time periods, the traditional OR group being first prior to switching to a dedicated OR system. Conducting a randomized trial by allocating procedures to a traditional or dedicated unit would be ideal, but not practical at our institution. We simulated randomization by using propensity score matching to correct for differences in surgeon training and patient demographics and comorbidities. Finally, our study was conducted at a single institution, which is a large academic tertiary care center. For more generalized conclusions, a study of larger scale involving multiple institutions would lead to more incite on the feasibility of a dedicated OR outside of our institution. Unfortunately some smaller hospitals or ambulatory surgery centers may not benefit from our work if they have a highly diverse mix of operations being performed in the same ORs.

In summary, the utilization of a dedicated OR can be applied in appropriate institutions with the right patient population and personnel to increase throughput without compromising patient care or requiring additional staff. The dedicated OR system significantly decreased operative time, anesthesia controlled time, and turnover time for TKA and THA procedures, without increasing complication rates. Further studies are required to determine what benefits are made possible by these time savings, but may include improvements in employee satisfaction and retention, cost savings to the hospital, and/or opportunity to increase surgical volume.

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**Appendix 1**
Demographics by Group Traditional vs Dedicated: Before Matching.

| | Total Knee Arthroplasty | | |
|---|---|---|---|
| | Traditional OR (N = 275) Mean ± SD or N (%) | Dedicated OR (N = 314) Mean ± SD or N (%) | *P* Value* |
| Age (years) | 65.9 ± 11.0 | 65.6 ± 10.8 | 0.68 |
| BMI | 32.3 ± 7.1 | 32.8 ± 7.1 | 0.35 |
| Gender (female, n = 335) | 156 (56.7) | 179 (57.0) | 0.95 |
| Surgeon | | | |
| Fellowship-trained (523) | 235 (85.8) | 288 (91.7) | 0.022 |
| Non-fellowship-trained (65) | 39 (14.2) | 26 (8.3) | |
| Laterality | | | |
| Left (294) | 148 (53.8) | 146 (46.5) | 0.076 |
| Right (295) | 127 (46.2) | 168 (53.5) | |
| Indications | | | |
| Osteoarthritis (561) | 263 (95.6) | 298 (94.9) | 0.68 |
| AVN/osteonecrosis (4) | 2 (0.73) | 2 (0.64) | 0.99** |
| RA (13) | 6 (2.2) | 7 (2.2) | 0.97 |
| Other (9) | 4 (1.5) | 5 (1.6) | 0.99** |
| | Total Hip Arthroplasty | | |
| | Traditional OR (N = 200) | Dedicated OR (N = 215) | *P* Value |
| Age (years) | 59.3 ± 14.2 | 60.0 ± 13.0 | 0.60 |
| BMI | 30.1 ± 6.4 | 30.1 ± 7.0 | 0.97 |
| Gender ( male, n= 215) | 106 (53.0) | 109 (50.7) | 0.64* |
| Surgeon | | | |
| Fellowship-trained (367) | 174 (87.4) | 193 (89.8) | 0.46* |
| Non-fellowship-trained (47) | 25 (12.6) | 22 (10.2) | |
| Laterality | | | |
| Left (200) | 92 (46.0) | 108 (50.2) | 0.39* |
| Right (215) | 108 (54.0) | 107 (49.8) | |
| Indications | | | |
| Osteoarthritis (342) | 165 (82.5) | 177 (82.3) | 0.96 |
| AVN/osteonecrosis (45) | 22 (11.0) | 23 (10.7) | 0.92 |
| RA (6) | 3 (1.5) | 3 (1.4) | 0.99** |
| Other (20) | 9 (4.5) | 11 (5.1) | 0.77 |

Student's t-test, unless noted otherwise.
* chi-Square test.
** Fisher's exact test.

**Appendix 2**
Comorbidities by OR Group: Before Matching.

| | Total Knee Arthroplasty | | |
|---|---|---|---|
| | Traditional OR (N = 275) N (%) | Dedicated OR (N = 314) N (%) | *P* Value* |
| Medical history | | | |
| Hypertension (412) | 198 (72.0) | 214 (68.2) | 0.31 |
| Diabetes (125) | 52 (18.9) | 73 (23.3) | 0.20 |
| Osteoporosis (27) | 7 (2.6) | 20 (6.4) | 0.027 |
| Cancer (93) | 46 (16.7) | 47 (15.0) | 0.56 |
| Hyperlipidemia (272) | 136 (49.5) | 136 (43.3) | 0.14 |
| Coronary artery disease (101) | 51 (18.6) | 50 (15.9) | 0.40 |
| Congestive heart failure (24) | 14 (5.1) | 10 (3.2) | 0.24 |
| Lung disease (75) | 34 (12.4) | 41 (13.1) | 0.80 |
| Social history | | | |
| Tobacco use (295) | 126 (45.8) | 169 (53.8) | 0.053 |
| Alcohol use (271) | 117 (42.6) | 154 (49.0) | 0.11 |
| Illicit drugs use (9) | 2 (0.73) | 7 (2.2) | 0.19** |
| ASA classification | | | |
| 2 (n = 227) | 111 (40.4) | 142 (45.2) | 0.24+ |
| 3 (n = 296) | 150 (54.6) | 163 (51.9) | |
| 4 (n = 23) | 14 (5.1) | 9 (2.9) | |

* Chi-square test, unless noted otherwise.
** Fisher's exact test.
+ Cochran-Mantel-Haenszel test.

**Appendix 3**
Comorbidities by OR Group: Before Matching.

| | Total Hip Arthroplasty | | |
|---|---|---|---|
| | Traditional OR (N = 200) N (%) | Dedicated OR (N = 215) N (%) | *P* Value* |
| Medical history | | | |
| Hypertension (213) | 104 (52.0) | 109 (50.7) | 0.79 |
| Diabetes (49) | 32 (16.0) | 17 (7.9) | 0.011 |
| Osteoporosis (8) | 2 (1.0) | 6 (2.8) | 0.29** |
| Cancer (50) | 27 (13.5) | 23 (10.7) | 0.38 |
| Hyperlipidemia (146) | 78 (39.0) | 68 (31.6) | 0.12 |
| Coronary artery disease (51) | 27 (13.5) | 24 (11.2) | 0.47 |
| Congestive heart failure (7) | 5 (2.5) | 2 (0.93) | 0.27** |
| Lung disease (62) | 22 (11.0) | 40 (18.6) | 0.030 |
| Social history | | | |
| Tobacco use (235) | 116 (58.0) | 119 (55.4) | 0.59 |
| Alcohol use (218) | 101 (50.5) | 117 (54.4) | 0.42 |
| Illicit drugs use (8) | 6 (3.0) | 2 (0.93) | 0.16** |
| ASA classification | | | |
| 1 (n = 13) | 8 (4.0) | 5 (2.3) | 0.90+ |
| 2 (n = 195) | 89 (44.5) | 106 (49.3) | |
| 3 (n = 193) | 97 (48.5) | 96 (44.7) | |
| 4 (n = 14) | 6 (3.0) | 8 (3.7) | |

* Chi-square test, unless noted otherwise.
** Fisher's exact test.
+ Cochran-Mantel-Haenszel test.

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SCIENTIFIC ARTICLE

# The Efficiency of a Dedicated Staff on Operating Room Turnover Time in Hand Surgery

Daniel M. Avery III, MD, Kristofer S. Matullo, MD

**Purpose** To evaluate the effect of orthopedic and nonorthopedic operating room (OR) staff on the efficiency of turnover time in a hand surgery practice.

**Methods** A total of 621 sequential hand surgery cases were retrospectively reviewed. Turnover times for sequential cases were calculated and analyzed with regard to the characteristics of the OR staff being primarily orthopedic or nonorthopedic.

**Results** A total of 227 turnover times were analyzed. The average turnover time with all nonorthopedic staff was 31 minutes, for having only an orthopedic surgical technician was 32 minutes, for having only an orthopedic circulator was 25 minutes, and for having both an orthopedic surgical technician and a circulator was 20 minutes. Statistical significance was seen when comparing only an orthopedic surgical technician versus both an orthopedic circulator and a surgical technician and when comparing both nonorthopedic staff versus both an orthopedic circulator and a surgical technician.

**Conclusions** OR efficiency is being increasingly evaluated for its effect on hospital revenue and OR staff costs. Reducing turnover time is one aspect of a multifaceted solution in increasing efficiency. Our study showed that, for hand surgery, orthopedic-specific staff can reduce turnover time. *(J Hand Surg Am. 2014;39(1):108–110.* *Copyright © 2014 by the American Society for Surgery of the Hand. All rights reserved.)*

**Type of study/level of evidence** Economic/Decision Analysis III.

**Key words** Hand surgery, operating room efficiency, turnover time.

Over the past decade, efficiency in the operating room (OR) has become an area of focus for many hospitals. With an increasing patient population, increasing cost of procedures, and decreasing reimbursements, it is challenging to deliver quality care in the rapidly changing health care system. Numerous studies have looked at various strategies to increase efficiency to keep ORs financially more viable.[1–8] Most of these studies have shown that decreasing the turnover time between cases isone way of making a surgeon's and staff's throughput easier.[1–8] However, many of these studies have examined all specialties within their system or focused on a specialty other than hand surgery.[1–9] In orthopedics, only turnover time for total joint arthroplasties has been examined for strategies to increase efficiency.[5]

Hand surgery stands as a unique subset of orthopedics to benefit from increased OR efficiency. Even minimal reductions in time between cases could translate to additional scheduling of cases because hand surgery cases often take far less time than other orthopedic OR procedures.

This study was conducted to evaluate the effect of OR staff on the efficiency of turnover time in a hand surgery practice. Our hypothesis was that having an orthopedic surgical technician and a circulating nurse would reduce turnover time when compared with

*From the Division of Hand Surgery, St. Luke's University Health Network; the Department of Orthopaedic Surgery, St. Luke's Hospital, Bethlehem, Pennsylvania.*

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**Corresponding author:** Kristofer S. Matullo, MD, St. Luke's University Health Network, 801 Ostrum Street, PPH-2, Bethlehem, PA 18015; e-mail: Kristofer.Matullo@sluhn.org.

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**TABLE 1. Number of Turnovers and Average Time by Staff Category**

| OR Staff | Number of Turnovers | Average Turnover Time in Minutes (range) |
|---|---|---|
| Nonorthopedic surgical technician and circulator | 53 | 30.5 (9–67) |
| Orthopedic surgical technician and nonorthopedic circulator | 71 | 31.9 (7–88) |
| Nonorthopedic surgical technician and orthopedic circulator | 34 | 24.8 (4–69) |
| Orthopedic surgical technician and circulator | 69 | 19.8 (5–58) |
| **Total** | 227 | 26.8 |

nonorthopedic staff in a hospital ambulatory surgery center environment.

## MATERIALS AND METHODS

After approval by our institutional review board, we conducted a retrospective review of K.S.M.'s case logs for hand surgery cases from July 2011 to June 2012 at our level I academic institution. All cases were performed in our outpatient ambulatory surgery center, located within the main hospital. A total of 621 sequential cases were identified, and operative records were reviewed. Cases included for evaluation were elective hand-specific cases regardless of patient age and running sequentially in a single operating suite but not involving microsurgery. Cases were excluded when the hand surgeon operated simultaneously in multiple operating suites, when they involved acute trauma care on inpatients, when cases were performed outside standard day shift hours (8:00 AM–3:00 PM), when turnover times greater than 90 minutes were likely outside the control of the OR staff, when there was a change of staff between cases, and when records were incomplete or electronically unavailable. Turnover time was defined as the difference between the time the previous patient left the room and the time the following patient came into the room as recorded in the nursing record.

The OR surgical technician and circulating nurse were categorized for each turnover time as being either orthopedic staff or nonorthopedic staff. Individuals were classified as orthopedic staff if greater than 75% of their typical time in the operating room was spent delivering care to orthopedic patients or performing orthopedic procedures. All nurses and technicians were nonunionized, non-incentivized hospital employees compensated according to an equal and standardized pay rate regardless of specialty.

### Statistics

Turnover times were logged into a spreadsheet based on their respective staff grouping. Average turnover time and analysis between staff groups were compared using a Student 2-tailed *t* test assuming equal variance. A $P$ of less than .05 denoted statistical significance.

## RESULTS

A total of 227 turnover times were included. Of these, 53 turnovers were performed with both nonorthopedic circulators and surgical technicians, 71 turnovers were performed with an orthopedic surgical technician and a nonorthopedic circulator, 34 turnovers were performed with a nonorthopedic surgical technician and an orthopedic circulator, and 69 turnovers were performed with both an orthopedic surgical technician and an orthopedic circulator.

The average turnover time in all cases, irrespective of staff, was 27 minutes. The average turnover time with respect to the type of staff involved is reported in Table 1.

The differences in turnover time (11 min) was significantly different when a complete nonorthopedic staff was compared with a complete orthopedic staff ($P = .005$). Also the differences in turnover time (12 min) were significant when an orthopedic technician was compared with a complete orthopedic staff ($P < .001$). The other differences were statistically insignificant.

## DISCUSSION

Increasing OR efficiency is a multifaceted task that includes turnover time, Dexter[8] and Patterson[2] advised that hospitals should focus on other aspects of OR efficiency such as perioperative nursing preparation, communication within the OR, and anesthesia policies such as performing pre-procedural regional blocks. However, their advice was based on observing multiple specialties with operations requiring long operative times. Hand surgery, with many procedures of less than 1 hour long, falls into one of the exceptions cited by Dexter.[8] For example, if a hand surgeon performed 10 cases per day, the difference in turnover time between all orthopedic staff and nonorthopedic staff would be approximately 96 minutes. This efficiency would possibly allow time for additional cases or could

reduce or redistribute the OR staff earlier in the day, perhaps preventing increased overtime or on-call pay.

Our study demonstrated that having consistent OR staff well versed in orthopedic surgery increased efficiency. We believe this falls in line with other studies such as Stepaniak et al[6] and Attarian et al[4] that demonstrated working with a consistent OR staff lowered turnover time. All orthopedic-specific staff familiar with the practice should perform at a similar level of efficiency, even if rotated through breaks or lunches throughout the day. It also agrees with one of the hindrances identified by Scheriff et al[7] that limitations in staff familiarity with procedures decreases OR efficiency. With the frequency of use of wrist arthroscopy and microscopes, it is also feasible that dedicated orthopedic staff would be more competent with the setup, draping, and maneuvering of these devices to decrease perioperative time, analogous to the results of Lasser et al[5] with dedicated staff in robot-assisted prostatectomy.

In our study, the worst turnover time was not with the combination of nonorthopedic technician and circulator but with an orthopedic surgical technician and a nonorthopedic circulator. The explanation may be that when our group identifies that we have unfamiliar staff, we (attending, resident, or physician assistant) tend to assist in room preparation. We feel the difference between these groups is reflective of additional assistance outside of what we studied.

Our study has several strengths. It evaluated a large contiguous segment of cases performed at one institution with consistent staff. We took care to eliminate confounding variables such as only evaluating single operating suite days and removing obvious prolonged turnover times due to equipment availability issues, level I trauma holds, and so forth. By analyzing less complex operative cases and excluding polytrauma and longer microvascular procedures, the instrumentation required to perform a majority of these surgeries is minimal. We used objectively recorded patient-out and patient-in times, which do not rely on a surgeon's perception and which do not include induction and waking the patient from general anesthesia or time taken to transfer the patient to and from the operating table. Elective outpatient cases were reviewed to eliminate the sometimes-prolonged times while transporting in-patients and preparing them for surgery. Therefore, only patients with stable comorbidities were analyzed. Although not a separate entity, our hospital ambulatory surgical center functions similar to stand-alone entities with its own preoperative holding area and with a consistent anesthesiologist and nurse anesthetist staff. A majority of patients underwent procedures with local anesthesia and light sedation. At our institution, the patient is transported into the room only after the room is completely set up. All turnover times are reflective of actual times to prepare the room for the next case. The possibility of hurrying turnover by opening equipment after the patient is in the operating suite is, therefore, eliminated. Lastly, one surgeon performed all cases. With this information, variables such as differing instrumentation and preferences by multiple surgeons were not factors. The surgeon did not change the quality of care delivered to each patient or typical operative technique in an attempt to increase speed or decrease turnover.

Our study also has several limitations. The retrospective nature of the study did not allow for precise identification of confounding variables such as equipment or anesthesia delay; however, we feel that such variables outside of the surgical team would be present despite orthopedic experience. We eliminated turnovers where there were staff changes, because we could not identify what part each staff member had in turnover responsibilities. Also excluded were add-on cases at the end of the day because the case equipment may not have been readily available or complete. Because our hospital does not employ staff specifically for orthopedics, selection bias in categorizing staff could be present, although categorizing staff by the percentage of cases within a specialty helped to determine frequency and experience in cases.

Our results support the strategy of using orthopedic-specific staff for hand surgery to decrease OR turnover time. Implementing this strategy in a prospective manner in a similar setting with a cost model analysis could validate these results and ascertain its economic benefits.

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SYMPOSIUM: ABJS CARL T. BRIGHTON WORKSHOP ON HEALTH POLICY ISSUES IN ORTHOPAEDIC SURGERY

# The Impact of Disruptive Innovations in Orthopaedics

**Erik Hansen MD, Kevin J. Bozic MD, MBA**

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**Abstract** The US healthcare system is currently facing daunting demographic and economic challenges. Because musculoskeletal disorders and disease represent a substantial and growing portion of this healthcare burden, novel approaches will be needed to continue to provide high-quality, affordable, and accessible orthopaedic care to our population. The concept of "disruptive innovations," which has been studied and popularized by Harvard Business School Professor Clayton Christensen, may offer a potential framework for developing strategies to improve quality and control costs associated with musculoskeletal care. The introduction of mobile fluoroscopic imaging systems, the development of the Surgical Implant Generation Network intramedullary nail for treatment of long bone fractures in the developing world, the expanding role and contributions of physician assistants and nurse practitioners to the orthopaedic team, and the rise of ambulatory surgery centers are all examples of disruptive innovations in the field of orthopaedics. Although numerous cultural and regulatory barriers have limited the widespread adoption of these "disruptive innovations," we believe they represent an opportunity for clinicians to regain leadership in health care while at the same time improving quality and access to care for patients with musculoskeletal disease.

## Introduction

The cost of delivering health care in the United States has become one of the most important public policy issues of the 21st century. The percentage of the US gross domestic product (GDP) that has been consumed by health care has grown from 5% in 1960 to a staggering 16% in 2007 [3]. According to latest projections by the Congressional Budget Office, unless drastic measures are undertaken to control healthcare spending in the United States, total national spending on health care will claim more than 30% of the GDP by 2035 and approximately 50% by 2082 [8]. Although the problem is clearly multifactorial, many health policy analysts have pointed to the adoption of new and advanced healthcare technologies as one of the primary drivers of cost [11]. The United States leads the world in biomedical research, and we have shown we can develop the most sophisticated care to tackle the most complex medical problems. However, our ability to deliver care effectively and efficiently to all who need it is woefully inadequate as evidenced by the high number of un- and underinsured citizens and our low ranking in measures of public health relative to other developed countries [22]. Thus, both the future health and viability of the US economy and its population are intimately related to the thoughtful and responsible adoption of new healthcare technologies.

Given past utilization rates and future demographic trends, the field of orthopaedic surgery can expect to be particularly impacted by this impending economic crisis. According to national healthcare statistics, musculoskeletal

One of the authors (KJB) is a paid consultant for Integrated Health Care Association and Blue Cross Blue Shield Association.

E. Hansen
Department of Orthopaedic Surgery, University of California, San Francisco, CA, USA

K. J. Bozic (✉)
Department of Orthopaedic Surgery and the Philip R. Lee Institute for Health Policy Studies, University of California, 500 Parnassus, MU 320W, San Francisco, CA 94143-0728, USA
e-mail: bozick@orthosurg.ucsf.edu



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disorders and disease are the leading cause of disability and account for more than half of all chronic conditions in people over the age of 50 [26]. During the period 2002 to 2004, over 83 million Americans reported one or more spine conditions, and 42 million Americans reported arthritis and joint pain [19, 26]. This resulted in an increase in ambulatory physician visits for musculoskeletal care from 426 million in 1996 to 1998 to 508 million in 2002 to 2004 as well as a 69% increase in total non-MD ambulatory care visits over that same time period [26]. The economic impact of these trends is substantial. In 2004, the sum of direct and indirect expenditures for the burden of musculoskeletal ailments was $849 billion, or 7.7% of the GDP [26].

Moreover, in the next 20 years, the estimated increase of 35 million North Americans over the age of 55 will further amplify the burden of musculoskeletal disease [5]. Nearly 50% of inpatient procedure volume is driven by individuals over the age of 65, and it is estimated that by the year 2030, close to 20% of the US population will have entered this age cohort [27]. Compounding the demographic trend of an aging baby boomer population, this unique cohort in American history has higher expectations of the healthcare system than any generation before them.

Although the future of the American healthcare system is wrought with both demographic and economic challenges, neither need prove insurmountable. In his research on "Disruptive Innovations" in health care, Harvard Business School Professor Clayton Christensen and his colleagues provide valuable insight into one possible strategy to address this challenging, seemingly intractable problem [7]. This article presents the basic principles of "disruptive innovations," documents their precedence in and relation to the healthcare system, and provides specific examples from the field of orthopaedic surgery. In our concluding remarks, we address the inherent cultural and regulatory barriers to adoption of these "disruptive innovations" and offer some possible strategies to overcome these obstacles.

## Disruptive Innovations

In his book, "The Innovator's Dilemma," Christensen defines disruptive innovations as "cheaper, simpler, more convenient products or services that start by meeting the needs of less-demanding customers" [6]. According to Christensen's research, disruptive innovations arise in every industry. Although the dominant players in a particular market sector focus on improving the functionality of their products or services to meet the needs of the most sophisticated customers at the high end of the market, they often miss the simpler, more convenient, and less costly alternatives initially designed to appeal to the least demanding customers at the low end of the market. Over time, the simpler (frequently technologically inferior) products and services get better and are eventually able to meet the needs of the vast majority of consumers.

Sustaining innovations are those products and services marketed toward consumers at the higher end of the market. To remain leaders in their field, industries invest in research and development to create a progressively more sophisticated product, which is characterized by a steadily increasing trajectory of technologic improvement (Fig. 1, top solid line). There are numerous examples of sustaining innovations in orthopaedics such as alternative hip replacement bearing surfaces, computer-assisted surgical navigation tools, total disk arthroplasty, locking plates, and bone graft substitutes. Although these new technologies represent important developments that may advance the field of orthopaedics, expand the indications for orthopaedic procedures, and improve patient outcomes, they do not necessarily address the needs of the majority of our patients nor do they help address the problems of limited accessibility and affordability of musculoskeletal care.

Consumers' ability to absorb or use the technologic advances of any innovation is finite (Fig. 1, area between the dashed lines). Furthermore, the pace of sustaining innovation nearly always outstrips the ability of consumers to absorb the improvements in functionality. This creates the potential for the introduction of disruptive innovations that start by meeting the needs of the least demanding consumers at the low end of the market (Fig. 1, bottom dashed line). The performance trajectory of these

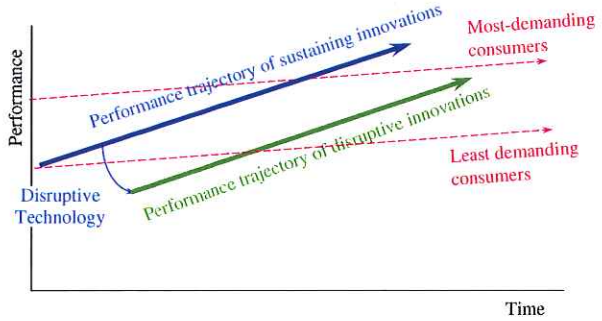


**Fig. 1** The performance trajectory over time of disruptive versus sustaining innovations is shown. The area between the dashed lines outlines the rate of improvement consumers can absorb over time. The pace of sustaining innovation nearly always outstrips the ability of customers to absorb it, thereby creating the potential for the introduction of disruptive innovations. The progress of these disruptive innovations is shown by the bottom solid line. (Reprinted with permission from Christensen CM, Bohmer R, Kenagy J. Will disruptive innovations cure health care? *Harv Bus Rev.* 2000;78:102–112, 199.)



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disruptive innovations has a distinct but similar vector of technologic improvement compared with sustaining innovations (Fig. 1, bottom solid line). Over time, the functionality of these technologies improves, and eventually, they are capable of meeting the needs of the vast majority of consumers.

Christensen goes on to argue that the "phenomenon of overshooting the needs of the average consumer and creating the potential for disruption quite accurately describes the current situation faced by the healthcare industry" [7]. Sustaining innovations such as emerging technologies, specialist physicians, and academic teaching hospitals constantly strive to improve their functionality to address the needs of the sickest, most complex patients with the most demanding healthcare problems. No one would argue that these entities are contributing to the progress in the field of medicine. However, in a world of limited healthcare resources and a nation where the most medically complex patients make up a minority of the population, it could be argued that our focus should be redirected toward identifying and developing disruptive innovations. This could start by addressing the needs of less medically complex patients but over time could be used to facilitate higher-quality, more convenient, more accessible, and less costly care to the majority of healthcare consumers in the United States.

The field of orthopaedics is constantly undergoing rapid development through ongoing basic science and clinical investigation. Currently, the focus of most biomedical researchers and the pharmaceutical, medical device, and biotechnology industries is disproportionately centered on sustaining innovations, because of organizational structures and financial incentives. For these reasons, the impact of disruptive innovations on the future of orthopaedics and the health care of the nation can only be realized with a change in perspective and a reallocation of healthcare dollars.

In the next sections, examples of disruptive innovations in four areas of orthopaedic care delivery illustrate various manners in which they may impact the healthcare system. In "Diagnostics", we focus on the introduction and popularization of the mini-fluoroscan as a means of facilitating and increasing access to real-time imaging. In "Surgical Techniques and Technologies", the Surgical Implant Generation Network (SIGN) intramedullary nail is analyzed as a "low-tech" treatment option to improve the level and access of orthopaedic fracture care in the developing world. The expanding role and contributions of physician assistants (PAs) and nurse practitioners (NPs) to the orthopaedic team is the topic of the discussion on disruptive innovations in "Care Processes." Finally, in "Healthcare Delivery Systems", we analyze the various ways in which institutions have attempted to implement the paradigm of "patient-centered care" by modifying existing programs and care delivery models, focusing specifically on the rise of ambulatory surgery centers.

## Diagnostics: Point-of-service Radiology: the Mini-fluoroscan

Mini-fluoroscans, or mini C-arms, are mobile fluoroscopic imaging systems designed for point-of-service, real-time images that have the potential to increase access and decrease costs in the delivery of high-quality orthopaedic care. They are gaining popularity in operating rooms, emergency departments, and physician offices because of their mobility, simplicity of use, lower cost, and lower-dose radiation compared with their full-size counterparts. Clearly, they do not currently offer the same image quality or functionality that full-scale fluoroscopy units or digital radiography equipment can provide, and they would not be appropriate for use in many complex procedures such as pedicle screw placement or open reduction internal fixation of a long-bone fracture. However, technologic advances have enabled these devices to provide adequate image quality for less complicated interventions such as evaluating the alignment of a distal radius fracture after closed reduction, allowing dynamic evaluation of small joint stability, or assessing the adequacy of reduction and hardware placement in the operative treatment of certain fractures.

As a disruptive innovation, mini-fluoroscans offer the ability to reduce the costs associated with using radiology technicians and radiologists while at the same time increasing the autonomy of the orthopaedic surgeon to obtain and interpret his or her own radiographs. In addition, the ability to obtain real-time images cuts down on the cumulative time and money spent waiting for conventional radiographs to be obtained, processed, and then either printed or uploaded onto a picture archiving and communication system. As the technology reliably improves such as image resolution and cordless foot pedals, it is expected that the indications for use of the mini C-arm will increase.

Currently, there are two types of mini C-arm units available in the United States: the Fluoroscan (Hologic, Inc, Bedford, MA) and the Xitec XiScan (F&M Control, SL, Vitoria, Spain). In a study comparing the mini-fluoroscan with a conventional mobile C-arm on its ability to maintain image quality while (1) delivering the lowest possible radiation exposure to both patient and physician; and (2) minimizing operator effort and inconvenience, the authors of the study rated the mini C-arm as "acceptable" in both categories [10].

Ideally, increased use of mini C-arms could result in improved patient outcomes and increased autonomy of the orthopaedic surgeon while reducing the need for radiology technicians to operate conventional fluoroscopy units, thus



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lowering overhead costs for hospitals and surgery centers. The mini C-arm allows orthopaedic surgeons, emergency department physicians, and nonphysician providers to obtain fluoroscopic images, view the images in real time on a monitor, save and retrieve them later, or have a printout immediately available during the closed management of fractures. With the increased volume of patients presenting to physician offices, urgent care clinics, and emergency departments and the high use of plain radiography, the ability to substitute the use of the mini C-arm for the use of conventional fluoroscopy and digital radiography could lead to reliable cost savings and a decreased burden on the healthcare workforce.

Fluoroscan, a division of Hologic, Inc, illustrates the natural progression of disruptive innovations to a technology sector and specifically within a single company. Within a year of expanding their product line by introducing the Premier mini C-arm to their already established conventional C-arm market, the success of the Premier resulted in the discontinuation of its larger, standard-sized C-arm. Hologic executives attribute the success to the user-friendly interface of the mini C-arm and the advent of a proprietary beam alignment technology called Laser Aiming Device (LAD) [23]. The LAD enables the user to position the desired part of the anatomy in the center of the imaging field when the input surface of the image intensifier is obscured by drapes, arm boards, or other objects present in the operating room. Currently, the company is focusing on improving their product by making the system even easier to use and streamlining system housekeeping functions like image storage and transfer. This example illustrates how a relatively simple technology that was originally inferior in functionality improved over time and was eventually able to meet the needs of most mainstream consumers, thus displacing its higher functionality predecessor (sustaining innovation) for certain indications.

## Surgical Techniques & Technology: SIGN (Surgical Implant Generation Network) System to 'Create Equality of Fracture Care Throughout the World'

The SIGN system was developed in 1999 to address the orthopaedic needs of the developing world and represents a surgical technique and technology as a disruptive innovation. Its founder, Dr Lewis Zirkle, explains the SIGN intramedullary nail was founded to "create equality of fracture care throughout the world" [25]. Rather than incorporating the newest technologic advancements or design modifications to address the needs of the higher end of the fracture care market, the nail was specifically designed to be "low tech," easy to use, and inexpensive to manufacture. Specifically, the SIGN system relies on hand drills and reamers as well as a rigid slotted jig for placement of interlocking screws. This response to the recognized lack of access to fluoroscopy and reliable power instrumentation in many countries in the developing world represents the way in which a disruptive innovation can increase access to treatment. Currently, approximately 40,000 SIGN nail procedures have been performed in over 140 programs in 40 countries [25].

In addition to a surgical technique adapted for a resource-poor healthcare system, the SIGN system itself was developed to be inexpensive to manufacture, highly versatile, and widely available. A set of 100 nails, complete with the instrumentation, is sold for an initial cost of $20,000. The nails themselves can be used for the humerus, tibia, and femur and inserted either in antegrade or retrograde fashion. Furthermore, the philosophy behind the SIGN system is to provide not only equitable, but sustainable fracture care. As such, a replacement nail and the interlocking screws are sent free of charge for each one that is used as long as the treating surgeon systematically reports the details of the clinical case, implants used, and postoperative radiographs on the SIGN web site's surgical database.

There are two published, peer-reviewed journal articles on clinical and radiographic outcomes after treatment with the SIGN nail system. One manuscript reviews the short- to midterm results of the SIGN nail for treatment of open tibia fractures in Kathmandu, Nepal, whereas the other reports on a consecutive series of patients who were treated with SIGN nails for extremity fractures in Nigeria [12, 24]. Both studies report a high degree of clinical success with a low incidence of complications. In Nepal, Shah et al. were able to demonstrate that 86% of (31 of 36) open tibia fractures healed within 6 months with only an 8% infection rate [24]. Similarly, Ikem and colleagues reported a mean time to union of 3 months, no missed interlocking screws, and a low complication rate. In their series of 40 patients, there were two cases of superficial infection, one interlocking screw failure from osteoporotic bone, and two delayed unions [12].

Like all disruptive innovations, the SIGN intramedullary nail system is not a static entity, but rather is evolving into other areas of fracture care. Recently, Dr Zirkle developed a SIGN system for internal fixation of hip fractures that does not rely on power instruments or fluoroscopy, which is called the SIGN hip construct. The first clinical case in which this system was used occurred at Wazir Akbar Khan Hospital in Kabul, Afghanistan, in a patient who sustained an intertrochanteric hip fracture. The translation of the SIGN surgical technique and instrumentation from long bone fractures to hip fractures clearly demonstrates the manner in which the performance trajectory of a disruptive



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innovation can improve over time and begin to meet the needs of more demanding consumers (Fig. 1, solid bottom line).

## Process of Care: Physician Assistants and Nurse Practitioners—Colleagues, Not Competitors

The increased role of physician assistants (PAs) and nurse practitioners (NPs) in orthopaedic surgical practice is an example of healthcare providers as a disruptive innovation, because they are able to help facilitate increased access and lower costs associated with delivering high-quality orthopaedic care. Although the establishment and development of the first formal PA and NP educational programs and professional organizations occurred in the mid-1960s, it was not until the 1980s and 1990s that there was a rapid expansion of PA and NP training programs. At that time, healthcare legislation was revised to reduce barriers to use PA and NP services in a variety of healthcare settings. HMOs recognized the important roles of PAs and NPs in controlling costs, and restrictions on resident duty hours spurred employment and postgraduate learning opportunities in hospital inpatient settings [18]. Twenty-three percent (11,500) of the estimated 50,000 clinically practicing PAs work in surgical specialties or subspecialties, and there are currently 5000 PAs employed in the field of orthopaedics in the United States [1].

Christensen et al. have noted that many of the most potent disruptive innovations in health care achieved success by "enabling a larger population of less-skilled people to do in a more convenient, less costly setting things that historically could be performed only by expensive specialists in centralized, inconvenient locations" [7]. For PAs and NPs in orthopaedics, common responsibilities include taking evening and weekend calls as well as emergency department coverage, performing admission history and physical examinations, first-assisting in the operating room, providing patients with preoperative information and postoperative instructions, and performing dressing and cast changes [13]. Many of these tasks and roles that used to be performed by surgeons are clearly within the capabilities of certified PAs and NPs and for a fraction of the cost. Moreover, according to the Medical Group Management Association (MGMA), PAs and NPs often generate revenue that more than covers their compensation. MGMA collects data annually comparing PA compensation with gross charges. According to 2002 data, for PAs in surgical practices, the employer pays 32 cents for every dollar of charges generated [17]. This cost savings is experienced both at the practice and national level. As of January 1, 1998, Medicare pays PAs 85% of the physician fee schedule, which also holds true for first-assisting during surgery. For a surgical procedure, this translates to approximately 14% of the primary surgeon's fees (ie, 85% of physician first assistant fees, which is 16% of the surgeon's fees) [1].

When an appropriate level of responsibility is bestowed on the PA or NP, quality of care is not sacrificed. In fact, studies of patient satisfaction have shown a high level of satisfaction with care provided by PAs and NPs. In 1994, the Federal Advisory Group on Physician Assistants and the Workforce concluded that published research since the profession began consistently found a high level of patient acceptance. Furthermore, a comprehensive 1995 to 1996 Kaiser study evaluating patient satisfaction with PAs, NPs, certified nurse midwives, and physicians in a managed care setting concluded that "patient satisfaction with interpersonal care appears to depend on communication style and not on type of provider" [21]. With the anticipated changes in demographics in the coming decades, it can be expected that PAs and NPs will play an increasingly important role in the orthopaedic team by assuming a larger share of the nonoperative aspects of the orthopaedic patients' care, thus allowing orthopaedic surgeons to focus on the surgical management of musculoskeletal disease.

## Healthcare Delivery Systems: The Rise of Ambulatory Surgery Centers

Although technological advancements and the expanding role of ancillary staff may contribute to improved access and care, the greatest opportunities to improve the healthcare system as a whole and the care provided to the population is to focus on and modify the healthcare delivery systems currently in place. Recently, there has been increased awareness that the current hospital system in the United States fails the individual patient in many regards as a result of the fragmented provision of care by multiple providers in a myriad of settings. In response to this, there has been an emphasis on patient-centered or patient-focused care as a low-technology solution to the existing problems. Single-specialty hospitals and ambulatory surgery centers (ASCs) have consistently enjoyed high patient volumes and high satisfaction rates, in part because of their ability to deliver focused, efficient, high-quality patient-centered care. In a recently published study, Cram and colleagues reported that even after adjusting for numerous important facility and patient characteristics such as bed size, teaching status, and patient comorbidities, specialty orthopaedic hospitals delivered higher-quality care to orthopaedic patients than their general hospital counterparts [9]. In response to this, general hospitals have had to modify their service lines and implement operational efficiencies in an attempt to compete for orthopaedic



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patients seeking high-quality, convenient, accessible care. As noted by Christensen et al., the basis for competition for many less complicated procedures such as elective orthopaedic surgery has changed to reward reliability, accessibility, convenience, and low cost rather than higher functionality [7].

Ambulatory surgery centers satisfy the criteria for a disruptive innovation in the field of care delivery in that they are a cheaper, simpler, more convenient alternative to hospital operating rooms, and they were initially designed to appeal to the low end of the market. An ASC is a facility that by definition provides surgical treatment that does not require hospitalization. These facilities were initially tailored toward healthier patients requiring minor elective procedures. Orthopaedic subspecialties amenable to ambulatory surgery include arthroscopy, sports-related injuries, hand, some spine as well as foot/ankle procedures, and the list is expanding.

Many of the initial ASCs struggled after their debut in 1972 as a result of inadequate reimbursement and the need to establish themselves in the eyes of investors as a high-quality, profitable investment. After 1982 and the approval of Medicare reimbursement for ASCs, there has been substantial growth in the number of ASCs in the United States. Today there are more than 4000 ASCs throughout the United States compared with 275 in 1980 and 1450 in 1990 [2, 14]. From 1996 to 2003, the number of ASCs increased by 50%, from 2425 to 3646, whereas the number of hospital-based outpatient surgery centers dropped by 16% [20]. One of the primary reasons for the success of ASCs when compared with hospital-based outpatient surgery centers is their profitability. The Pennsylvania Health Cost Containment Council reports that free-standing ASCs have an average net margin of 12%, whereas hospital outpatient surgery centers are on average barely profitable at 2% [20]. These differences in profitability have led to payment reforms that have limited payment for ASCs to 65% of the payment for hospital-based outpatient surgery centers for the same procedures [16]. These types of misguided payment reforms incentivize less efficient care and threaten the future viability of ASCs to deliver high-quality, cost-efficient care.

The literature supports the fact that increased volume and profits have not come at the expense of quality of care. In fact, the American Association for Accreditation of Ambulatory Surgery Facilities, in its ongoing effort to improve patient care, has developed an Internet-based quality improvement and peer review program to analyze outcomes for the surgery centers it accredits. Each surgeon must report all unanticipated sequelae, and at least six random cases are reviewed by an accepted peer review group biannually. In a study conducted over 2 years (2001 to 2002), one unanticipated sequelae occurred in every 299 procedures (incidence of 0.33%), and a death occurred in one in 58,810 procedures (0.0017%), which was comparable whether the procedure was performed in an accredited ambulatory surgery facility or a hospital-based surgical facility [15]. Thus, it appears that ASCs, rather than being static entities, are constantly innovating, streamlining, and incorporating technologic advances in surgical devices, techniques, and anesthesia protocols to expand the conditions for which same-day surgery is safe and appropriate.

## Reasons for Nonadoption: Barriers to Progress

Disruptive innovations in health care, in theory, offer lower cost, more efficient and convenient alternatives while maintaining, if not improving, the quality of care provided to patients. Therefore, it might seem unusual that there would be any resistance to their adoption. Yet as Christensen aptly notes, "healthcare may be the most entrenched, change-averse industry in the United States" [5]. From physicians to hospitals, health plans to implant manufacturers and regulators, it appears many stakeholders in the US healthcare system support the status quo to maintain their positions and profits. Although no one would blame the fact that most healthcare stakeholders feel a keen sense of defensiveness to protect their piece of an ever diminishing pie, without thoughtful, voluntary sacrifice, we risk losing control of how our piece is divided. It is at these crossroads specifically where providers can regain some control of the practice of medicine. The rise of managed care, changes in reimbursement rates from third-party payers, and the diffusion of new technologies to the market have intensified "turf wars" between the different professional guilds of medical practitioners. Disruptive innovations, some would argue, are only stoking the flames, because they allow procedures to be performed more efficiently in a more convenient location by providers who had previously been unable to provide such a service. In orthopaedic surgery, examples of "turf wars" include the ongoing battle with radiologists over the use of in-office diagnostic imaging and conflicts with podiatrists and physical therapists over the scope of their practice. These disputes are provider-centric conflicts that consume valuable resources and energy that could be redirected to enhance the value of care we provide by increasing quality and reducing costs.

Hospitals, by virtue of their size, associated overhead, and their large investments in the latest sustaining technologies, are similarly wary of disruptive innovations, because they may threaten their long-term financial viability. The rise in ASCs and single-specialty hospitals have shown investors and physicians alike that high-quality care



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can be provided with a much higher return on investment when facilities are patient-oriented, care delivery and operations are streamlined, and physicians and personnel are well integrated. Clearly, general hospitals are at a distinct disadvantage when it comes to "competing" for profits with standalone ASCs and single-specialty hospitals, because the burden of the uninsured and underinsured falls squarely on the shoulders of the former and the scope of practice differs greatly between the various healthcare delivery systems. However, comparisons can and should be drawn between the greater operating efficiencies of the ambulatory surgery centers as compared with hospital-based outpatient surgery centers. The margin differentials that exist between these two delivery systems cannot be explained simply by the patient population cared for or services provided. Although it may be true that ASC's are guilty of "cherry picking" patients, an analysis of the systems in place in these facilities may provide valuable lessons to improve the efficiencies of the hospital-based outpatient surgery centers. Unfortunately, it appears many hospitals are ill-equipped to compete in today's flexible, highly competitive healthcare delivery market.

Commercial health plans and other third-party payers, with their strong focus on profit margins, would seem to be an ally of disruptive innovations in that these technologies hold the promise of providing cost savings without sacrificing quality of care. However, commercial payers only reimburse for procedures that have been clinically validated, and many disruptive innovations, by virtue of being recent entrants to the market, do not yet have peer-reviewed research to support their efficacy compared with so-called "gold standard" treatment interventions. By labeling many new potentially disruptive procedures as "investigational," private insurers stifle growth and innovation that could lead to higher-quality, lower-cost care in the long run.

The rise in direct-to-consumer advertising of hip and knee replacement implants, primarily by implant manufacturers, but also by hospitals and surgeons, to gain a more competitive position in the lucrative and expanding arthroplasty market also poses a formidable institutional barrier to the adoption of disruptive innovations. It is the sustaining innovations that currently fuel the research and development of the orthopaedic device manufacturers such as alternative bearings for use in THA, computer-assisted surgical navigation tools, and new suture fixation devices. Although these devices have the potential to improve patient outcomes, they are consistently introduced into the market at a substantial cost premium and before validation of their clinical benefit and cost-effectiveness through well-designed, prospective clinical studies. Patients, as consumers, are shielded from the costs of orthopaedic implants and are often presented with misleading information about the benefits of particular products, which in turn may lead to inappropriate demands for newer, more costly, unproven technologies, strain the physician-patient relationship, and potentially contribute to the rising cost of health care [4].

Regulators, as opposed to physicians, care delivery systems, and third-party payers, have no financial incentive to resist the diffusion of disruptive innovations. Although originally established to protect both the consumer and society from unforeseeable risk as well as enforce the standards established by physicians, regulatory bodies often indirectly curb the diffusion of disruptive innovations by protecting and enforcing the status quo, which happens to be on the side of sustaining innovations. One of the main obstacles to diffusion of disruptive innovations stems from a dearth of published research demonstrating safety and efficacy. The lengthy and cumbersome FDA approval process for investigational devices and the bureaucratically complex HIPAA regulations are two key examples of how regulators indirectly impede the diffusion of disruptive innovations. Additionally, the enforcement of stringent intellectual property laws has the unintended consequence of limiting the introduction of generic drugs and device alternatives.

## Discussion

The US healthcare system is clearly in crisis, and current strategies have proven inadequate. Many healthcare institutions and healthcare technologies have overshot the needs of most patients with nonlife-threatening conditions who require elective surgical treatment such as many orthopaedic patients. As Christensen et al. have noted in their work, the market for simple, elective surgical procedures no longer rewards higher functionality, but rather rewards convenience, accessibility, low cost, and reliability [7].

In this article, we have applied the concept of disruptive innovations popularized by Christensen to the field of orthopaedics to illustrate examples in which simpler, cheaper alternatives have improved access of care, increased patient satisfaction, and empowered clinicians to provide higher-quality, more convenient and efficient care to their patients. Although we chose to focus on the specific examples of disruptive innovations described, there are many other potential examples related to musculoskeletal care delivery, including calcium phosphate cement for the treatment of distal radius fractures in the elderly, musculoskeletal ultrasound, and "medical tourism."

One of the defining characteristics of a disruptive innovation is a performance trajectory that allows it to eventually meet the demands of more sophisticated consumers. Each of our examples has the potential to



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continually evolve, improve, and thereby become "more disruptive" over time. Specifically, the technology underlying the mini-fluoroscans may improve to the point that the image quality achieved is comparable to that of conventional C-arms. Furthermore, although a number of the larger C-arms now are able to create fluoroscopic computed tomography reformats for three-dimensional detail, one could imagine that the mini C-arms may incorporate this feature in the years to come. This would allow for an expansion of current indications such as evaluation of complex, intraarticular fractures by these smaller imaging machines. Additionally, less expensive radiographic printers may be developed to allow for point-of-service printing of formal radiographs, thereby obviating any dependence on the radiology department.

In regard to increasing the role of PAs and NPs, these so-called "midlevel" providers have become an integral part of most orthopaedic practices, functioning as primary care musculoskeletal providers and thus allowing orthopaedic surgeons to focus on the surgical management of musculoskeletal disease.

Similarly, ASCs will continue to grow their market share as surgeons and anesthesiologists collaborate to develop perioperative protocols that allow for more complex procedures to be performed as "same day surgeries" without compromising safety (eg, improving preoperative education, including the proper use of assistive devices, providing appropriate preoperative education to patients and their families, and discharging patients home with indwelling pain catheters).

The sustaining orthopaedic innovations that are repeatedly introduced into the marketplace will continue to benefit our patients and advance the field of orthopaedics. To date, health care in general and the field of orthopaedic surgery in particular has focused a disproportionate share of resources and effort on the problems of a medical minority. To improve the overall health of the nation, efforts and resources should be redirected toward technologies that improve access and tackle issues of affordability to address the needs of the majority. Although it would be naïve to believe all of the ills of the healthcare system could be reversed simply by the development and diffusion of disruptive innovations, not actively attempting to identify and cultivate them will lead us further down our current path toward unsustainable healthcare inflation and an ever increasing gap between the health care we are capable of delivering based on technologic innovation and the health care we are able to deliver based on limited resources. Moreover, the concept of disruptive innovations offers the opportunity for clinicians to regain leadership in health care by working together with other healthcare leaders to deliver higher-quality, more convenient and accessible cost-effective care to our patients.

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RECYCLED

**Harford Hospital**
**Main Campus**
**New Surgeons Joining Medical Staff FY 2013**
**Projected vs. Actual Surgical Volume**

| | SERVICE | Projected Volume FY 2014 InPt | FY 2014 OutPt ** | FY 2014 Total | (Based on 3 months Oct-Dec 2013) Annualized Volume FYTD 2014 InPt | FYTD 2014 OutPt | FYTD 2014 Total |
|---|---|---|---|---|---|---|---|
| * | Vasc Thorac | 75 | 50 | 125 | 216 | 64 | 280 |
| * | Colorectal | 0 | 10 | 10 | 116 | 80 | 196 |
| | Urology | 50 | 66 | 116 | 8 | 8 | 16 |
| | Breast | 40 | 25 | 65 | 16 | 76 | 92 |
| | General | 75 | 50 | 125 | 124 | 136 | 260 |
| * | Oncology | 50 | 50 | 100 | 32 | 68 | 100 |
| | Ophthalmology | 0 | 3 | 3 | 0 | 0 | 0 |
| | GYN | 0 | 50 | 50 | 24 | 16 | 40 |
| * | General | 50 | 50 | 100 | 152 | 36 | 188 |
| * | Vasc Thorac | 50 | 50 | 100 | 116 | 80 | 196 |
| | Vasc Thorac | 50 | 50 | 100 | 36 | 24 | 60 |
| | Orthopedics/Joints | 50 | 50 | 100 | 180 | 0 | 180 |
| | Orthopedics/Joints | 50 | 50 | 100 | 16 | 12 | 28 |
| | Ophthalmology | 0 | 10 | 10 | 0 | 28 | 28 |
| * | Orthopedics/Trauma | 22 | 5 | 27 | 0 | 0 | 0 |
| | General Surgery/Breast | 17 | 50 | 67 | 4 | 88 | 92 |
| * | Orthopedics/Hand | 8 | 42 | 50 | 176 | 56 | 232 |
| * | Orthopedics/Oncology | 12 | 3 | 15 | 12 | 4 | 16 |
| * | Orthopedic/Spine | 20 | 10 | 30 | 80 | 8 | 88 |
| * | General/Breast | 50 | 50 | 100 | 56 | 184 | 240 |
| | Genral/Transplant | 17 | 0 | 17 | 36 | 4 | 40 |
| | Genral/Transplant | 50 | 50 | 100 | 36 | 8 | 44 |
| | OB/GYN | 0 | 0 | 0 | 0 | 0 | 0 |
| | Plastic Surgery | 0 | 0 | 0 | 0 | 0 | 0 |
| | ENT Shift from HH to WHSC | 0 | -169 | -169 | 8 | 128 | 136 |
| | Pain Management | | | 0 | 0 | 0 | 0 |
| | | **736** | **605** | **1341** | **1548** | **1148** | **2696** |

**Projected additional surgical volume:**

| | |
|---|---|
| **Inpatient cases** | **812** |
| **Outpatient cases** | **543** |
| **Total** | **1355** |

* Actively recruited FY 2013

** See page 000445 of CON Application for FY 2014 volume projections related to new surgeons

note- With the addition of 543 outpatient cases, projected utilization of outpatient surgical suites is as follows:

| | FY 2014 | FY 2015 | FY 2016 |
|---|---|---|---|
| **% Utilization** | **79%** | **87%** | **106%** |

## Greer, Leslie

**From:** Lazarus, Steven
**Sent:** Tuesday, February 25, 2014 11:06 AM
**To:** Jennifer Groves Fusco (jfusco@uks.com)
**Cc:** Greer, Leslie
**Subject:** FW: Hartford Surgery Center & CT Surgery Center Objection
**Attachments:** 31851.pdf

Here is the opposition to the petition for Intervenor. Just wanted to make sure you got a copy.

Sincerely,

Steve

*Steven W. Lazarus*
Associate Health Care Analyst
Division of Office of Health Care Access
Connecticut Department of Public Health
410 Capitol Avenue
Hartford, CT 06134
Phone: 860-418-7012
Fax: 860-418-7053

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**From:** Greer, Leslie
**Sent:** Tuesday, February 25, 2014 10:47 AM
**To:** Lazarus, Steven; Riggott, Kaila; Hansted, Kevin; Martone, Kim
**Subject:** Hartford Surgery Center & CT Surgery Center Objection

Attached is an objection for Intervenor Status for Hartford Surgery Center & CT Surgery Center.

*Leslie M. Greer*
CT Department of Public Health
Office of Health Care Access
410 Capitol Avenue, MS#13HCA
Hartford, CT 06134
Phone: (860) 418-7013
Fax: (860) 418-7053
*Website: www.ct.gov/ohca*
Please consider the environment before printing this message

SHIPMAN & GOODWIN LLP®
COUNSELORS AT LAW

Joan W. Feldman
Phone: (860) 251-5104
Fax: (860) 251-5211
jfeldman@goodwin.com

February 25, 2014

VIA HAND DELIVERY

Kevin Hansted, Esq.
Hearing Officer
Department of Public Health
Office of Health Care Access
410 Capitol Avenue, MS #13HCA
P.O. Box 34048
Hartford, Connecticut 06134-0308

**Re: Objection to Hartford Surgery Center, LLC's and Connecticut Surgery Center, Limited Partnership's Petition for Intervenor Status; Docket No. 13-32851-CON**

Dear Attorney Hansted:

By this letter and on behalf of the Applicant in the above-referenced Application, I respectfully: (1) object to Hartford Surgery Center, LLC's ("HSC") and Connecticut Surgery Center, Limited Partnership's ("CSC") petitions for Intervenor Status (the "Petitions"); and (2) disagree with and respond to HSC's and CSC's statements made in said Petitions.

**1. Objection to HSC's and CSC's Petition for Intervenor Status:**

HSC and CSC have failed to demonstrate how its participation at the hearing, as Intervenors, will assist the Office of Health Care Access ("OHCA") in rendering a final decision concerning this Application as required by Section 19a-9-27(b)(4) of the Regulations of Connecticut State Agencies. HSC and CSC have provided OHCA with a series of unsubstantiated, inaccurate, emotional and false statements as a basis for its Petitions, that should not become part of the evidence that OHCA considers to rule on this Application. Accordingly, we believe that a more appropriate avenue for HSC's and CSC's participation is through the public portion of the upcoming hearing at which time OHCA may permit HSC's and CSC's views to be heard.

**2. Applicant's Responses to HSC's and CSC's Statements Made in Petitions:**

The following sets forth the Applicant's specific responses to HSC's and CSC's statements in their Petitions for Intervenor Status:

A. Petitioners Fail to Understand the Applicant's Institute Model.

The Petitioners in their request for Intervenor status state that the Applicant's proposal is duplicative because it, in particular, and as an alternative to the proposed ambulatory surgery center, has significant capacity at its two Hartford facilities (Retreat and Gillett) to absorb the outpatient orthopedic surgical volumes that the Applicant generates. This is a preposterous statement for several reasons. If the Hartford Hospital affiliated orthopedic surgeons desired to perform their outpatient orthopedic surgery at either of HSC'or CSC's ambulatory surgery centers, they would be free to do so. However, they have not chosen to do so simply because such facilities are outdated and ill-equipped to perform orthopedic surgery cases in the type of managed and controlled environment that our affiliated orthopedic surgeons expect and demand. The fact is that the orthopedic surgeons on the medical staff of Hartford Hospital have very high standards for their patients and have chosen to align with Hartford Hospital because they share the same commitment to high quality and the efficient management of the orthopedic surgical pathway. Moreover, since the proposed ambulatory surgery center model will be a laboratory for innovation, research and teaching, the HSC and CSC ambulatory surgery centers are not viable alternatives to the proposed ambulatory surgery center. Thus, HSC and CSC completely fail to recognize that the proposed ambulatory surgery center is an integral component to the Institute and is not simply interchangeable with HSC's or CSC's operating rooms. Accordingly, all of the arguments made by the Petitioners with respect to additional available capacity are inapplicable and without merit.

B. Petitioners Distort the Facts with Respect to the Availability of Utilization Data.

The Petitioners claim that the Applicant failed to provide relevant data regarding the other outpatient operating rooms in the Applicant's primary service area. The Applicant, per OHCA's request, provided utilization data with respect to where 75% of Hartford Hospital's outpatient surgeries originate. See Exhibit 20. The Applicant, in fact, provided all the utilization data that is publicly available with respect to outpatient surgery. It is worth noting that while the Petitioners deride the Applicant for not providing data that is publicly unavailable, it fails in its own petitions to provide any utilization data with respect to its two Hartford ambulatory surgery facilities. Moreover, even if the utilization data had been publicly available to the Applicant (with respect to the number, size and fit-out of operating rooms) and it was relevant, the Applicant still would not have access to information regarding specific operating room utilization. In addition, please note that in Dr. Courtland Lewis' prefiled testimony, the Applicant demonstrates that both the Rocky Hill and Glastonbury ambulatory surgery centers are at capacity even without including the orthopedic related pain cases performed in these two facilities in their utilization statistics. Please see Exhibit 29 of the Application. Finally, the Applicant is not proposing to move any orthopedic cases from any operating rooms other than those owned separately or jointly by Hartford Hospital, Orthopedic Associates of Hartford, P.C. and Constitution Surgery Centers, LLC. Accordingly, as originally stated in the Applicant's Application, nothing that the Applicant is proposing in this Application will adversely impact any other providers.

C. Petititoner Distorts the Facts With Respect to Patient Access and Reimbursement.

The Petitioners claim that the proposed ambulatory surgery center will disadvantage the medically indigent and Medicaid populations. This is completely untrue and baseless. The payer mix that is provided in the Applicant's Application reflects utilization data for both the Hospital and Orthopedic Associates of Hartford, P.C. Furthermore, the proposed ambulatory surgery center, (even though it will not qualify as a tax-exempt entity), requires that the proposed facility operate pursuant to the Hartford Hospital Financial Assistance Policy which undoubtedly, the Petitioners do not follow in that such a policy is only required for tax-exempt entities. Thus, the Applicant submits to OHCA that there would be greater access issues for the medically indigent if they had to utilize the Petitioners' facilities rather than if they used the proposed ambulatory surgery center. Finally, with respect to reimbursement, the Petitioners falsely state that the Applicant was misleading when it stated in its Application that the proposed ambulatory surgery center would result in lower Medicare costs than a hospital-based ambulatory surgery center. This is also completely untrue, but more importantly, such statement underscores the Petitioners failure to recognize the need for hospitals and physicians to align in order to respond to the demands of Health Care Reform by jointly managing the costs associated with the entire orthopedic surgical pathway.

D. Petitioner Acknowledges the Applicant's Need for an Additional Three Outpatient Operating Rooms.

Remarkably, by the Petitioners suggesting that Hartford Hospital, and the Rocky Hill and Glastonbury ambulatory surgery centers each add one additional operating room (for a total of three operating rooms) to absorb the additional volume that the Applicant generates, constitutes an admission by the Petitioners that the Applicant requires at least three additional outpatient operating rooms. We agree that we require at least three additional operating rooms, but for all the reasons stated in our Application, those operating rooms must be imbedded within and operated by the Institute. Moreover, neither the Rocky Hill nor Glastonbury locations would physically allow for expansion of the physical plant on a more cost-effective basis than the proposal.

In summary, the arguments made by Petitioners in their petitions are not factually based, are irrelevant and will only serve as a distraction to OHCA in deciding the issues before it in this proceeding. Therefore, on behalf of the Applicant, I respectfully request that both Petitioners not be granted Intervenor Status and that their testimony be heard at the public portion of the hearing only. In the alternative, if Intervenor Status is granted to the Petitioners, I respectfully request that they not be granted the right to cross-examine the Applicant.

Respectfully Submitted,

Joan Feldman, Esq.

# STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

*Office of Health Care Access*

**IN THE MATTER OF:**

A Certificate of Need Application by
HHC Hartford Surgery Center, LLC
Notice to Petitioner re: Request for Status

Docket Number: 13-31851-CON

**RULING ON A PETITION FILED BY HARTFORD SURGERY CENTER, LLC TO BE DESIGNATED AS AN INTERVENOR WITH FULL PROCEDURAL RIGHTS**

By petition dated February 21, 2014, Hartford Surgery Center, LLC ("Petitioner") requested Intervenor status with full rights of cross-examination in the public hearing to be held by the Department of Public Health ("DPH") Office of Health Care Access ("OHCA") regarding the Certificate of Need ("CON") application of HHC Hartford Surgery Center, LLC ("Applicant") filed under Docket Number: 13-31851-CON.

Pursuant to Connecticut General Statutes § 4-177a, the Petitioner is hereby designated as an Intervenor with full rights of cross-examination at the hearing scheduled for February 28, 2014, 9:00 a.m., at 410 Capitol Avenue, Hartford, Connecticut. As an Intervenor with full rights of cross-examination, the Petitioner is allowed to participate as indicated below.

The Petitioner is granted the right to inspect and copy records on file with OHCA related to the CON filed under Docket Number 13-31851-CON and will be copied on all pleadings, correspondence and filings submitted from this point forward by the Applicant until the issuance of a final decision by OHCA. As an Intervenor with full rights of cross-examination, the Petitioner may be cross-examined by the Applicant and the Petitioner has the right to cross-examine the Applicant.

OHCA will make any additional rulings as to the extent of the hearing participation rights of the Petitioner throughout the hearing in the interest of justice and to promote the orderly conduct of the proceedings.

2/25/14
Date

Kevin T. Hansted
Hearing Officer

# STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

*Office of Health Care Access*

**IN THE MATTER OF:**

A Certificate of Need Application by
HHC Hartford Surgery Center, LLC
Notice to Petitioner re: Request for Status

Docket Number: 13-31851-CON

**RULING ON A PETITION FILED BY CONNECTICUT SURGERY CENTER, LIMITED PARTNERSHIP TO BE DESIGNATED AS AN INTERVENOR WITH FULL PROCEDURAL RIGHTS**

By petition dated February 21, 2014, Connecticut Surgery Center, Limited Partnership ("Petitioner") requested Intervenor status with full rights of cross-examination in the public hearing to be held by the Department of Public Health ("DPH") Office of Health Care Access ("OHCA") regarding the Certificate of Need ("CON") application of HHC Hartford Surgery Center, LLC ("Applicant") filed under Docket Number: 13-31851-CON.

Pursuant to Connecticut General Statutes § 4-177a, the Petitioner is hereby designated as an Intervenor with full rights of cross-examination at the hearing scheduled for February 28, 2014, 9:00 a.m., at 410 Capitol Avenue, Hartford, Connecticut. As an Intervenor with full rights of cross-examination, the Petitioner is allowed to participate as indicated below.

The Petitioner is granted the right to inspect and copy records on file with OHCA related to the CON filed under Docket Number 13-31851-CON and will be copied on all pleadings, correspondence and filings submitted from this point forward by the Applicant until the issuance of a final decision by OHCA. As an Intervenor with full rights of cross-examination, the Petitioner may be cross-examined by the Applicant and the Petitioner has the right to cross-examine the Applicant.

OHCA will make any additional rulings as to the extent of the hearing participation rights of the Petitioner throughout the hearing in the interest of justice and to promote the orderly conduct of the proceedings.

2/25/14
Date

Kevin T. ~~Hansted~~
Hearing Officer

**IN THE MATTER OF:**

A Certificate of Need Application by
HHC Hartford Surgery Center, LLC

Docket Number: 13-31851-CON

**RULING ON APPLICANT'S OBJECTIONS**

On February 25, 2014, HHC Hartford Surgery Center, LLC ("Applicant") filed an Objection to the Petitions of Hartford Surgery Center, LLC and Connecticut Surgery Center, Limited Partnership for Intervenor Status with Full Procedural Rights.

The Applicant's Objection is hereby **OVERRULED**

2/25/14
Date

Kevin T. Hansted
Hearing Officer

* * * COMMUNICATION RESULT REPORT ( FEB. 25. 2014 2:59PM ) * * *

FAX HEADER:

| TRANSMITTED/STORED : FEB. 25. 2014 2:58PM<br>FILE MODE | OPTION | ADDRESS | RESULT | PAGE |
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| 123 MEMORY TX | | 918602515211 | OK | 4/4 |

REASON FOR ERROR
E-1) HANG UP OR LINE FAIL
E-2) BUSY
E-3) NO ANSWER
E-4) NO FACSIMILE CONNECTION

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
***OFFICE OF HEALTH CARE ACCESS***

**FAX SHEET**

**TO:** JOAN FELDMAN

**FAX:** 860-251-5211

**AGENCY:**

**FROM:** STEVEN LAZARUS

**DATE:** 2/25/14 **Time:**

**NUMBER OF PAGES:** 2
*(including transmittal sheet*

**Comments:**

Please see the attached copy of the Rullings in the matter of DN: 13-31851-CON.

***PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.***

***Phone: (860) 418-7001*** ***Fax: (860) 418-7053***

***410 Capitol Ave., MS#13HCA***
***P.O.Box 340308***
***Hartford, CT 06134***

* * * COMMUNICATION RESULT REPORT ( FEB. 25. 2014 3:01PM ) * * *

FAX HEADER:

| TRANSMITTED/STORED : FEB. 25. 2014 2:59PM<br>FILE MODE | OPTION | ADDRESS | RESULT | PAGE |
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REASON FOR ERROR
E-1) HANG UP OR LINE FAIL
E-2) BUSY
E-3) NO ANSWER
E-4) NO FACSIMILE CONNECTION

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
***OFFICE OF HEALTH CARE ACCESS***

**FAX SHEET**

**TO:** JENNIFER GROVES FUSCO

**FAX:** 203-772-2037

**AGENCY:**

**FROM:** STEVEN LAZARUS

**DATE:** 2/25/14 **Time:**

**NUMBER OF PAGES:** 4
*(including transmittal sheet*

**Comments:**

Please see the attached copy of the Rullings in the matter of DN: 13-31851-CON.

***PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.***

***Phone: (860) 418-7001*** ***Fax: (860) 418-7053***

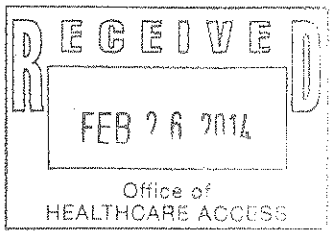
***410 Capitol Ave., MS#13HCA***
***P.O.Box 340308***
***Hartford, CT 06134***

## Greer, Leslie

**From:** Lazarus, Steven
**Sent:** Wednesday, February 26, 2014 12:11 PM
**To:** Olejarz, Barbara; Greer, Leslie
**Cc:** Hansted, Kevin; Martone, Kim; Riggott, Kaila
**Subject:** FW: HHC Surgery Center, LLC - Prefiled Testimony and Objection
**Attachments:** DOC001.PDF

Barbara,

Please place this email into the record as appropriate.




Thank you,

Steven

*Steven W. Lazarus*
Associate Health Care Analyst
Division of Office of Health Care Access
Connecticut Department of Public Health
410 Capitol Avenue
Hartford, CT 06134
Phone: 860-418-7012
Fax: 860-418-7053

---

**From:** Feldman, Joan [mailto:JFeldman@goodwin.com]
**Sent:** Wednesday, February 26, 2014 12:06 PM
**To:** Jennifer Groves Fusco (jfusco@uks.com)
**Cc:** Lazarus, Steven
**Subject:** FW: HHC Surgery Center, LLC - Prefiled Testimony and Objection

Jennifer:
I know that you already have this, but I am sending anyway. You will receive the hard copy in the mail. See your Friday.
Thanks.
Joan

**Shipman & Goodwin** LLP
COUNSELORS AT LAW

**Joan W. Feldman**
Partner
One Constitution Plaza
Hartford, CT 06103-1919

Tel (860) 251-5104
Fax (860) 251-5211
jfeldman@goodwin.com
www.shipmangoodwin.com

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SHIPMAN & GOODWIN LLP®

COUNSELORS AT LAW

Joan W. Feldman, Esq.
Phone: (860) 251-5104
Fax: (860) 251-5211
jfeldman@goodwin.com

COPY

February 26, 2014

**VIA HAND DELIVERY**

Steven W. Lazarus
Associate Health Care Analyst
Division of Office of Health Care Access
Connecticut Department of Public Health
410 Capitol Avenue, MS #13HCA
P.O. Box 34048
Hartford, Connecticut 06134-0308

Re: **IN THE MATTER OF THE ESTABLISHMENT OF AN ORTHOPEDIC AMBULATORY SURGERY CENTER ON THE HARTFORD HOSPITAL CAMPUS**
**DOCKET NO: 13-31851-CON**

Dear Mr. Lazarus:

Enclosed please find our Certification that our Notice of Appearance Form dated February 24, 2014, Pre-Filed Testimony of Jeffrey A. Flaks, Chief Operating Officer of Hartford HealthCare and Courtland G. Lewis, MD, Physician In Chief, Hartford Hospital Bone & Joint Institute along with support exhibits dated February 24, 2014 and our letter dated February 25, 2014 objecting to Hartford Surgery Center, LLC's and Connecticut Surgery Center, Limited Partnership's Petition for Intervenor Status on behalf of the Applicant in the above referenced matter has been sent to Jennifer Groves Fusco, Intervenor's counsel.

If you have any questions, please do not hesitate to contact me.

Sincerely yours,

Joan W. Feldman

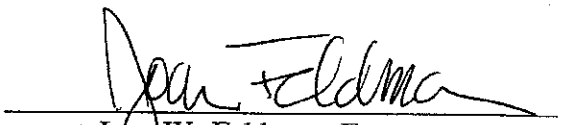
Jwf/tja
Enclosure

000643 02/26/2014)

**CERTIFICATION**

I hereby certify that a copy of the foregoing has been sent via United States mail, postage prepaid, and electronic mail, this 26th day of February, 2015 to the following:

Jennifer Groves Fusco, Esq.
Updike, Kelly & Spellacy, P.C.
One Century Tower
265 Church Street
New Haven, CT 06510



Joan W. Feldman, Esq.
Shipman & Goodwin LLP

MILFORD HOSPITAL

February 21, 2014

RECEIVED
FEB 26 2014
Office of
HEALTHCARE ACCESS

Ms. Kimberly Martone,
Director of Operations, OHCA
410 Capitol Ave., MS# 13HCA
P.O. Box 340308
Hartford, CT 06134-0308

Dear Ms. Martone:

Milford Hospital respectfully requests an extension of time until April 30, 2014 for the following items:

Submission of the electronic FY 2013 Annual Reporting HRS reports plus related support, Audited Financials Statements and the notarized filing affidavit.

Submission of the electronic FY 2013 Twelve Months Actual filing HRS reports plus related support, the Report of Independent Accountants on Applying Agreed-Upon Procedures to Report 600 and the notarized filing affidavit.

The issuance of the Hospital's audited financial statements has been delayed to allow time for additional preparation and review of the audited financial statements. The audit is still in process, with our independent auditors in discussions with Hospital management to work through several complex accounting and auditing issues that may have an impact on the audited financial statements for the year ended September 30, 2013.

In the meantime, please advise if we should complete and submit the annual reporting and twelve-month reports based on internal unaudited numbers.

If you have any questions, please feel free to contact me at 203-876-4231.

Thank you for your consideration of this extension request.

Sincerely,

Laura Smith

Laura Smith
VP of Finance/CFO

300 Seaside Avenue, P.O. Box 3015, Milford, Connecticut 06460-0815 Tel 203 876 4000 Fax 203 876 4198

www.milfordhospital.org

SHIPMAN & GOODWIN LLP
COUNSELORS AT LAW

Joan W. Feldman, Esq.
Phone: (860) 251-5104
Fax: (860) 251-5211
jfeldman@goodwin.com

February 24, 2014

**VIA HAND DELIVERY**

Kimberly Martone
Director of Operations
Department of Public Health
Office of Health Care Access
410 Capitol Avenue, MS #13HCA
P.O. Box 34048
Hartford, Connecticut 06134-0308

Re: **IN THE MATTER OF THE ESTABLISHMENT OF AN ORTHOPEDIC AMBULATORY SURGERY CENTER ON THE HARTFORD HOSPITAL CAMPUS**
**DOCKET NO: 13-31851-CON**

Dear Ms. Martone:

Enclosed please find the Notice of Appearance form regarding the matter referenced above. If you have any questions, please do not hesitate to contact me.

Sincerely yours,

Joan W. Feldman

Jwf/tja
Enclosure

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
**OFFICE OF HEALTH CARE ACCESS**

| | | |
|---|---|---|
| **IN THE MATTER OF THE** | : | **DOCKET NO. 13-31851-CON** |
| **ESTABLISHMENT OF AN ORTHOPEDIC** | : | |
| **AMBULATORY SURGERY CENTER ON** | : | |
| **THE HARTFORD HOSPITAL CAMPUS** | : | **February 24, 2014** |

# NOTICE OF APPEARANCE

Please enter the appearance of Shipman & Goodwin LLP on behalf of the Applicant in the above-referenced matter.

Respectfully Submitted,

HHC Hartford Surgery Center, LLC

By: Joan Feldman

Joan W. Feldman, Esq.
jfeldman@goodwin.com
Of Shipman & Goodwin LLP
One Constitution Plaza
Hartford, CT 06103-1919
Tel: 860-251-5104
Fax: 860-251-5211
Their Attorney

SHIPMAN & GOODWIN LLP®
COUNSELORS AT LAW

Joan W. Feldman, Esq.
Phone: (860) 251-5104
Fax: (860) 251-5211
jfeldman@goodwin.com

February 24, 2014

**VIA HAND DELIVERY**

Kimberly Martone
Director of Operations
Department of Public Health
Office of Health Care Access
410 Capitol Avenue, MS #13HCA
P.O. Box 34048
Hartford, Connecticut 06134-0308

Re: **IN THE MATTER OF THE ESTABLISHMENT OF AN ORTHOPEDIC AMBULATORY SURGERY CENTER ON THE HARTFORD HOSPITAL CAMPUS**
**DOCKET NO: 13-31851-CON**

Dear Ms. Martone:

Enclosed please find an original and five copies of our Pre-Filed Testimony of Jeffrey A. Flaks, Chief Operating Officer of Hartford HealthCare and Courtland G. Lewis, MD, Physician In Chief, Hartford Hospital Bone & Joint Institute along with support exhibits on behalf of the Applicant regarding the matter referenced above. If you have any questions, please do not hesitate to contact me.

Sincerely yours,

Joan W. Feldman

Jwf/tja
Enclosure

000535 (02/24/14)

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
**OFFICE OF HEALTH CARE ACCESS**

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|---|---|---|
| **IN THE MATTER OF THE ESTABLISHMENT OF AN ORTHOPEDIC AMBULATORY SURGERY CENTER ON THE HARTFORD HOSPITAL CAMPUS** | : | **DOCKET NO. 13-31851-CON** |
| | : | |
| | : | |
| | : | **February 24, 2014** |

**PRE-FILED TESTIMONY OF JEFFREY A. FLAKS, CHIEF OPERATING OFFICER OF HARTFORD HEALTHCARE ON BEHALF OF THE APPLICANT**

Accompanying this cover sheet is the pre-filed testimony of Jeffrey A. Flaks on behalf of the Applicant in the above-captioned application.

Respectfully Submitted,

HHC HARTFORD SURGERY CENTER, LLC

By:

Joan W. Feldman, Esq.
jfeldman@goodwin.com
Of Shipman & Goodwin LLP
One Constitution Plaza
Hartford, CT 06103-1919
Tel: 860-251-5104
Fax: 860-251-5211
Its Attorney

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
**OFFICE OF HEALTH CARE ACCESS**

| | | |
|---|---|---|
| **IN THE MATTER OF THE** | **:** | **DOCKET NO. 13-31851-CON** |
| **ESTABLISHMENT OF AN ORTHOPEDIC** | **:** | |
| **AMBULATORY SURGERY CENTER ON** | **:** | |
| **THE HARTFORD HOSPITAL CAMPUS** | **:** | **February 24, 2014** |

**PRE-FILED TESTIMONY OF JEFFREY A. FLAKS, CHIEF OPERATING OFFICER, HARTFORD HEALTHCARE ON BEHALF OF THE APPLICANT**

Good morning, Attorney Hansted and staff of the Office of Health Care Access ("OHCA"). My name is Jeffrey A. Flaks and I am the Chief Operating Officer of Hartford HealthCare, the System Parent of Hartford Hospital (the "Hospital"), and until very recently, the President & Chief Executive Officer of Hartford Hospital. I am very grateful for this opportunity to be here with you today and share with you why the above-referenced Application is so important to the Applicant and the Hospital, and the reasons why we believe the proposed ambulatory surgery center should be approved by OHCA.

## I. Background.

In our Application for the ambulatory surgery center referenced above, we emphasized the following key factors as evidencing the strong need for the proposed single specialty orthopedic ambulatory surgery center:

- The demand for orthopedic surgery is expected to rise dramatically over the next decade.[1] In Connecticut alone, there is a projected 28% increase in outpatient orthopedic surgical cases;[2]

[1] See http://www.advisory.com/Research/Technology-Insights/Expert-Insights/2012/AAOS-2012-Four-imperatives-for-the-future-of-orthopedics.

[2] See http://www.advisory.com/Research/Health-Care-Advisory-Board/Tools/2010/Outpatient-Market-Forecaster

- There has been a 13% growth of outpatient and a 23% growth of inpatient orthopedic surgical cases associated with the Hospital-affiliated orthopedic surgeons in the last 36 months[3];

- The single specialty ambulatory surgery centers dedicated to orthopedics and affiliated with the Hospital are at capacity;

- The Hospital has added over 25 surgeons to its Medical Staff in the last 12 months, resulting in significant increases in its overall outpatient surgical volumes, significantly greater than that which was projected in our Application;[4]

- While demand for outpatient orthopedic ambulatory surgery will increase, we recognize that we must control our costs and be prepared to manage risk for orthopedic surgical procedures. In our Application, we demonstrate that performing orthopedic procedures in an ambulatory surgery setting is 35% less costly than performing the same procedures in the hospital setting. See CON Application at page 0008;

- The Hospital will need to provide greater value with lower revenue streams while at the same time differentiating its services in relation to the newest technologies; and
- The Institute model that I will describe to you will explain why it is so vital to have the proposed ambulatory surgery center physically imbedded within the Institute.

Now, in the context of these demands, the current Hartford HealthCare and Hospital leadership strongly believe that the Hospital must collaborate with its physicians to both co-develop and co-manage the project described herein for the purpose of providing a level of orthopedic services comparable to that being offered by some of the most renowned musculoskeletal centers in the Country (including by way of example, The Hospital for Special Surgery, New York University Hospital, The Cleveland Clinic and the Mayo Clinic).

While the Hospital has been diligently developing its orthopedic service line over the last seven years (e.g. the Hospital has recruited three talented fellowship-trained orthopedic surgeons and established a highly successful orthopedics ambulatory surgery center in

[3] See Dr. Lewis' pre-filed testimony Exhibit 35.
[4] See Dr. Lewis' pre-filed testimony Exhibit 36.

Glastonbury, CT, which is at capacity)[5] it is now, more than ever, convinced that a collaborative, multi-disciplinary and data-driven innovative approach to bone and joint disorders is in the best interests of its patients. In particular, Hartford HealthCare, the Hospital Board, the Hospital's senior management and relevant members of the Hospital's medical staff unequivocally and enthusiastically support a collaborative, integrated and multi-disciplinary approach to bone and joint disorders. Now and without further delay, I will describe to you the musculoskeletal institute, which will be beyond advanced, and will have, at its core, (subject to OHCA's approval) an ambulatory surgery center dedicated to bone and joint disorders.

## II. The Hospital's Plan for a Musculoskeletal Institute.

The health care industry literature is replete with evidence that the demand for orthopedic services will continue to grow for a number of reasons, including innovative techniques, the fact that individuals are living longer (resulting in more revisions) and that there is an obesity epidemic in our Nation.[6] As we discussed in our Application, health care reform is driving the demand for high quality, lower-cost orthopedic services. To achieve this balance and level of accountability, the Hospital must embrace innovative technology in collaboration with its orthopedic surgeons so that we may transform the infrastructure of our current orthopedic service line. To do so, the Hospital is in the planning stages of developing, on its main campus, a musculoskeletal center dedicated to the delivery of comprehensive inpatient and outpatient musculoskeletal services (the "Institute").

---

[5] See utilization data for the first quarter of FY 2014 attached hereto as Exhibit 29.

[6] See Exhibit 30 at page 17 et seq. or http://www.advisory.com/Research/Marketing-and-Planning-Leadership-Council/Studies/2011/Orthopedics-Service-Line-Strategic-Outlook.

The Institute's primary objective will be to enhance the clinical experience of the orthopedic patient. Since musculoskeletal disorders typically involve more than one bodily system, the Institute will take a multi-discipline approach for diagnosis and treatment. The Hospital and its physicians strongly believe that a multi-disciplinary approach to musculoskeletal bone and joint disorders will contribute to better outcomes for the patient and greater operational efficiencies. Accordingly, Institute services will not only include orthopedic services, but will also include services relating to a wide range of bone and joint disorders, such as rheumatology, neurology, oncology, metabolic disorders, pain management, physical and rehabilitative medicine.

In addition, the Institute's services will utilize and incorporate state of the art technology, along with an operational commitment to data-driven innovation, all for the sole purpose of optimizing the patient experience, achieving the highest quality patient outcomes, and delivering high value musculoskeletal services to our payers and patients alike. In essence, the entire Institute and all of its interrelated and interdependent components, including the proposed ambulatory surgery center, will be grounded in certain operating principles and processes that embody a culture of safety, quality and innovation.

In addition, the Institute will commit significant staff and resources to conducting translational research relating to musculoskeletal disorders. With respect to the innovation component, industry experts from the information technology and biomedical engineering industry sectors have eagerly expressed strong interest in conducting orthopedics-related translational research at the Institute. One global industry innovator has already committed to

collaborating with the Hospital in developing data-driven systems focused on efficient patient management and quality improvements in the delivery of orthopedic services.

Additionally, the State of Connecticut recently awarded the Hospital a 15 million dollar grant to support a 30,000 square foot expansion of the Hospital's Center for Education Simulation and Innovation (known as "CESI"). CESI is a world class training facility that allows healthcare professionals to simulate different types of acute care crises and higher technology treatment. In connection with such grant, Governor Malloy stated,

> Hartford Hospital has an important role to play in Connecticut's resurgence in the bioscience and health services sectors. This expansion project is about investing in innovation, research and training-all the things we need to do as a state to stay competitive. While the project will certainly create good paying jobs with good benefits, this state of the art training facility is really about creating a Hartford Hospital that draws the world's top doctors and other healthcare professionals to our Capitol City for years to come.

See http://giving.harthosp.org/state-grant-for-cesi. The combination of CESI and the Institute, including the dedicated academic facilities imbedded within the Institute, will undoubtedly strengthen the Hospital's ability to attract talented physicians who desire residency or fellowship training experience in one of the many graduate medical education disciplines to be offered at the Institute.[7]

Most importantly, all Institute clinical services will be clinically integrated within one central location so that the patient can physically navigate within the Institute with ease and convenience. Essentially, there will be no reason for the patient to leave the premises of the Institute to receive any of their services. This is particularly advantageous for patients who by virtue of their musculoskeletal problems often have moderate to severe mobility limitations. For example, a patient who is seen for an orthopedic consultation, may immediately proceed to

[7] See Exhibit 31 attached hereto for a rendering of the Institute floor plan.

have a scan or undergo diagnostic laboratory tests, proceed to a rheumatology consult, return for infusion therapy, or have inpatient or outpatient surgery, and then return for rehabilitation, all of which will be proximately located in one central location with transportation assistance within the Institute should it be needed. Once again, the objective of a centralized location is to improve the patient experience so that a visit to the Institute neither stresses nor exhausts the patient, especially the elderly and those in pain.

More specifically, the Institute will encompass 135,000 square feet of space dedicated to providing diagnostic, treatment, research and educational services relating to musculoskeletal disorders, including radiology services, laboratory and other diagnostic services, research laboratories, simulation laboratories, motion laboratory teaching space, private inpatient rooms, dedicated inpatient operating rooms, physical medicine and rehabilitation space, medical office space and the proposed outpatient ambulatory surgery center. We attach hereto as Exhibit 32 a rendering of the Institute that was unavailable at the time of our Application submission. As you can see, the physical structure along with the presence of the Institute will contribute most positively to the City of Hartford and its economic development. It is thus, the hope and belief of the Hospital that by demonstrating real and substantial economic investment in the City that it will spur further economic growth in the City of Hartford, not to mention the State of Connecticut.

**III. The Need for the Proposed Dedicated Ambulatory Surgery Center.**

As I previously mentioned, the proposal to establish a three (3) operating room ambulatory surgery center dedicated to orthopedic surgery is an essential and critical component to the overall plan for the Institute. It is also representative of a model that can be

found in some of the leading musculoskeletal centers in our country. In the instant case, the Hospital is proposing that the ambulatory surgery center would have three (3) operating rooms (with shell space for two (2) additional operating rooms) that are purposefully designed to accommodate the needs of our surgeons who are performing the most sophisticated orthopedic surgical procedures, including but not limited to, minimally invasive techniques, joint replacement, hand surgery, trauma surgery, and back and spine surgery.

The imperatives of health care reform necessitate that the Hospital deliver greater value to its patients and payers alike, but at a lower cost. This can only be accomplished by transforming its existing delivery model to one that is well coordinated, efficient and focused on data-driven innovation.[8] In addition, the Institute model is based upon a recognition and commitment by Hartford HealthCare and the Hospital that if they are going to deliver state of the art orthopedic services at a quality and service level that is commensurate with leading musculoskeletal centers (and that which our community so deserves), they must align with their physicians, embrace the relevant research findings, and design surgical environments that are dedicated to orthopedic services. Better yet, we hope that the Institute becomes a destination facility for patients to receive orthopedic services.

Unlike other surgical specialties, we know that orthopedics requires uniquely designed operating rooms for the specialized tools and equipment required by the surgeons, including arthroscopic equipment, radioscopic visualization, boom-mounted systems for ease of movement and computerized monitoring. Generally, much of the surgical equipment is best used when it is attached to ceiling-mounted arms that can be adjusted to reach anywhere the

[8] Moreover, we fully expect to assume the financial risk for managing a patient's orthopedic surgery. Being able to care for a patient in an environment that is well managed will contribute to our overall success.

surgeon needs it to be situated (also making it easier to clean the rooms and reduce clutter). Our existing Hospital operating rooms do not afford us this type of space, nor can we take off line our existing ambulatory surgical space and exclusively dedicate it to orthopedics because of all our other competing demands as described in our Application and more particularly described in Dr. Lewis' pre-filed testimony.

Hospitals are increasingly employing operating rooms dedicated exclusively to orthopedics because they have proven to have a positive impact on patient throughput and thus, hospital revenues. As discussed in a recent study published in *The Journal of Arthroplasty*, all hospitals must find innovative ways to improve efficiency without compromising patient quality and safety. With dedicated orthopedic operating rooms and dedicated and experienced orthopedic staff, the hospital could more effectively manage operating room utilization, reduce down time and ultimately, improve the bottom line by allowing the Hospital to perform more surgeries.

> Process redesign in large teaching hospitals may substantially improve operational performance without compromising patient safety. These data demonstrate that using staff members familiar with orthopedic equipment and procedural needs can decrease operative time by an average of 19 minutes per operation, which extrapolates to a total average savings of just over 1.25 hours for a surgeon who performs 4 primary arthroplasty procedures per day. Unlike previous studies which have required additional staff to decrease both operative and non-operative times..., our study maintained the same amount of staff for each unit....The dedicated OR system significantly decreased operative time, anesthesia controlled time, and turnover time for TKA [total knee replacement] and THA [total hip replacement] procedures, without increasing complication rates.

See Exhibit 33 at page 1070 attached hereto for "Dedicated Orthopedic Operating Room Unit Improves Operating Room Efficiency", *The Journal of Arthroplasty*, 28 (2013) 1066-1071.e2.

We also know from our very own experience in our orthopedics dedicated ambulatory surgery center in Glastonbury that turnover time is less than it is in our Hospital operated general use ambulatory surgery centers. We believe the reason for this greater efficiency is

due to a unified dynamic team approach wherein the clinicians and staff are able to anticipate each other's needs in a seamless manner. Therefore, it is well established that by having our orthopedic operating room suites established and ready to go (without having to roll in equipment from other operating rooms), we can greatly improve turnover time between cases.

In a recent study examining the efficiency of a dedicated staff on operating room turnover time in hand surgery, the researchers found that dedicated staff made a measurable difference in operating room turnover time.

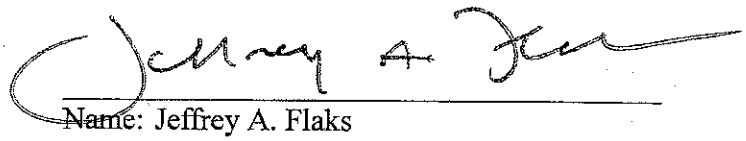
> Our study demonstrated that having consistent OR staff well versed in orthopedic surgery increased efficiency....With the frequency of use of wrist arthroscopy and microscopes, it is also feasible that dedicated orthopedic staff would be more competent with the setup, draping, and maneuvering of these devices to decrease perioperative time....Our results support the strategy of using orthopedic-specific staff for hand surgery to decrease OR turnover time.

One significant benefit to reducing turnover time and having more availability for orthopedic cases is that we can dedicate some of the outpatient operating room time to urgent trauma cases so those cases can be done without the delay that you have when you do not have dedicated space. See Exhibit 34 at page 110 attached hereto for "The Efficiency of a Dedicated Staff on Operating Room Turnover Time in Hand Surgery", *Scientific Article* (2014) ASSH.

Of course, the biggest beneficiary of greater operating room efficiencies will be the patient. A dedicated orthopedic ambulatory surgery center means shorter wait times for patients needing orthopedic surgery. It is our goal that once patients are informed that they require a surgical procedure that they will be scheduled with minimal wait time. If you are in pain or your mobility is limited, a shorter wait time makes a world of difference to the patient and their period of disability.

In summary, given the demands related to Health Care Reform, the Hospital fully understands that it must engage its physicians to embrace and prepare for present and future demands relating to high quality and low cost in the delivery of orthopedic services. While there are competing providers that may view this proposal as a threat to them, the real threat is if this proposal is denied and the community is deprived of access, innovation and higher value musculoskeletal services. We hope that you are equally convinced that the proposed ambulatory surgery center is an essential and critical component of the plan for the Institute as described herein.

I adopt the foregoing pre-filed testimony as my own.



Name: Jeffrey A. Flaks
Title: Chief Operating Officer
Hartford HealthCare

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**

**OFFICE OF HEALTH CARE ACCESS**

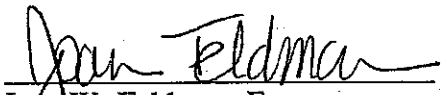
| | | |
|---|---|---|
| **IN THE MATTER OF THE** | : | **DOCKET NO. 13-31851-CON** |
| **ESTABLISHMENT OF AN ORTHOPEDIC** | : | |
| **AMBULATORY SURGERY CENTER ON** | : | |
| **THE HARTFORD HOSPITAL CAMPUS** | : | **February 24, 2014** |

**PRE-FILED TESTIMONY OF COURTLAND G. LEWIS, MD, PHYSICIAN IN CHIEF, HARTFORD HOSPITAL BONE & JOINT INSTITUTE ON BEHALF OF THE APPLICANT**

Accompanying this cover sheet is the pre-filed testimony of Courtland G. Lewis, M.D. on behalf of the Applicant in the above-captioned application.

Respectfully Submitted,

HHC HARTFORD SURGERY CENTER, LLC

By: 

Joan W. Feldman, Esq.
jfeldman@goodwin.com
Of Shipman & Goodwin LLP
One Constitution Plaza
Hartford, CT 06103-1919
Tel: 860-251-5104
Fax: 860-251-5211
Its Attorney

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
**OFFICE OF HEALTH CARE ACCESS**

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**PRE-FILED TESTIMONY OF COURTLAND G. LEWIS, M.D., PHYSICIAN IN CHIEF, HARTFORD HOSPITAL BONE & JOINT INSTITUTE ON BEHALF OF THE APPLICANT**

Good morning, Attorney Hansted and staff of the Office of Health Care Access ("OHCA"). My name is Courtland G. Lewis, M.D. and I am the Physician in Chief of the Hartford Hospital Bone & Joint Institute (the "Institute) and a member of Orthopedic Associates of Hartford, P.C. I am very grateful for this opportunity to be here with you today and share with you why the above-referenced Application is so important to both the Applicant and Hartford Hospital (the "Hospital"), and the reasons why I believe the proposed ambulatory surgery center should be approved by OHCA.

## I. Health Reform.

I understand that OHCA is very well informed with respect to the impact that health care reform is having on the entire health care industry. Notwithstanding, I would very much appreciate the opportunity, if OHCA would so indulge me, to provide my perspective, as an orthopedic surgeon and Physician in Chief of the Institute, on the

specific impact that health care reform is having and will continue to have on the delivery of orthopedic services.

Muskuloskeletal disorders are the leading cause of adult disability and account for more than half of all chronic conditions for individuals over the age of 50. As the number of individuals over the age of 50 grows and the obesity epidemic persists, the demand for orthopedic services will also grow. See Exhibit 35 at page 2513 attached hereto for "The Impact of Disruptive Innovations in Orthopaedics", *Symposium: AJBS Carl T. Brighton Workshop on Health Policy Issues in Orthopaedic Surgery*, (2009) 467:2512-2520. Given both the actual and projected demand for orthopedic services, and the fact that orthopedic services will represent a large percentage of the health care dollar expenditures, orthopedic service providers must embrace new and innovative orthopedic service delivery models to lower costs and improve quality.

In particular, there are several driving forces that directly impact the need for providers of orthopedic services to transform their service delivery model to remain relevant and deliver what is viewed by both patients and payers alike as high quality and lower cost orthopedic services. First, whether reimbursement for orthopedic services is based upon a fee-for-service model, or other risk-based models (e.g., bundled payments, shared savings or population-health management models), hospitals and physicians will need to redesign their care delivery models to be capable of managing their costs without compromising patient safety or quality. Given the economic challenges on orthopedic service providers, (including but not limited to greater risk on longer-term outcomes, e.g., limits on total costs and readmission penalties), the Hospital and its orthopedic

surgeons have chosen to align so they can coordinate and standardize their care in order to avoid unnecessary costs and provide a higher level of service. See Exhibit 30 at page 16 attached hereto.

Specifically, the Applicant believes that the Hospital and its physicians must have a coordinated and collaborative approach throughout the orthopedic patient's surgical pathway, including pre-operative care, consultations, pain management and rehabilitation in order to reduce complications, lower costs and improve overall quality. Simply put, the traditional silo approach to the delivery of orthopedic patient care services must become a thing of the past.

Second, since new technological advances in orthopedics are constantly being developed, decisions regarding technological investment will need to be planned and coordinated in order to obtain adequate profit margins and ensure overall financial stability. The Institute model, (as described to you by Mr. Flaks in his testimony), will require that purchase decisions relating to technological innovations be made jointly by the Hospital and its physicians so that they can collectively evaluate the incremental value of new technology and appropriately balance patient access to such technology without jeopardizing the bottom line.

> ...[B]oth the future health and viability of the U.S. economy and its population are intimately related to the thoughtful and responsible adoption of new healthcare technologies.

See Exhibit 35 at page 2512 attached hereto. The Proposal in the instant case, which involves the Hospital and its orthopedic surgeons aligning to operate the Institute, (and jointly owning the ambulatory surgery center), is a model that the Applicant strongly

believes will result in the most responsible and judicious decision-making with respect to the purchase of premium technology and the overall management of the Institute, and in particular, the proposed ambulatory surgery center.

## II. Why the Proposed Ambulatory Surgery Center Is Needed and Critical to the Institute's Success.

While the Applicant is not before OHCA to request approval for the Institute model, it is important that the Applicant adequately describe the Institute model so that OHCA can more fully appreciate the role that the proposed ambulatory surgery center will have with respect to the overall success of the Institute. The Institute will be operated as a separate division within the Hospital, and as such, will be accountable for its own clinical and operational outcomes.[1] Specifically, it will have its own dedicated staff and its own standardized processes and procedures for the clinical care and operations related to the delivery of orthopedic services. In addition, all services and components within the Institute (including the proposed ambulatory surgery center) will be data driven to support and direct current and future operations, and ideally, predict where the Institute needs to be in terms of advancing its orthopedic services care delivery model.

Most importantly and integral to the Institute's success, will be a purposeful change in the culture and the processes relating to each episode of care. By having maximum control over the operational and clinical environment within the Institute, the Hospital and its physicians will be able to utilize, for example, Six Lean Sigma principles

[1] While the proposed ambulatory surgery center will operate as a separate cost center within the Institute, all of the Institute's operational policies and procedures will apply to the proposed ambulatory surgery center.

and other performance improvement strategies to improve its performance capability, implement reliable improvement systems, focus on utilization of resources, focus on quality improvement and safety, and most importantly, enhance patient satisfaction.[2]

With respect to the Institute's ability to deliver high quality, accessible and lower cost orthopedic services, the proposed ambulatory surgery center will play a critical role in such capability and success. There is already ample evidence that many orthopedic procedures can be provided to patients more cost-effectively when provided in an ambulatory surgical setting (versus inpatient setting) without sacrificing safety, quality, or patient satisfaction. See Exhibit 35 at page 2516. Specifically, as the Institute continues to innovate with respect to the most cost-effective and safest processes for the delivery of orthopedic services, it is expected and planned that the proposed ambulatory surgery center will become the clinical focal point for many more surgical procedures than that which are currently being performed in an inpatient setting.

> ...[t]he greatest opportunities to improve the healthcare system as a whole and the care provided to the population is to focus on and modify the healthcare delivery systems currently in place. Recently, there has been increased awareness that the current hospital system in the United States fails the individual patient in many regards as a result of the fragmented provision of care by multiple providers in a myriad of settings. In response to this, there has been an emphasis on patient-centered or patient-focused care as a low-technology solution to the existing problems. Single-specialty hospitals and ambulatory surgery centers...have consistently enjoyed high patient volumes and high patient satisfaction rates, in part because of their ability to deliver focused, efficient, high-quality patient-centered care.

[2] The Hospital has already hired an experienced industrial engineer to be a full-time staff member of the Institute to implement the application of the Six Lean Sigma principles.

See Exhibit 35 at page 2516-2519 attached hereto. In sum, the Institute's operational and clinical objectives will be entirely focused on employing evidence-based innovative strategies to provide orthopedic services to a greater number of patients, at a lower cost and with better patient outcomes. The Applicant firmly believes that the proposed single-specialty ambulatory surgery center, imbedded within the Institute, is the only way to successfully conduct its research, innovation and achieve the desired results as previously described.

If you refer to the schematic drawing depicting the Institute's proposed ambulatory surgery center floor plan, you will see that the proposed ambulatory surgical center is located near the inpatient operating rooms. See Exhibit 31 attached hereto. This floor plan was intentionally designed this way so that the proposed ambulatory surgery center is proximate to the inpatient operating rooms in order to safely evaluate the performance of new procedures (that have historically been performed in an inpatient operating room setting) in the lower cost ambulatory surgical setting. Therefore and by way of example, if the Applicant were to perform a procedure for the first time in the proposed ambulatory surgery center, the clinicians would have immediate access to the Institute's inpatient operating rooms and its staff should they require the additional resources and the backup support of the inpatient operating rooms.

> ...[i]t appears that ASCs, rather than being static entities, are constantly innovating, streamlining, and incorporating technologic advances in surgical devices, techniques, and anesthesia protocols to expand the conditions for which same-day surgery is safe and appropriate.

See Exhibit 35 at page 2517 attached hereto.

Moreover, in order to manage the proposed outpatient ambulatory surgical center, it must be on the same campus and integrated within the walls of the Institute. Each of the service components offered by the Institute will be interrelated and in many instances, operationally co-dependent. The Applicant strongly believes that if all of the direct and indirect staff members of the proposed ambulatory surgery center are not Institute staff, and or the processes not tightly managed and standardized by the Institute, the overall success of the Institute and the proposed ambulatory surgery center will be significantly compromised.

Finally, with respect to the demand and the need for this proposed ambulatory surgery center, the Applicant has indicated in its Application that both the ambulatory surgery centers in Glastonbury and Rocky Hill are at full capacity. See Exhibit 29 attached hereto. Therefore, the Applicant strongly believes that the utilization statistics more than

[Rest of page left intentionally blank]

supports an additional single specialty ambulatory surgery center dedicated to orthopedics. Moreover, if you refer to Exhibit 36 attached hereto it is amply clear that the volumes that we projected for outpatient surgeries in our Application for fiscal year 2014 are significantly understated based upon actual experience to date. Therefore, based upon this new data, there is absolutely no question that any existing capacity that the Hospital has in its operating rooms will be in great demand based upon the volumes associated with the new surgeons who have recently joined the Hospital. See Exhibit 36 attached hereto.

For all the foregoing reasons, respectfully request that OHCA approve the proposed ambulatory surgery center and should you have any questions, I would be most pleased to try to answer them.

I adopt the foregoing pre-filed testimony as my own.

Name: Courtland G. Lewis, M.D.
Title: Physician In Chief
Hartford Hospital Bone & Joint Institute

**Glastonbury Surgery Center**
**Operating Room Utilization**
**FY 2010 through FY2013**

**Cases and Operating Rooms - Glastonbury ASC (4 ORs)**
**Surgical Cases**

| | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|
| Total Orthopedic Surgery | 607 | 2,081 | 3,011 | 3,260 |
| | | | | |
| Minutes of Surgery / Cleanup | 54,630 | 187,290 | 270,990 | 293,400 |
| OR Need Calculated | 0.57 | 1.95 | 2.82 | 3.06 |
| Number of ORs Required | 1 | 2 | 3 | 4 |

OHCA Facility Plan Guidelines
Unless otherwise supported by documentation from Applicant:

Capacity of the proposed facility will be based on 8 hours per day, 5 days per week for a total of 2,000 hours per year

Optimal utilization of an OR = 80%
Average time per case = 60 minutes
Cleanup time = 30 minutes per case

Optimal OR utilization in minutes = 96000 minutes per OR

**Additional OR time utilized by Pain Cases**

**Cases and Operating Rooms - Glastonbury ASC (4 ORs)**
**Pain cases**

| | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|
| Pain Cases | - | - | - | 562 |
| | | | | |
| Minutes of Surgery / Cleanup | - | - | - | 16,860 |
| OR Need Calculated | 0.00 | 0.00 | 0.00 | 0.18 |
| Number of ORs Required | 0 | 0 | 0 | 1 |

OHCA Facility Plan Guidelines
Unless otherwise supported by documentation from Applicant:

Capacity of the proposed facility will be based on 8 hours per day, 5 days per week for a total of 2,000 hours per year

Optimal utilization of an OR = 80%
Average time per case = 15 minutes
Cleanup time = 15 minutes per case

Optimal OR utilization in minutes = 96000 minutes per OR

**OASC Rocky Hill ASC**
**Operating Room Utilization**
**FY 2010 through FY2013**

**Cases and Operating Rooms - OASC Rocky Hill ASC (4 ORs)**
**Surgical Cases**

| | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|
| Total Orthopedic Surgery | 4,716 | 4,585 | 4,570 | 3,662 |
| | | | | |
| Minutes of Surgery / Cleanup | 424,440 | 412,650 | 411,300 | 329,580 |
| OR Need Calculated | 4.42 | 4.30 | 4.28 | 3.43 |
| Number of ORs Required | 5 | 5 | 5 | 4 |

OHCA Facility Plan Guidelines
Unless otherwise supported by documentation from Applicant:

Capacity of the proposed facility will be based on 8 hours per day, 5 days per week for a total of 2,000 hours per year

Optimal utilization of an OR = 80%
Average time per case = 60 minutes
Cleanup time = 30 minutes per case

Optimal OR utilization in minutes = 96000 minutes per OR

**Additional OR time utilized by Pain Cases**

**Cases and Operating Rooms - OASC Rocky Hill ASC (4 ORs)**
**Pain cases**

| | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|
| Pain Cases | 2,213 | 3,253 | 3,214 | 3,955 |
| | | | | |
| Minutes of Surgery / Cleanup | 66,390 | 97,590 | 96,420 | 118,650 |
| OR Need Calculated | 0.69 | 1.02 | 1.00 | 1.24 |
| Number of ORs Required | 1 | 2 | 2 | 2 |

OHCA Facility Plan Guidelines
Unless otherwise supported by documentation from Applicant:

Capacity of the proposed facility will be based on 8 hours per day, 5 days per week for a total of 2,000 hours per year

Optimal utilization of an OR = 80%
Average time per case = 15 minutes
Cleanup time = 15 minutes per case

Optimal OR utilization in minutes = 96000 minutes per OR

The Advisory Board Company | Marketing and Planning Leadership Council

# Orthopedics: Service Line Strategic Outlook

- State of the Service Line
- Growth & Marketing
- Innovation & Technology
- Reform & Care Redesign

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# Marketing and Planning Leadership Council


**Project Director**
Patricia Wynn

**Contributing Consultant**
Leah Reidy

**Design Consultant**
Matt Starchek

**Managing Director**
Shay Pratt



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# Available Within Your Marketing and Planning Leadership Council Membership

Over the past several years, the Marketing and Planning Leadership Council has developed numerous resources to assist program leaders in securing long-term growth. The most relevant resources are outlined on the right. All of these resources are available in unlimited quantities through the Marketing and Planning Leadership Council membership.

## *Strategic Guidance for Service Line Planning*

**Transforming Service Lines for Risk-Based Payment**
*Executive Briefing for Planners and Strategists*

- Service Line Infrastructure
- Patient Centered Care Processes
- Value-Based Technology Purchasing
- Marketing for Upstream Volumes

**Service Line Transformation Blog**
*Weekly Insights and Case Profiles for Informing Service Line Growth Strategy*

- Service Line Organization and Infrastructure
- Chronic Care Strategy
- Service Line Physician Strategy
- Next-Generation Service Line Marketing

**To Access via Advisory.com**

To access these and other Marketing and Planning Leadership Council publications and research, please visit our website: www.advisory.com/mplc

## *Tactics and Best Practices for Service Line Marketing*

**Advancing Physician Outreach Programs**
*Key Considerations for Program Structure and Effectiveness*

- Driving Outreach with Physician Data
- Aligning Outreach with Performance Management Principles
- Value-Based Technology Purchasing
- Perfecting Physician-to-Physician Outreach

**Marketing Prioritization Toolkit**

The Marketing Prioritization Toolkit provides a quantitative and qualitative framework for evaluating the impact of multiple proposed campaigns. Particularly helpful for evaluating service line-specific campaigns, the tool provides a matrix plotting campaigns relative to each other based on marketability, cost, and fulfillment of user-defined objectives.

**To Access Data and Analytic Tools**

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# Beyond the Marketing and Planning Leadership Council: Crimson Market Advantage

In addition to the resources available through the **Marketing and Planning Leadership Council**, The Advisory Board Company offers the **Crimson Market Advantage**.

**Crimson Market Advantage** provides total physician-specific market volume and referral network visibility to help hospitals and health systems drive physician-based growth. This novel, unparalleled visibility into physician performance and referral patterns is available for both inpatient and outpatient settings, as well as for unaligned physicians in your market.

**Contact Us**

For additional information on **Crimson Market Advantage** please visit our website: www.advisory.com or email us at Beyond@advisory.com

## *Drive Referral-Based Growth Through Physician Analytics*

### A High Stakes (and Frustrating) Challenge

Despite surging interest in managing physician referrals, hospitals and health systems are unable to answer these critical questions:

- Are we capturing both the quantity and quality of referrals from our market?
- How can I segment the referring physician community to discover leakages or missed growth opportunities?
- What is the best approach to redirect these referrals to my organization?
- How do we track progress and document ROI for our business development and physician marketing efforts?

### An Innovative Solution

By leveraging hospital and exciting new third-party data, our proprietary methodology provides unprecedented insight into these strategic priorities:

- Capture both the quantity and quality of referrals .
- Segment the referring physician community to discover leakages or missed growth opportunities
- Utilize best practice strategy in physician outreach.
- Track progress and document ROI of business development and physician marketing efforts

## *Expand Your Physician Referral Network*

Working with members of our founding cohort, we are confirming that this visibility represents a breakthrough in identifying growth opportunities, targeting physician outreach, and informing physician alignment efforts.

- On average, a hospitals referral network is up to 30% larger than currently recognized.
- Members using our approach are surfacing up to four times greater referral leakages, translating into millions of dollars in revenue opportunity.

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# Orthopedics: Service Line Strategic Outlook

The purpose of this publication is to provide hospital and health system strategists, planners, marketers, orthopedic specialists, and service line leaders a detailed analysis of the near-term forecast for orthopedic services, with a particular focus on growth strategy, technology adoption, and accountable care implications. Organizations are encouraged to use the questions on the right to guide conversations for service line planning and growth strategy.

Members may also access Marketing and Planning Leadership Council experts for real-time planning and growth strategy discussions. To do so, please contact your Advisory Board account manager or Shay Pratt, Managing Director, at pratts@advisory.com.

## *Key Questions for Orthopedics Service Line Planning*

### I

**State of the Service Line**

- What is orthopedics' contribution to the hospital?
- Which product lines are the greatest contributors?
- What are the recent growth and reimbursement trends?
- What are the most important issues facing the service line?

### II

**Growth & Marketing**

- What is the competitive landscape for orthopedics?
- What are the drivers and barriers of profitable growth?
- How are hospitals aligning with physicians to achieve growth?
- How should programs organize and market themselves?

### III

**Innovation & Technology**

- What are the disruptive technologies in orthopedics?
- Will any technologies drastically shift the site-of-service, volumes or finances of the service line?
- How can programs use innovation to grow volumes?

### IV

**Reform & Care Redesign**

- Which payment reforms affect the orthopedic service line?
- How should the orthopedic service line evolve to assume quality, cost, and utilization risk?
- How are organizations re-designing care to prosper under both fee-for-service and accountable payment models?

Source: Marketing and Planning Leadership Council interviews and analysis.

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# Executive Summary

**State of the Service Line**

Long a pillar of growth and profitability for hospitals and health systems, the orthopedics service line provided attractive per-case economics and close to $25 billion in inpatient and outpatient contribution profits in 2010. While the economic downturn has softened volume growth for many programs, both inpatient and outpatient orthopedics services are expected to grow respectably through 2015, driven by an aging population, growth in revisions, and intensifying market competition.

However, the rate of profitable volume growth is increasingly challenged in recent years by several trends, including margin-eroding high-cost innovations, outmigration to ambulatory surgery, and increasing payer scrutiny of procedure appropriateness. In addition, in the wake of the Patient Protection and Affordable Care Act (PPACA) of 2010, hospitals will increasingly be held accountable for delivering high-quality, low-cost orthopedics care. As a result, institutions will need to address three key competencies: developing a focused growth and marketing strategy, crafting adoption principles for premium technology, and transforming the orthopedics service line infrastructure to succeed under increased performance risk.

**Growth & Marketing**

Three major factors will continue to drive absolute volume growth for the service line. First, baby boomers are now approaching the optimal age for joint replacement. Second, rising obesity rates place pressure on joints, increasing the need for earlier interventions. Finally, the robust growth across the past 10 years in both joint replacements and sports medicine services will set the stage for repeat procedures in the decade ahead. However, before aggressively pursuing volume growth in any service area, institutions must first assess their own profitability, given the variability of per-procedure costs across the country. To do so, organizations will need to align with high-value specialists who demonstrate consistent and efficient inpatient care. Hospitals must then communicate their high-quality, patient-centered, comprehensive service offering to the marketplace, not only continuing to develop relationships with key referring physicians, but also marketing orthopedics directly to consumers through a diverse set of communications channels.

**Innovation & Technology**

Across the last decade, orthopedics programs have been hit with a barrage of new implants for spine, joint replacement and trauma procedures. As new product introductions are not often met with a commensurate increase in reimbursement, programs must assess premium technology investments to ensure procedural margins. In particular, orthopedic specialists, planners, and service line leaders must evaluate the purported incremental quality benefits of new technologies, along with their potential to expand markets for key demographics.

**Reform & Care Redesign**

The PPACA introduces a number of risk-based payment experiments, such as bundled payments and shared savings, that increase performance risk for hospital-based orthopedics. As payment reforms place increased risk on longer term outcomes and per capita costs, institutions may need to extend the purview of the service line across a broader care continuum. This means standardizing the approach to consultation, pre-operative education and pain management, as well as rehabilitation and discharge. Value-based purchasing, bundled payments, and readmissions penalties will all require institutions to optimize the pathway for orthopedic surgery in an effort to reduce complications and costs and improve quality and efficiency.

**Editor's Note on Spine Procedures:** The orthopedics service line is typically defined to include joint replacements, sports medicine, hand and foot procedures, and orthopedic trauma. Although some organizations consider spine procedures within the orthopedics purview, the majority of hospitals organize spine services in the neurosciences service line. As such, the Marketing and Planning Leadership Council will provide a more detailed analysis of growth strategy for spine services in a forthcoming publication on the outlook for neurosciences, to be published in December 2011.

Marketing and Planning Leadership Council
September 2011

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# State of the Service Line

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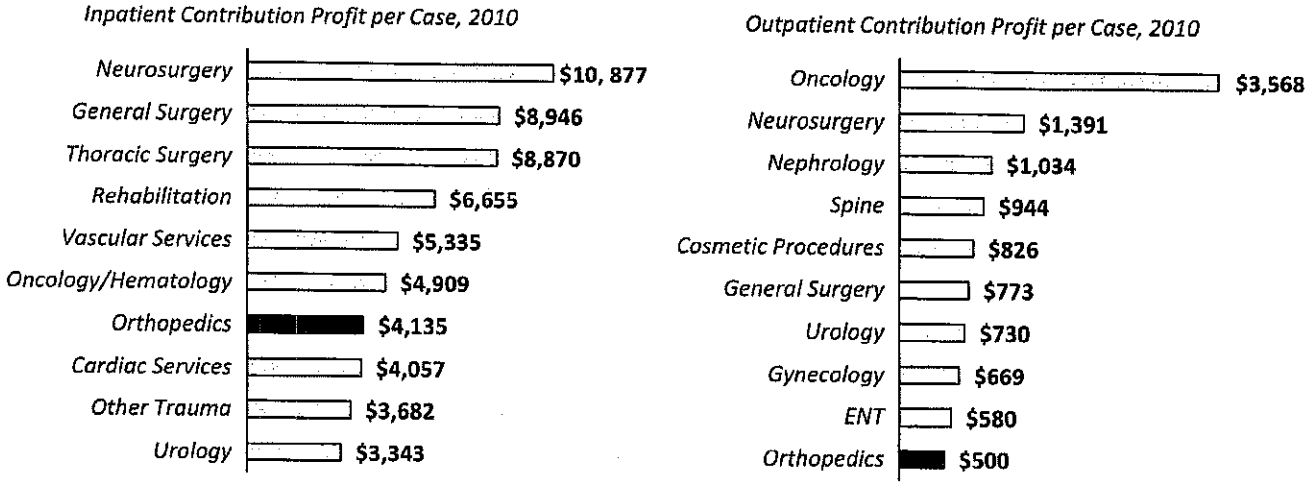
# A Pillar of Hospital Profitability

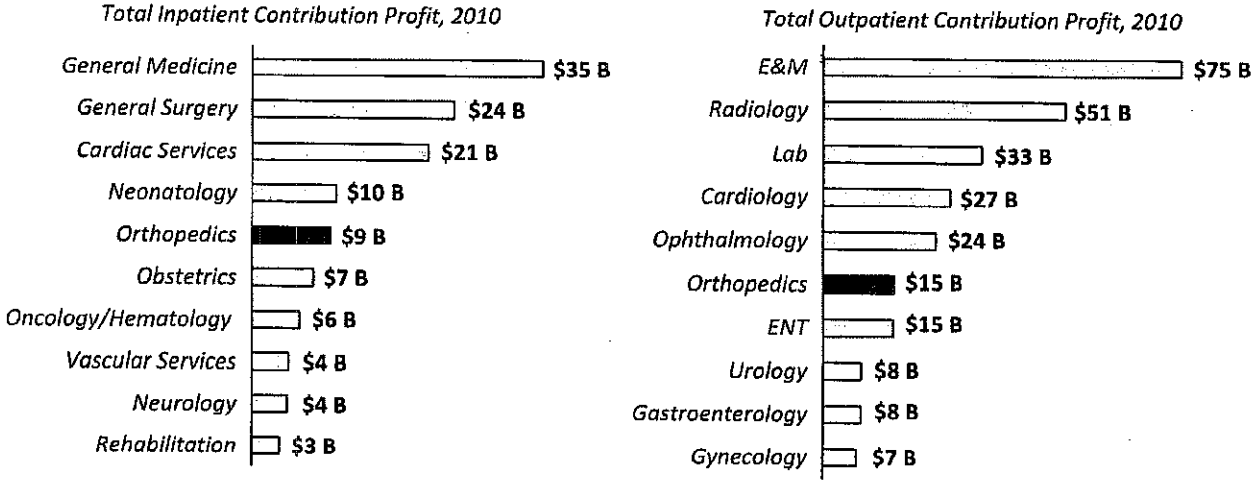
The orthopedics service line continues to contribute substantially to hospitals' book of business. Nationally, the service line ranks in the top five for total contribution profit when combining inpatient and outpatient services.

While many institutions view orthopedics as a reliable profit center under fee-for-service economics, ensuring consistent profitability can be challenging. With soaring implant costs, wavering reimbursement, and intensifying competition, the service line requires careful management to ensure its continued success.

## Top Ten Service Lines by Contribution Profit per Case




## Top Ten Service Lines by Total Contribution Profit




Source: Advisory Board National Model.

1 Evaluation and Management

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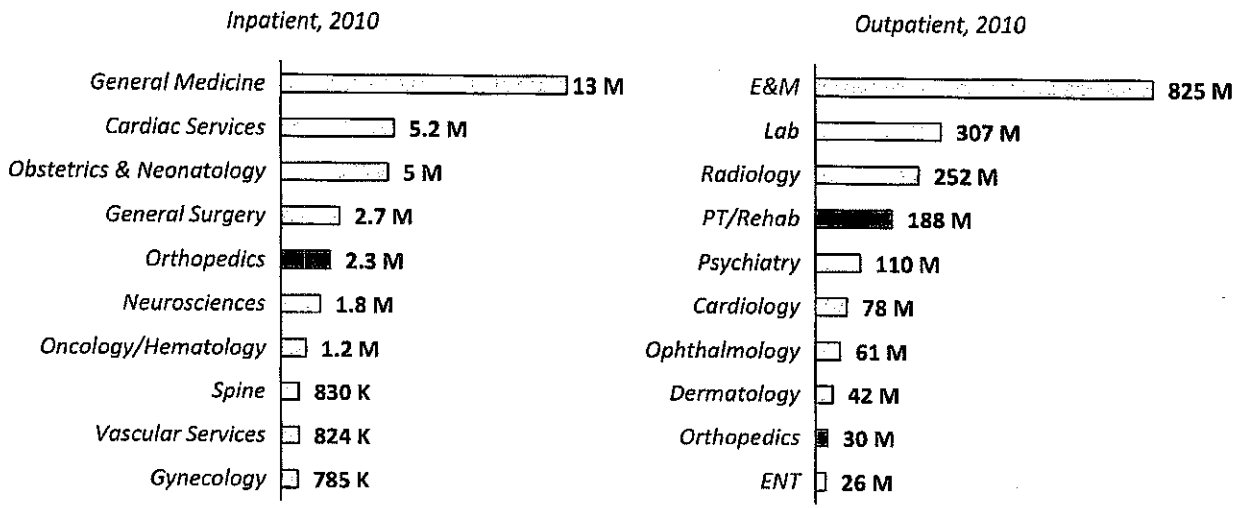
000568 (02/24/14)

# A Major Volume Contributor

Given the financial value of orthopedics, many have prioritized the service line as a central component of overall growth strategy. Unlike many other procedural businesses, orthopedics is expected to grow substantially in coming years, with aging baby boomers expecting to continue an active lifestyle well into their later years.

The Advisory Board forecasts positive growth for orthopedics across the next 10 years, with 14 percent growth in inpatient orthopedics (mainly joint replacement) and 38 percent growth in outpatient orthopedics (mainly sports medicine).

**Top Ten Service Lines by Volume**




**Poised for Growth: 10-year Volume Forecasts**

| 14% | 38% |
|---|---|
| Inpatient Orthopedics | Outpatient Orthopedics |

Source: Advisory Board Data and Analytics Group.

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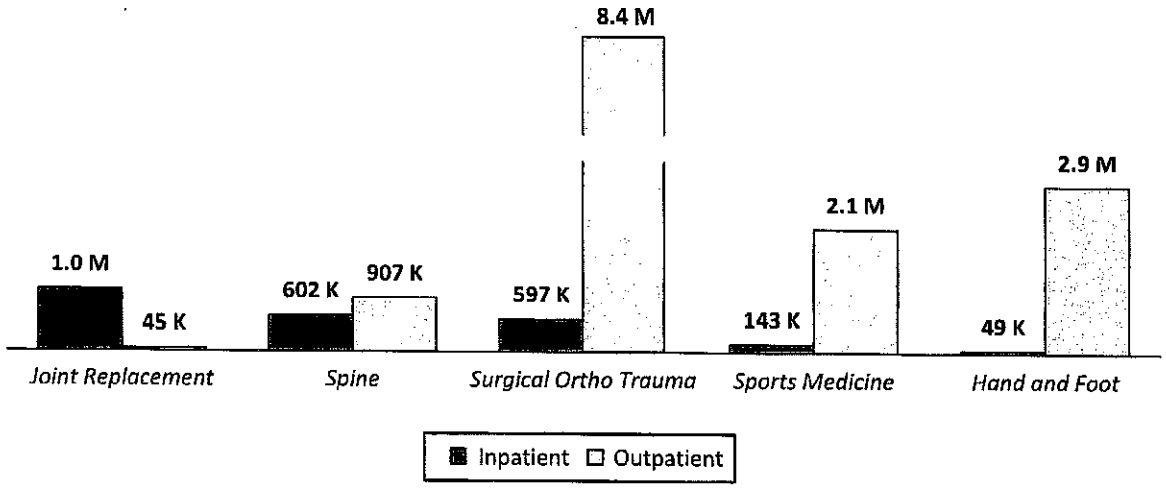
# Unbundling the Orthopedics Product Portfolio

While the orthopedics service line can encompass many services—including joint replacement, spine surgery, rheumatology, sports medicine, trauma, extremity care, and pain management—for most institutions, joint replacement is the largest strategic priority. On the inpatient side, joint replacement leads in volume and contribution profit, and competition, though fervent, is restricted to the hospital setting.

Outpatient orthopedics is considerably more crowded; sports medicine includes both hospital and ambulatory surgery center providers. The enormous volumes associated with outpatient sports medicine procedures, however, keep arthroscopic repair procedures in the spotlight.

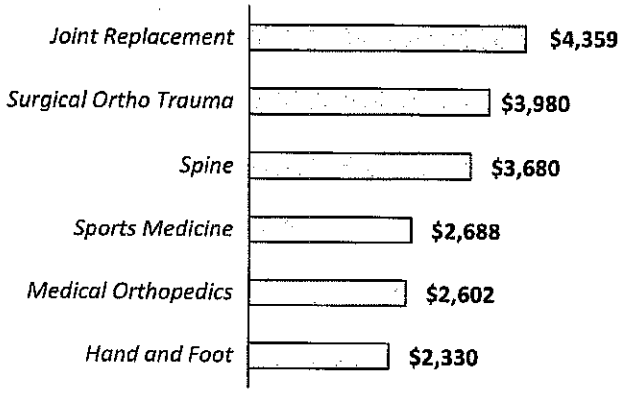
**Orthopedics Product Lines by Volume**

*2010*



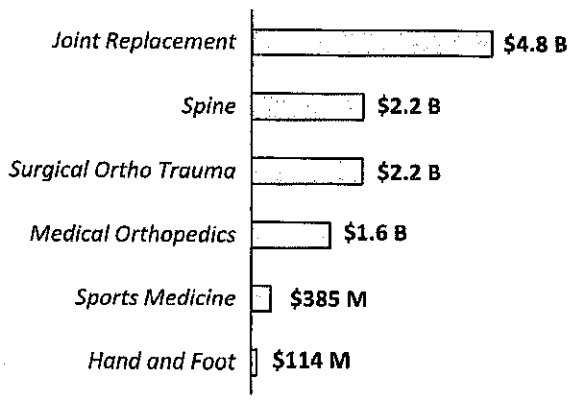

**Product Lines by Inpatient Contribution Profit per Case**

*2010*




**Product Lines by Inpatient Total Contribution Profit**

*2010*




Source: Advisory Board National Model.

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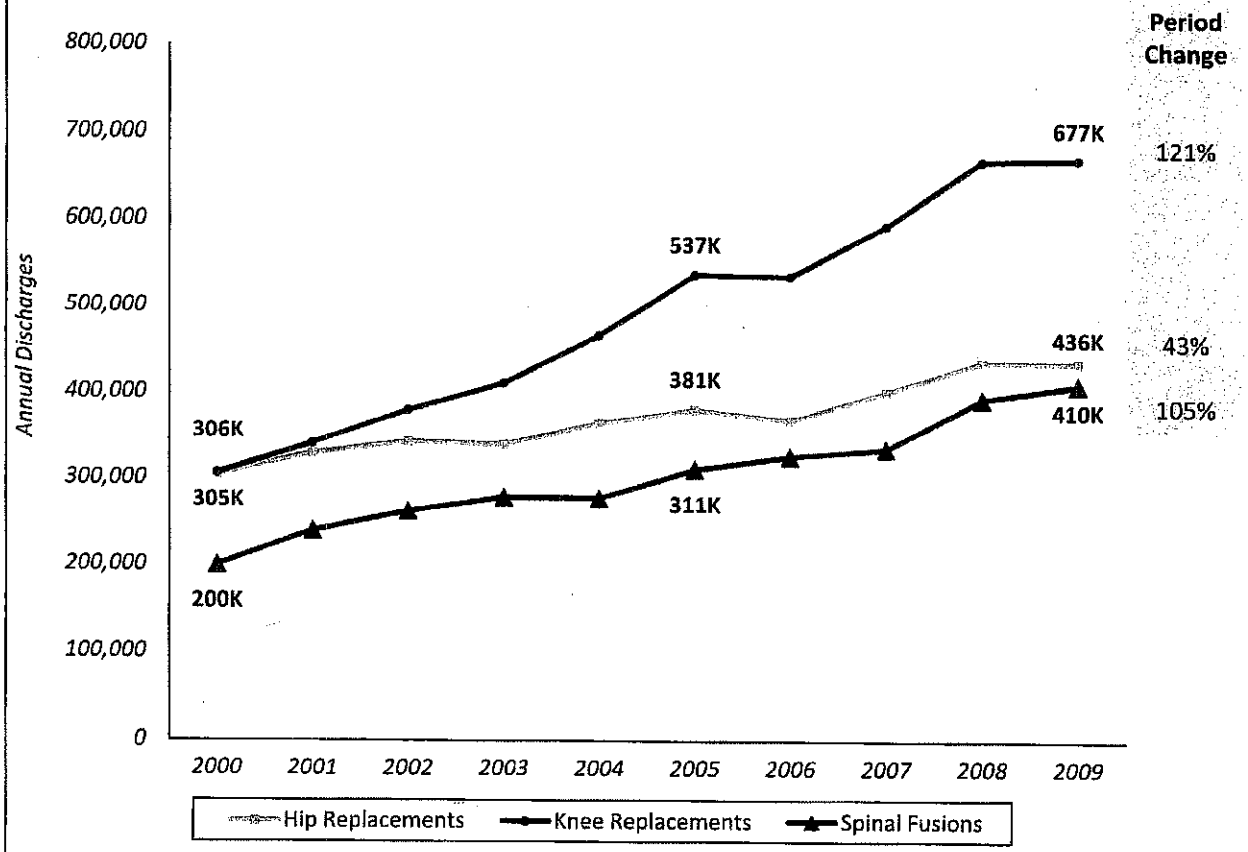
# A Dominant Driver of Growth Across the Past Decade

Growth projections for orthopedics, while positive, fall well below growth rates from the previous 10 years. From 2000 to 2009, total hip replacement volumes increased 43 percent and knee replacement and spinal fusion volumes more than doubled.

Growth was driven by the aging population, improvements in technology, and expansion of minimally invasive surgical techniques. Additionally, higher-impact activities and comorbidities such as obesity compelled younger patients to consider joint replacement and spinal fusions.

**Growth in Key Musculoskeletal Surgeries**

*2000-2009*




Source: HCUPnet, available at: http://hcupnet.ahrq.gov/HCUPnet.jsp, accessed June 29, 2011.

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000571 (02/24/14)

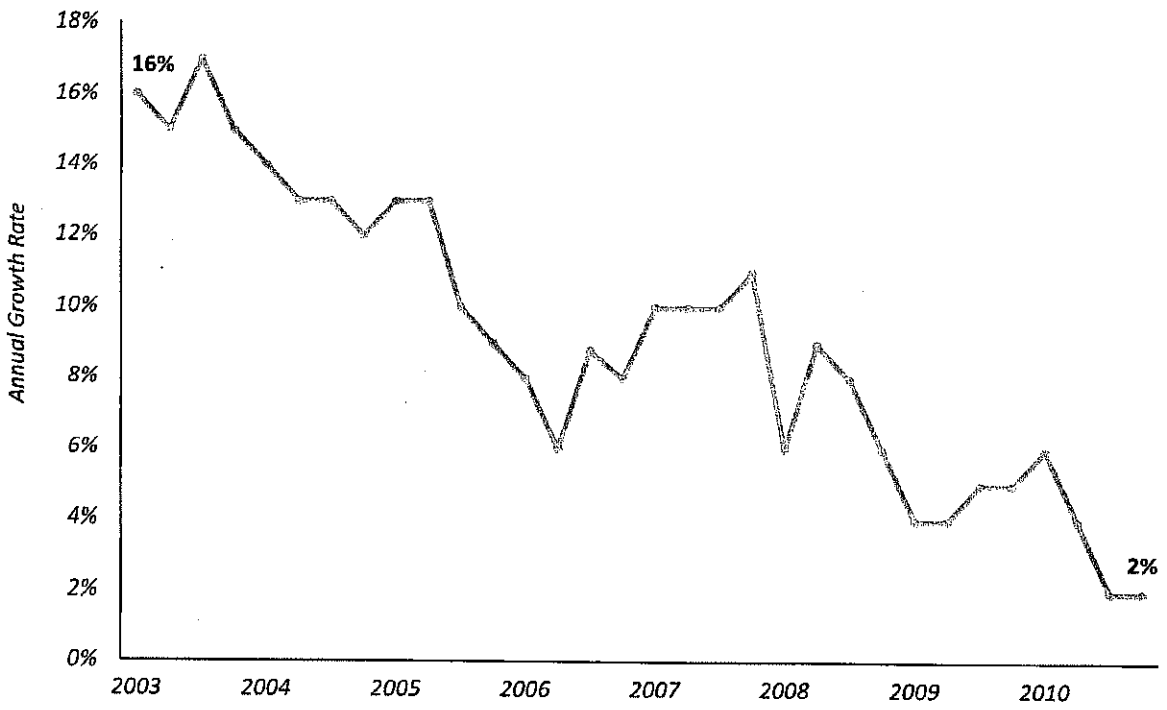
# Double-Digit Growth Rates a Thing of the Past

The rate of growth in orthopedics has slowed considerably, especially in the past two years, due to the economic slowdown. Recent data suggest the specialty has moved to an annual growth rate well in the single digits.

Slow to moderate growth will likely remain as long as unemployment remains high and consumers experience financial uncertainty. According to some industry analysts, every 3 percent rise in unemployment results in a 1 percent decline in elective procedures nationally. Since common elective joint replacement and spine procedures are typically scheduled as many as six months in advance, these slower growth rates will likely continue across 2011 and 2012, even with demographics providing a natural buoy to utilization.

**Total Joint Replacement: National Growth Rates by Quarter**

*2000-2009*




Source: Stewart, K, "Orthopedic Market Update: Not Worse, But Not Better," DeutscheBank, February 22, 2011.

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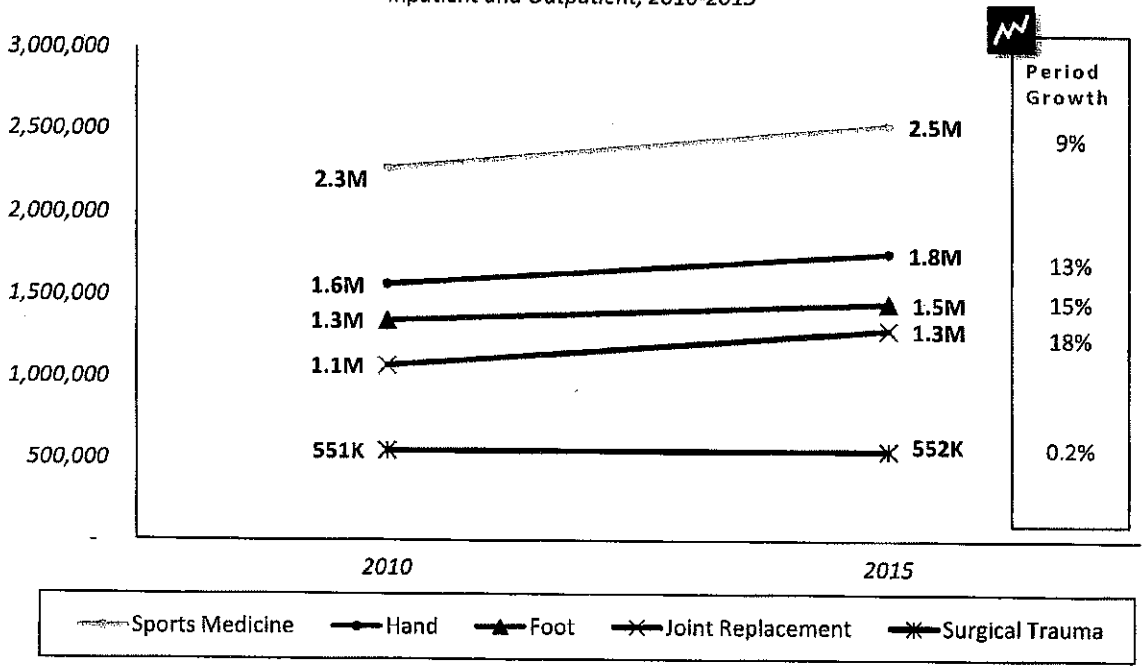
000572 (02/24/14)

# Still Strong Underlying Demand

Strong growth in orthopedics is expected to continue once the economy rebounds and the labor market improves, sustained by technology improvements in joint replacements coupled with more younger patients opting for the procedures. Additionally, long-term evidence from international joint registries is validating the clinical success and cost-effectiveness of joint replacement. These findings are likely to reassure patients and insurers as they consider joint replacement as a treatment for end-stage osteoarthritis.

**Orthopedics Product Line Volume Forecasts**

*Inpatient and Outpatient, 2010-2015*




### Drivers of Profitable Growth

- Aging population
- Increasing obesity rates
- Revisions following past replacement, sports medicine procedures
- Increasing competition

### Barriers to Profitable Growth

- Economy-related slowdown in volume
- High-price technologies eroding profits
- Outmigration to ambulatory surgery
- Increasing scrutiny over appropriateness
- Heightened focus on outcomes, value

Source; Advisory Board National Forecasting Model, Marketing and Planning Leadership Council research and analysis.

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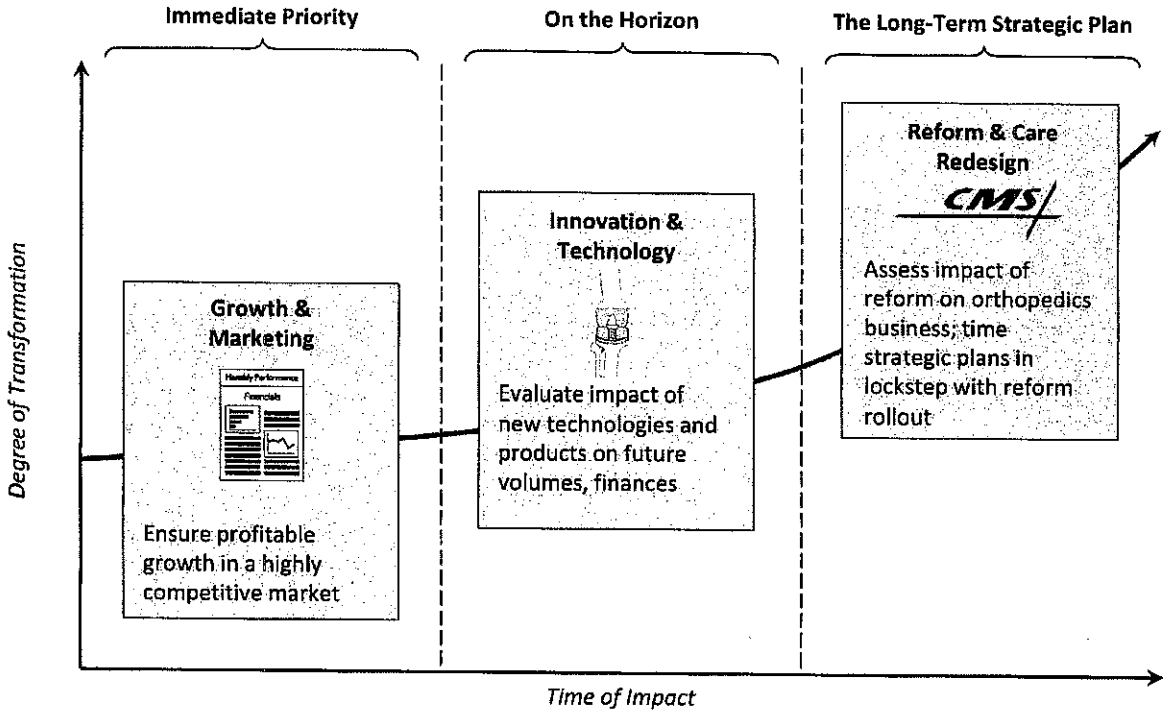
# Today's Strategic Priorities for Orthopedics

As institutions look to develop strategic plans for orthopedics, three major considerations must be addressed. First, slower rates of growth and an increasingly competitive market require institutions to set a deliberate plan for orthopedics growth.

Next, institutions must consider and assess the impact technologies and innovation will have on the orthopedics business. While many technologies purport to drive future growth, they also may hamper per-case economics given premium pricing.

Finally, orthopedics programs must begin to consider the impact accountable payment initiatives and risk-based incentives will have on orthopedics strategy. While most organizations will continue to operate in a fee-for-service environment for the near term, orthopedics business strategy could fundamentally shift as new risk-based payment models develop. Programs must consider these changes today, but ensure strategic plans evolve in lockstep with new incentives.

**Timeline of Strategic Considerations for the Orthopedics Service Line**




Source: Marketing and Planning Leadership Council insights and analysis.

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# Growth & Marketing

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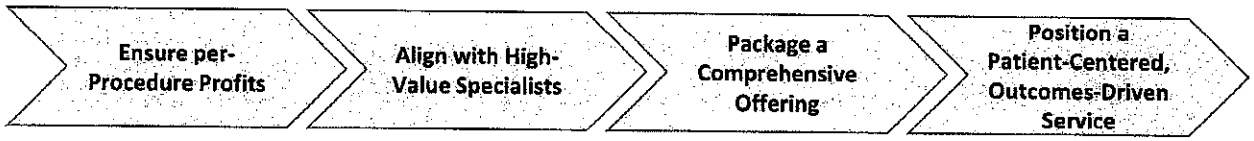
# Developing a Disciplined Approach to Orthopedics Growth Strategy

Buoyed by strong demographics and cultural expectations for a high quality of life and activity in later years, orthopedics should experience significant growth across the next decade. However, given a low barrier to entry, resulting in a sizable number of providers and intense competition, as well as variable margins, careful management will be required to ensure market differentiation and profitability.

Programs should focus on four core strategies for growth: (1) ensure per-procedure profits, (2) align with high-value specialists, (3) package a comprehensive orthopedics offering, and (4) position a patient-centered, outcomes-driven service.

**Key Imperatives for Orthopedics Growth Strategy**




Given profit variability, any growth plan should start with an assessment of institutional orthopedic economics and a plan for reducing orthopedic implant costs

The active support of surgeons is critical to reduce orthopedic implant costs, elevate clinical quality, and achieve competitive advantage and volume growth

As orthopedics care increasingly becomes a commodity business, differentiation achieved by constructing a coherent package of services for patients that extends across the continuum of care

Once a comprehensive, quality-driven program is built, it must actively communicate its patient-centered, outcomes-driven approach to care

Source: Marketing and Planning Leadership Council insights and analysis.

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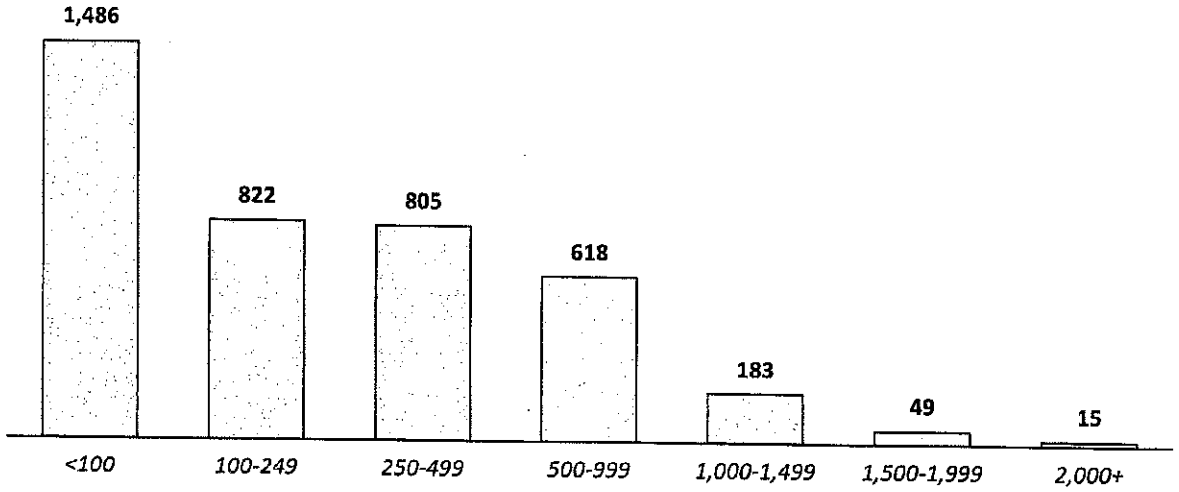
# Low Barriers to Entry Create Competitive, Commoditized Orthopedics Market

Since orthopedics typically does not require extensive capital or technology investments, barriers to entry are low for new providers. The vast majority of acute care hospitals now offer orthopedic surgery and many programs face difficulty securing competitive advantage. The orthopedics business is relatively mature and commoditized, with high success rates and few high-end, high-volume differentiating procedures.

One way institutions look to differentiate their programs is to focus on niche or specialized offerings. High-end sports medicine, trauma, foot, and upper-extremity surgeries can differentiate an orthopedics program as comprehensive. However, joint replacement surgeries typically account for approximately half of program volume, and providers should focus service line planning efforts on these product lines given the volume and profit potential.

**Provider Segmentation by 2010 Orthopedic Volumes**

n = 3,978[1]




**An Even Distribution**

47% Average Percent of Total Orthopedic Volumes Accounted for by Joint Replacement

**The Joint Benchmark**

203 Average Number of Joint Replacements for Facilities with Greater Than 10 Total Joint Replacements

1 Excludes programs with fewer than 10 orthopedic volumes. Orthopedic volumes defined using Advisory Board Inpatient Service Line Definition, which does not include spine.

Source: MEDPAR FYs 2003, 2008, 2010.

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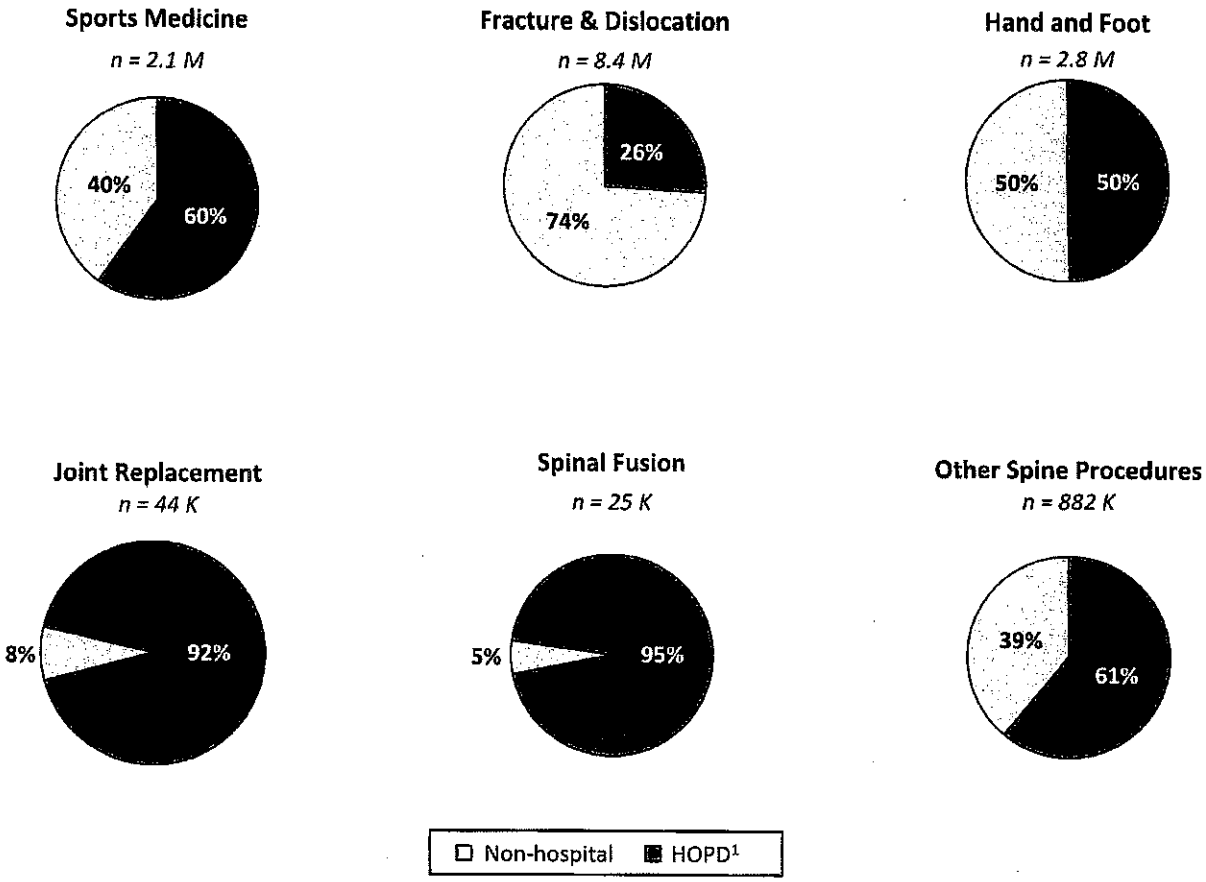
# Outpatient Business Saturated with Non-hospital Providers

Technological and care innovations are enabling certain surgical cases to be done in 23-hour or same-day care settings. At the same time, financial incentives and the desire for greater efficiency are driving business outside the hospital altogether to freestanding surgery center settings.

While the joint replacement business is increasingly commoditized with hospital providers, surgical outmigration for outpatient orthopedics primarily affects the sports medicine and spine sub-service lines. This trend is expected to continue over the next several years may diminish operating margins for some programs.

**Outpatient Product Lines by Site-of-Service**




1 Hospital outpatient department.

Source: Marketing and Planning Leadership Council insights and analysis.

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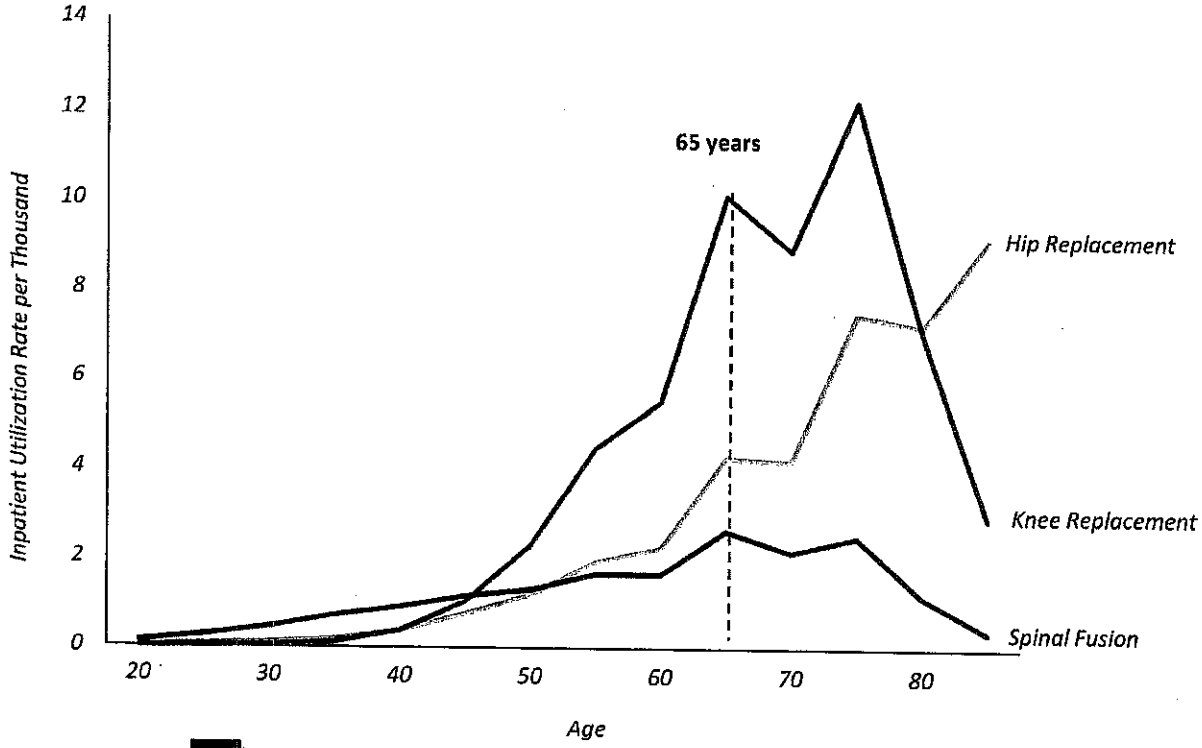
000578 (02/24/14)

# Graying Baby Boomers Entering the Sweet Spot for Joint Replacement

While orthopedics competition intensifies, the overall orthopedics business continues to be poised for growth. Three major factors will continue to drive absolute volume growth for the service line. First, baby boomers are now approaching the optimal age for joint replacement. Second, rising obesity rates place pressure on joints, increasing the need for earlier interventions. Finally, the robust growth across the past 10 years in both joint replacements and sports medicine arthroscopies will set the stage for repeat procedures in the decade ahead.

Overall, osteoarthritis affects roughly 15 percent of adults aged 25 and older and 34 percent of those over 65. This equates to approximately 27 million individuals affected with the disease. While the vast majority do not require joint replacements right away, there is still ample latent demand for the service. As individuals enter into Medicare eligibility, joint replacement becomes more likely. The average age for a spinal fusion is 56; it is 66 for a knee replacement and 70 for a hip replacement. The rapid graying of the population will therefore contribute significantly to the rise in orthopedics; the fastest growing age co-hort, those older than 65, is expected to grow 38 percent across the next 10 years.

**Orthopedic Surgical Volumes Across Age Cohorts**




**Increase in US Population by Age Cohorts: 2010-2020**

| 5% | 38% |
|---|---|
| 45-64 year olds | 65+ year olds |

Source: CDC, accessed June 27, 2011, available at: http://www.cdc.gov/arthritis/basics/osteoarthritis.htm; Marketing and Planning Leadership Council interviews and analysis.

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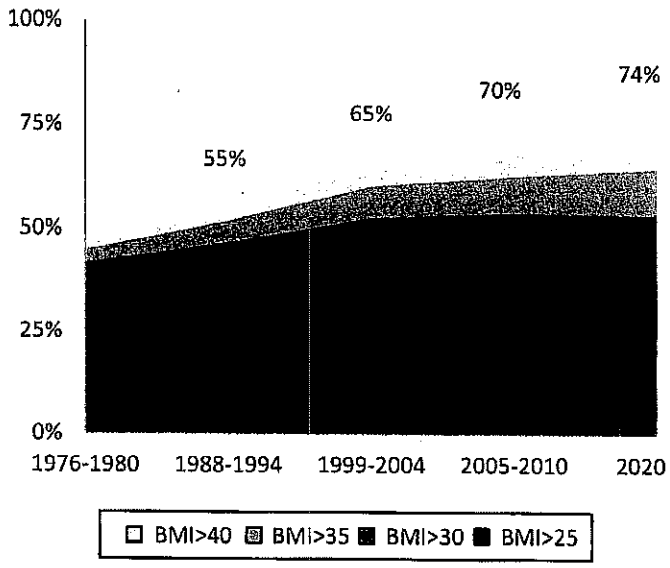
# Rise in Obesity Driving Increased Osteoarthritis

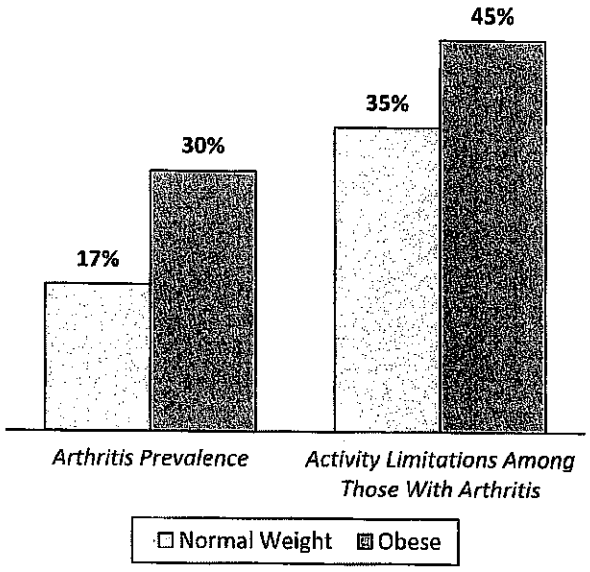
According to the Centers for Disease Control and Prevention (CDC), arthritis is the most common cause of disability and costs the United States approximately $128 billion annually. While demographics are increasing the overall number of orthopedic patients, the obesity epidemic is accelerating the rate of osteoarthritis development. Every 10 additional pounds of body weight exerts 30 to 60 pounds of force on the knees while walking.

This growing obesity problem impacts not only the prevalence of arthritis, but also the activity limitations for those with the disease and the complexity of the joint replacement surgery when performed on them. Between 1991 and 1992 and 2007 and 2008, obesity prevalence in total hip replacement increased from 2.2 to 7.6 percent, respectively. Many physicians note that this increase in the obesity rate impacts the safety and efficacy of the joint replacement procedure, as well as the time required to complete the case. In data presented in June 2011, 10 additional BMI points increased the complication rate of joint replacement by 284 percent, and a 5 percent increase in BMI lowered functional outcomes scores by 96 percent.

**Percentage of the Population by BMI**




**Obesity's Impact on Arthritis**




### A Direct Correlation

"There is a direct correlation between obesity and arthritis. At our specific practice, in the 1990s the number of patients who were obese was low. But now about 50 percent of the patients we operate on are obese."

*Orthopedic Surgeon*
*Large Orthopedic Practice in the Southeast*

Source: Ruhm CJ, "Current and Future Prevalence of Obesity and Severe Obesity in the United States," NBER Working Paper, Number 13181; Centers for Disease Control and Prevention, accessed June 28, 2011, available at: http://www.cdc.gov/chronicdisease/resources/publications/aag/arthritis-text.htm#chart1; ORTHO SuperSite, "Keeping Up with Future Demand for Joint Arthroplasty Will Prove Challenging," accessed June 30, 2011, available at: http://www.orthosupersite.com/view.aspx?rid=80218; "Overweight Is A High Risk Factor For Complications In Hip And Knee Replacement: Experts Urge Obese Patients To Reduce Weight Before Surgery," http://www.medicalnewstoday.com/releases/227108.php, accessed July 25, 2011. Marketing and Planning Leadership Council interviews and analysis.

1 Projected figures for 2010 and 2020.

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# Recent Robust Growth to Drive Revisions in the Years Ahead

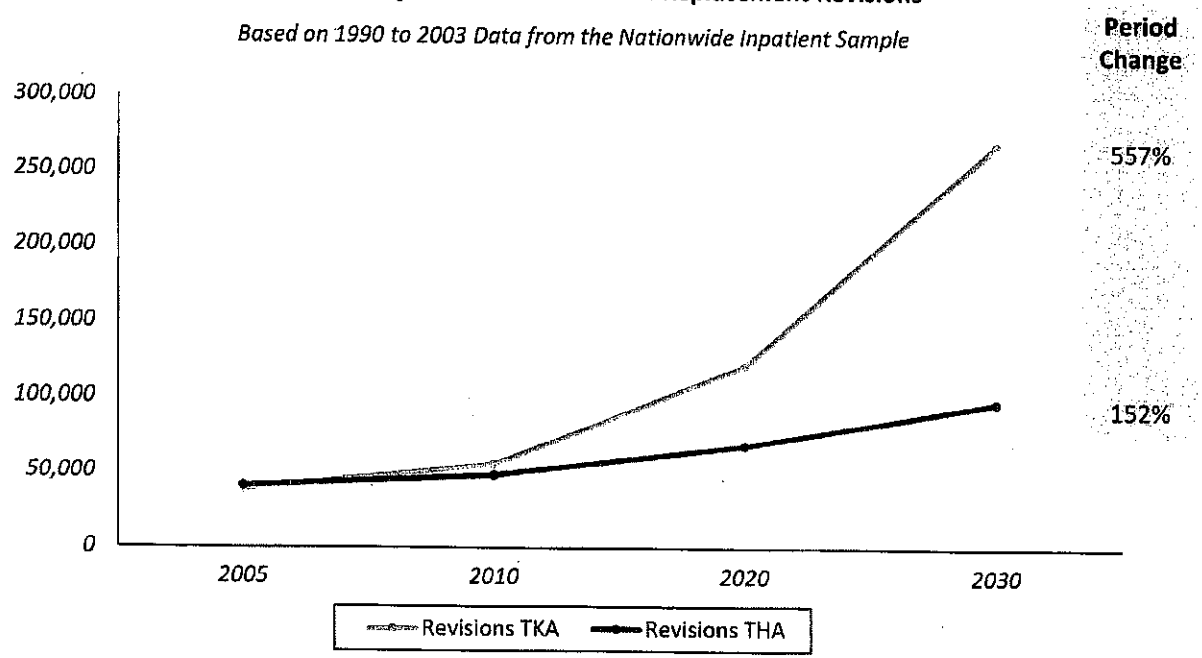
With the volume growth of the orthopedics service line across the past 10 years, there will likely be significant demand for revision surgeries given the nature of the materials utilized in joint replacement. An aggregation of worldwide registry data demonstrated that for both hip and knee replacements, revision rates were approximately six percent at five years, and 12 percent after 10 years.

A study presented at the 2011 Annual Meeting of the American Academy of Orthopedic Surgeons attempted to assess whether key demographic factors contributed to revisions. The results demonstrated that patients ages 65 to 75 years had a 47 percent greater risk of revision than patients older than 75, and men had a 20 percent higher risk of revision compared with women. Patients whose total hip replacements were performed by low-volume surgeons were also at a higher risk of revision.

While revision surgeries will contribute to the overall growth of the orthopedics service line, growth through revision surgeries is not ideal. Revisions are reimbursed at the same rate as primary joint replacements, with higher complication rates and procedure times. Fewer surgeons are trained to complete revisions on a routine basis, threatening physician supply as demand increases.

**Annual and Projected Number of Joint Replacement Revisions**

*Based on 1990 to 2003 Data from the Nationwide Inpatient Sample*




**Growth through Revisions a Profits Wild Card**

"A general orthopedic surgeon is usually reluctant to perform revision surgery because it is much more complicated and much more time-consuming, plus it is not reimbursed very well."

*Orthopedic Surgeon*
*Large Orthopedic Practice in the Southeast*

Source: Kurtz S et al., "Projections of Primary and Revision Hip and Knee Arthroplasty in the United States from 2005 to 2030," *Journal of Bone & Joint Surgery*, 2007;89:780-785; Cram P et al., "Clinical Characteristics and Outcomes of Medicare Patients Undergoing Total Hip Arthroplasty, 1991-2008," JAMA, April 2011, 305: 1560-1567; ORTHO SuperSite, "Keeping Up with Future Demand for Joint Arthroplasty Will Prove Challenging," accessed June 30, 2011, available at: http://www.orthosupersite.com/view.aspx?rid=80218; Marketing and Planning Leadership Council interviews and analysis;.

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000581 (02/24/14)

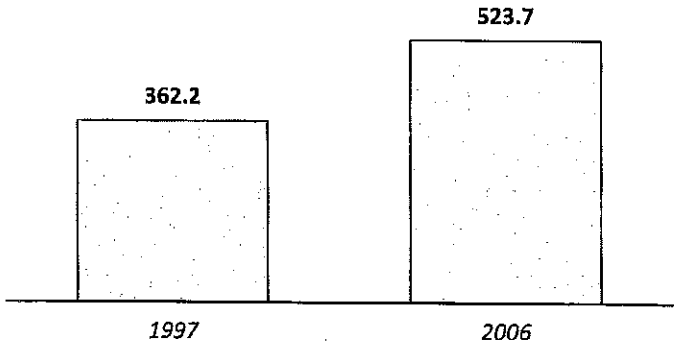
# Active "Weekend Warriors" Eventually Will Require Replacements After Arthroscopy

For the past 10 years, baby boomers have been positioned in the demographic sweet spot for sports medicine procedures, with arthroscopic repair utilization spiking for individuals between 40 and 55 years of age. Even among Medicare patients, the rate of knee arthroscopy has grown significantly across the past 10 years, with a 45 percent increase in the rate of arthroscopies between 1997 and 2006.

Arthroscopy can be used to treat acute injuries associated with torn cartilage and ligaments, or as an early intervention for patients with osteoarthritis. While these interventions are highly effective, many patients will eventually require a joint replacement given the weakened joint. One study reported that in Medicare patients, those treated with arthroscopy for osteoarthritis (arthropathy) required a total joint replacement in 10 percent of cases one year after surgery and in 33 percent of cases nine years after surgery. Injury patients exhibit similar demand for replacement. While these rates are likely higher in the Medicare population, the increase in an active population requiring arthroscopies, combined with the increased demand among younger patients to maintain an active lifestyle, will ultimately continue to drive increased joint replacement volumes.

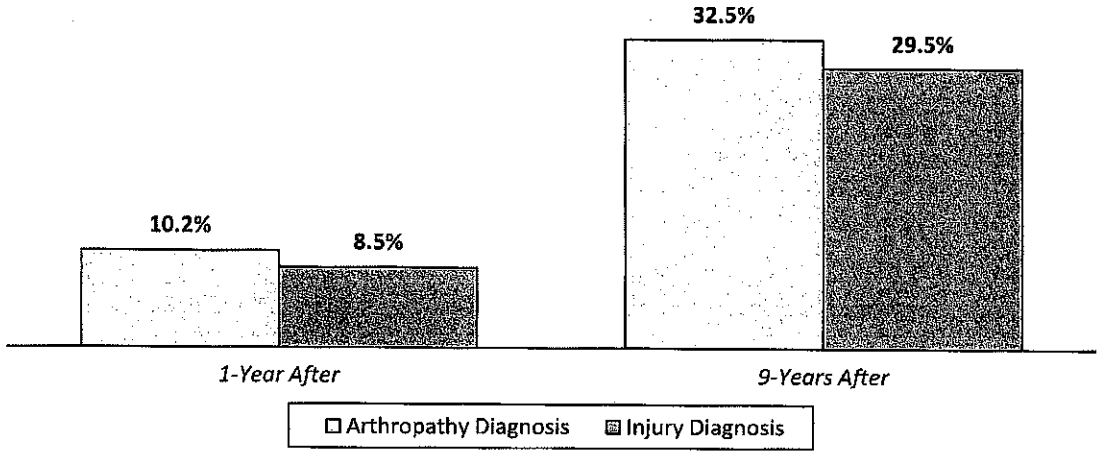
**Prevalence of Knee Arthroscopy per 100,000 Medicare Patients**

*n = 78,137 patients*




**Patients Undergoing Knee Replacement After Arthroscopy**

*n = 78,137 patients*




Source: Kim S et al., "Temporal Relationship Between Knee Arthroscopy and Arthroplasty: A Quality Measure for Joint Care?" *The Journal of Arthroplasty*, February 2011, 26:187-191;

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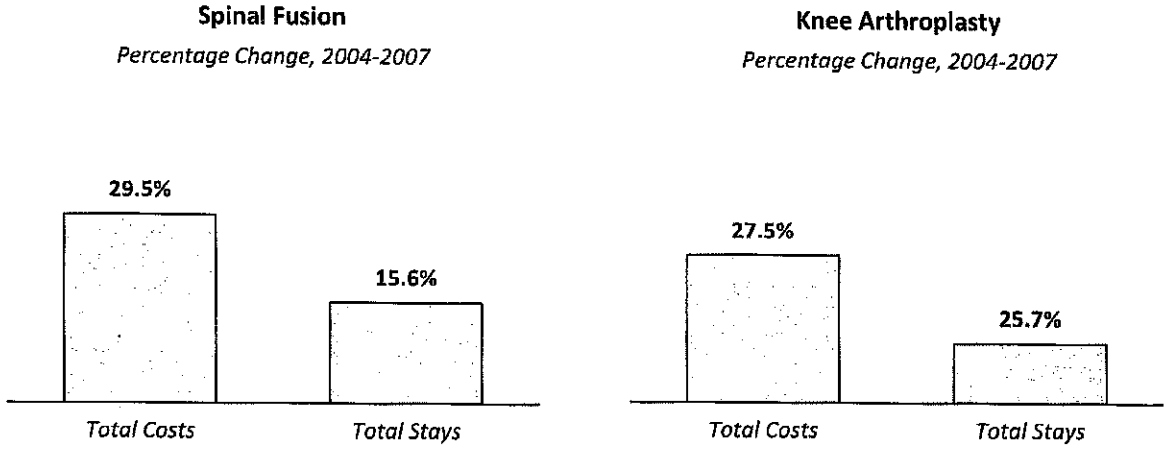
000582 (02/24/14)

# Rapidly Increasing Orthopedic Costs Erode Margins, Increase Payer Scrutiny

As institutions look to capitalize on the growth expected in orthopedics across the next decade, they will need to do so with a careful eye toward cost given eroding margins and payer scrutiny. A study published in 2010 by the Agency for Healthcare Research and Quality (AHRQ) examined the top procedures with the most rapidly increasing hospital costs. Among the procedures examined, knee replacement had the highest aggregate change of cost of $9.2 billion between 2004 and 2007, and spinal fusion was the second highest of all those examined, with procedural costs rising at nearly double the rate of the volume of procedures themselves.

*Rapidly Increasing Costs in Common Orthopedic Procedures*




**Procedures with the Most Rapidly Increasing Hospital Costs, 2004–2007**

- 2010 AHRQ Study examined rising costs of inpatient hospital care
- Among the procedures examined, knee arthroplasty had the highest aggregate change in cost ($9.2 billion) and spinal fusion had the second highest aggregate cost in 2007 ($8.9 billion)
- Of the 29.5 percent increase in total cost for spinal fusion, 12.8 was due to increase in mean cost of hospital stays. Of the 27.5 percent increase for knee arthroplasty, 26 percent was due to volume growth, rather than cost increases

Source: Statistical Brief #82. Healthcare Cost and Utilization Project (HCUP). March 2010. Agency for Healthcare Research and Quality, Rockville, MD.

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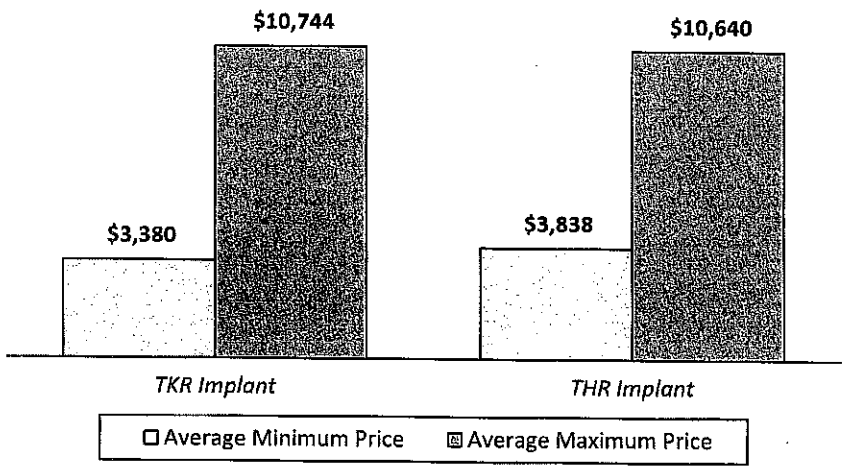
# Profitability Must Be Ensured Before Large-Scale Growth Efforts

Before aggressively pursuing volume growth, institutions must first assess their own profitability, given the variability of per-procedure costs across the country. While costs have risen precipitously across the past five years, due both to higher prices and a higher portion of premium devices used, hospital revenue for orthopedic procedures has remained relatively constant, with joint replacement reimbursement increasing by just 0.4 percent between 2010 and 2011. As list prices for orthopedic implants have risen 278 percent between 1991 and 2011, hospital payment has only risen by 38 percent and physician payment has actually declined by 33 percent. Institutions must assess individual profitability by procedure and by physician given the vast variability among hospitals and even physicians within the same facility.

**Range of Average Implant Cost per Case**

*N = 61 Hospitals*




**Study in Brief: Costs and Cost Management Strategies for Hip and Knee Replacement Implants**

- Average implant costs showed a threefold difference across 61 hospitals
- Higher-volume hospitals experienced lower implant costs per case
- Hospitals using more costly implants experienced higher non-implant-related costs
- Restricting physician choice to a limited number of implant vendors was not associated with lower implant costs in this study

Source: Bozic, K. "Costs and Cost Management Strategies for Hip and Knee Replacement Implants." AAOS Annual Meeting Paper Presentations, San Diego, CA, 16 February 2011.

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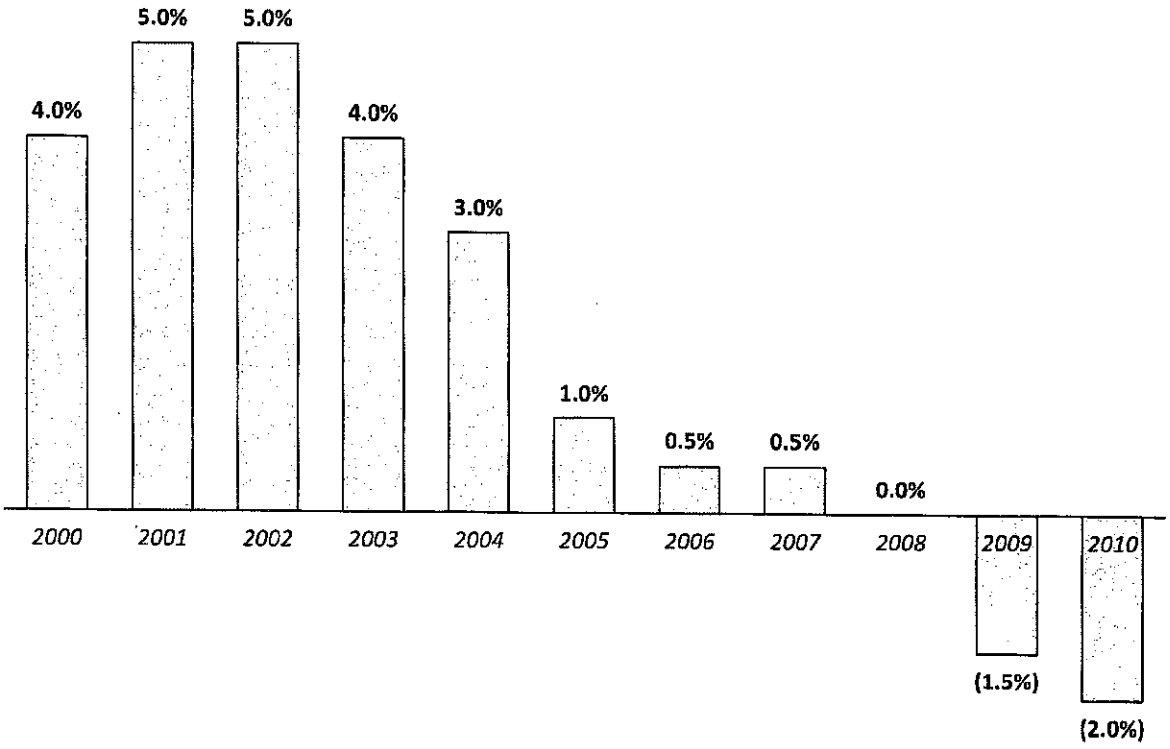
# Economy Pressuring Implant Pricing

While the economy has dampened short-term growth expectations, one bright side may be the impact the economy has had on hospitals' negotiating power with orthopedic vendors. The uncertain economic environment brought urgency to the need to reduce orthopedic implant costs, establishing a burning platform to align hospitals and physicians together in an unprecedented manner.

Many institutions reported both increased formal and informal alignment with physicians during the downturn, which served to break long-standing allegiances many physicians had with orthopedic vendors. The result was the first estimated declines in orthopedics pricing in the past 10 years. While volumes are likely to rebound, institutions should look to maintain these savings and not allow implants to reach pre-recession price levels.

**Estimated Percentage Change in Joint Replacement Pricing**

*2000-2010*




Source: Stewart, K, "Orthopedic Market Update: Not Worse, But Not Better," DeutscheBank, February 22, 2011.

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000585 (02/24/14)

# Imperative to Partner with Physicians to Achieve Meaningful Device Cost Savings

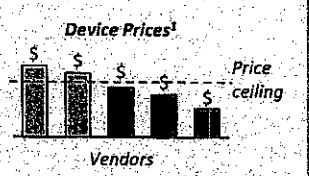
Physician alignment is critical for successful contracting with vendors. Hospitals have a favorable negotiating position if physicians are willing to adjust their vendor selection to control hospital costs. Because the process should ultimately focus on assessing the clinical merits of devices and the value associated with their cost, physicians should be at the core of value analysis.

The ideal process starts by compiling clinical data on the products; demonstrating that value analysis is a process intended to drive selection of the highest quality products, not just to generate cost savings. After a full clinical assessment of products is completed, financial information should be shared with physicians.

The success of these value analysis interactions and the collective strategy of the group will ultimately determine the best course of action for reducing implant costs. Different hospitals have used a variety of strategies to develop contracts with orthopedic implant vendors. As a first step in preserving physician choice of implant, many hospitals have established an all-comer price ceiling, or capitated pricing agreement. Progressive institutions with strong physician alignment have pursued standardization strategies or, in select cases, online reverse auctions.

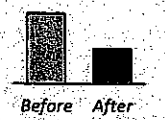
**Device Cost Reduction Strategies**

**Establish All-Comer Price Ceiling**



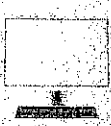

- Hospital, physicians set maximum price for each device
- All vendors willing to meet price request able to contract with hospital at specified price levels

**Consolidate Approved Devices and Vendors**




- Physicians reduce number of devices, vendors to consolidate market share
- Obtain preferential pricing in exchange for volume guarantees

**Organize Online Reverse Auction**



- Hospital hosts electronic reverse auction
- Vendors bid on sale price, see blinded bids from other vendors
- Encourages price competition without volume guarantees

*Increased Aggressiveness,*
*Increased Need for Strong Physician Alignment*

1) Illustrative data.

Source: Marketing and Planning Leadership Council interviews and analysis.

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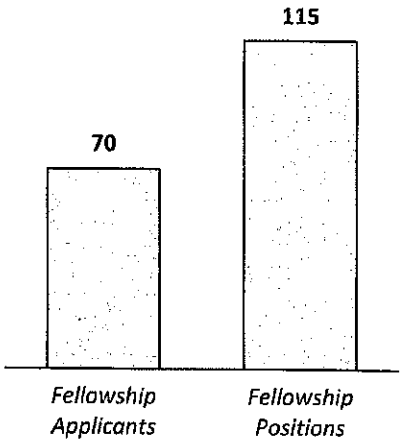
# Patients Not the Only Ones Aging—Orthopedics Surgeons Set for Shortage

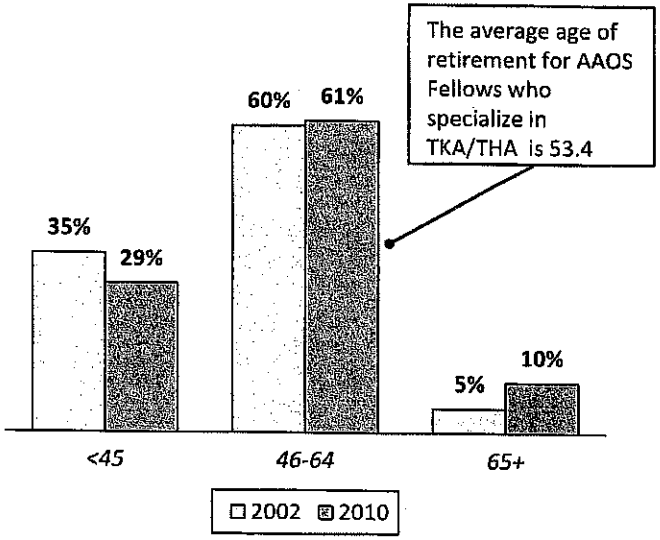
The second imperative to achieving profitable growth is to align with high value specialists, or those specialists with a focus on high-quality, low-cost, efficient care. To craft a successful and sustainable orthopedic strategy, hospitals and health systems, without exception, need to achieve better alignment with orthopedic surgeons. The active support of surgeons is critical to achieving every major strategic goal for hospital orthopedics programs, including reducing orthopedic implant costs, elevating clinical quality, and achieving competitive advantage and volume growth.

However, while volumes are poised to increase, providers will also face a supply shortage of orthopedic surgeons. Given the high proportion of Medicare patients among the joint replacement patient population, joint replacements are becoming less lucrative for surgeons. Thus, orthopedic surgeons are increasingly looking to sub-specialties such as sports medicine and spine surgery, as these specialties have more predictable hours, less physically demanding procedures, and more lucrative reimbursement. Recently total joint fellowships have remained unfilled, while a majority of orthopedic surgeons near retirement.

**Number of Total Joint Fellowship Positions Versus Number of Applicants**




**Distribution of Orthopedic Surgeons by Age Group**




Source: Hariri S et al., "A Resident Survey Study of Orthopedic Fellowship Specialty Decision Making and Views on Arthroplasty as a Career," *The Journal of Arthroplasty*, December 2010; Turkelson C et al., "State-Level Changes in in AAOS Orthopaedic Fellows," AAOS, April 2010; Iorio, R et al., "Orthopaedic Surgeon Workforce and Volume Assessment for Total Hip and Knee Replacement in the United States: Preparing for an Epidemic," *Journal of Bone and Joint Surgery*, 2008, 90:1598-1605; Marketing and Planning Leadership Council interviews and analysis.

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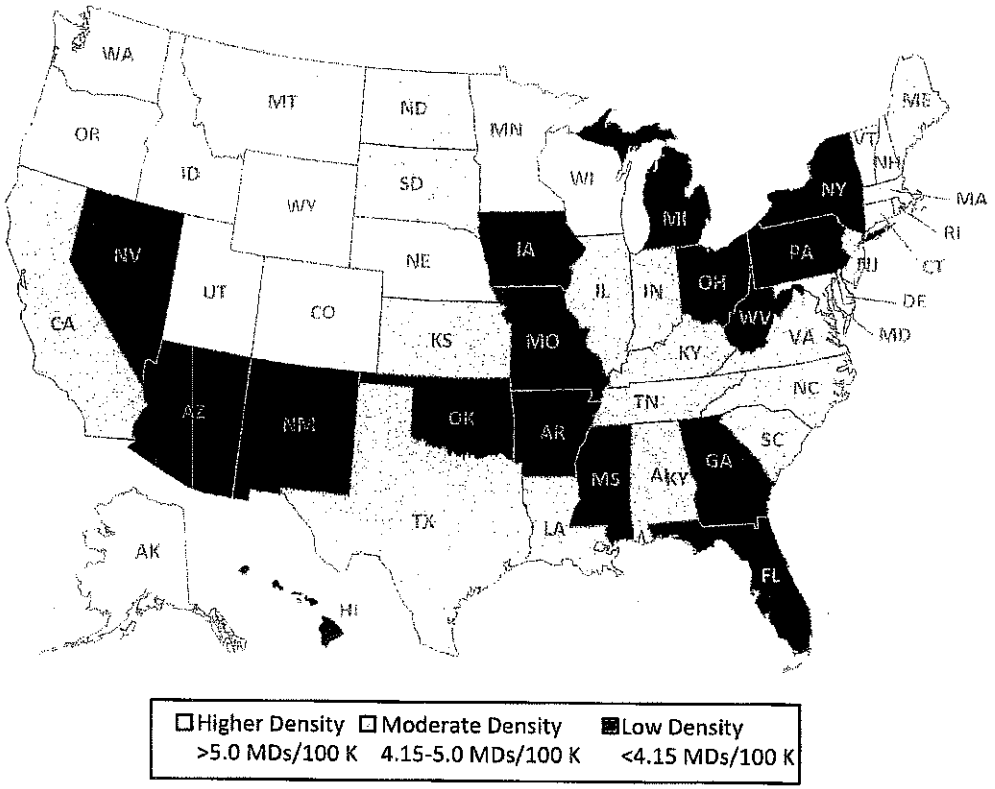
# Regional Demographics Exacerbate Local Physician Shortage Potential

Across the next five years, approximately 2,000 orthopedic surgeons performing total joint replacements will enter the workforce; conservative estimates—an average 65-year old retirement assumption—suggest during the same period 1,900 surgeons will retire. A more aggressive (and potentially realistic) retirement age of 59 years predicts 4,200 surgeons will retire by 2016.

While nationwide estimates predict a severe physician shortage in the years ahead, local dynamics may differ. In 2010, the national density of orthopedic surgeons was 5.67 for every 100,000 people. When analyzed for just the population over 65, the national density of orthopedic surgeons drops to 4.33 nationally. Given the prevalence of joint replacement in this age group, variation among states in the over-65 population will greatly impact overall physician supply. Given their aging populations and trend toward older surgeons, Arkansas and Florida will likely face the most severe shortage in the years ahead.

**Orthopedic Surgeon Density for 65+ Population, 2010**

*Number of Orthopedists per 10,000 People Over 65*




Source: Turkelson, et al. "State-level Changes in AAOS Orthopaedic Fellows," AAOS, April 2010. Fehring et al, "Joint Replacement Access in 2016: A Supply Side Crisis," *The Journal of Arthroplasty*, Vol 25 No 8, 2010.

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# Fiercely Independent Orthopedic Surgeons Easing Toward Employment

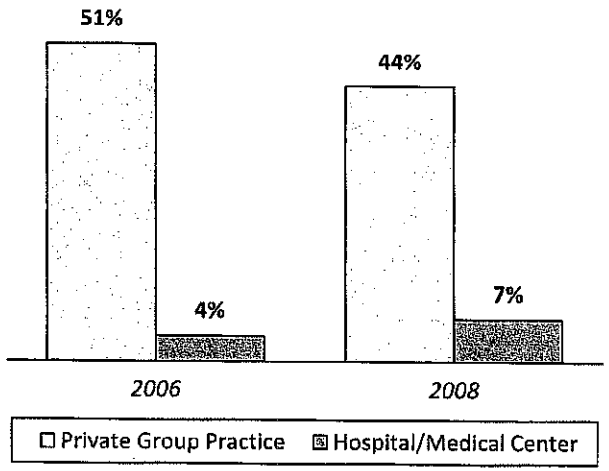
Given the vital strategic necessity for hospitals to align with orthopedic surgeons, many have taken a more formal approach to strengthening ties with their physicians. Across the past five years many institutions have begun to employ orthopedic surgeons—something mostly unheard of five years ago for a traditionally highly independent physician specialty.

Orthopedic surgeon employment is still relatively low compared to other surgical specialties such as cardiac surgery or neurosurgery. However, as institutions look to secure growth amidst a physician shortage and ensure profitability as risk-based payment more closely ties financial success to quality and cost management performance, many will need to consider more formal relationships with orthopedic surgeons.

**2008 AAOS Orthopedic Census Report**

*Orthopedic Surgeon Practice Setting Reporting*

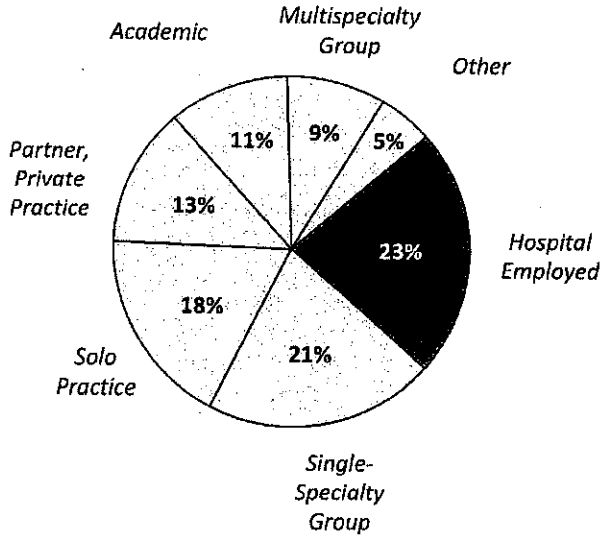
n = ~9,500




**2011 Medscape Orthopedic Surgeon Compensation Report**

*Orthopedic Surgeon Practice Setting Reporting*

n = 15,924*




Source: Source: AAOS, "Orthopedic Surgeon Quick Facts," accessed June 29, 2011, available at: http://www.aaos.org/research/stats/Surgeonstats.asp; AAOS, "Orthopaedic Practice in the US 2005-2006," accessed June 29, 2011, available at: http://www2.uic.edu/stud_orgs/prof/surgeons/events/2006CensusPublic.pdf; Medscape, "Medscape Orthopedics Productivity Report: 2011 Results," accessed June 29, 2011, available at: http://www.medscape.com/features/slideshow/compensation/2011/orthopaedics; Marketing and Planning Leadership Council interviews and analysis,

*Across all specialties. Survey reports that the overall number of responses by specialty mirrors the AMA breakdown of specialties.

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# Comanagement Allows Partnership on Strategy Without Full Salary for Surgeons

Given the highly independent nature of orthopedic surgeons and the financial risk associated with full-fledged employment, many institutions are seeking other ways to more formally align with surgeons. Comanagement can potentially align surgeon incentives with hospital strategic priorities by partnering with physicians on service line management and setting specific performance metrics that are tied to physician bonuses. In orthopedics, the most common performance metrics focus on operational measures, such as correct documentation and on-time starts, and clinical measures, such as infection rates and technology usage.

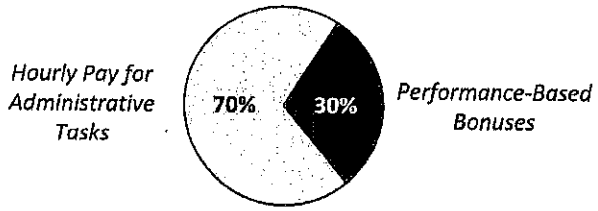
**Clinical Co-management**

**11%**

Percentage of hospitals reporting use of comanagement agreements with orthopedic surgeons

**Comanagement Compensation Structure**

*Contract Combines Guaranteed, Variable Compensation*



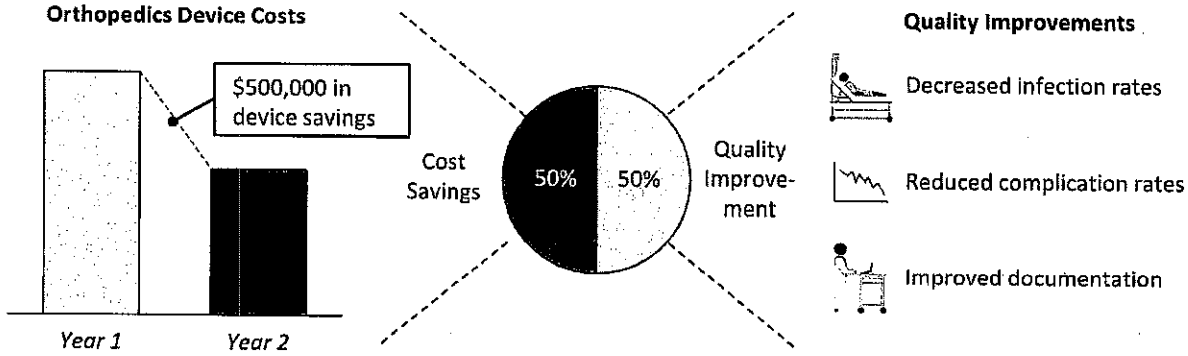

**Sample Orthopedics Performance Metrics**

**Clinical Measures:**
- Prophylactic use of antibiotics
- Consistent use of on-agreement prostheses and technology
- Appropriate care measures
- In-house mortality rate
- Surgical site infection within 30 days
- Cooperation in device value analysis teams, quality improvement efforts
- Readmissions rate

**Operational Measures:**
- Correct documentation
- On-time starts & turnaround times
- Use of electronic medical record
- Outreach to, coordination with referring physicians

**Proposed Returns on Comanagement Contract**

*Improved Performance Recoups Contract Value*




Source: HealthLeaders Intelligence, "Physician Alignment in an Era of Change," available at: http://content.hcpro.com/pdf/content/256536.pdf, accessed March 22, 2011; Marketing and Planning Leadership Council interviews and analysis.

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# Center-Based Product Packaging the Differentiator in Increasingly Commoditized World

In the current economic environment, hospitals cannot afford to lose profitable orthopedic volumes to competitors. Unfortunately, as innovation in orthopedics technology slows and orthopedics care increasingly becomes a "commodity" business, referring primary care physicians and their patients have more opportunity to choose among many regional hospitals in making a decision about where they receive treatment.

To differentiate themselves in an increasingly competitive environment, institutions should organize a patient-centered and comprehensive product offering that constructs a coherent package of services for patients and extends across the continuum of care. Providers are increasingly compelled to compete on quality and convenience. It is not enough, however, to simply self-designate as a "center of excellence." The hospitals that increase market share will be those that have truly developed efficient intake processes, assembled multidisciplinary care teams, committed to patient and family education, and trained staff in customer service.

**Components of a Comprehensive Joint Program's Continuum of Care**

**Patient Intake**

**Pre-operative Planning**

**Post-operative Care**

**Elevating Awareness**

- Easy-Intake Joint Pain Seminars: Organizing informational community outreach seminars to direct patients to tangible next step
- Advanced Technology Promotion: Utilizing communication channels to promote availability of new technologies targeting a younger demographic
- Alumni Development: Cultivating "graduates" of joint replacement program to build goodwill, word of mouth

**Enhancing Patient Satisfaction**

- Patient Education: Structuring pre- and post-operative patient education to reinforce expectations
- Hip and Knee Hotel Model: Designing facility and operational services to present high-end "hotel-like" offering

**Decreasing Length of Stay, Readmissions**

- Rapid Recovery Protocols: Scheduling rehab and post-op recovery toward accelerated timeline
- Next-Generation Pain Management: Utilizing multimodal and regional anesthesia techniques to improve pain management
- Family Coaching: Involving family members in pre-discharge rehab
- Group Rehabilitation: Delivering PT and other rehab activities collectively
- Organized Discharge Planning and Post-Acute Relationships: Planning education and effective two-way communication with post-acute care to prevent readmissions

Source: Marketing and Planning Leadership Council interviews and analysis.

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# Formal Certification Aligning Providers Toward Quality, Process Improvement

As the commodization of orthopedics continues, institutions are increasingly looking for more formal ways to differentiate themselves. Self-designation as a "center of excellence" has become ubiquitous and does not necessarily connote the high-quality care that outcomes-conscious referring physicians and increasingly savvy consumers demand.

As competition heightens and risk-based payment looms, many institutions are exploring formal designation as a certified center of excellence. Formal certification programs lay out specific goals and criteria programs must achieve to be certified as a center of excellence. While some providers previously viewed formal certification as bureaucratic and unnecessary for growing volume, many are now using the certification process to align physicians, staff and administrators toward a common goal of high-quality, efficient care. While payers and referring physicians have not yet begun actively steering patients to designated centers in large numbers, certification may be the rallying call institutions use to build a quality-driven program. Programs can then actively market the certification and ultimately be prepared if robust patient steerage begins in earnest.

**Criteria for Formal "Center of Excellence" Certification Programs**

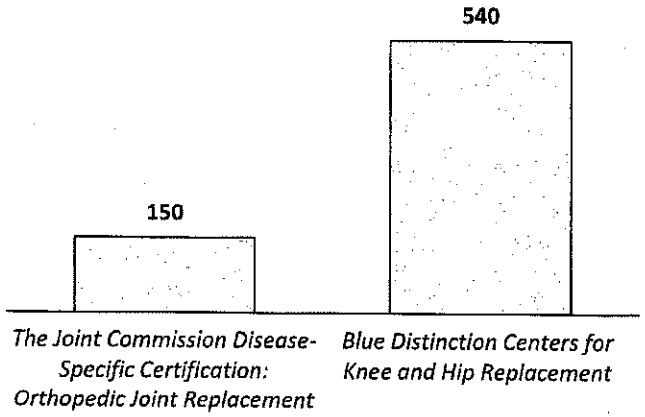
**The Joint Commission Disease-Specific Certification: Orthopedic Joint Replacement**

- Compliance with consensus-based national standards
- Effective and consistent use of appropriate, evidence-based clinical practice guidelines for hip, knee, or shoulder replacement
- Collection and analysis of a minimum of four performance measures specific to the hip, knee, or shoulder replacement patient population, two of which must be clinical in nature

**Blue Distinction Centers : Hip and Knee Replacement**

- At least 100 total hip and total knee joint replacement surgeries (primary and revision) per year, with a minimum of 25 each total hip and total knee replacements
- Comprehensive quality management program, pre-operative patient education, processes that support transitions of care, clinical outcomes that meet objective thresholds (e.g., complication rates and length of stay)

**Number of Certified Programs**




Source: "Blue Distinction Fact Sheet" available at: http://www.bcbs.com/innovations/bluedistinction/blue-distinction-fact-sheet.pdf, accessed July 22, 2011. "Disease-Specific Care Certification: Joint Replacement" available at: http://www.jointcommission.org/certification/orthopedic_joint_replacement.aspx, accessed July 22, 2011.

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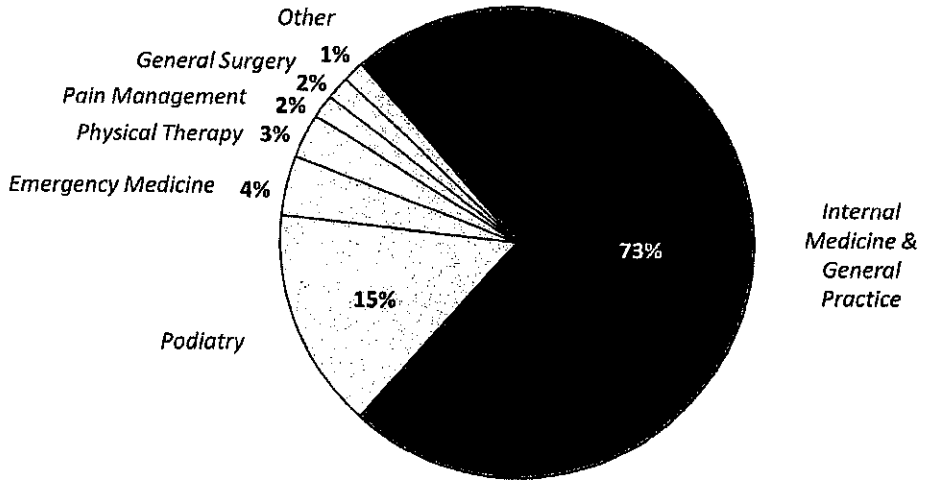
# Primary Care, Podiatry the Key Referrers

As organizations build comprehensive, quality-driven programs, they will need to actively communicate their differentiation to referring physicians and consumers to gain competitive advantage. Primary care physicians (PCPs) drive the lion's share of referrals to the orthopedic specialty. Podiatrists, however, may be an under-targeted referral source.

While many primary care physicians have long-standing referral relationships with individual surgeons, increasingly primary care physicians are seeking out organizations that empirically demonstrate high-quality, low-cost services and serve as a partner in the continued care of their patients. To build a relationship and communicate the quality of orthopedic care, physician liaisons have proven to be effective. Even small shifts in referral patterns with a single physician can produce a significant return. For example, if one orthopedic surgeon increases the number of joint surgeries at a hospital by about 18 cases, that can generate about $70,000 in additional contribution profit, enough to cover a typical liaison salary.

**Top Referring Specialties to Orthopedic Surgery[1]**

n = 253,000 Patient Records




## Key Steps to Building Referral Relationships

- Segment referring physicians into "loyalists," "splitters," and "new referrers," and target outreach effort to each group. Consider using physician referral analysis tools and dedicated physician liaisons to build continuous relationships with referring physicians
- First shore up loyalist business, focusing on service ethic and education about comprehensiveness of offerings; use information about why loyalists refer in future marketing efforts to non-loyalist physicians
- Next, target splitters, typically defined as those physicians who refer only 40 to 60 percent of their patients to one hospital; with splitters, listen to top-of-mind priorities and concerns, consider physician-to-physician conversations and sharing clinical outcomes data where applicable
- With new referrers, create a standardized approach to follow-up; send a welcome packet to the physician's office and notify the liaison responsible for that physician to add him or her to the target list

1) Excludes those patients referred by "orthopedic surgery" or with no referral specialty named.

Source: Marketing and Planning Leadership Council interviews and analysis.

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# Disparate Orthopedics Markets Require Tailored Marketing Messages, Channels

While physician referrals will continue to be the mainstay of program growth, orthopedics is one of the few specialties where patients actively seek treatment independent of their primary care physician's referral. Given the ubiquity of the procedure among specific age cohorts and social groups, many patients rely on word-of-mouth recommendations for physicians and hospitals as they seek orthopedic treatment.

To capitalize on this, many hospitals actively market their integrated orthopedic service offerings directly to patients, touting their multidisciplinary approach to patient care, the expertise of their physicians, and the newest treatments offered. Many leading programs look to create a program buzz via a strong online presence, traditional media outlets, and local community services.

Given the segmented markets for orthopedics, programs should take care to orient both the marketing message and the channel through which it is delivered to the specific target audience. Younger, active baby boomers are more likely to utilize social media, while the current Medicare generation will more likely turn to traditional channels such as formal advertisements or personal recommendations.

## *Marketing Channels for Orthopedics Programs*

### Social Media Presence

*Targeting Active Baby Boomers*

- Document successful patient testimonials; engage two-way communication with question/answer features, either on personal website or on Facebook
- Embed video on orthopedics' webpage or create dedicated YouTube site with success stories from past patients, pre-operative educational videos from program physicians, webcasts of surgeries

### Alumni Network

*Targeting Medicare Generation*

- Patients over 65 less likely to utilize social media, more likely to learn about programs through the traditional "social network," person-to-person recommendations
- Create database to keep in contact with both sports medicine and joint replacement patients; host alumni reunion events; feature alumni during pre-operative education sessions

### Local Sports Services

*Targeting Athletes and Sports Enthusiasts*

- Provide athletic trainers to local sports teams, including high school sports; educate local athletes about injury prevention and program offerings
- Offer preseason physicals for athletes, Saturday morning clinics during sports seasons
- Consider sponsoring professional sports teams and local athletic events

### Bone Health Education

*Targeting At-Risk Populations*

- Host educational seminars to at-risk patients for either sports injuries or osteoarthritis; targets include golfers, skiers, gardeners, tennis enthusiasts, physical labor professionals
- Build educational program around "bone health" or "injury prevention," but introduce key program attributes and physicians and collect patient contact information for continued mailings

Source: Marketing and Planning Leadership Council interviews and analysis.

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# Innovation & Technology

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# Orthopedics Innovation Targeting Younger Patient Demographic

Across the last decade, orthopedics programs have been hit with a barrage of new implants for spine, joint replacement, and trauma procedures. With each addition of a new "premium" device, program margins typically suffer. Orthopedic margin erosion typically results from a shift toward a higher product mix, not necessarily price increases on current products. As new product introductions are not often met with a commensurate increase in reimbursement in orthopedics, programs must subsume the cost increases associated with usage of premium technologies.

That being said, premium orthopedic implants purport to tap into a younger patient population. Design improvements on both hip and knee technology allow surgeons to treat a younger demographic by extending the technology's useful life, creating a more natural feel for younger, more active patients, and even by intervening during earlier stages of the disease. While these technologies can bring new patients into the system through targeted advertising to prospective patients, few have demonstrated empirical benefits over the well-tested and highly effective traditional joint replacements.

**Evolution of Orthopedic Innovation**

| Extending Technology's Useful Life | Creating a More Natural Feel | Intervening in Earlier Stages of Disease |
|---|---|---|
| **Hip Bearing Surfaces**<br>Hard-on-hard articulating surfaces within hip implants reduce wear, extend longevity | **Mobile-Bearing Knees**<br>Permit slight axial rotation to re-create natural knee movement<br><br>**High-Flexion Knees**<br>Allow a higher degree of knee bending for highly active patients<br><br>**Gender-Specific Knees**<br>Streamline implant design for the "unique" anatomy of women<br><br>**Custom Knees**<br>Use pre-surgery imaging to create custom cutting guides or custom implants individualized to specific patient's anatomy | **Hip Resurfacing**<br>Bone-preserving technique covers osteoarthritis-affected hip joint surfaces with metal implants; easier to revise than hip replacement procedure<br><br>**Unicompartmental Knees**<br>Bone- and muscle-sparing knee replacement technique treats early stage osteoarthritis that covers only one knee compartment<br><br>**Biologics**<br>Cell-based or tissue-based interventions that promote natural healing of tendons, ligament or bone, thus reducing or delaying the need for total joint replacement |

Source: Marketing and Planning Leadership Council interviews and analysis.

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# Hard-on-Hard Bearing Surfaces Losing Favor

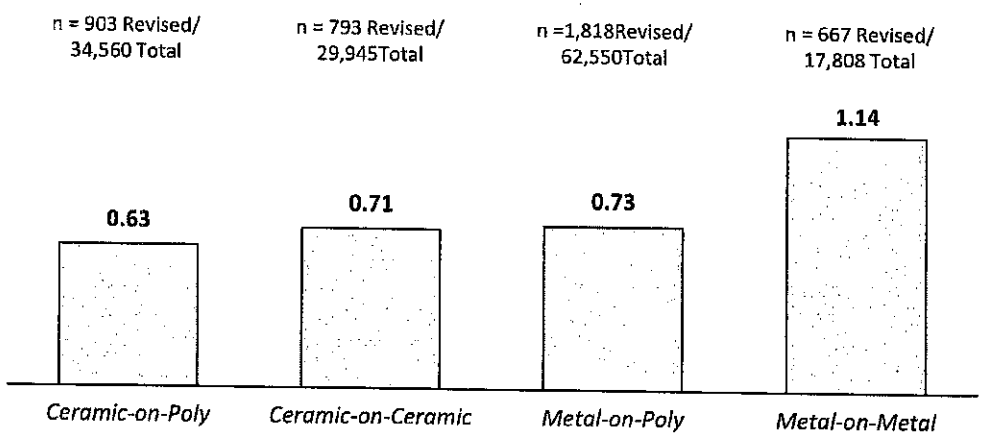
For hip replacement, premium implants include innovative bearing surfaces used to extend the useful life of the implant. Hard-on-hard articulating surfaces, namely metal-on-metal (MOM) and ceramic-on-ceramic (COC) implants, purport to increase the wear resistance of the implant over time, thus extending the time before a revision implant will be required.

Cross-linked polyethylene, or plastic irradiated to increase wear, has become the standard of care for hip replacement, though its wear rate of 0.1 millimeters (mm) per year does not equate with the 0.01 mm for metal-on-metal or 0.0001 mm for ceramic-on-ceramic. That being said, premium implants themselves are not without risk.

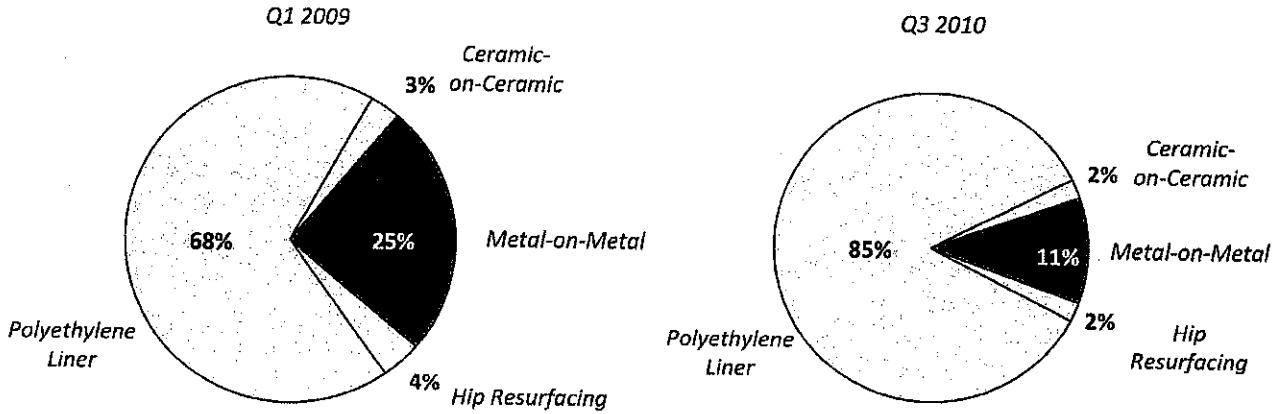
Recent reports concerning metal-on-metal implants highlight the accumulation of metal ions in vitro leading to complications and possible revisions. In December 2010, the Food and Drug Administration issued a patient advisory and ordered all manufacturers of metal-on-metal hip implants to submit data to a post-market surveillance study. This controversy has directly impacted volumes; from their peak of 37 percent of all total hips implanted in 2007, MOM utilization accounted for 11 percent of hip implants toward the end of 2010.

**Revision Rates of Primary Total Hip Replacement by Bearing Surface[1]**

*Australian Orthopedic Association National Joint Replacement Registry 1999-2009*




**Change in Hip Replacement Bearing Surface Use**




1 Revisions per 100 Observed Years; 95% Confidence Interval.

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Source: "Hip and Knee Arthroplasty 2010 Annual Report," accessed July 20, 2011; *Orthopedics Network News*, January 2011 Newsletter: Vol. 22, Number 1; Crawford, et al., "Metal-on-Metal: Is it Worth the Risk?" *Journal of Arthroplasty*, 2010. Vol 25. No. 1.

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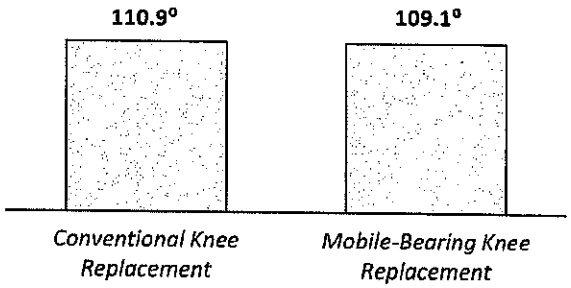
# Increased Mobility Coming at an Increased Cost (With Limited Evidence of Benefit)

Premium knee implants focus on recreating the natural feel and fit of the knee joint. Two premium implants, mobile-bearing knees and high-flexion knees, intend to allow more natural knee movement rather than the strict flexion and limited rotation allowed through a traditional knee replacement. These innovations theoretically allow younger, more active patients to return to sports-related activities, such as tennis, or those from non-western cultures who may need a greater degree of flexion for activities of daily living (e.g., kneeling for religious services).

While athletic patients looking to return to sports may seek out these premium implants, most studies have shown no significant difference in range of motion between high-flexion, mobile-bearing, and conventional implants. Interestingly, according to one study[1] high flexion knees may actually provide greater benefit to those patients who have a more limited range of motion before surgery.

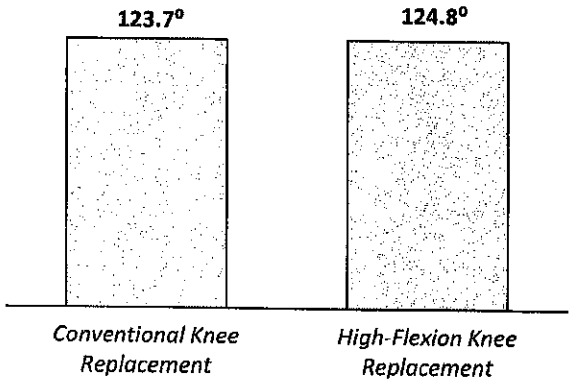
**Mobile-Bearing Versus Conventional Knee Replacement**

*Mean Range of Motion, Degrees*
n = 312




**High-Flexion Versus Conventional Knee Replacement**

*Mean Range of Motion, Degrees*
n = 100




### Mobile-Bearing Knee Replacement

- A next-generation knee construct that includes a moving tibia base plate that permits slight rotation, in addition to the standard axis of movement
- The goal is to improve restoration of natural knee motion by allowing increased axial rotation of the knee
- May offer more "normal" knee motion, and could, in theory, extend survivorship of knee implants by improving load bearing
- Increasingly used in select, high-demand patients

### High-Flexion Knee Replacement

- A next-generation knee construct that features longer condyles in the femoral component, thus permitting a greater degree of flexion in the joint
- The goal is to allow high flexion from 130 degrees to 155 degrees
- While it is designed to improve bending, several studies have shown no significant improvement over conventional knees
- Sometimes used in select, high-demand patients

1 http://www.orthosupersite.com/view.aspx?rid=82351

Source: Gioe, TJ et al. "Mobile and fixed-bearing (all-polyethylene tibial component) total knee arthroplasty designs. A prospective randomized trial," *The Journal of Joint and Bone Surgery*, 91 (9), 2009. Luo et al. "High-Flexion vs Conventional Prostheses Total Arthroplasty: A Meta-Analysis." *The Journal of Arthroplasty*. 2010.

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000598 (02/24/14)

# From Gender-Specific to Patient-Specific: Paying for Marketing Cachet?

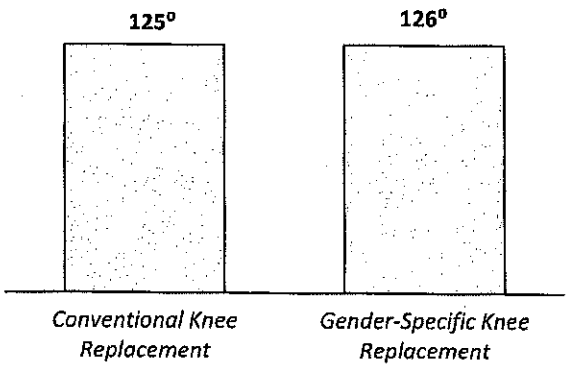
When gender-specific implants for women made a splash in orthopedics with their debut in 2006, women flocked to practices demanding the implant that was shaped especially for the "unique" anatomy of women. Since then, enthusiasm for the devices has dampened, but women still seek out the device due to aggressive marketing efforts.

Similarly, custom-fit knees, either through custom-cutting guides or custom implants, purport to capitalize on the unique anatomy of individual patients to create a more natural fit. Ideally this would create a "perfect fit" for the patient, optimizing functional outcomes and minimizing pain. Although it appears custom cutting guides are as safe and effective as conventional knee implants, they do not seem to offer any noticeably superior clinical outcomes.

The technology also promises to increase operational efficiency; if the surgeon knows exactly which instruments to use and where to cut, the procedure can be completed more quickly and OR staff can predetermine the right mix of implants and tools. Not all surgeons have found that these blocks significantly reduce time in surgery or supply needs; even for those that do, few see a return large enough to recoup these implants' premium price.

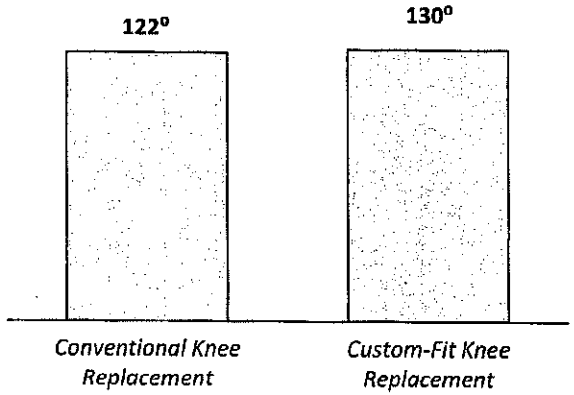
**Conventional Versus Gender-Specific Knee Replacement**

*Mean Range of Motion, Degrees*




**Conventional Versus Custom-Fit Knee Replacement**

*Mean Range of Motion, Degrees*




### Gender-Specific Knee Replacement

- Metal-on-polyethylene implants contoured to fit the anatomical shape of women's knees
- According to manufacturer Zimmer, because the bone in the front of a woman's knee is less prominent than in a man's, conventional implants could prove too thick for women. This thickness may contribute to a "bulky" feeling and result in pain and a decrease in the range of motion
- The gender-specific artificial knee has a thinner profile, theoretically giving women a more "natural" feeling, though this has not borne out in clinical results

### Custom-Fit Knee Replacement

- Implants customized to individual patient's anatomy, either through custom cutting blocks or through custom-made implants
- The price point for custom cutting guides and custom implants is several thousand dollars higher than a standard TKR, and insurers have yet to offer incremental reimbursement
- Products include: Custom-Cutting Guides: Biomet Signature, Stryker OtisKnee, Zimmer Patient Specific Instrumentation (PSI), Smith & Nephew Visionaire; Custom Implant: ConforMIS

Source: Spencer et al. "Initial Experience with Custom-fit Total Knee Replacement: Intra-operative Events and Long-leg Coronal Alignment" *International Orthopedics*, 2009. "Gender Bender: Do Gender Knee Implants Provide Better Outcomes?" American Academy of Orthopedics Surgeons Press Release, August 18, 2010.

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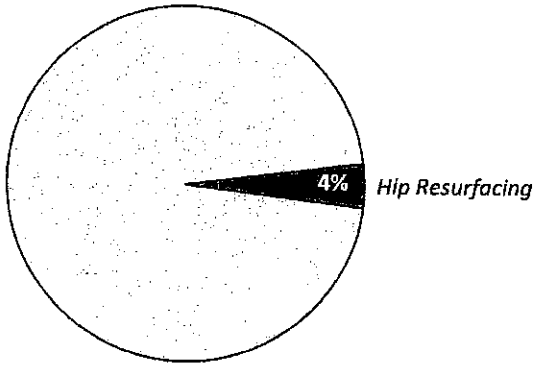
# Resurfacing: Targeting a Younger Demographic Through Earlier Intervention

Another mechanism orthopedic manufacturers have enlisted to target a younger patient demographic is to intervene earlier in the progress of osteoarthritis. Some technologies allow resurfacing the joint—rather than completely replacing it—in younger, active patients.

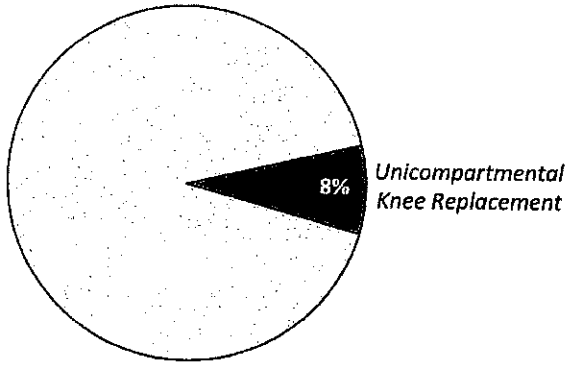
In the hip, a metal-on-metal resurfacing construct allows surgeons to preserve a greater proportion of the patient's natural bone, thus making future revisions easier in younger, more active patients. Though more commonly referred to as unicompartmental or bicompartmental knee replacement, the knee joint can also be resurfaced in an effort to retain as much bone as possible. In patients with centralized osteoarthritis, surgeons can replace individual compartments of the knee.

Patients often actively seek out these procedures. Outcomes, however, can be mixed, especially for those surgeons with less experience. Mako's RIO system uses a robotic arm to assist with unicompartmental knee replacement. Some programs have adopted the RIO hoping to capture this previously untapped market, but with a $900,000 price tag, institutions must generate hundreds of additional procedures to ever recoup the investment; the average user completes 50 procedures annually, with many seeing far fewer.

**Percentage of Hip Replacements Resurfaced**



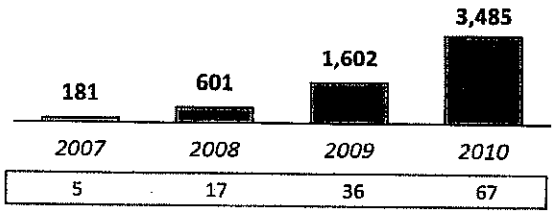

**Percentage of Knee Replacements Resurfaced**




**Mako Surgical's RIO system**

- Intraoperative, stereotactic guidance technology used to assist unicompartmental knee replacement
- Robotic arm provides passive resistance to surgeon, allowing a more precise reproducible procedure
- Primarily indicated for unicompartmental knee replacement, but recently gained approval for use in hip replacements

**Procedures Performed Using Mako RIO**




Source: Riddle et al. "Yearly Incidence of Unicompartmental Knee Arthroplasty in the United States". 2007; Mendenhall et al., "Orthopedics Network News January 2011 Newsletter": Vol. 22, Number 1; MAKO Surgical Corps Quarterly Reports 2007-2010.

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000600 (02/24/14)

# True Market Disruption—Biologics for "Joint Preservation"—Still Years Away

Joint replacements are so successful, technological innovations generally improve procedural outcomes only at the margins, with no blockbuster disruptions across the past 10 years. While the technologies previously discussed can potentially expand into new patient populations or increase market share, the volume impact is typically small and likely at the expense of margin erosion.

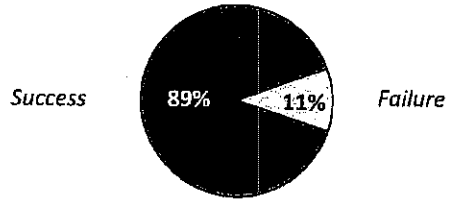
The true disruptor in orthopedics would be a business that preserves the natural joint—one that obviates or delays the need for a joint replacement. While still far on the horizon, biologic innovations could eventually dampen the need for joint replacements in the future. But given the robust market demand for joint replacement, and the difficulty associated with developing these innovations, few biologic applications are ready for bedside use. Widespread biologic usage is still several years away from adoption.

## *Orthopedic Biologic Innovations on the Horizon*

### Meniscus Repair & Replacement

*Example: Use of Biological Transplants*

Meniscus Allograft Survival Rate, n = 45 patients

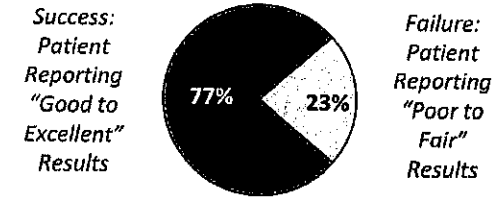



- Damaged meniscus is most often removed, rather than repaired, which accelerates development of osteoarthritis in the joint
- Biological meniscus replacement may encourage tissue regrowth, delaying progression of arthrosis prolonging time to joint replacement

### Acute Cartilage Damage

*Example: Autologous Chondrocyte Implantation*

Patient Pain Follow-Up Following Carticel Injection, n = 154




- Damaged knee cartilage cannot heal on its own, eventually increasing wear on the joint
- Biological autologous cell injections regenerate the articular cartilage in the knee after being injected during a surgical procedure, hopefully prolonging the time to joint replacement

### Fracture Treatment

*Example: Use of Mesenchymal Stem Cell Injections*

- 10 to 20 percent of the approximately 8 million annual bone fractures fail to heal adequately
- In animal studies, autologous adult mesenchymal stem cells potent with a regenerative growth factor (IGF-I) are attracted to the fracture site and improve the healing process
- In a study presented in June 2011 at The Endocrine Society Annual Meeting, mice treated with stem cells enriched with IGF-1 had more bone bridging the fracture gap, and the new bone was three to four times stronger than compared to controls left to heal on their own or those that received stem cells only

Source: Stone, et al., "Meniscus Allograft Survival in Patients with Moderate to Severe Unicompartmental Arthritis: A 2- to 7-Year Follow-up," *The Journal of Arthroscopic and Related Surgery*, Vol 22, No 5, May 2006; "Future of Cartilage and Meniscus Repair," *In Vivo*, July/August 2008. "Study of the Treatment of Articular Repair (STAR), available at http://www.carticel.com/healthcare/about/star-study-research.aspx, accessed July 22, 2011; "Mesenchymal Stem Cells and Fracture Healing," available at: http://www.orthosupersite.com/view.aspx?rid=31441, accessed July 22, 2011.



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# Reform & Care Redesign

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000603 (02/24/14)

# Health Reform Forcing New Strategic Priorities for Orthopedics

The Patient Protection and Affordable Care Act (PPACA), signed into law in March 2010, charges CMS with launching a number of risk-based payment experiments such as bundled payments and shared savings. These payment models introduce new cost, quality, or utilization risks on hospital care.

As institutions look to develop their five-year orthopedics strategic plans, hospital planners and service line leaders must consider the impact these new payment incentives will have on overall orthopedics growth strategy. Under either fee-for-service or risk-based payment, institutions must strive to increase the quality and cost effectiveness of surgical care. However, as payment reforms place increased risk on longer term outcomes and per capita costs, institutions may need to consider extending the purview of the service line across a broader care continuum. Shared savings models in particular represent potentially the most seismic incentive change. These payment methodologies reward accountable care organizations (ACOs) for restricting orthopedic surgery volumes to the most appropriate cases.

**New Imperatives for Orthopedics Under Reform**

| Increase Quality, Cost Effectiveness of Surgery | Extend Across the Care Continuum | Choose the Most Appropriate Treatment |
|---|---|---|
| **Comparative Effectiveness** American Joint Replacement Registry in development; expectation that 90 percent of providers will eventually submit outcomes data | **Episodic Bundling** 30-day (or longer) bundled payments will require organizations to assume risk not only for the surgical care, but the post-acute care and readmissions | **Medicare Shared Savings Program** Organizations voluntarily creating accountable care organizations will be rewarded for slowing, rather than growing, high-cost procedural offerings such as orthopedic surgery, restricting utilization to only appropriate cases |
| **Value-Based Purchasing** Six surgical care improvement measures and eight patient satisfaction measures mean orthopedic quality tied directly to hospital financial success | **Readmissions Penalties** Orthopedics is not yet one of the proposed conditions penalized under the Medicare Hospital Readmissions Reduction Program, though it could be included after 2014 | |
| **Bundled Payments** Discount the total reimbursement delivered, but package the payment into one lump sum to align disparate providers toward the goal of care coordination and ultimately cost reduction | | |

Source: Marketing and Planning Leadership Council interviews and analysis.

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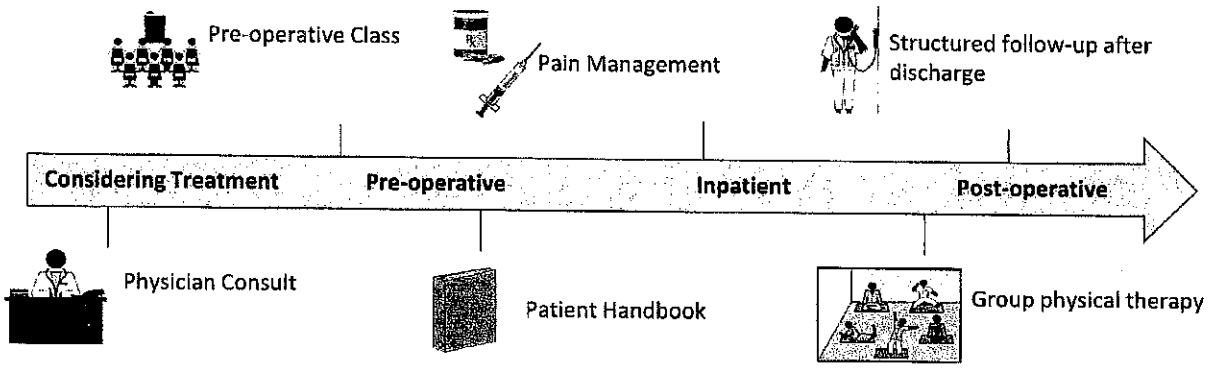
# New Imperative to Extend Purview Across the Care Continuum

Future orthopedics' payments may be tied more closely to the cost and quality of care delivered, not only within the acute care episode, but also before and after treatment.

To provide more efficient and high-quality surgeries, institutions must extend care across the continuum. This means standardizing the approach to consultation, pre-operative education, and pain management, as well as rehabilitation and discharge. Value-based purchasing, bundled payments, and readmissions penalties will all require institutions to map out and optimize the pathway for orthopedic surgery in an effort to reduce complications and costs, and to improve quality and efficiency.

Further afield, shared savings programs may change how hospitals view the care continuum for orthopedics, moving away from only considering the disease in late-stage osteoarthritis, moving upstream to consider primary prevention and longitudinal disease management.

**The Continuum of Care for Late-Stage Osteoarthritis Patients**




**Treatment Options Through Progression of Osteoarthritis**

- Weight loss to minimize stress and load-bearing on the joint
- Exercise to enhance range of motion and naturally lubricate the joint

- Cortisone injections to dull the pain
- Arthroscopy to remedy soft tissue ailments which may be exacerbating osteoarthritis
- Cartilage repair therapies
- Aggressive pain control through medication management

- Joint replacement when conservative therapy has failed and osteoarthritis has reached "end-stage" level

Source: Marketing and Planning Leadership Council research and analysis.

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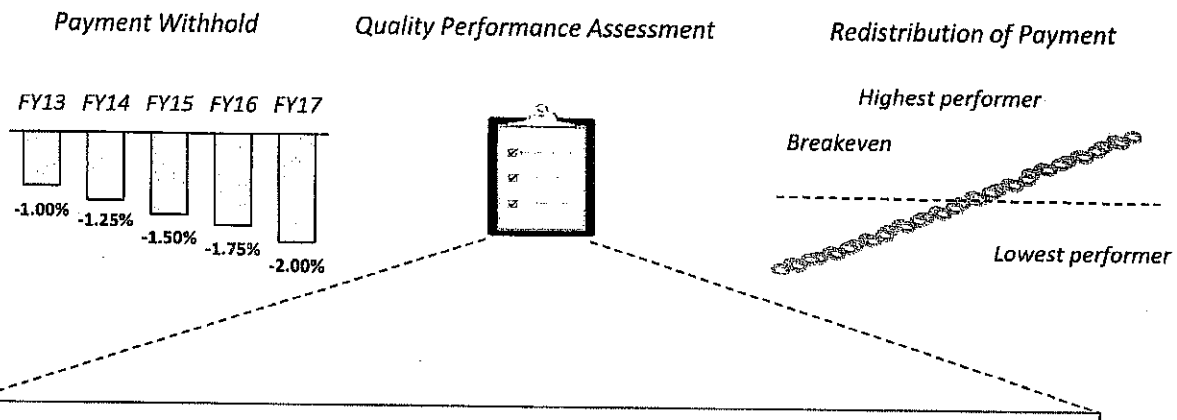
# Orthopedics Quality Strongly Tied to Value-Based Purchasing Success

One of the first rollouts of the Patient Protection and Affordable Care Act, value-based purchasing will tie hospitals' financial success to inpatient quality performance. Under the mandatory program, hospitals with commensurately higher care quality and patient satisfaction will be rewarded with higher Medicare payments. According to the rule, incentives will be funded by a 1 percent cut in base operating DRG payments—totaling about $850 million in the first year—for each discharge in FY 2013, reaching 2 percent by FY 2017. About 30 percent of bonuses will be determined by patient scores, while clinical measures will determine the rest. The program will take effect in FY 2013 and apply to payments for discharges occurring on or after October 1, 2012.

Under value-based purchasing, the quality and perception of orthopedics surgeries will have an outsized impact on overall hospital financial performance, with six surgical care improvement measures and eight patient satisfaction measures (including pain management) relevant to orthopedics.

**The Mechanics of Value-Based Purchasing**




**Quality Metrics Affecting Orthopedics Under Value-Based Purchasing**

**Surgical Care Improvement Measures**

- Prophylactic antibiotic received within one hour prior to surgery
- Antibiotic selection for surgical patients
- Antibiotics discontinued within 24 hours after surgery
- Appropriate surgery patients who received beta blocker during perioperative period
- Surgery patients with recommended VTP[1] ordered
- Surgery patients receiving appropriate VTP within 24 hours of surgery

**Patient Satisfaction (HCAHPS) Measures**

- Communication with nurses
- Communication with doctors
- Responsiveness of hospital staff
- Pain management
- Communication about medicines
- Cleanliness and quietness of hospital environment
- Discharge information
- Overall rating of hospital

1) Venous thromboembolism prophylaxis.

Source: Centers for Medicare and Medicaid Services; Marketing and Planning Leadership Council interviews and analysis.

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# Some Institutions Beginning to Experiment with Longer-Term Outcomes Tracking

Beyond hospital-based quality, government officials have focused much discussion and deliberation around long-term outcomes, especially in orthopedics. Given the elective nature of many orthopedics surgeries, and the controversy surrounding utilization of some procedures such as spinal fusion, progressive programs are beginning to track survey-based outcomes data to document functional status improvements. While these data can be utilized in marketing efforts and payer negotiations, there are currently no direct incentives to pay for what could ultimately be an expensive endeavor.

In terms of process, while some mail or e-mail these surveys to patients, a few innovative institutions have begun collecting these data using tablet computer surveys administered in the waiting room during follow-up appointments.

**Methods for Evaluating Outcomes for Orthopedic Procedures**

| Outcomes Tracking Tool | Key Attributes | Metrics Tracked |
|---|---|---|
| **Short Form – 36 (SF-36)** | 36-question patient survey that focuses on a patient's physical and mental state | • Bodily pain<br>• Limitations due to physical/mental health<br>• Mental health<br>• Overall health<br>• Physical functioning<br>• Social functioning |
| **Western Ontario and McMaster Universities Osteoarthritis Index** | 24-question survey originally designed to assess arthritis in the knee and hip, though now used for various joint-specific interventions such as total joint replacement | • Pain<br>• Physical function<br>• Stiffness |
| **Harris Hip Score** | 8-question survey and physical examination administered by a physician | • Hip function<br>• Level of activity<br>• Pain Physician examination<br>• Range of movement |
| **Knee Society Clinical Rating System** | Survey split into two portions: a physician-administered knee score based on clinical parameters and a functional score based on patient perception of knee performance | • Function<br>• Level of activity<br>• Pain<br>• Range of motion<br>• Stiffness/Swelling of joint |
| **The Oxford Hip Score** | 12-question survey that focuses on hip functionality and pain | • Function<br>• Pain |

Source: Ashby, E., "Outcome Measures for Orthopedic Interventions on the Hip," *Journal of Bone and Joint Surgery*, May 2008; Wright, R., "Knee Sports Injury Outcome Measures," *Journal of Knee Surgery*, 18 (1) (January 2005); Busija, L. "Magnitude and Meaningfulness of Change in SF-36 Scores in Four Types of Orthopedic Surgery," *Health Quality of Life Outcomes*, 31 (6), July 2008; Mahomed N., "The Harris Hip Score: Comparison of Patient Self-report with Surgeon Assessment," *Journal of Arthroplasty*,16 2001; Insall, J., "Rationale of the Knee Society Clinical Rating System," *Clinical Orthopaedics*, (248), November 1989.

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# American Joint Replacement Registry Poised to Make Its Debut

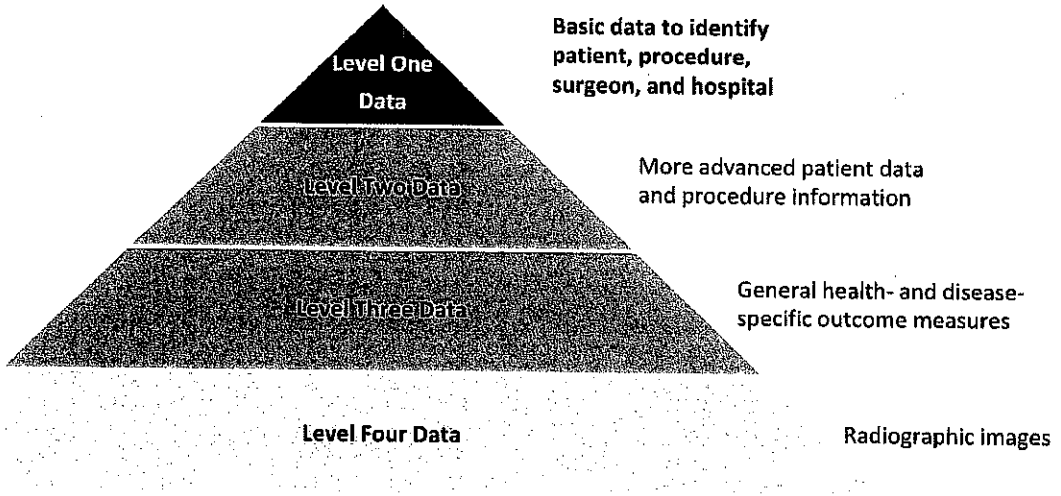
Responding to the discussion about long-term outcomes in orthopedics, a National Joint Replacement Registry has been approved by the American Academy of Orthopedic Surgeons (AAOS). The registry's mission is to use data collection to reduce morbidity and mortality, improve patient safety and quality, aid medical decision making, reduce medical spending, and advance orthopedic bioengineering.

The registry launched in fall 2010, and while it currently is accepting only level one data—basic patient and surgery identifiers—it ultimately will collect outcomes-related clinical information. The registry is designed to assess the most effective technologies and techniques, thus improving orthopedic quality and reducing the need for short- and long-term revision surgeries. According to AAOS, a modest two percent decrease in the U.S. revision rate would yield a savings of $65.2 million in one year.

Most institutions should wait for participation in the national registry before pursuing robust outcomes tracking programs in earnest, unless fervent competition or aggressive payers require more immediate action.

**American Joint Replacement Registry**

*Planned Rollout of Data Collection Elements*




**American Joint Replacement Registry Goals**

| 16 | 90% | $1.3B |
|---|---|---|
| Hospitals involved in the pilot phase, which began collecting Tier 1 data in December 2011 | Participation goal for all hospitals in the United States performing TJR by year 5 | Estimated potential savings across 20 years due to a 2% decrease in revision surgeries |

Source: Lewallen, D. "American Joint Replacement Registry Informational Session." AAOS Annual Meeting Paper Presentations. San Diego, CA. 16 February 2011; American Joint Replacement Registry Fact Sheet, available at: http://orthodoc.aaos.org/ajrr/AJRR%20Fact%20Sheet_AJRR.pdf, accessed July 18, 2011.

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000608 (02/24/14)

# Value-Stream Mapping to Standardize Care for Quality, Cost Gains

While the quality of care will increasingly be tied to payment, the cost of care is an evergreen concern for providers, both under fee-for-service reimbursement as well as new payment methodologies. One way that progressive organizations are looking to improve the quality, cost, and efficiency of care is to standardize care delivery wherever possible.

Organizations are increasingly using Lean principles and value stream mapping as a technique to unite constituencies across the care continuum in process improvement and care standardization.

### 10-Month Lean TJR Results

| | |
|---|---|
| 29% | Reduction in average length of stay (3.4 to 2.4 days) |
| 40% | Reduction in average OR turnaround times (27 to 16 minutes) |
| 50% | Reduction in skilled nursing facility (SNF) utilization |

### Sample Orthopedics Value Stream Mapping Process

| Prioritize Care Pathways for Development | Analyze Internal Data and EBM[1] | Form Multi-Disciplinary Taskforce | Develop Plan for Standardization | Implement Plan and Track Adherence |
|---|---|---|---|---|
| • Total volumes<br>• Variability of pathway<br>• Profitability<br>• Growth potential | • Internal assessment of care delivery process, outcomes, cost<br>• External review of EBM | • Engage all providers across pathway from diagnosis to "cure"<br>• Schedule 1 to 3 day summit to review data | • Identify flashpoints across pathway<br>• Prioritize targets for standardizing<br>• Set timeline and metrics of success | • Engage stakeholders in change effort<br>• Monitor adherence<br>• Revisit standards as evidence, experience develops |

**Data Gathered**

- Procedure volumes
- Cost variability
- Outcomes variability
- Reimbursement
- Profitability
- Patient flow data
- Growth potential
- Referral patterns
- Evidence-based medicine

**Plan of Action During Value Streaming Kickoff**

- *Analyze current state*
  - Identify processes of focus
  - Find process inefficiencies
- *Determine ideal state*
  - Explore options for process optimization
  - Alter process for optimal efficiency
- *Finalize new standards*
  - Prioritize standards for implementation
  - Set standardization timelines
  - Determine evaluation metrics

**Standardization Priorities**

- Implant costs
- Order sets
- Total hip replacement length of stay
- OR turnover time
- Imaging utilization
- Discharge protocols
- Pre-op education

1) Evidence-based medicine

Source: Mohan, V. "Integration of Lean Manufacturing Principles Optimizes TJR Perioperative Efficiency and LOS," AAOS Annual Meeting Paper Presentations. San Diego, CA. 18 February 2011.

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000609 (02/24/14)

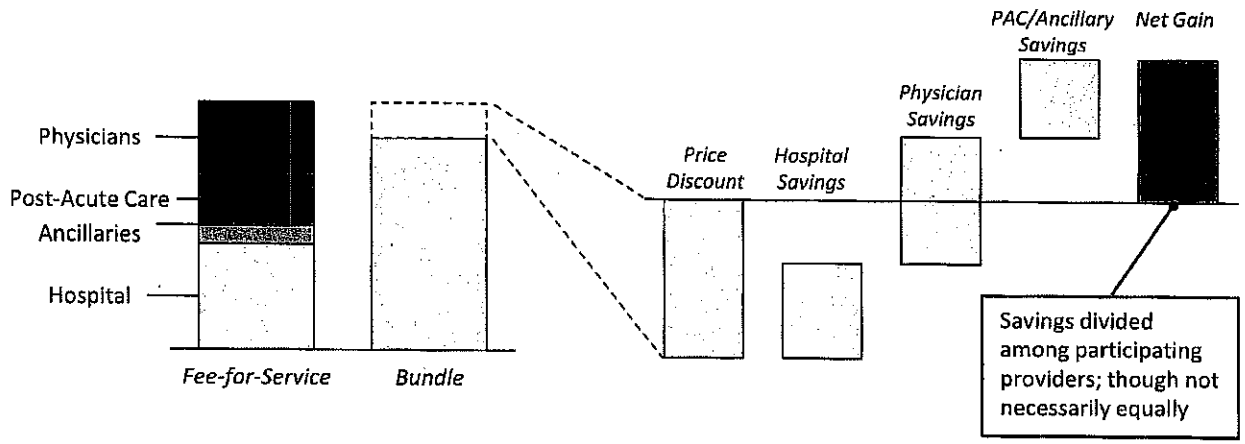
# Bundled Payments Shifting Risk onto Providers, but Providing Aligned Incentives

Bundled payments will place even more emphasis on margin improvement. Whether focused on inpatient care or longer term care episodes, bundled payments typically discount the total reimbursement delivered, and package hospital and physician payments into one lump sum to align disparate providers toward the goal of care coordination and ultimately cost reduction.

The Medicare Acute Care Episode (ACE) demonstration included orthopedic surgeries in its pilot, and participating organizations looked to orthopedic devices, length of stay reductions, and ancillary cutbacks for cost savings. Under episodic bundling, post-acute care usage and readmissions will also be included in the payment bundle.

While bundled payments may place some revenue at risk, organizations can use the model to strengthen hospital-surgeon relationships. An organization can potentially overcome strained relations with independent physicians and provide an added gainsharing incentive to reduce episodic costs and improve margins. Surgeons may be unwilling to create multiple bundling contracts with several hospitals, allowing an opportunity to tighten relationships without formal employment.

**The Mechanics of Bundled Payments**




**Orthopedic ACE Success at Hillcrest Medical Center**

| 10% | 57% | 20% |
|---|---|---|
| Reduction in Total Orthopedics Cost | Improvement in Orthopedics Medicare Margins | Improvement in Orthopedics All-Payer Margins |

Source: Dobbs, S, "The Medicare ACE Demonstration Project: Testing A New Bundled Payment System at Hillcrest Medical Center," presentation to Healthcare Financial Management Association, 2010; Health Care Advisory Board interviews and analysis.

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# Reduced Reimbursement, Burgeoning Volumes Force Continued Vigilance on LOS

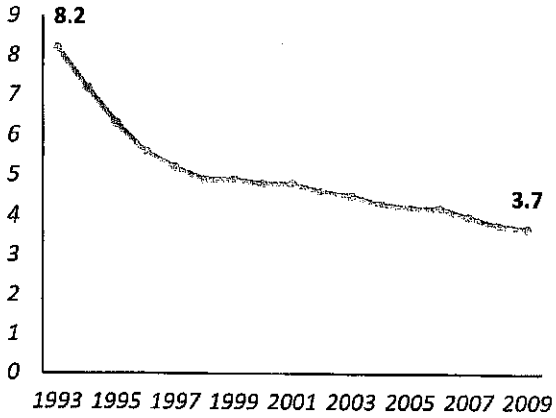
One key process improvement effort for orthopedics continues to be improving length of stay. As per-case revenues decrease from both health care reform and the growing Medicare population, efficiency gains are increasingly necessary to reduce costs and increase throughput.

Hospitals and surgeons have reduced length of stay (LOS) for joint replacement by more than 50 percent since 1993. However, LOS has plateaued around three to four days for most organizations.

However, some progressive organizations have pushed the reduced LOS even further, focusing on innovations in surgical technique, peri-operative care protocols and pain management. Minimally invasive surgical techniques in particular allow surgeons to avoid cutting muscles and tendons, which allows for quicker healing and less pain for the patient. A handful of organizations are pioneering minimally invasive joint replacements as outpatient procedures, but these programs are still uncommon.

**Total Joint Replacement Length of Stay**

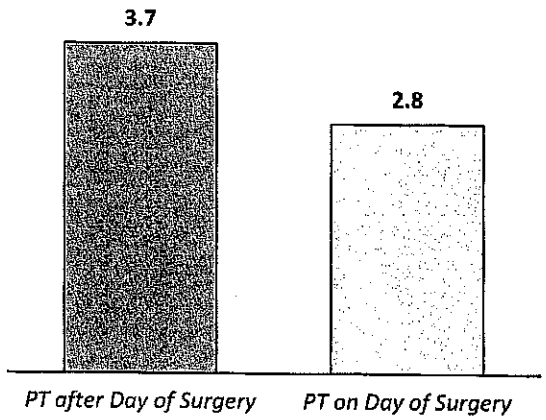
*1993-2009*




**Impact of Physical Therapy on Hospital Stay**

*Average LOS for Patients Receiving TJR*

n = 128




| Factors Impacting Length of Stay |
|---|
| Surgical Approach: Minimally Invasive or Traditional |
| Patient's Post-operative Pain |
| Length of Time Before Initiating Rehabilitation |
| Patient's Pre-op Health Level / Comorbidities |
| Peri-operative Care Protocols |

Source: HCUP-net, accessed July 18, 2011; Huddleston, J., AAOS Annual Meeting Paper Presentations; San Diego, CA, 18 February 2011.

000611 (02/24/14)

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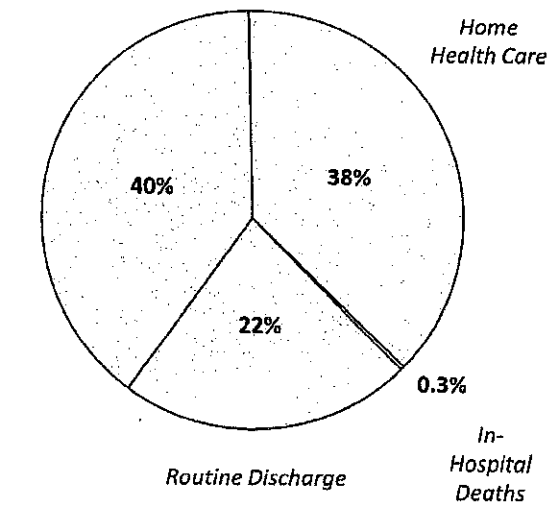
# Alignment with Post-Acute Care Becoming Critical

While improving LOS can reduce costs and improve throughput, episodic bundling and readmissions penalties may prove risky for those institutions looking to reduce LOS by any means possible. Under episodic bundles, post-acute providers will be included under the lump sum payment, meaning that lower acuity post-acute care is one opportunity for savings, as is a reduction in readmissions.

Recovering orthopedic patients frequently utilize post-acute care, with 40 percent discharged to another institution such as a skilled nursing facility (SNF) or rehab, and nearly 40 percent more being discharged with home health care assistance. As institutions accept bundled payments with these organizations, better care coordination becomes essential. Orthopedics service line directors should focus efforts on formalizing discharge planning, standardizing referral guidelines, and partnering with post-acute providers to share data and facilitate ongoing communication.

**Promoting Appropriate Post-Acute Care Through Discharge Planning**

*Discharge Status for Joint Replacement Admissions*
*2009*
*n = 1.1 M*




**Keys to Successful Orthopedic Discharge Plans**

- Create Formal Discharge Planning Process
- Standardize Referral Guidelines to Post-Acute Care
- Track Patient Follow-up
- Pre-schedule Post-operative Visit
- Enable Data Sharing with Post-Acute Care
- Facilitate Ongoing Communication

1) MS-DRGs: 461, 462, 466-470.

Source: Marketing and Planning Leadership Council research and analysis.

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# Majority of Orthopedics Readmissions Tied to Non-orthopedics Diagnoses

While orthopedic readmissions are not among Medicare's initial targets for the Hospital Readmissions Reduction Program, bundled payments ultimately will place increased risk on orthopedic readmissions. Current fee-for-service economics encourage focused efforts on reducing LOS without necessarily addressing the cost of post-acute care; one large study suggests that as LOS in hip replacement diminished, 30-day readmissions rates and use of expensive post-acute care rose dramatically.

Both hip and knee replacements are prone to readmissions, although the majority of all-cause readmissions likely stems from non-orthopedic causes such as congestive heart failure or ischemic heart disease.

As institutions look to curb orthopedic readmissions, special care should be taken to not only discharge patients appropriately, but also understand the patient's comorbidities and address the patients post-surgical needs holistically.

**THR 30-day Readmissions Rates**

| '99-'00 | '07-'08 |
|---|---|
| 4.8% | 8.5% |

1) Venous thromboembolism was not one of the top 10 causes of readmission.

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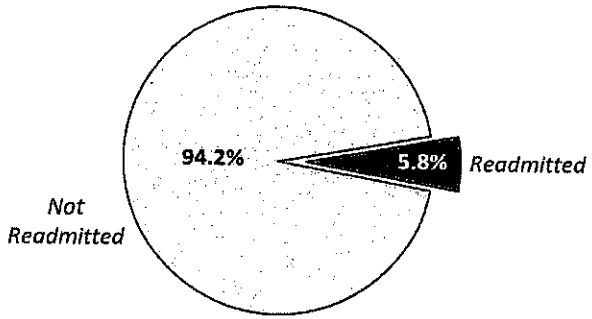
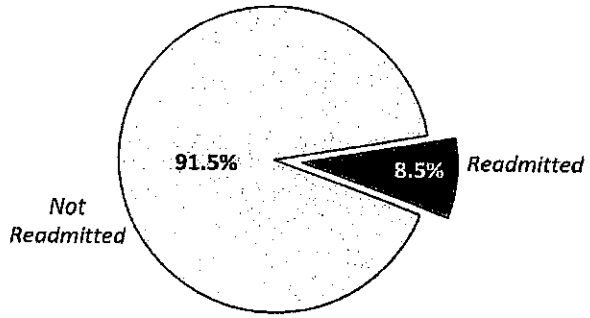
**Total Knee Replacement 30-Day Readmissions**

n = 4,057



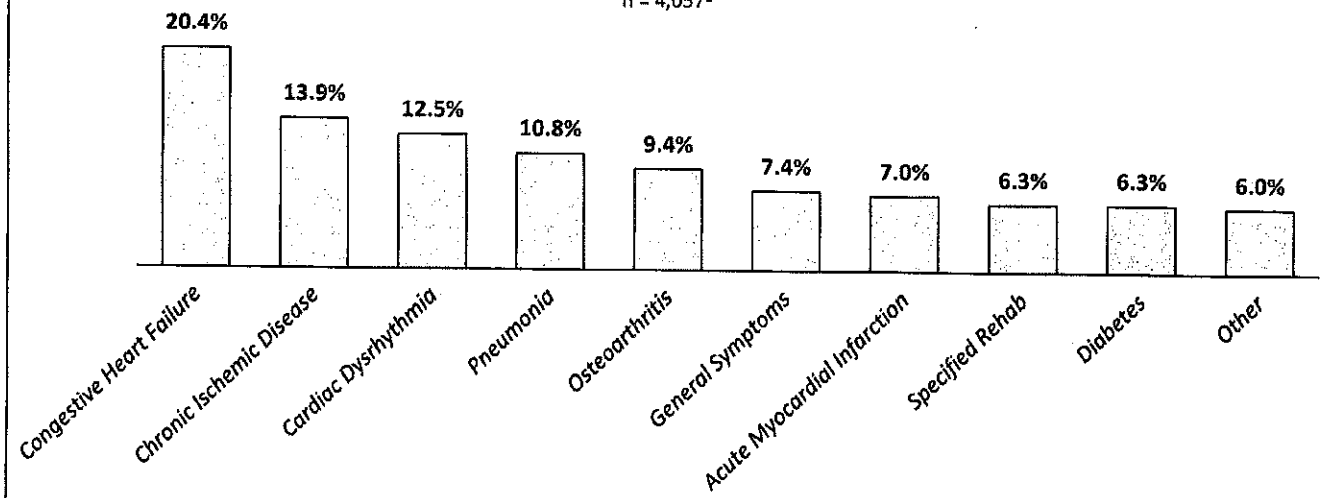

**Total Hip Replacement 30-Day Readmissions**

n = 1.5 M




**Most Common Diagnoses Among Total Knee Replacement 30-day Readmissions**

n = 4,057[1]




Source: Vorhies, J. et al., "Decreased Length of Stay After TKA Is Not Associated With Increased Readmission Rates in a National Medicare Sample," *Clinical Orthopedics and Related Research*, July 1, 2011; Cram et al., "Clinical Characteristics and Outcomes of Medicare Patients Undergoing Total Hip Arthroplasty, 1991-2008" *JAMA*, 305(15), 2011.

# Widespread Utilization Variability Suggests Opportunity to Slow Volume Growth

Penalizing readmissions is Medicare's first step toward realigning incentives to reduce unnecessary and wasteful volume. Medicare is also targeting potentially unnecessary preference-sensitive elective procedures through shared savings programs and accountable care organizations (ACOs).

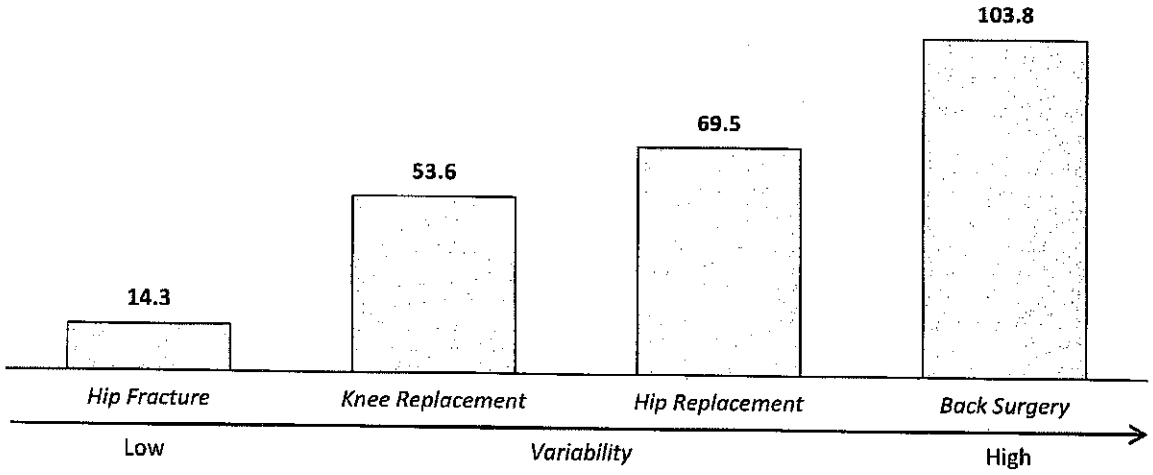
While most payment reforms address hospital-based quality and cost of care, Medicare's Shared Savings Program provides an incentive to lower the per capita spending for a population across time, thus shifting incentives away from procedural growth and toward prevention.

Given the elective nature of most procedures in orthopedics, as incentives shift physicians and hospitals may be encouraged to manage down utilization. The national variability of these procedures suggests there may be an opportunity to slow the growth of these procedures in high utilizing areas.

However, the Medicare Shared Savings Program is currently voluntary. Most institutions will continue to operate under fee-for-service economics, and should therefore continue to prioritize growth until the organization formally receives the majority of its payment under a utilization risk scenario.

**Regional Variability in Use Rates for Common Orthopedics Procedures**

*Systematic Components of Variation*[1]




**Range in Regional Variability for Orthopedic Procedures**

| 4x | 5x | 7x |
|---|---|---|
| THR: Hip Fracture | TJR: Hip Fracture | Back Surgery: Hip Fracture |

1 Higher number implies higher variability. The authors state "Systematic Components of Variation (SCV) are measures that allow comparisons of variation among procedures with different mean rates. The numerator is the number of patients with the indicated procedure; the denominator is the number of enrolled patients in traditional Medicare living in those regions."

Source: Fisher et al., "Trends and Regional Variation in Hip, Knee, and Shoulder Replacement," A Dartmouth Atlas Surgery Report, available at: http://www.dartmouthatlas.org/downloads/reports/Joint_Replacement_0410.pdf, accessed July 28, 2011.

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000614 (02/24/14)

# Conservative Therapy, Not Prevention, Likely to Slow Orthopedic Utilization

As incentives shift from encouraging volume growth to slowing utilization, organizations must redesign care pathways to encourage more appropriate and conservative treatment. While long-term lifestyle changes such as weight reduction and exercise may prevent osteoarthritis, once patients feel symptoms it is too late to reverse the disease. That being said, surgery is the last-stage option for osteoarthritis pain.

Institutions looking to promote appropriate care should potentially employ a multidisciplinary approach that begins with conservative treatments, pain management, and physical therapy before surgery.

While potentially dampening the rate of per capita surgeries, conservative care pathways may surprisingly foster overall volume growth, even under fee-for-service incentives. Given the rapid growth of orthopedics and the potential shortage of physicians, effective triage protocols may increase efficiency of surgeons, reducing the number of patients physicians must see to generate a surgical candidate. Additionally, the comprehensive approach and patient-centered pathway may differentiate a center, ultimately driving overall volume growth.

## Points of Entry for Orthopedic Intake Consults

### *Surgeon*

- 1 to 2 surgeons meet patients as they enter the spine center
- Surgeon takes full patient history and performs surgery as needed
- Limited use of pain management and physical medicine

### *Physiatrist*

- Physiatrist first meets patients as they as enter the orthopedic center
- Physiatrist takes patient history and employs nonsurgical approaches to care first, deferring patients to surgery only when nonsurgical care is not successful
- Usually used as a triage mechanism in higher-volume centers to maintain effective use of surgeons' time

### *Nurse Coordinator*

- Nurse or physician assistant acts as care coordinator as patients enter the orthopedics center
- Care coordinator takes patient history and refers patient to physiatrist or surgeon, as appropriate
- Emphasis on comprehensive care allows patient to meet with physiatrists, surgeons, chiropractors, etc.

### Call Center Components to Ensure Appropriate Triage

- Pre-authorization
- Decision algorithms
- Risk stratification tools
- Triage software
- Dedicated call center nurse

Source: Marketing and Planning Leadership Council interviews and analysis.

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# Patients Must Ultimately Be the Decision Makers in Opting for Conservative Therapy

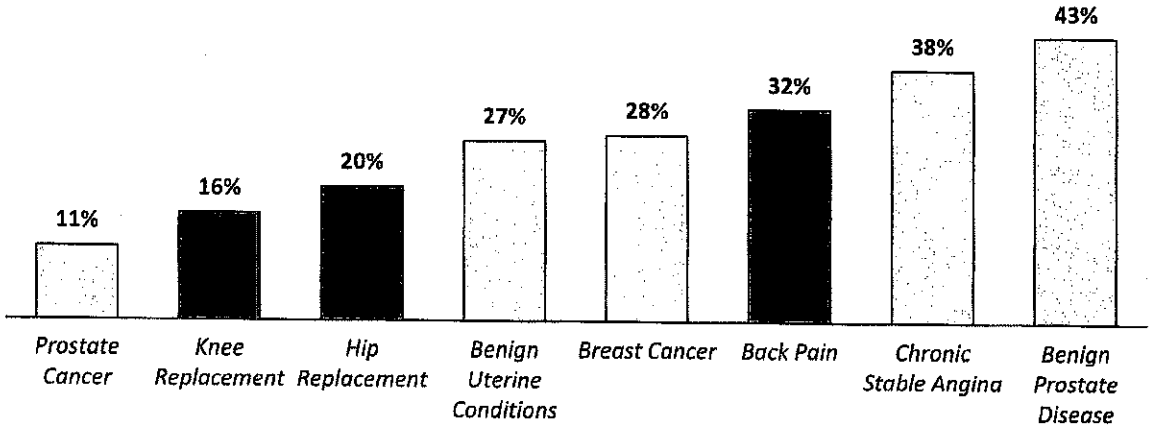
Ultimately, organizations participating in the Medicare Shared Savings Program or other utilization risk-based payment programs will encourage patients to consider conservative treatment options and move forward with surgery only as a last resort. When patients are presented with conservative options along with surgery, a number do self-select non-invasive treatment. Under a shared-decision making pilot, approximately one out of every five joint replacement patients and one out of every three back pain patients chose conservative options. While the vast majority still choose surgery, given the high cost associated with these procedures there is room for cost savings for a payer or an accountable care organization under a shared savings arrangement.

It is important to note, however, that under Medicare's Shared Savings Program, patients will still be able to seek out other providers, and bonuses will be tied to patient satisfaction measures. Institutions aggressively pushing conservative care without keeping patients at the center of the decision could lose not only the bonus, but also the contribution profit of performing the case at their institution.

**Claims-Validated Shift Rate Among Patients Participating in Shared Decision Making**

*Percentage of Patients Shifting to More Conservative Therapy Than Was Initially Planned*

n = 5,335 patients




***Treatment Shift Savings***

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $91 K | $3.7 M | $2.7 M | $2.6 M | $43 K | $2 M | $2.8 M | $555 K |

**Case in Brief: Treatment Decision Support**

- Service provided by OptumHealth, part of UnitedHealth Group
- Treatment Decision Support service provides nurse coaching to help patients evaluate treatment options and find high quality providers

Source: OptumHealth Care Solutions: Product Sheet, 2007, available at: http://www.optumhealth.com/content/Files/DS_TDS_Product%20Sheet_FINAL.pdf, accessed March 27, 2009; "Voice of the Consumer: Empowered to Chose, Finding an Alternative to Surgery Puts Patient in Charge of Her Health," *Hub Magazine (UnitedHealth Group), Summer 2008*, available at: http://www.hubmagazine.net/articles.php?ID=179, accessed March 27, 2009; UnitedHealth Group, 2007 Summary Annual Report, 2007.

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**Schematic Design Approval**
The Floor Plan developed by the departmental user groups, planners and designers constitutes the interpretation of the Space Program and Departmental needs.
The Signatures below reflect the acceptance of this Agreement and allows the Design Development phase of work to proceed.

This signifies that the floor plan/room arrangement is fixed and changes to these items shall be made only through the authorization of the hospital administration.

DEPARTMENT NAME: Surgery

The signatures below reflect the acceptance of this agreement and allow the Design Development Phase of work to proceed.

| | | |
|---|---|---|
| | Dr. Rose E. | Date 11/18/13 |
| | Dr. R.J.S. | Date 11/18/13 |
| | Dr. Marks S. | Date 11/18/13 |
| | Dr. GMR | Date 11/18/13 |
| | Holly S. | Date 11/18/13 |
| | Booth | Date 11/18/13 |
| | Trask | Date 11/21/13 |
| | | Date |
| | | Date |
| | | Date |

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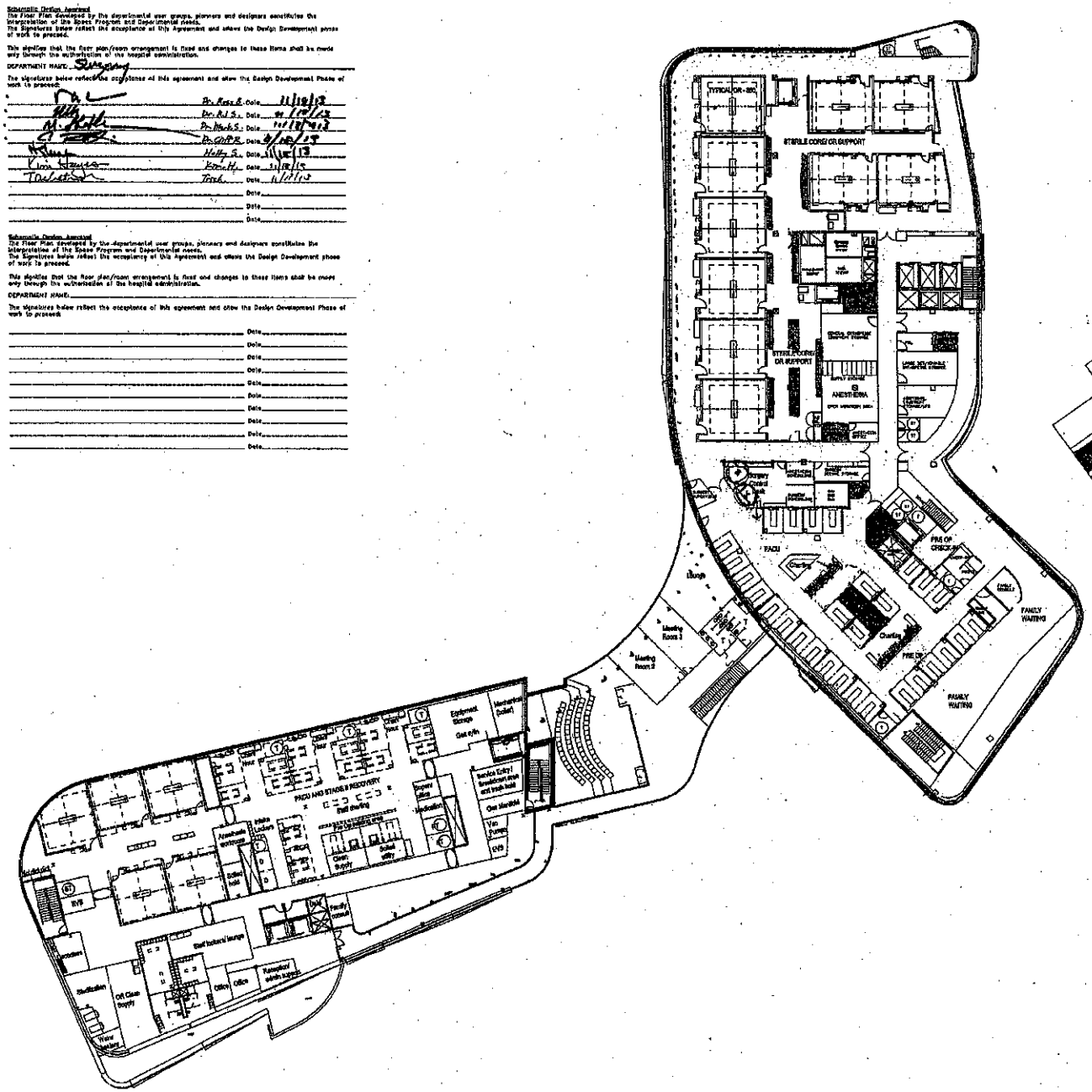


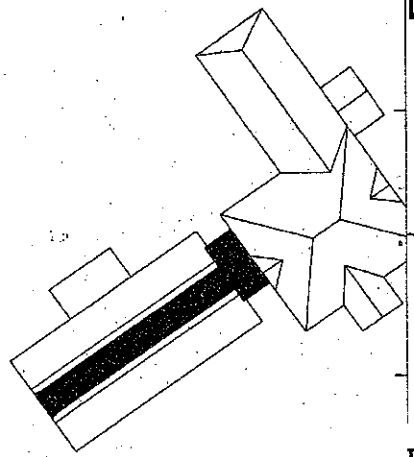

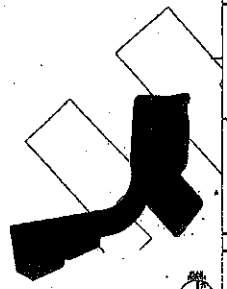

KEY PLAN

HDR
Architects Engineers P.C.

PERKINS WILL
Perkins + Will
315 Park Avenue South, 4th Floor
New York, NY 10003

BRA
Bard, Rao + Athanas Consulting Engineers
311 Arsenal Street
Watertown, MA 02472

HARTFORD HOSPITAL
-Bone Joint Institute
-Medical Office Bldg
-Ambulatory Service Center

80 Seymour Street
Hartford, CT, 06102

Hartford HealthCare
Bone & Joint Institute
Hartford Hospital

| MARK | DATE | DESCRIPTION |
|---|---|---|

PRELIMINARY

THIRD FLOOR

X-XXX

SCHEMATIC DESIGN

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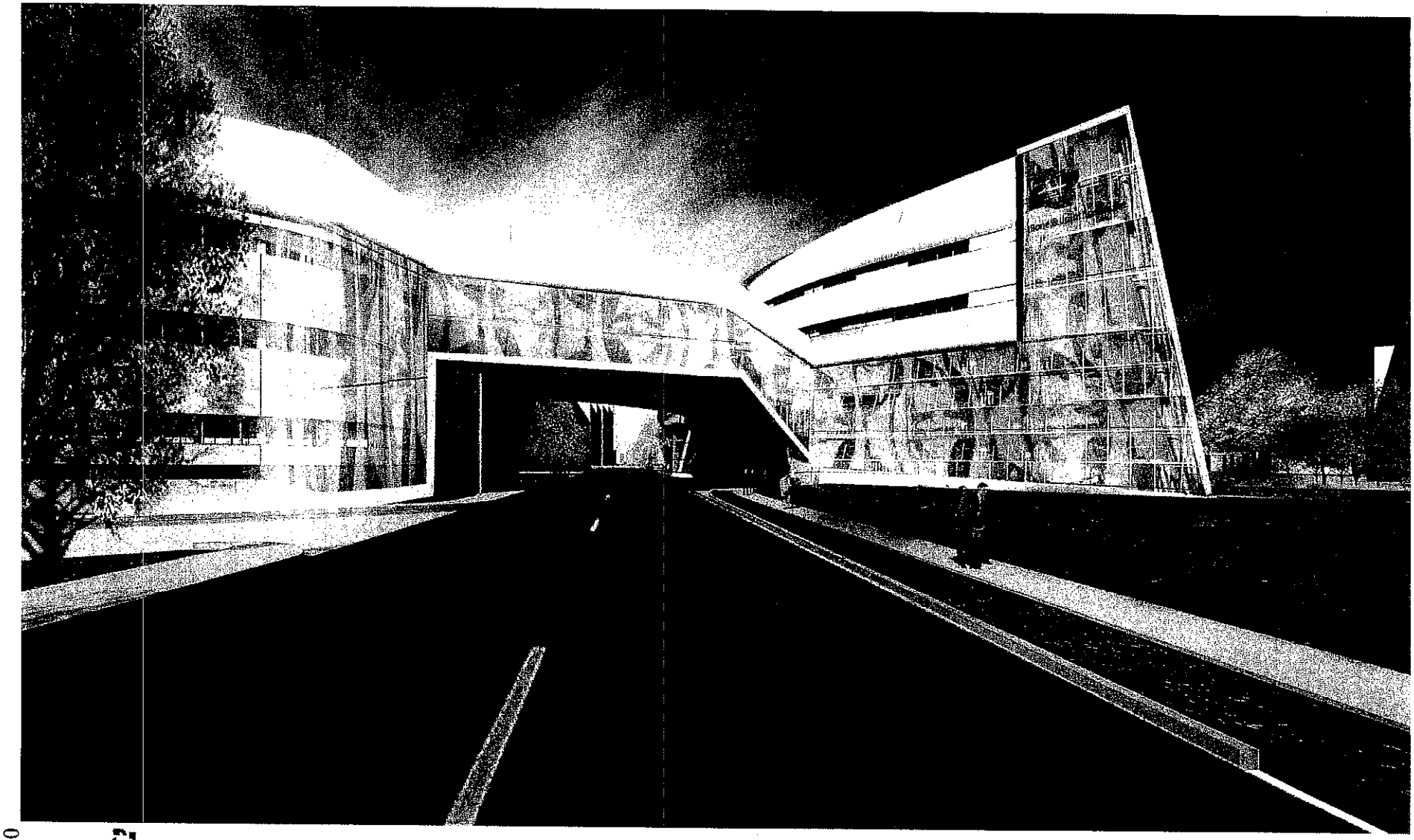

Hartford HealthCare
Bone & Joint Institute
Hartford Hospital

SEYMOUR STREET ROADWAY VIEW
5 NOVEMBER 2013

PERKINS + WILL

000618 (02/24/14)

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# Dedicated Orthopedic Operating Room Unit Improves Operating Room Efficiency

Travis J. Small DO [a], Bishoy V. Gad MD [a], Alison K. Klika MS [a], Loran S. Mounir-Soliman MD [b], Ryan L. Gerritsen BA [a], Wael K. Barsoum MD [a]

[a] Department of Orthopaedic Surgery, Cleveland Clinic, Cleveland, Ohio
[b] Department of General Anesthesiology, Cleveland Clinic, Cleveland, Ohio

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ABSTRACT

We investigated the effectiveness of dedicated orthopedic operating rooms (OR) on minimizing time spent on perioperative processes to increase OR throughput in total knee and hip arthroplasty procedures. The use of a dedicated orthopedic unit that included 6 ORs with staff allocated only for those ORs was compared to the use of a traditional staffing model. After matching to simulate randomization, each group consisted of 422 procedures. The dedicated orthopedic unit improved average anesthesia controlled time by 4 minutes ($P<.001$), operative time by 7 minutes ($P=.004$) and turnover time by 8 minutes ($P<.001$). An overall improvement of 19 minutes per procedure using the dedicated unit was observed. Utilizing a dedicated orthopedic unit can save time without increasing adverse events.

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The health-care system currently faces many challenges including diminishing resources, increasing costs and changes in reimbursement [1–4]. These economic pressures require hospitals to frequently evaluate operating room (OR) processes to improve efficiency without undermining patient safety and care. System design is cited as the most effective method for improving OR procedures [5–8] and increasing OR capacity. Effectively managing OR processes is critical for maximizing OR utilization, diminishing resource downtime and facilitating an effective team dynamic. The classic system of running an OR involves placing staff (e.g., anesthesia, surgical technicians and nurses) wherever needed. Sharing staff amongst various specialties is referred to as a traditional OR staffing model. In contrast, a dedicated OR is considered to be an OR unit with committed staff to only one specialty with specific cases. Other studies have analyzed multidisciplinary team assessment to improve process [6,9–12] and using parallel processing to improve operative and non-operative times [7].

Improving OR utilization requires understanding of 3 parameters: time required for surgery, case scheduling, and minimizing time between surgeries [5]. First, technological advances and improvements in surgical technique may decrease time required for surgery [5], while process improvements may also decrease surgical time. Secondly, time required for surgery is often thought of as surgeon and procedure dependent. However, studies have shown that there are consistent relationships established amongst surgeons for each procedure [13,14]. Estimation for procedure time serves as an effective tool to improve scheduling difficulties [15–18]. Lastly, analyzing sources of increased non-operative time subdivided into anesthesia controlled time (ACT) and turnover time (TOT), through a multidisciplinary (nursing, anesthesia, and surgical team) approach has proven effective in previous studies [6,7]. All of these parameters must be investigated to fully maximize patient throughput.

Our institution has decreased both operative and non-operative time by making system improvements using high throughput processes which led to an increase in contribution margin (difference between direct cost and revenue) of 19.6% over a 2-year period [7]. This was accomplished through redesign of the operative system to include perioperative induction rooms [15], and block rooms for regional anesthesia [8]. Other improvements were achieved by adding dedicated circulating nurses and enhancing communication between OR technicians with handheld radios [19]. These successful maneuvers can be attributed to a multidisciplinary approach consisting of orthopedic surgeons, anesthesiologists, nurses, nurse managers, and support staff [6,8]. A limitation in this design was that it concentrated added resources on only one room each day.

The primary objective of this study was to determine whether the use of a dedicated orthopedic unit, encompassing an average of 6 rooms per day, would decrease overall OR time, including ACT, operative time, and TOT. A secondary goal of the study was to compare amount, type and severity of complications for traditional

Supplementary material available at www.arthroplastyjournal.org.

The Conflict of Interest statement associated with this article can be found at http://dx.doi.org/10.1016/j.arth.2013.01.033.

Reprint requests: Alison Klika, MS, Research Program Manager, Department of Orthopaedic Surgery, Cleveland Clinic – A41, 9500 Euclid Ave., Cleveland, OH 44195.

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http://dx.doi.org/10.1016/j.arth.2013.01.033

and dedicated orthopedic units. We hypothesized that the dedicated orthopedic unit would allow for decreased OR time, without increasing complication rates.

## Materials and Methods

The Institutional Review Board reviewed and approved the study. A process improvement commission was created in 2008 by the surgical operations department of a tertiary medical center to reorganize the flow of orthopedic ORs performing total knee arthroplasty (TKA) and total hip arthroplasty (THA) procedures. Beginning on April 1, 2009, the total joints orthopedic ORs at our Institution began to function as an isolated unit (i.e., dedicated OR) from other services. The unit remained "dedicated" until 7:30 pm at which time staffing and call responsibilities were shared with the rest of the surgical suite. The 6 dedicated ORs were allocated nurses, anesthesiologists, orthopedic surgeons and OR technicians who exclusively performed primary total joint arthroplasty procedures. At preset intervals, the anesthesia staff from the orthopedic team rotated through different subspecialty anesthesia services. In addition, measures were taken to avoid penalizing OR staff for being efficient by prohibiting staff members from floating to other cases outside the dedicated OR, unless by choice. Once staff completed their assigned tasks in the OR they were either delegated to educational or service work, or allowed to go home. Patient flow into and out of the dedicated OR was similar to traditional OR services as described by Krupta [5]. There were no changes in anticoagulation protocols or standard of care protocols between the two time periods.

Cases for a retrospective review were identified using our operating room information system to query Current Procedural Terminology codes [20] for primary TKA (27447) and primary THA (27130) cases from 2 time periods. Cases from September 1, 2008 to February 28, 2009 defined the control group (i.e., traditional), and cases from September 1, 2009 to February 28, 2010 defined the dedicated OR group.

Time interval definitions by the American Association of Clinical Directors Procedural Times [21] were used to define the metrics. The sequence of time intervals is summarized in Fig. 1. Specific parameters studied were patient in room (PIR) times, procedure start times (PST), and patient out of room times (POR). PIR to PST was referred to as ACT, PST to POR was called operative time, and POR from the first case to PIR of the second case was referred to as turnover time (TOT). Intervals between PIR and POR, PST and POR, PIR for one case to PIR of the following case, and POR from one case to PIR of the following case were then examined. Data were collected and analyzed for the each cohort as a whole, then as TKA and THA subgroups. PIR 1 to PIR 2 intervals of greater than 500 minutes (8 hr 20 min) were excluded due to unrealistic room TOT and OR times. These were likely non-contiguous cases, meaning that the long TOT was due to a case ending the previous day and a new case being the first case of the following surgical day. All cases greater than 500 minutes and negative times were excluded as these were most likely due to errors in computer reporting, CPT recording, or inexplicably long cases due to non-procedure related complications.

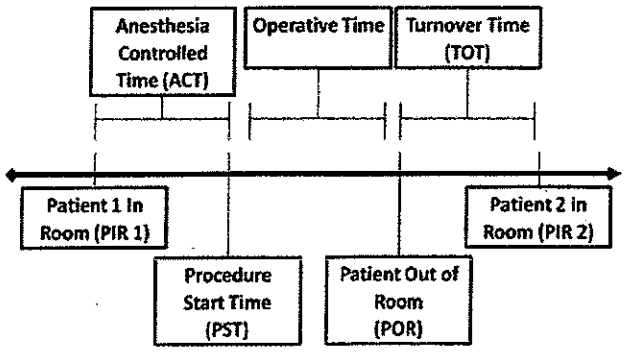


**Fig. 1.** Summary of OR times in linear time format.

Acute and in-house complications were recorded for all patients. In-house complications were defined as any adverse event that occurred immediately after surgery until discharge from the hospital. Acute complications were defined as any readmission within 90 days of the surgical date following discharge from the hospital. Any patient that did not have contact with his/her surgeon within 90 days was excluded from the study (n=12 control; n=5 dedicated). Complications were categorized based on type (i.e., infection, hematomas/deep vein thrombosis, fractures, mechanical failures, other) and severity (grade 1 to 5) of the complication following Dindo et al. [22]. Complications listed as 'other' consisted of arthrofibrosis and emergency room visits as well as unrelated procedures of transurethral prostectomy, CHF exacerbation, laparscopic cholesycectomy, and sickle-cell crisis. Grade 1 complications were defined as any deviation from normal post-operative course excluding the following treatments: antiemetics, antipyretics, analgetics, diuretics, electrolytes, and physiotherapy. Grade 2 complications required any drugs other then allowed in grade one complications including blood transfusions and total parenteral nutrition. Grade 3 complications required surgical, endoscopic and/or radiographic intervention. Grade 4 complications were life-threatening including CNS complications requiring IC/ICU management. Grade 5 complications included death of the patient.

### *Statistical Methods*

Baseline characteristics were first evaluated to determine areas of statistical significance between groups so that they could be appropriately adjusted for in the models. Descriptive statistics were computed comparing the OR groups (traditional vs dedicated). Subgroup analyses evaluating TKA and THA procedures were also evaluated. Categorical data were compared using chi-square tests for measures of association. The Fisher's exact test was applied for expected cell counts<5 and the Cochran Mantel–Haenszel chi-square tests were used for ordinal data. Continuous data were compared using the student's t-tests for normally distributed data; non-normal data were compared using the non-parametric Wilcoxon tests.

Since dedicated and traditional ORs differed significantly for some of the demographic and comorbidity variables; in order to make appropriate comparisons a propensity matching analysis was performed. Demographics utilized for matching consisted of: age, body mass index (BMI), gender, surgeon, laterality, and indications for surgery (Table 1 and Appendix 1). Comorbidities applied for matching were hypertension, diabetes, osteoporosis, cancer, hyperlipidemia, coronary artery disease, congestive heart failure, lung disease, tobacco use, alcohol use, and illicit drug use as well as American Society of Anesthesiologists (ASA) Classification (Tables 2, 3 and Appendixes 2, 3). Logistic regression was used to estimate a propensity score (PS), which represents the probability a patient would be in the treatment group (i.e. dedicated OR) rather than the control group (i.e., traditional OR) [23]. Propensity scoring removed any significant variations between the two groups to simulate randomization. Greedy 1 to 1 matching techniques were then used to pair patients who were in dedicated OR with those were in traditional OR by choosing the patients with the nearest PS [24]. Comparisons of perioperative times and complications were made between the PS-matched patients with Chi-square or Fisher's exact test or Wilcoxon rank sum test where appropriate. The process was repeated for both the TKA and THA subgroups.

**Table 1**
Demographics by OR Group: After Matching.

| | Total Knee Arthroplasty | | |
|---|---|---|---|
| | Traditional OR (N=233) Mean±SD or N (%) | Dedicated OR (N=233) Mean±SD or N (%) | P Value |
| Age (years) | 65.7±11.0 | 65.4±11.0 | 0.76 |
| BMI | 32.4±7.2 | 32.6±7.2 | 0.77 |
| Gender (Female=266) | 134 (57.5) | 132 (56.7) | 0.85* |
| Surgeon | | | |
| Fellowship-trained (418) | 208 (89.3) | 210 (90.1) | 0.76* |
| Non-fellowship-trained (48) | 25 (89.3) | 23 (9.9) | |
| Laterality | | | |
| Left (230) | 117 (50.2) | 113 (48.5) | 0.71* |
| Right (236) | 116 (49.8) | 120 (51.5) | |
| Indications | | | |
| Osteoarthritis (448) | 225 (96.6) | 223 (95.7) | 0.63* |
| AVN/Osteonecrosis (1) | 0 (0.0) | 1 (0.43) | 0.99** |
| RA (12) | 6 (2.6) | 6 (2.6) | 0.99* |
| Other (5) | 2 (0.86) | 3 (1.3) | 0.99** |
| | Total Hip Arthroplasty | | |
| | Traditional OR (N=157) | Dedicated OR (N=157) | P Value |
| Age (years) | 59.5±14.0 | 59.0±13.0 | 0.78 |
| BMI | 30.2±6.6 | 30.3±6.6 | 0.89 |
| Gender (Male=168) | 83 (52.9) | 85 (54.1) | 0.82* |
| Surgeon | | | |
| Fellowship-trained (279) | 139 (88.5) | 140(89.2) | 0.86* |
| Non-fellowship-trained (35) | 18(11.5) | 17(10.8) | |
| Laterality | | | |
| Left (151) | 76 (48.4) | 75 (47.8) | 0.91* |
| Right (163) | 81 (51.6) | 82 (52.2) | |
| Indications | | | |
| Osteoarthritis (257) | 128 (81.5) | 129 (82.2) | 0.88* |
| AVN/Osteonecrosis (34) | 17 (10.8) | 17 (10.8) | 0.99* |
| RA (4) | 2 (1.3) | 2 (1.3) | 0.99** |
| Other (17) | 9 (5.7) | 8 (5.1) | 0.80* |

Student's t-test, unless noted otherwise.
Note: There were 2 surgeons who did not perform any THA procedures.
* Chi-square test.
** Fisher's exact test.

## Results

There were 475 cases (n=200 primary THA; n=275 primary TKA) in the traditional OR control group spanning 181 OR days (Appendix 1). In the dedicated OR study group, 529 cases (n=215 primary THA; n=314 TKA) spanning 181 OR days were performed (Appendix 1). Turnover time was recorded for 164 cases in the control group and 209 cases in the dedicated group from the total cases as described above. Before PS matching there were differences between the number of TKA procedures performed by adult

**Table 2**
Comorbidities by OR Group: After Matching.

| | Total Knee Arthroplasty | | |
|---|---|---|---|
| | Traditional OR (N=233) N (%) | Dedicated OR (N=233) N (%) | P Value* |
| Medical history | | | |
| Hypertension (326) | 165 (70.8) | 161 (69.1) | 0.69 |
| Diabetes (93) | 48 (20.6) | 45 (19.3) | 0.73 |
| Osteoporosis (13) | 7 (3.0) | 6 (2.6) | 0.78 |
| Cancer (81) | 42 (18.0) | 39 (16.7) | 0.71 |
| Hyperlipidemia (211) | 105 (45.1) | 106 (45.5) | 0.93 |
| Coronary artery disease (79) | 41 (17.6) | 38 (16.3) | 0.71 |
| Congestive heart failure (19) | 9 (3.9) | 10 (4.3) | 0.81 |
| Lung disease (56) | 26 (11.2) | 30 (12.9) | 0.57 |
| Social history | | | |
| Tobacco use (225) | 112 (48.1) | 113 (48.5) | 0.93 |
| Alcohol use (221) | 108 (46.4) | 113 (48.5) | 0.64 |
| Illicit drugs use (4) | 2 (0.86) | 2 (0.86) | 0.99** |
| ASA classification | | | |
| 2 (n=199) | 98 (42.1) | 101 (43.4) | 0.87+ |
| 3 (n=252) | 128 (54.9) | 124 (53.2) | |
| 4 (n=15) | 7 (3.0) | 8 (3.4) | |

* Chi-square test, unless noted otherwise.
** Fisher's exact test.
\+ Cochran-Mantel-Haenszel test.

**Table 3**
Comorbidities by OR Group: After Matching.

| | Total Hip Arthroplasty | | |
|---|---|---|---|
| | Traditional OR (N=157) N (%) | Dedicated OR (N=157) N (%) | *P* Value* |
| Medical history | | | |
| Hypertension (160) | 79 (50.3) | 81 (51.6) | 0.82 |
| Diabetes (29) | 13 (8.3) | 16 (10.2) | 0.56 |
| Osteoporosis (5) | 2 (1.3) | 3 (1.9) | 0.99** |
| Cancer (31) | 15 (9.6) | 16 (10.2) | 0.85 |
| Hyperlipidemia (108) | 55 (35.0) | 53 (33.8) | 0.81 |
| Coronary artery disease (34) | 17 (10.8) | 17 (10.8) | 0.99 |
| Congestive heart failure (1) | 0 (0.00) | 1 (0.64) | 0.99** |
| Lung disease (38) | 18 (11.5) | 20 (12.7) | 0.73 |
| Social history | | | |
| Tobacco use (167) | 82 (52.2) | 85 (54.9) | 0.73 |
| Alcohol use (163) | 81 (51.6) | 82 (52.2) | 0.91 |
| Illicit drugs use (4) | 2 (1.3) | 2 (1.3) | 0.99** |
| ASA classification | | | |
| 1 (n=9) | 6 (3.8) | 3 (1.9) | 0.64+ |
| 2 (n=149) | 74 (47.1) | 75 (47.8) | |
| 3 (n=148) | 73 (46.5) | 75 (47.8) | |
| 4 (n=8) | 4 (2.6) | 4 (2.6) | |

* Chi-square test, unless noted otherwise.
** Fisher's exact test.
\+ Cochran-Mantel-Haenszel test.

reconstruction fellowship-trained surgeons and non-fellowship trained surgeons ($P=0.022$) (Appendix 1). Before matching there was a difference in TKA patients for osteoporosis ($P=0.027$), and the THA group had differences in diabetes ($P=0.011$) and lung disease ($P=0.030$) (Appendixes 2 and 3). The final overall PS matched cohort simulated a randomized control trial to eliminate the differences between cohorts consisted of 780 patients (n=390 paired traditional OR unit procedures, n=390 dedicated OR unit procedures). The TKA subgroup consisted of 466 patients (n=233 paired traditional OR, n=233 dedicated OR). The THA subgroup consisted of 314 patients (n=157 paired traditional OR, n=157 dedicated OR).

Time improvements were found in combined TKA and THA groups, including ACT (4.0 minutes, $P<.001$), operative time (7.0 minutes, $P=.012$), and TOT (8.0 minutes, $P<.001$) (Table 5). When considering the TKA only subgroup, ACT (3.0 minutes, $P<.001$) and TOT (5.5 minutes, $P<.001$) were reduced in the dedicated subgroup compared to the traditional subgroup (Table 5). Patients receiving THA had improvements in ACT (4.0 minutes, $P=.010$), operative time (9.0 minutes, $P=.019$), and TOT (5.0 minutes, $P=.017$) (Table 4).

In the TKA subgroup, there were more hematoma complications (n=17, 7.3%) in the traditional OR group compared to the dedicated OR group (n=6, 2.6%; $P=0.019$) (Table 5). The subgroup of THA procedures had an increase in total complications for the traditional OR (n=22, 14.0%) compared to the dedicated OR group (n=10, 6.4%; $P=.025$ (Table 5). In terms of severity of complications, the traditional OR group had more severe complications compared to the dedicated OR group ($P=.03$) (Table 5). The traditional OR had one

**Table 4**
Perioperative Times by OR Group: After Matching.

| | Total Hip and Knee Arthroplasty | | | |
|---|---|---|---|---|
| | Traditional OR (N=422) Median (25th Percentile, 75th Percentile) | Dedicated OR (N=422) Median (25th Percentile, 75th Percentile) | Improvement | *P* Value ++ |
| Anesthesia controlled time (min) | 47.0 (40.0, 56.0) | 43.0 (36.0, 52.0) | 4.0 | <0.001 |
| Operating room time (min) | 141.0 (119.0, 161.0) | 134.0 (113.0, 154.0) | 7.0 | 0.012 |
| | Traditional OR (N=147) | Dedicated OR (N=167) | | |
| Turnover time (min) | 42.0 (32.0, 48.0) | 34.0 (26.0, 43.0) | 8.0 | <0.001 |
| | Total Knee Arthroplasty | | | |
| | Traditional OR (N=233) | Dedicated OR (N=233) | Improvement | *P* Value ++ |
| Anesthesia controlled time (min) | 44.0 (39.0, 52.0) | 41.0 (35.0, 47.0) | 3.0 | <0.001 |
| Operating room time (min) | 137.0 (119.0, 157.0) | 137.0 (117.0, 157.0) | 0.0 | 0.95 |
| | Traditional OR (N=74) | Dedicated OR (N=82) | | |
| Turnover time (min) | 39.5 (32.0, 48.0) | 34.0 (24.0, 41.0) | 5.5 | <0.001 |
| | Total Hip Arthroplasty | | | |
| | Traditional OR (N=157) | Dedicated OR (N=157) | Improvement | *P* Value ++ |
| Anesthesia controlled time (min) | 51.0 (42.0, 59.0) | 47.0 (38.0, 55.0) | 4.0 | 0.010 |
| Operating room time (min) | 141.0 (117.0, 163.0) | 132.0 (108.0, 154.0) | 9.0 | 0.019 |
| | Traditional OR (N=61) | Dedicated OR (N=75) | | |
| Turnover time (min) | 42.0 (32.0, 47.0) | 34.0 (27.0, 45.0) | 5.0 | 0.017 |

++ Non-parametric Wilcoxon rank sum test data.

**Table 5**
Complications by OR Group: After Matching.

| | Total Knee Arthroplasty | | |
|---|---|---|---|
| | Traditional OR (N=233) N (%) | Dedicated OR (N=233) N (%) | *P* Value* |
| Infection (n=21) | 9 (3.9) | 12 (5.2) | 0.50 |
| Fracture (n=1) | 0 (0.00) | 1 (0.43) | 0.99** |
| Hematoma (n=23) | 17 (7.3) | 6 (2.6) | 0.019 |
| Mechanical failure (n=0) | 0 (0.00) | 0 (0.00) | N/A |
| Other (n=47) | 19 (8.2) | 28 (12.0) | 0.17 |
| Total | | | |
| 1 (90) | 43 (18.5) | 47 (20.2) | 0.72+ |
| 2 (1) | 1 (0.43) | 0 (0.00) | |
| Grade of severity | | | |
| 1 (22) | 9 (3.9) | 13 (5.6) | 0.91+ |
| 2 (53) | 27 (11.6) | 26 (11.2) | |
| 3 (16) | 8 (3.4) | 8 (3.4) | |
| 4 (0) | 0 (0.00) | 0 (0.00) | |
| 5 (0) | 0 (0.00) | 0 (0.00) | |
| | Total Hip Arthroplasty | | |
| | Traditional OR (N=157) | Dedicated OR (N=157) | *P* Value* |
| Infection (n=5) | 5 (3.2) | 0 (0.00) | 0.061** |
| Fracture (n=1) | 1 (0.64) | 0 (0.00) | 0.99** |
| Hematoma (n=7) | 5 (3.2) | 2 (1.3) | 0.45** |
| Mechanical failure (n=0) | 0 (0.00) | 0 (0.00) | N/A |
| Other (n=19) | 11 (7.0) | 8 (5.1) | 0.48** |
| Total (n=32) | 22 (14.0) | 10 (6.4) | 0.025 |
| Grade of severity | | | |
| 1 (9) | 6 (3.8) | 3 (1.9) | 0.03+ |
| 2 (14) | 9 (5.7) | 5 (3.2) | |
| 3 (8) | 6 (3.8) | 2 (1.3) | |
| 4 (1) | 1 (0.64) | 0 (0.00) | |
| 5 (0) | 0 (0.00) | 0 (0.00) | |

* Chi-square test, unless noted otherwise.
** Fisher's exact test.
\+ Cochran-Mantel-Haenszel test.

grade 4 complication in the THA subgroup compared to zero in the dedicated OR subgroup.

## Discussion

Process redesign in large teaching hospitals may substantially improve operational performance without compromising patient safety. These data demonstrate that using staff members familiar with orthopedic equipment and procedural needs can decrease operative time by an average of 19 minutes per operation, which extrapolates to a total average savings of just over 1.25 hours for a surgeon who performs 4 primary arthroplasty procedures per day. Unlike previous studies which have required additional staff to decrease both operative and non-operative times [25–27], our study maintained the same amount of staff for each unit. With the additional time gained from a dedicated OR unit, staff can be offered efficiency incentives, more time off, or time to do other activities.

Several studies have looked to improve OR throughput by adjusting parameters either directly or indirectly involved with OR processes [5,15–19]. With regards to non-operative time Smith et al. [7] reported a parallel process that involved using a procedural block room for total joint arthroplasty ORs which led to substantially increased OR throughput. Also, Harders et al. [10] showed that process redesign decreased non-operative time from 65 to 42.2 minutes when comparing similar cases at a large tertiary county-owned hospital. Their report illustrated process improvements resulting in a significant decrease in operative time with a precisely selected group of predictably routine operations, including anterior cruciate ligament reconstructions, total and reverse shoulder arthroplasties, and laparoscopic cholecystectomies. Non-operative time encompasses activities which engage the entire OR team. Our study demonstrated an improvement in non-operative time parameters with ACT improving by 4 minutes ($P<.001$) and TOT by 8 minutes ($P<.001$). An estimated 12 minute improvement per case should not be minimized as these savings may provide the opportunity to add an additional procedure or for staff to leave work early, which could ultimately increase employee satisfaction and decrease staff turnover.

Operative time has traditionally been viewed as being related to a surgeon's proficiency for a particular procedure. This study is the first in the current orthopedic literature to suggest a surgeon's interaction with his/her team substantially reduces operative time due to familiarity of anesthesiologists, nurses and support staff with particular surgical needs. This improved surgical time may also be due to effect of working in a high throughput environment causing the surgical team to work more efficiently. Improved times may be obtained with continued use of the system as employees become more experienced within the dedicated unit.

The increase in efficiency did not compromise patient care as shown by the complication rate comparisons. The complications in the traditional OR were significantly higher for hematomas in TKA procedures, which consisted of deep vein thrombosis, pulmonary embolism, and surgical wound hematomas. Total complications in THA patients were significantly lower and less severe in the dedicated OR compared to the traditional unit. Our high rate of complications could be due to the inclusion of any patient admitted within 90 days of surgery (i.e. emergency room visit, possibly unrelated surgical procedure/condition).

There are a few limitations to this study. First, this model is not as applicable to operations that are un-predictable, challenging, or require difficult intra-operative decision making. It is suggested that a dedicated OR unit for complicated cases be designed to accommodate for difficult surgical needs. Additionally, these results may not be

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germane to situations in which there cannot be a dedicated OR where anesthesiologists, nurses and technicians who are familiar with primary TKA and THA can be isolated. Our study occurred over two different time periods, the traditional OR group being first prior to switching to a dedicated OR system. Conducting a randomized trial by allocating procedures to a traditional or dedicated unit would be ideal, but not practical at our institution. We simulated randomization by using propensity score matching to correct for differences in surgeon training and patient demographics and comorbidities. Finally, our study was conducted at a single institution, which is a large academic tertiary care center. For more generalized conclusions, a study of larger scale involving multiple institutions would lead to more incite on the feasibility of a dedicated OR outside of our institution. Unfortunately some smaller hospitals or ambulatory surgery centers may not benefit from our work if they have a highly diverse mix of operations being performed in the same ORs.

In summary, the utilization of a dedicated OR can be applied in appropriate institutions with the right patient population and personnel to increase throughput without compromising patient care or requiring additional staff. The dedicated OR system significantly decreased operative time, anesthesia controlled time, and turnover time for TKA and THA procedures, without increasing complication rates. Further studies are required to determine what benefits are made possible by these time savings, but may include improvements in employee satisfaction and retention, cost savings to the hospital, and/or opportunity to increase surgical volume.

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**Appendix 1**
Demographics by Group Traditional vs Dedicated: Before Matching.

| | Total Knee Arthroplasty | | |
|---|---|---|---|
| | Traditional OR (N = 275) Mean ± SD or N (%) | Dedicated OR (N = 314) Mean ± SD or N (%) | *P* Value* |
| Age (years) | 65.9 ± 11.0 | 65.6 ± 10.8 | 0.68 |
| BMI | 32.3 ± 7.1 | 32.8 ± 7.1 | 0.35 |
| Gender (female, n = 335) | 156 (56.7) | 179 (57.0) | 0.95 |
| Surgeon | | | |
| Fellowship-trained (523) | 235 (85.8) | 288 (91.7) | 0.022 |
| Non-fellowship-trained (65) | 39 (14.2) | 26 (8.3) | |
| Laterality | | | |
| Left (294) | 148 (53.8) | 146 (46.5) | 0.076 |
| Right (295) | 127 (46.2) | 168 (53.5) | |
| Indications | | | |
| Osteoarthritis (561) | 263 (95.6) | 298 (94.9) | 0.68 |
| AVN/osteonecrosis (4) | 2 (0.73) | 2 (0.64) | 0.99** |
| RA (13) | 6 (2.2) | 7 (2.2) | 0.97 |
| Other (9) | 4 (1.5) | 5 (1.6) | 0.99** |

| | Total Hip Arthroplasty | | |
|---|---|---|---|
| | Traditional OR (N = 200) | Dedicated OR (N = 215) | *P* Value |
| Age (years) | 59.3 ± 14.2 | 60.0 ± 13.0 | 0.60 |
| BMI | 30.1 ± 6.4 | 30.1 ± 7.0 | 0.97 |
| Gender ( male, n= 215) | 106 (53.0) | 109 (50.7) | 0.64* |
| Surgeon | | | |
| Fellowship-trained (367) | 174 (87.4) | 193 (89.8) | 0.46* |
| Non-fellowship-trained (47) | 25 (12.6) | 22 (10.2) | |
| Laterality | | | |
| Left (200) | 92 (46.0) | 108 (50.2) | 0.39* |
| Right (215) | 108 (54.0) | 107 (49.8) | |
| Indications | | | |
| Osteoarthritis (342) | 165 (82.5) | 177 (82.3) | 0.96 |
| AVN/osteonecrosis (45) | 22 (11.0) | 23 (10.7) | 0.92 |
| RA (6) | 3 (1.5) | 3 (1.4) | 0.99** |
| Other (20) | 9 (4.5) | 11 (5.1) | 0.77 |

Student's t-test, unless noted otherwise.
* chi-Square test.
** Fisher's exact test.

**Appendix 2**
Comorbidities by OR Group: Before Matching.

| | Total Knee Arthroplasty | | |
|---|---|---|---|
| | Traditional OR (N = 275) N (%) | Dedicated OR (N = 314) N (%) | *P* Value* |
| Medical history | | | |
| Hypertension (412) | 198 (72.0) | 214 (68.2) | 0.31 |
| Diabetes (125) | 52 (18.9) | 73 (23.3) | 0.20 |
| Osteoporosis (27) | 7 (2.6) | 20 (6.4) | 0.027 |
| Cancer (93) | 46 (16.7) | 47 (15.0) | 0.56 |
| Hyperlipidemia (272) | 136 (49.5) | 136 (43.3) | 0.14 |
| Coronary artery disease (101) | 51 (18.6) | 50 (15.9) | 0.40 |
| Congestive heart failure (24) | 14 (5.1) | 10 (3.2) | 0.24 |
| Lung disease (75) | 34 (12.4) | 41 (13.1) | 0.80 |
| Social history | | | |
| Tobacco use (295) | 126 (45.8) | 169 (53.8) | 0.053 |
| Alcohol use (271) | 117 (42.6) | 154 (49.0) | 0.11 |
| Illicit drugs use (9) | 2 (0.73) | 7 (2.2) | 0.19** |
| ASA classification | | | |
| 2 (n = 227) | 111 (40.4) | 142 (45.2) | 0.24+ |
| 3 (n = 296) | 150 (54.6) | 163 (51.9) | |
| 4 (n = 23) | 14 (5.1) | 9 (2.9) | |

* Chi-square test, unless noted otherwise.
** Fisher's exact test.
\+ Cochran-Mantel-Haenszel test.

**Appendix 3**
Comorbidities by OR Group: Before Matching.

| | Total Hip Arthroplasty | | |
|---|---|---|---|
| | Traditional OR (N = 200) N (%) | Dedicated OR (N = 215) N (%) | *P* Value* |
| Medical history | | | |
| Hypertension (213) | 104 (52.0) | 109 (50.7) | 0.79 |
| Diabetes (49) | 32 (16.0) | 17 (7.9) | 0.011 |
| Osteoporosis (8) | 2 (1.0) | 6 (2.8) | 0.29** |
| Cancer (50) | 27 (13.5) | 23 (10.7) | 0.38 |
| Hyperlipidemia (146) | 78 (39.0) | 68 (31.6) | 0.12 |
| Coronary artery disease (51) | 27 (13.5) | 24 (11.2) | 0.47 |
| Congestive heart failure (7) | 5 (2.5) | 2 (0.93) | 0.27** |
| Lung disease (62) | 22 (11.0) | 40 (18.6) | 0.030 |
| Social history | | | |
| Tobacco use (235) | 116 (58.0) | 119 (55.4) | 0.59 |
| Alcohol use (218) | 101 (50.5) | 117 (54.4) | 0.42 |
| Illicit drugs use (8) | 6 (3.0) | 2 (0.93) | 0.16** |
| ASA classification | | | |
| 1 (n = 13) | 8 (4.0) | 5 (2.3) | 0.90+ |
| 2 (n = 195) | 89 (44.5) | 106 (49.3) | |
| 3 (n = 193) | 97 (48.5) | 96 (44.7) | |
| 4 (n = 14) | 6 (3.0) | 8 (3.7) | |

* Chi-square test, unless noted otherwise.
** Fisher's exact test.
+ Cochran-Mantel-Haenszel test.

SCIENTIFIC ARTICLE

# The Efficiency of a Dedicated Staff on Operating Room Turnover Time in Hand Surgery

Daniel M. Avery III, MD, Kristofer S. Matullo, MD

**Purpose** To evaluate the effect of orthopedic and nonorthopedic operating room (OR) staff on the efficiency of turnover time in a hand surgery practice.

**Methods** A total of 621 sequential hand surgery cases were retrospectively reviewed. Turnover times for sequential cases were calculated and analyzed with regard to the characteristics of the OR staff being primarily orthopedic or nonorthopedic.

**Results** A total of 227 turnover times were analyzed. The average turnover time with all nonorthopedic staff was 31 minutes, for having only an orthopedic surgical technician was 32 minutes, for having only an orthopedic circulator was 25 minutes, and for having both an orthopedic surgical technician and a circulator was 20 minutes. Statistical significance was seen when comparing only an orthopedic surgical technician versus both an orthopedic circulator and a surgical technician and when comparing both nonorthopedic staff versus both an orthopedic circulator and a surgical technician.

**Conclusions** OR efficiency is being increasingly evaluated for its effect on hospital revenue and OR staff costs. Reducing turnover time is one aspect of a multifaceted solution in increasing efficiency. Our study showed that, for hand surgery, orthopedic-specific staff can reduce turnover time. *(J Hand Surg Am. 2014;39(1):108–110. Copyright © 2014 by the American Society for Surgery of the Hand. All rights reserved.)*

**Type of study/level of evidence** Economic/Decision Analysis III.

**Key words** Hand surgery, operating room efficiency, turnover time.

OVER THE PAST DECADE, efficiency in the operating room (OR) has become an area of focus for many hospitals. With an increasing patient population, increasing cost of procedures, and decreasing reimbursements, it is challenging to deliver quality care in the rapidly changing health care system. Numerous studies have looked at various strategies to increase efficiency to keep ORs financially more viable.[1–8] Most of these studies have shown that decreasing the turnover time between cases isone way of making a surgeon's and staff's throughput easier.[1–8] However, many of these studies have examined all specialties within their system or focused on a specialty other than hand surgery.[1–9] In orthopedics, only turnover time for total joint arthroplasties has been examined for strategies to increase efficiency.[5]

Hand surgery stands as a unique subset of orthopedics to benefit from increased OR efficiency. Even minimal reductions in time between cases could translate to additional scheduling of cases because hand surgery cases often take far less time than other orthopedic OR procedures.

This study was conducted to evaluate the effect of OR staff on the efficiency of turnover time in a hand surgery practice. Our hypothesis was that having an orthopedic surgical technician and a circulating nurse would reduce turnover time when compared with

*From the Division of Hand Surgery, St. Luke's University Health Network; the Department of Orthopaedic Surgery, St. Luke's Hospital, Bethlehem, Pennsylvania.*

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**Corresponding author:** Kristofer S. Matullo, MD, St. Luke's University Health Network, 801 Ostrum Street, PPH-2, Bethlehem, PA 18015; e-mail: Kristofer.Matullo@sluhn.org.

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**TABLE 1. Number of Turnovers and Average Time by Staff Category**

| OR Staff | Number of Turnovers | Average Turnover Time in Minutes (range) |
|---|---|---|
| Nonorthopedic surgical technician and circulator | 53 | 30.5 (9–67) |
| Orthopedic surgical technician and nonorthopedic circulator | 71 | 31.9 (7–88) |
| Nonorthopedic surgical technician and orthopedic circulator | 34 | 24.8 (4–69) |
| Orthopedic surgical technician and circulator | 69 | 19.8 (5–58) |
| **Total** | 227 | 26.8 |

nonorthopedic staff in a hospital ambulatory surgery center environment.

## MATERIALS AND METHODS

After approval by our institutional review board, we conducted a retrospective review of K.S.M.'s case logs for hand surgery cases from July 2011 to June 2012 at our level I academic institution. All cases were performed in our outpatient ambulatory surgery center, located within the main hospital. A total of 621 sequential cases were identified, and operative records were reviewed. Cases included for evaluation were elective hand-specific cases regardless of patient age and running sequentially in a single operating suite but not involving microsurgery. Cases were excluded when the hand surgeon operated simultaneously in multiple operating suites, when they involved acute trauma care on inpatients, when cases were performed outside standard day shift hours (8:00 AM–3:00 PM), when turnover times greater than 90 minutes were likely outside the control of the OR staff, when there was a change of staff between cases, and when records were incomplete or electronically unavailable. Turnover time was defined as the difference between the time the previous patient left the room and the time the following patient came into the room as recorded in the nursing record.

The OR surgical technician and circulating nurse were categorized for each turnover time as being either orthopedic staff or nonorthopedic staff. Individuals were classified as orthopedic staff if greater than 75% of their typical time in the operating room was spent delivering care to orthopedic patients or performing orthopedic procedures. All nurses and technicians were nonunionized, non-incentivized hospital employees compensated according to an equal and standardized pay rate regardless of specialty.

### Statistics

Turnover times were logged into a spreadsheet based on their respective staff grouping. Average turnover time and analysis between staff groups were compared using a Student 2-tailed $t$ test assuming equal variance. A $P$ of less than .05 denoted statistical significance.

## RESULTS

A total of 227 turnover times were included. Of these, 53 turnovers were performed with both nonorthopedic circulators and surgical technicians, 71 turnovers were performed with an orthopedic surgical technician and a nonorthopedic circulator, 34 turnovers were performed with a nonorthopedic surgical technician and an orthopedic circulator, and 69 turnovers were performed with both an orthopedic surgical technician and an orthopedic circulator.

The average turnover time in all cases, irrespective of staff, was 27 minutes. The average turnover time with respect to the type of staff involved is reported in Table 1.

The differences in turnover time (11 min) was significantly different when a complete nonorthopedic staff was compared with a complete orthopedic staff ($P = .005$). Also the differences in turnover time (12 min) were significant when an orthopedic technician was compared with a complete orthopedic staff ($P < .001$). The other differences were statistically insignificant.

## DISCUSSION

Increasing OR efficiency is a multifaceted task that includes turnover time, Dexter[8] and Patterson[2] advised that hospitals should focus on other aspects of OR efficiency such as perioperative nursing preparation, communication within the OR, and anesthesia policies such as performing pre-procedural regional blocks. However, their advice was based on observing multiple specialties with operations requiring long operative times. Hand surgery, with many procedures of less than 1 hour long, falls into one of the exceptions cited by Dexter.[8] For example, if a hand surgeon performed 10 cases per day, the difference in turnover time between all orthopedic staff and nonorthopedic staff would be approximately 96 minutes. This efficiency would possibly allow time for additional cases or could



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reduce or redistribute the OR staff earlier in the day, perhaps preventing increased overtime or on-call pay.

Our study demonstrated that having consistent OR staff well versed in orthopedic surgery increased efficiency. We believe this falls in line with other studies such as Stepaniak et al[6] and Attarian et al[4] that demonstrated working with a consistent OR staff lowered turnover time. All orthopedic-specific staff familiar with the practice should perform at a similar level of efficiency, even if rotated through breaks or lunches throughout the day. It also agrees with one of the hindrances identified by Scheriff et al[7] that limitations in staff familiarity with procedures decreases OR efficiency. With the frequency of use of wrist arthroscopy and microscopes, it is also feasible that dedicated orthopedic staff would be more competent with the setup, draping, and maneuvering of these devices to decrease perioperative time, analogous to the results of Lasser et al[5] with dedicated staff in robot-assisted prostatectomy.

In our study, the worst turnover time was not with the combination of nonorthopedic technician and circulator but with an orthopedic surgical technician and a nonorthopedic circulator. The explanation may be that when our group identifies that we have unfamiliar staff, we (attending, resident, or physician assistant) tend to assist in room preparation. We feel the difference between these groups is reflective of additional assistance outside of what we studied.

Our study has several strengths. It evaluated a large contiguous segment of cases performed at one institution with consistent staff. We took care to eliminate confounding variables such as only evaluating single operating suite days and removing obvious prolonged turnover times due to equipment availability issues, level I trauma holds, and so forth. By analyzing less complex operative cases and excluding polytrauma and longer microvascular procedures, the instrumentation required to perform a majority of these surgeries is minimal. We used objectively recorded patient-out and patient-in times, which do not rely on a surgeon's perception and which do not include induction and waking the patient from general anesthesia or time taken to transfer the patient to and from the operating table. Elective outpatient cases were reviewed to eliminate the sometimes-prolonged times while transporting in-patients and preparing them for surgery. Therefore, only patients with stable comorbidities were analyzed. Although not a separate entity, our hospital ambulatory surgical center functions similar to stand-alone entities with its own preoperative holding area and with a consistent anesthesiologist and nurse anesthetist staff. A majority of patients underwent procedures with local anesthesia and light sedation. At our institution, the patient is transported into the room only after the room is completely set up. All turnover times are reflective of actual times to prepare the room for the next case. The possibility of hurrying turnover by opening equipment after the patient is in the operating suite is, therefore, eliminated. Lastly, one surgeon performed all cases. With this information, variables such as differing instrumentation and preferences by multiple surgeons were not factors. The surgeon did not change the quality of care delivered to each patient or typical operative technique in an attempt to increase speed or decrease turnover.

Our study also has several limitations. The retrospective nature of the study did not allow for precise identification of confounding variables such as equipment or anesthesia delay; however, we feel that such variables outside of the surgical team would be present despite orthopedic experience. We eliminated turnovers where there were staff changes, because we could not identify what part each staff member had in turnover responsibilities. Also excluded were add-on cases at the end of the day because the case equipment may not have been readily available or complete. Because our hospital does not employ staff specifically for orthopedics, selection bias in categorizing staff could be present, although categorizing staff by the percentage of cases within a specialty helped to determine frequency and experience in cases.

Our results support the strategy of using orthopedic-specific staff for hand surgery to decrease OR turnover time. Implementing this strategy in a prospective manner in a similar setting with a cost model analysis could validate these results and ascertain its economic benefits.

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SYMPOSIUM: ABJS CARL T. BRIGHTON WORKSHOP ON HEALTH POLICY ISSUES IN ORTHOPAEDIC SURGERY

# The Impact of Disruptive Innovations in Orthopaedics

**Erik Hansen MD, Kevin J. Bozic MD, MBA**

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**Abstract** The US healthcare system is currently facing daunting demographic and economic challenges. Because musculoskeletal disorders and disease represent a substantial and growing portion of this healthcare burden, novel approaches will be needed to continue to provide high-quality, affordable, and accessible orthopaedic care to our population. The concept of "disruptive innovations," which has been studied and popularized by Harvard Business School Professor Clayton Christensen, may offer a potential framework for developing strategies to improve quality and control costs associated with musculoskeletal care. The introduction of mobile fluoroscopic imaging systems, the development of the Surgical Implant Generation Network intramedullary nail for treatment of long bone fractures in the developing world, the expanding role and contributions of physician assistants and nurse practitioners to the orthopaedic team, and the rise of ambulatory surgery centers are all examples of disruptive innovations in the field of orthopaedics. Although numerous cultural and regulatory barriers have limited the widespread adoption of these "disruptive innovations," we believe they represent an opportunity for clinicians to regain leadership in health care while at the same time improving quality and access to care for patients with musculoskeletal disease.

## Introduction

The cost of delivering health care in the United States has become one of the most important public policy issues of the 21st century. The percentage of the US gross domestic product (GDP) that has been consumed by health care has grown from 5% in 1960 to a staggering 16% in 2007 [3]. According to latest projections by the Congressional Budget Office, unless drastic measures are undertaken to control healthcare spending in the United States, total national spending on health care will claim more than 30% of the GDP by 2035 and approximately 50% by 2082 [8]. Although the problem is clearly multifactorial, many health policy analysts have pointed to the adoption of new and advanced healthcare technologies as one of the primary drivers of cost [11]. The United States leads the world in biomedical research, and we have shown we can develop the most sophisticated care to tackle the most complex medical problems. However, our ability to deliver care effectively and efficiently to all who need it is woefully inadequate as evidenced by the high number of un- and underinsured citizens and our low ranking in measures of public health relative to other developed countries [22]. Thus, both the future health and viability of the US economy and its population are intimately related to the thoughtful and responsible adoption of new healthcare technologies.

Given past utilization rates and future demographic trends, the field of orthopaedic surgery can expect to be particularly impacted by this impending economic crisis. According to national healthcare statistics, musculoskeletal

One of the authors (KJB) is a paid consultant for Integrated Health Care Association and Blue Cross Blue Shield Association.

E. Hansen
Department of Orthopaedic Surgery, University of California, San Francisco, CA, USA

K. J. Bozic (✉)
Department of Orthopaedic Surgery and the Philip R. Lee Institute for Health Policy Studies, University of California, 500 Parnassus, MU 320W, San Francisco, CA 94143-0728, USA
e-mail: bozick@orthosurg.ucsf.edu



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disorders and disease are the leading cause of disability and account for more than half of all chronic conditions in people over the age of 50 [26]. During the period 2002 to 2004, over 83 million Americans reported one or more spine conditions, and 42 million Americans reported arthritis and joint pain [19, 26]. This resulted in an increase in ambulatory physician visits for musculoskeletal care from 426 million in 1996 to 1998 to 508 million in 2002 to 2004 as well as a 69% increase in total non-MD ambulatory care visits over that same time period [26]. The economic impact of these trends is substantial. In 2004, the sum of direct and indirect expenditures for the burden of musculoskeletal ailments was $849 billion, or 7.7% of the GDP [26].

Moreover, in the next 20 years, the estimated increase of 35 million North Americans over the age of 55 will further amplify the burden of musculoskeletal disease [5]. Nearly 50% of inpatient procedure volume is driven by individuals over the age of 65, and it is estimated that by the year 2030, close to 20% of the US population will have entered this age cohort [27]. Compounding the demographic trend of an aging baby boomer population, this unique cohort in American history has higher expectations of the healthcare system than any generation before them.

Although the future of the American healthcare system is wrought with both demographic and economic challenges, neither need prove insurmountable. In his research on "Disruptive Innovations" in health care, Harvard Business School Professor Clayton Christensen and his colleagues provide valuable insight into one possible strategy to address this challenging, seemingly intractable problem [7]. This article presents the basic principles of "disruptive innovations," documents their precedence in and relation to the healthcare system, and provides specific examples from the field of orthopaedic surgery. In our concluding remarks, we address the inherent cultural and regulatory barriers to adoption of these "disruptive innovations" and offer some possible strategies to overcome these obstacles.

## Disruptive Innovations

In his book, "The Innovator's Dilemma," Christensen defines disruptive innovations as "cheaper, simpler, more convenient products or services that start by meeting the needs of less-demanding customers" [6]. According to Christensen's research, disruptive innovations arise in every industry. Although the dominant players in a particular market sector focus on improving the functionality of their products or services to meet the needs of the most sophisticated customers at the high end of the market, they often miss the simpler, more convenient, and less costly alternatives initially designed to appeal to the least demanding customers at the low end of the market. Over time, the simpler (frequently technologically inferior) products and services get better and are eventually able to meet the needs of the vast majority of consumers.

Sustaining innovations are those products and services marketed toward consumers at the higher end of the market. To remain leaders in their field, industries invest in research and development to create a progressively more sophisticated product, which is characterized by a steadily increasing trajectory of technologic improvement (Fig. 1, top solid line). There are numerous examples of sustaining innovations in orthopaedics such as alternative hip replacement bearing surfaces, computer-assisted surgical navigation tools, total disk arthroplasty, locking plates, and bone graft substitutes. Although these new technologies represent important developments that may advance the field of orthopaedics, expand the indications for orthopaedic procedures, and improve patient outcomes, they do not necessarily address the needs of the majority of our patients nor do they help address the problems of limited accessibility and affordability of musculoskeletal care.

Consumers' ability to absorb or use the technologic advances of any innovation is finite (Fig. 1, area between the dashed lines). Furthermore, the pace of sustaining innovation nearly always outstrips the ability of consumers to absorb the improvements in functionality. This creates the potential for the introduction of disruptive innovations that start by meeting the needs of the least demanding consumers at the low end of the market (Fig. 1, bottom dashed line). The performance trajectory of these

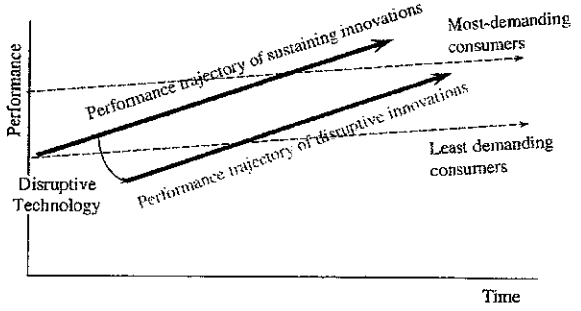


**Fig. 1** The performance trajectory over time of disruptive versus sustaining innovations is shown. The area between the dashed lines outlines the rate of improvement consumers can absorb over time. The pace of sustaining innovation nearly always outstrips the ability of customers to absorb it, thereby creating the potential for the introduction of disruptive innovations. The progress of these disruptive innovations is shown by the bottom solid line. (Reprinted with permission from Christensen CM, Bohmer R, Kenagy J. Will disruptive innovations cure health care? *Harv Bus Rev.* 2000;78:102–112, 199.)



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disruptive innovations has a distinct but similar vector of technologic improvement compared with sustaining innovations (Fig. 1, bottom solid line). Over time, the functionality of these technologies improves, and eventually, they are capable of meeting the needs of the vast majority of consumers.

Christensen goes on to argue that the "phenomenon of overshooting the needs of the average consumer and creating the potential for disruption quite accurately describes the current situation faced by the healthcare industry" [7]. Sustaining innovations such as emerging technologies, specialist physicians, and academic teaching hospitals constantly strive to improve their functionality to address the needs of the sickest, most complex patients with the most demanding healthcare problems. No one would argue that these entities are contributing to the progress in the field of medicine. However, in a world of limited healthcare resources and a nation where the most medically complex patients make up a minority of the population, it could be argued that our focus should be redirected toward identifying and developing disruptive innovations. This could start by addressing the needs of less medically complex patients but over time could be used to facilitate higher-quality, more convenient, more accessible, and less costly care to the majority of healthcare consumers in the United States.

The field of orthopaedics is constantly undergoing rapid development through ongoing basic science and clinical investigation. Currently, the focus of most biomedical researchers and the pharmaceutical, medical device, and biotechnology industries is disproportionately centered on sustaining innovations, because of organizational structures and financial incentives. For these reasons, the impact of disruptive innovations on the future of orthopaedics and the health care of the nation can only be realized with a change in perspective and a reallocation of healthcare dollars.

In the next sections, examples of disruptive innovations in four areas of orthopaedic care delivery illustrate various manners in which they may impact the healthcare system. In "Diagnostics", we focus on the introduction and popularization of the mini-fluoroscan as a means of facilitating and increasing access to real-time imaging. In "Surgical Techniques and Technologies", the Surgical Implant Generation Network (SIGN) intramedullary nail is analyzed as a "low-tech" treatment option to improve the level and access of orthopaedic fracture care in the developing world. The expanding role and contributions of physician assistants (PAs) and nurse practitioners (NPs) to the orthopaedic team is the topic of the discussion on disruptive innovations in "Care Processes." Finally, in "Healthcare Delivery Systems", we analyze the various ways in which institutions have attempted to implement the paradigm of "patient-centered care" by modifying existing programs and care delivery models, focusing specifically on the rise of ambulatory surgery centers.

## Diagnostics: Point-of-service Radiology: the Mini-fluoroscan

Mini-fluoroscans, or mini C-arms, are mobile fluoroscopic imaging systems designed for point-of-service, real-time images that have the potential to increase access and decrease costs in the delivery of high-quality orthopaedic care. They are gaining popularity in operating rooms, emergency departments, and physician offices because of their mobility, simplicity of use, lower cost, and lower-dose radiation compared with their full-size counterparts. Clearly, they do not currently offer the same image quality or functionality that full-scale fluoroscopy units or digital radiography equipment can provide, and they would not be appropriate for use in many complex procedures such as pedicle screw placement or open reduction internal fixation of a long-bone fracture. However, technologic advances have enabled these devices to provide adequate image quality for less complicated interventions such as evaluating the alignment of a distal radius fracture after closed reduction, allowing dynamic evaluation of small joint stability, or assessing the adequacy of reduction and hardware placement in the operative treatment of certain fractures.

As a disruptive innovation, mini-fluoroscans offer the ability to reduce the costs associated with using radiology technicians and radiologists while at the same time increasing the autonomy of the orthopaedic surgeon to obtain and interpret his or her own radiographs. In addition, the ability to obtain real-time images cuts down on the cumulative time and money spent waiting for conventional radiographs to be obtained, processed, and then either printed or uploaded onto a picture archiving and communication system. As the technology reliably improves such as image resolution and cordless foot pedals, it is expected that the indications for use of the mini C-arm will increase.

Currently, there are two types of mini C-arm units available in the United States: the Fluoroscan (Hologic, Inc, Bedford, MA) and the Xitec XiScan (F&M Control, SL, Vitoria, Spain). In a study comparing the mini-fluoroscan with a conventional mobile C-arm on its ability to maintain image quality while (1) delivering the lowest possible radiation exposure to both patient and physician; and (2) minimizing operator effort and inconvenience, the authors of the study rated the mini C-arm as "acceptable" in both categories [10].

Ideally, increased use of mini C-arms could result in improved patient outcomes and increased autonomy of the orthopaedic surgeon while reducing the need for radiology technicians to operate conventional fluoroscopy units, thus



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lowering overhead costs for hospitals and surgery centers. The mini C-arm allows orthopaedic surgeons, emergency department physicians, and nonphysician providers to obtain fluoroscopic images, view the images in real time on a monitor, save and retrieve them later, or have a printout immediately available during the closed management of fractures. With the increased volume of patients presenting to physician offices, urgent care clinics, and emergency departments and the high use of plain radiography, the ability to substitute the use of the mini C-arm for the use of conventional fluoroscopy and digital radiography could lead to reliable cost savings and a decreased burden on the healthcare workforce.

Fluoroscan, a division of Hologic, Inc, illustrates the natural progression of disruptive innovations to a technology sector and specifically within a single company. Within a year of expanding their product line by introducing the Premier mini C-arm to their already established conventional C-arm market, the success of the Premier resulted in the discontinuation of its larger, standard-sized C-arm. Hologic executives attribute the success to the user-friendly interface of the mini C-arm and the advent of a proprietary beam alignment technology called Laser Aiming Device (LAD) [23]. The LAD enables the user to position the desired part of the anatomy in the center of the imaging field when the input surface of the image intensifier is obscured by drapes, arm boards, or other objects present in the operating room. Currently, the company is focusing on improving their product by making the system even easier to use and streamlining system housekeeping functions like image storage and transfer. This example illustrates how a relatively simple technology that was originally inferior in functionality improved over time and was eventually able to meet the needs of most mainstream consumers, thus displacing its higher functionality predecessor (sustaining innovation) for certain indications.

## Surgical Techniques & Technology: SIGN (Surgical Implant Generation Network) System to 'Create Equality of Fracture Care Throughout the World'

The SIGN system was developed in 1999 to address the orthopaedic needs of the developing world and represents a surgical technique and technology as a disruptive innovation. Its founder, Dr Lewis Zirkle, explains the SIGN intramedullary nail was founded to "create equality of fracture care throughout the world" [25]. Rather than incorporating the newest technologic advancements or design modifications to address the needs of the higher end of the fracture care market, the nail was specifically designed to be "low tech," easy to use, and inexpensive to manufacture. Specifically, the SIGN system relies on hand drills and reamers as well as a rigid slotted jig for placement of interlocking screws. This response to the recognized lack of access to fluoroscopy and reliable power instrumentation in many countries in the developing world represents the way in which a disruptive innovation can increase access to treatment. Currently, approximately 40,000 SIGN nail procedures have been performed in over 140 programs in 40 countries [25].

In addition to a surgical technique adapted for a resource-poor healthcare system, the SIGN system itself was developed to be inexpensive to manufacture, highly versatile, and widely available. A set of 100 nails, complete with the instrumentation, is sold for an initial cost of $20,000. The nails themselves can be used for the humerus, tibia, and femur and inserted either in antegrade or retrograde fashion. Furthermore, the philosophy behind the SIGN system is to provide not only equitable, but sustainable fracture care. As such, a replacement nail and the interlocking screws are sent free of charge for each one that is used as long as the treating surgeon systematically reports the details of the clinical case, implants used, and postoperative radiographs on the SIGN web site's surgical database.

There are two published, peer-reviewed journal articles on clinical and radiographic outcomes after treatment with the SIGN nail system. One manuscript reviews the short- to midterm results of the SIGN nail for treatment of open tibia fractures in Kathmandu, Nepal, whereas the other reports on a consecutive series of patients who were treated with SIGN nails for extremity fractures in Nigeria [12, 24]. Both studies report a high degree of clinical success with a low incidence of complications. In Nepal, Shah et al. were able to demonstrate that 86% of (31 of 36) open tibia fractures healed within 6 months with only an 8% infection rate [24]. Similarly, Ikem and colleagues reported a mean time to union of 3 months, no missed interlocking screws, and a low complication rate. In their series of 40 patients, there were two cases of superficial infection, one interlocking screw failure from osteoporotic bone, and two delayed unions [12].

Like all disruptive innovations, the SIGN intramedullary nail system is not a static entity, but rather is evolving into other areas of fracture care. Recently, Dr Zirkle developed a SIGN system for internal fixation of hip fractures that does not rely on power instruments or fluoroscopy, which is called the SIGN hip construct. The first clinical case in which this system was used occurred at Wazir Akbar Khan Hospital in Kabul, Afghanistan, in a patient who sustained an intertrochanteric hip fracture. The translation of the SIGN surgical technique and instrumentation from long bone fractures to hip fractures clearly demonstrates the manner in which the performance trajectory of a disruptive



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innovation can improve over time and begin to meet the needs of more demanding consumers (Fig. 1, solid bottom line).

## Process of Care: Physician Assistants and Nurse Practitioners—Colleagues, Not Competitors

The increased role of physician assistants (PAs) and nurse practitioners (NPs) in orthopaedic surgical practice is an example of healthcare providers as a disruptive innovation, because they are able to help facilitate increased access and lower costs associated with delivering high-quality orthopaedic care. Although the establishment and development of the first formal PA and NP educational programs and professional organizations occurred in the mid-1960s, it was not until the 1980s and 1990s that there was a rapid expansion of PA and NP training programs. At that time, healthcare legislation was revised to reduce barriers to use PA and NP services in a variety of healthcare settings. HMOs recognized the important roles of PAs and NPs in controlling costs, and restrictions on resident duty hours spurred employment and postgraduate learning opportunities in hospital inpatient settings [18]. Twenty-three percent (11,500) of the estimated 50,000 clinically practicing PAs work in surgical specialties or subspecialties, and there are currently 5000 PAs employed in the field of orthopaedics in the United States [1].

Christensen et al. have noted that many of the most potent disruptive innovations in health care achieved success by "enabling a larger population of less-skilled people to do in a more convenient, less costly setting things that historically could be performed only by expensive specialists in centralized, inconvenient locations" [7]. For PAs and NPs in orthopaedics, common responsibilities include taking evening and weekend calls as well as emergency department coverage, performing admission history and physical examinations, first-assisting in the operating room, providing patients with preoperative information and postoperative instructions, and performing dressing and cast changes [13]. Many of these tasks and roles that used to be performed by surgeons are clearly within the capabilities of certified PAs and NPs and for a fraction of the cost. Moreover, according to the Medical Group Management Association (MGMA), PAs and NPs often generate revenue that more than covers their compensation. MGMA collects data annually comparing PA compensation with gross charges. According to 2002 data, for PAs in surgical practices, the employer pays 32 cents for every dollar of charges generated [17]. This cost savings is experienced both at the practice and national level. As of January 1, 1998, Medicare pays PAs 85% of the physician fee schedule, which also holds true for first-assisting during surgery. For a surgical procedure, this translates to approximately 14% of the primary surgeon's fees (ie, 85% of physician first assistant fees, which is 16% of the surgeon's fees) [1].

When an appropriate level of responsibility is bestowed on the PA or NP, quality of care is not sacrificed. In fact, studies of patient satisfaction have shown a high level of satisfaction with care provided by PAs and NPs. In 1994, the Federal Advisory Group on Physician Assistants and the Workforce concluded that published research since the profession began consistently found a high level of patient acceptance. Furthermore, a comprehensive 1995 to 1996 Kaiser study evaluating patient satisfaction with PAs, NPs, certified nurse midwives, and physicians in a managed care setting concluded that "patient satisfaction with interpersonal care appears to depend on communication style and not on type of provider" [21]. With the anticipated changes in demographics in the coming decades, it can be expected that PAs and NPs will play an increasingly important role in the orthopaedic team by assuming a larger share of the nonoperative aspects of the orthopaedic patients' care, thus allowing orthopaedic surgeons to focus on the surgical management of musculoskeletal disease.

## Healthcare Delivery Systems: The Rise of Ambulatory Surgery Centers

Although technological advancements and the expanding role of ancillary staff may contribute to improved access and care, the greatest opportunities to improve the healthcare system as a whole and the care provided to the population is to focus on and modify the healthcare delivery systems currently in place. Recently, there has been increased awareness that the current hospital system in the United States fails the individual patient in many regards as a result of the fragmented provision of care by multiple providers in a myriad of settings. In response to this, there has been an emphasis on patient-centered or patient-focused care as a low-technology solution to the existing problems. Single-specialty hospitals and ambulatory surgery centers (ASCs) have consistently enjoyed high patient volumes and high satisfaction rates, in part because of their ability to deliver focused, efficient, high-quality patient-centered care. In a recently published study, Cram and colleagues reported that even after adjusting for numerous important facility and patient characteristics such as bed size, teaching status, and patient comorbidities, specialty orthopaedic hospitals delivered higher-quality care to orthopaedic patients than their general hospital counterparts [9]. In response to this, general hospitals have had to modify their service lines and implement operational efficiencies in an attempt to compete for orthopaedic



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patients seeking high-quality, convenient, accessible care. As noted by Christensen et al., the basis for competition for many less complicated procedures such as elective orthopaedic surgery has changed to reward reliability, accessibility, convenience, and low cost rather than higher functionality [7].

Ambulatory surgery centers satisfy the criteria for a disruptive innovation in the field of care delivery in that they are a cheaper, simpler, more convenient alternative to hospital operating rooms, and they were initially designed to appeal to the low end of the market. An ASC is a facility that by definition provides surgical treatment that does not require hospitalization. These facilities were initially tailored toward healthier patients requiring minor elective procedures. Orthopaedic subspecialties amenable to ambulatory surgery include arthroscopy, sports-related injuries, hand, some spine as well as foot/ankle procedures, and the list is expanding.

Many of the initial ASCs struggled after their debut in 1972 as a result of inadequate reimbursement and the need to establish themselves in the eyes of investors as a high-quality, profitable investment. After 1982 and the approval of Medicare reimbursement for ASCs, there has been substantial growth in the number of ASCs in the United States. Today there are more than 4000 ASCs throughout the United States compared with 275 in 1980 and 1450 in 1990 [2, 14]. From 1996 to 2003, the number of ASCs increased by 50%, from 2425 to 3646, whereas the number of hospital-based outpatient surgery centers dropped by 16% [20]. One of the primary reasons for the success of ASCs when compared with hospital-based outpatient surgery centers is their profitability. The Pennsylvania Health Cost Containment Council reports that free-standing ASCs have an average net margin of 12%, whereas hospital outpatient surgery centers are on average barely profitable at 2% [20]. These differences in profitability have led to payment reforms that have limited payment for ASCs to 65% of the payment for hospital-based outpatient surgery centers for the same procedures [16]. These types of misguided payment reforms incentivize less efficient care and threaten the future viability of ASCs to deliver high-quality, cost-efficient care.

The literature supports the fact that increased volume and profits have not come at the expense of quality of care. In fact, the American Association for Accreditation of Ambulatory Surgery Facilities, in its ongoing effort to improve patient care, has developed an Internet-based quality improvement and peer review program to analyze outcomes for the surgery centers it accredits. Each surgeon must report all unanticipated sequelae, and at least six random cases are reviewed by an accepted peer review group biannually. In a study conducted over 2 years (2001 to 2002), one unanticipated sequelae occurred in every 299 procedures (incidence of 0.33%), and a death occurred in one in 58,810 procedures (0.0017%), which was comparable whether the procedure was performed in an accredited ambulatory surgery facility or a hospital-based surgical facility [15]. Thus, it appears that ASCs, rather than being static entities, are constantly innovating, streamlining, and incorporating technologic advances in surgical devices, techniques, and anesthesia protocols to expand the conditions for which same-day surgery is safe and appropriate.

## Reasons for Nonadoption: Barriers to Progress

Disruptive innovations in health care, in theory, offer lower cost, more efficient and convenient alternatives while maintaining, if not improving, the quality of care provided to patients. Therefore, it might seem unusual that there would be any resistance to their adoption. Yet as Christensen aptly notes, "healthcare may be the most entrenched, change-averse industry in the United States" [5]. From physicians to hospitals, health plans to implant manufacturers and regulators, it appears many stakeholders in the US healthcare system support the status quo to maintain their positions and profits. Although no one would blame the fact that most healthcare stakeholders feel a keen sense of defensiveness to protect their piece of an ever diminishing pie, without thoughtful, voluntary sacrifice, we risk losing control of how our piece is divided. It is at these crossroads specifically where providers can regain some control of the practice of medicine. The rise of managed care, changes in reimbursement rates from third-party payers, and the diffusion of new technologies to the market have intensified "turf wars" between the different professional guilds of medical practitioners. Disruptive innovations, some would argue, are only stoking the flames, because they allow procedures to be performed more efficiently in a more convenient location by providers who had previously been unable to provide such a service. In orthopaedic surgery, examples of "turf wars" include the ongoing battle with radiologists over the use of in-office diagnostic imaging and conflicts with podiatrists and physical therapists over the scope of their practice. These disputes are provider-centric conflicts that consume valuable resources and energy that could be redirected to enhance the value of care we provide by increasing quality and reducing costs.

Hospitals, by virtue of their size, associated overhead, and their large investments in the latest sustaining technologies, are similarly wary of disruptive innovations, because they may threaten their long-term financial viability. The rise in ASCs and single-specialty hospitals have shown investors and physicians alike that high-quality care



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can be provided with a much higher return on investment when facilities are patient-oriented, care delivery and operations are streamlined, and physicians and personnel are well integrated. Clearly, general hospitals are at a distinct disadvantage when it comes to "competing" for profits with standalone ASCs and single-specialty hospitals, because the burden of the uninsured and underinsured falls squarely on the shoulders of the former and the scope of practice differs greatly between the various healthcare delivery systems. However, comparisons can and should be drawn between the greater operating efficiencies of the ambulatory surgery centers as compared with hospital-based outpatient surgery centers. The margin differentials that exist between these two delivery systems cannot be explained simply by the patient population cared for or services provided. Although it may be true that ASC's are guilty of "cherry picking" patients, an analysis of the systems in place in these facilities may provide valuable lessons to improve the efficiencies of the hospital-based outpatient surgery centers. Unfortunately, it appears many hospitals are ill-equipped to compete in today's flexible, highly competitive healthcare delivery market.

Commercial health plans and other third-party payers, with their strong focus on profit margins, would seem to be an ally of disruptive innovations in that these technologies hold the promise of providing cost savings without sacrificing quality of care. However, commercial payers only reimburse for procedures that have been clinically validated, and many disruptive innovations, by virtue of being recent entrants to the market, do not yet have peer-reviewed research to support their efficacy compared with so-called "gold standard" treatment interventions. By labeling many new potentially disruptive procedures as "investigational," private insurers stifle growth and innovation that could lead to higher-quality, lower-cost care in the long run.

The rise in direct-to-consumer advertising of hip and knee replacement implants, primarily by implant manufacturers, but also by hospitals and surgeons, to gain a more competitive position in the lucrative and expanding arthroplasty market also poses a formidable institutional barrier to the adoption of disruptive innovations. It is the sustaining innovations that currently fuel the research and development of the orthopaedic device manufacturers such as alternative bearings for use in THA, computer-assisted surgical navigation tools, and new suture fixation devices. Although these devices have the potential to improve patient outcomes, they are consistently introduced into the market at a substantial cost premium and before validation of their clinical benefit and cost-effectiveness through well-designed, prospective clinical studies. Patients, as consumers, are shielded from the costs of orthopaedic implants and are often presented with misleading information about the benefits of particular products, which in turn may lead to inappropriate demands for newer, more costly, unproven technologies, strain the physician-patient relationship, and potentially contribute to the rising cost of health care [4].

Regulators, as opposed to physicians, care delivery systems, and third-party payers, have no financial incentive to resist the diffusion of disruptive innovations. Although originally established to protect both the consumer and society from unforeseeable risk as well as enforce the standards established by physicians, regulatory bodies often indirectly curb the diffusion of disruptive innovations by protecting and enforcing the status quo, which happens to be on the side of sustaining innovations. One of the main obstacles to diffusion of disruptive innovations stems from a dearth of published research demonstrating safety and efficacy. The lengthy and cumbersome FDA approval process for investigational devices and the bureaucratically complex HIPAA regulations are two key examples of how regulators indirectly impede the diffusion of disruptive innovations. Additionally, the enforcement of stringent intellectual property laws has the unintended consequence of limiting the introduction of generic drugs and device alternatives.

## Discussion

The US healthcare system is clearly in crisis, and current strategies have proven inadequate. Many healthcare institutions and healthcare technologies have overshot the needs of most patients with nonlife-threatening conditions who require elective surgical treatment such as many orthopaedic patients. As Christensen et al. have noted in their work, the market for simple, elective surgical procedures no longer rewards higher functionality, but rather rewards convenience, accessibility, low cost, and reliability [7].

In this article, we have applied the concept of disruptive innovations popularized by Christensen to the field of orthopaedics to illustrate examples in which simpler, cheaper alternatives have improved access of care, increased patient satisfaction, and empowered clinicians to provide higher-quality, more convenient and efficient care to their patients. Although we chose to focus on the specific examples of disruptive innovations described, there are many other potential examples related to musculoskeletal care delivery, including calcium phosphate cement for the treatment of distal radius fractures in the elderly, musculoskeletal ultrasound, and "medical tourism."

One of the defining characteristics of a disruptive innovation is a performance trajectory that allows it to eventually meet the demands of more sophisticated consumers. Each of our examples has the potential to



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continually evolve, improve, and thereby become "more disruptive" over time. Specifically, the technology underlying the mini-fluoroscans may improve to the point that the image quality achieved is comparable to that of conventional C-arms. Furthermore, although a number of the larger C-arms now are able to create fluoroscopic computed tomography reformats for three-dimensional detail, one could imagine that the mini C-arms may incorporate this feature in the years to come. This would allow for an expansion of current indications such as evaluation of complex, intraarticular fractures by these smaller imaging machines. Additionally, less expensive radiographic printers may be developed to allow for point-of-service printing of formal radiographs, thereby obviating any dependence on the radiology department.

In regard to increasing the role of PAs and NPs, these so-called "midlevel" providers have become an integral part of most orthopaedic practices, functioning as primary care musculoskeletal providers and thus allowing orthopaedic surgeons to focus on the surgical management of musculoskeletal disease.

Similarly, ASCs will continue to grow their market share as surgeons and anesthesiologists collaborate to develop perioperative protocols that allow for more complex procedures to be performed as "same day surgeries" without compromising safety (eg, improving preoperative education, including the proper use of assistive devices, providing appropriate preoperative education to patients and their families, and discharging patients home with indwelling pain catheters).

The sustaining orthopaedic innovations that are repeatedly introduced into the marketplace will continue to benefit our patients and advance the field of orthopaedics. To date, health care in general and the field of orthopaedic surgery in particular has focused a disproportionate share of resources and effort on the problems of a medical minority. To improve the overall health of the nation, efforts and resources should be redirected toward technologies that improve access and tackle issues of affordability to address the needs of the majority. Although it would be naïve to believe all of the ills of the healthcare system could be reversed simply by the development and diffusion of disruptive innovations, not actively attempting to identify and cultivate them will lead us further down our current path toward unsustainable healthcare inflation and an ever increasing gap between the health care we are capable of delivering based on technologic innovation and the health care we are able to deliver based on limited resources. Moreover, the concept of disruptive innovations offers the opportunity for clinicians to regain leadership in health care by working together with other healthcare leaders to deliver higher-quality, more convenient and accessible cost-effective care to our patients.

**Acknowledgments** We thank Vanessa Chiu, MPH, for her help in preparing the manuscript.

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000638 (02/24/14)

**Harford Hospital**
**Main Campus**
**New Surgeons Joining Medical Staff FY 2013**
**Projected vs. Actual Surgical Volume**

(Based on 3 months Oct-Dec 2013)

| | SERVICE | Projected Volume FY 2014 InPt | FY 2014 OutPt ** | FY 2014 Total | Annualized Volume FYTD 2014 InPt | FYTD 2014 OutPt | FYTD 2014 Total |
|---|---|---|---|---|---|---|---|
| * | Vasc Thorac | 75 | 50 | 125 | 216 | 64 | 280 |
| * | Colorectal | 0 | 10 | 10 | 116 | 80 | 196 |
| | Urology | 50 | 66 | 116 | 8 | 8 | 16 |
| | Breast | 40 | 25 | 65 | 16 | 76 | 92 |
| | General | 75 | 50 | 125 | 124 | 136 | 260 |
| * | Oncology | 50 | 50 | 100 | 32 | 68 | 100 |
| | Ophthalmology | 0 | 3 | 3 | 0 | 0 | 0 |
| | GYN | 0 | 50 | 50 | 24 | 16 | 40 |
| * | General | 50 | 50 | 100 | 152 | 36 | 188 |
| * | Vasc Thorac | 50 | 50 | 100 | 116 | 80 | 196 |
| | Vasc Thorac | 50 | 50 | 100 | 36 | 24 | 60 |
| | Orthopedics/Joints | 50 | 50 | 100 | 180 | 0 | 180 |
| | Orthopedics/Joints | 50 | 50 | 100 | 16 | 12 | 28 |
| | Ophthalmology | 0 | 10 | 10 | 0 | 28 | 28 |
| * | Orthopedics/Trauma | 22 | 5 | 27 | 0 | 0 | 0 |
| | General Surgery/Breast | 17 | 50 | 67 | 4 | 88 | 92 |
| * | Orthopedics/Hand | 8 | 42 | 50 | 176 | 56 | 232 |
| * | Orthopedics/Oncology | 12 | 3 | 15 | 12 | 4 | 16 |
| * | Orthopedic/Spine | 20 | 10 | 30 | 80 | 8 | 88 |
| * | General/Breast | 50 | 50 | 100 | 56 | 184 | 240 |
| | Genral/Transplant | 17 | 0 | 17 | 36 | 4 | 40 |
| | Genral/Transplant | 50 | 50 | 100 | 36 | 8 | 44 |
| | OB/GYN | 0 | 0 | 0 | 0 | 0 | 0 |
| | Plastic Surgery | 0 | 0 | 0 | 0 | 0 | 0 |
| | ENT Shift from HH to WHSC | 0 | -169 | -169 | 8 | 128 | 136 |
| | Pain Management | | | 0 | 0 | 0 | 0 |
| | | **736** | **605** | **1341** | **1548** | **1148** | **2696** |

**Projected additional surgical volume:**

| | |
|---|---|
| **Inpatient cases** | **812** |
| **Outpatient cases** | **543** |
| **Total** | **1355** |

* Actively recruited FY 2013

** See page 000445 of CON Application for FY 2014 volume projections related to new surgeons

note- With the addition of 543 outpatient cases, projected utilization of outpatient surgical suites is as follows:

| | FY 2014 | FY 2015 | FY 2016 |
|---|---|---|---|
| **% Utilization** | **79%** | **87%** | **106%** |

SHIPMAN & GOODWIN LLP®

COUNSELORS AT LAW

Joan W. Feldman
Phone: (860) 251-5104
Fax: (860) 251-5211
jfeldman@goodwin.com

February 25, 2014

VIA HAND DELIVERY

Kevin Hansted, Esq.
Hearing Officer
Department of Public Health
Office of Health Care Access
410 Capitol Avenue, MS #13HCA
P.O. Box 34048
Hartford, Connecticut 06134-0308

**Re: Objection to Hartford Surgery Center, LLC's and Connecticut Surgery Center, Limited Partnership's Petition for Intervenor Status; Docket No. 13-32851-CON**

Dear Attorney Hansted:

By this letter and on behalf of the Applicant in the above-referenced Application, I respectfully: (1) object to Hartford Surgery Center, LLC's ("HSC") and Connecticut Surgery Center, Limited Partnership's ("CSC") petitions for Intervenor Status (the "Petitions"); and (2) disagree with and respond to HSC's and CSC's statements made in said Petitions.

**1. Objection to HSC's and CSC's Petition for Intervenor Status:**

HSC and CSC have failed to demonstrate how its participation at the hearing, as Intervenors, will assist the Office of Health Care Access ("OHCA") in rendering a final decision concerning this Application as required by Section 19a-9-27(b)(4) of the Regulations of Connecticut State Agencies. HSC and CSC have provided OHCA with a series of unsubstantiated, inaccurate, emotional and false statements as a basis for its Petitions, that should not become part of the evidence that OHCA considers to rule on this Application. Accordingly, we believe that a more appropriate avenue for HSC's and CSC's participation is through the public portion of the upcoming hearing at which time OHCA may permit HSC's and CSC's views to be heard.

**2. Applicant's Responses to HSC's and CSC's Statements Made in Petitions:**

The following sets forth the Applicant's specific responses to HSC's and CSC's statements in their Petitions for Intervenor Status:

A. Petitioners Fail to Understand the Applicant's Institute Model.

The Petitioners in their request for Intervenor status state that the Applicant's proposal is duplicative because it, in particular, and as an alternative to the proposed ambulatory surgery center, has significant capacity at its two Hartford facilities (Retreat and Gillett) to absorb the outpatient orthopedic surgical volumes that the Applicant generates. This is a preposterous statement for several reasons. If the Hartford Hospital affiliated orthopedic surgeons desired to perform their outpatient orthopedic surgery at either of HSC'or CSC's ambulatory surgery centers, they would be free to do so. However, they have not chosen to do so simply because such facilities are outdated and ill-equipped to perform orthopedic surgery cases in the type of managed and controlled environment that our affiliated orthopedic surgeons expect and demand. The fact is that the orthopedic surgeons on the medical staff of Hartford Hospital have very high standards for their patients and have chosen to align with Hartford Hospital because they share the same commitment to high quality and the efficient management of the orthopedic surgical pathway. Moreover, since the proposed ambulatory surgery center model will be a laboratory for innovation, research and teaching, the HSC and CSC ambulatory surgery centers are not viable alternatives to the proposed ambulatory surgery center. Thus, HSC and CSC completely fail to recognize that the proposed ambulatory surgery center is an integral component to the Institute and is not simply interchangeable with HSC's or CSC's operating rooms. Accordingly, all of the arguments made by the Petitioners with respect to additional available capacity are inapplicable and without merit.

B. Petitioners Distort the Facts with Respect to the Availability of Utilization Data.

The Petitioners claim that the Applicant failed to provide relevant data regarding the other outpatient operating rooms in the Applicant's primary service area. The Applicant, per OHCA's request, provided utilization data with respect to where 75% of Hartford Hospital's outpatient surgeries originate. See Exhibit 20. The Applicant, in fact, provided all the utilization data that is publicly available with respect to outpatient surgery. It is worth noting that while the Petitioners deride the Applicant for not providing data that is publicly unavailable, it fails in its own petitions to provide any utilization data with respect to its two Hartford ambulatory surgery facilities. Moreover, even if the utilization data had been publicly available to the Applicant (with respect to the number, size and fit-out of operating rooms) and it was relevant, the Applicant still would not have access to information regarding specific operating room utilization. In addition, please note that in Dr. Courtland Lewis' prefiled testimony, the Applicant demonstrates that both the Rocky Hill and Glastonbury ambulatory surgery centers are at capacity even without including the orthopedic related pain cases performed in these two facilities in their utilization statistics. Please see Exhibit 29 of the Application. Finally, the Applicant is not proposing to move any orthopedic cases from any operating rooms other than those owned separately or jointly by Hartford Hospital, Orthopedic Associates of Hartford, P.C. and Constitution Surgery Centers, LLC. Accordingly, as originally stated in the Applicant's Application, nothing that the Applicant is proposing in this Application will adversely impact any other providers.

C. Petititoner Distorts the Facts With Respect to Patient Access and Reimbursement.

The Petitioners claim that the proposed ambulatory surgery center will disadvantage the medically indigent and Medicaid populations. This is completely untrue and baseless. The payer mix that is provided in the Applicant's Application reflects utilization data for both the Hospital and Orthopedic Associates of Hartford, P.C. Furthermore, the proposed ambulatory surgery center, (even though it will not qualify as a tax-exempt entity), requires that the proposed facility operate pursuant to the Hartford Hospital Financial Assistance Policy which undoubtedly, the Petitioners do not follow in that such a policy is only required for tax-exempt entities. Thus, the Applicant submits to OHCA that there would be greater access issues for the medically indigent if they had to utilize the Petitioners' facilities rather than if they used the proposed ambulatory surgery center. Finally, with respect to reimbursement, the Petitioners falsely state that the Applicant was misleading when it stated in its Application that the proposed ambulatory surgery center would result in lower Medicare costs than a hospital-based ambulatory surgery center. This is also completely untrue, but more importantly, such statement underscores the Petitioners failure to recognize the need for hospitals and physicians to align in order to respond to the demands of Health Care Reform by jointly managing the costs associated with the entire orthopedic surgical pathway.

D. Petitioner Acknowledges the Applicant's Need for an Additional Three Outpatient Operating Rooms.

Remarkably, by the Petitioners suggesting that Hartford Hospital, and the Rocky Hill and Glastonbury ambulatory surgery centers each add one additional operating room (for a total of three operating rooms) to absorb the additional volume that the Applicant generates, constitutes an admission by the Petitioners that the Applicant requires at least three additional outpatient operating rooms. We agree that we require at least three additional operating rooms, but for all the reasons stated in our Application, those operating rooms must be imbedded within and operated by the Institute. Moreover, neither the Rocky Hill nor Glastonbury locations would physically allow for expansion of the physical plant on a more cost-effective basis than the proposal.

In summary, the arguments made by Petitioners in their petitions are not factually based, are irrelevant and will only serve as a distraction to OHCA in deciding the issues before it in this proceeding. Therefore, on behalf of the Applicant, I respectfully request that both Petitioners not be granted Intervenor Status and that their testimony be heard at the public portion of the hearing only. In the alternative, if Intervenor Status is granted to the Petitioners, I respectfully request that they not be granted the right to cross-examine the Applicant.

Respectfully Submitted,

Joan Feldman, Esq.

# STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

*Office of Health Care Access*

## TENTATIVE AGENDA

## PUBLIC HEARING

**Docket Number: 13-31851-CON**

**Hartford Hospital, Constitution Surgery Centers, LLC and Affiliated Physicians, collectively to be known as HHC Hartford Surgery Center, LLC**

**Establishment of an Ambulatory Surgery Center, to be located on the Campus of Hartford Hospital**

**February 28, 2014 at 9:00 a.m.**

**I. Convening of the Public Hearing**

**II. Applicant's Direct Testimony (15 minutes)**

**III. Intervenor's Testimony (10 minutes)**
**Connecticut Surgery Center, Limited Partnership**

**IV. Connecticut Surgery Center, Limited Partnership**
**Cross-Examines Applicant**

**V. Applicant Cross-Examines Connecticut Surgery Center, Limited Partnership**

**VI. Intervenor's Testimony (10 minutes)**
**Hartford Surgery Center, LLC**

**VII. Hartford Surgery Center, LLC Cross-Examines Applicant**

**VIII. Applicant Cross-Examines Hartford Surgery Center, LLC**

**IX. OHCA's Questions**

**X. Closing Remarks**

**XI. Public Hearing Adjourned**

*An Equal Opportunity Provider*
*(If you require aid/accommodation to participate fully and fairly, contact us either by phone, fax or email)*
410 Capitol Ave., MS#13HCA, P.O.Box 340308, Hartford, CT 06134-0308
Telephone: (860) 418-7001 Fax: (860) 418-7053 Email: OHCA@ct.gov

## Olejarz, Barbara

**From:** Hansted, Kevin
**Sent:** Wednesday, February 26, 2014 2:51 PM
**To:** Jennifer Groves Fusco; Feldman, Joan; Olejarz, Barbara
**Subject:** RE: information for hearing

Attorney Fusco, I will leave it up to you as to how you want to present your case.

Also, with respect to the time allotted, as has been my past practice, I do not intend to cut off anyone's testimony unless the time becomes unreasonable. Therefore, please don't focus too much on the times allotted in the Agenda. I will make sure everyone is fully and fairly heard.

Kevin T. Hansted
Staff Attorney
Department of Public Health
Office of Health Care Access
410 Capitol Ave., MS #13HCA
P.O. Box 340308
Hartford, CT 06134
Phone: 860-418-7044

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**From:** Jennifer Groves Fusco [mailto:jfusco@uks.com]
**Sent:** Wednesday, February 26, 2014 2:34 PM
**To:** Feldman, Joan; Olejarz, Barbara
**Cc:** Hansted, Kevin
**Subject:** RE: information for hearing

If the Applicant is given 20 minutes (vs. the 15 minutes noted on the Agenda), I would ask for no less than 20 minutes combined for the Intervenors. As written we are entitled to 10 minutes each, and I am not waiving my clients' right to take the full time allocated if necessary. I was simply trying to streamline the process.

Thanks
Jen

---

**From:** Feldman, Joan [mailto:JFeldman@goodwin.com]
**Sent:** Wednesday, February 26, 2014 2:28 PM
**To:** Jennifer Groves Fusco; Olejarz, Barbara
**Cc:** Hansted, Kevin; Durdy, Barbara (Barbara.Durdy@hhchealth.org); Goyette, Karen T.
**Subject:** RE: information for hearing

All:
I would have expected that since the Applicant is only getting 20 minutes, that the total time for the Intervenors was 10 minutes. Please advise.

Thanks.
Joan

**Shipman & Goodwin** LLP
COUNSELORS AT LAW

**Joan W. Feldman**
Partner
One Constitution Plaza
Hartford, CT 06103-1919

Tel (860) 251-5104
Fax (860) 251-5211
jfeldman@goodwin.com
www.shipmangoodwin.com

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**From:** Jennifer Groves Fusco [mailto:jfusco@uks.com]
**Sent:** Wednesday, February 26, 2014 2:25 PM
**To:** Olejarz, Barbara
**Cc:** Hansted, Kevin; Feldman, Joan
**Subject:** RE: information for hearing

Thank you, Barbara.

Kevin, in reviewing the agenda I see that you've allocated 10 minutes each for HSC and CSC to present. If neither OHCA nor the Applicant objects, I would like to have Mr. Ellison give a single, combined presentation, which I don't think will take the full 20 minutes. I would also like to conduct any cross-examination on behalf of both entities at the same time rather than separately. Please let me know if this is okay. I have copied Joan Feldman on this email in the event that she has an objection.

Thanks again.

Jen

---

**From:** Olejarz, Barbara [mailto:Barbara.Olejarz@ct.gov]
**Sent:** Wednesday, February 26, 2014 2:16 PM
**To:** Jennifer Groves Fusco
**Cc:** Hansted, Kevin
**Subject:** information for hearing

2/26/14

Attached is information that was faxed out to you today regarding Friday's hearing. Your office called and said there was a problem with the fax and I told them I would email it to you.

*Barbara K. Olejarz*
Administrative Assistant to Kimberly Martone
Office of Health Care Access
Department of Public Health
410 Capitol Ave., MS#13HCA
Hartford, CT 06134
Phone: 860 418-7005
Email: Barbara.olejarz@ct.gov

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# STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

*Office of Health Care Access*

## TABLE OF THE RECORD

**APPLICANT:** **Hartford Hospital, Constitution Surgery Centers, LLC and Affiliated Physicians, collectively to be known as HHC Hartford Surgery Center, LLC**

**DOCKET NUMBER:** **13-31851-CON**

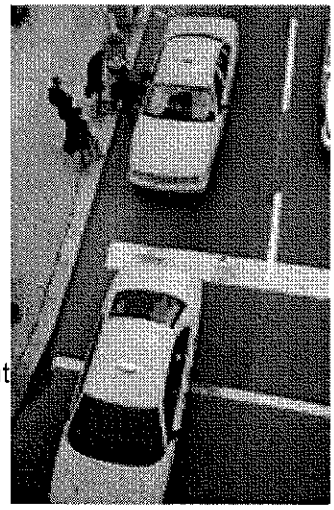
**PUBLIC HEARING:** **February 28 at 9:00 a.m.**

**PLACE:** **410 Capitol Avenue, Third Floor Hearing Room Hartford, Connecticut**

| | |
|---|---|
| **A** | Letter from HHC Hartford Surgery Center, LLC ("Applicant") dated July 15, 2013 enclosing the CON application for the establishment of an Orthopedic Outpatient Surgery Facility on the Hartford Hospital Campus under Docket Number 13-31851, received by OHCA on July 15, 2014. (418 pages) |
| **B** | Letter from Senator John Fonfara received on July 11, 2013 and OHCA response dated July 19, 2013 in the matter of the CON application under Docket Number 13-31851. (3 pages) |
| **C** | OHCA's letter to the Applicant dated August 14, 2013 requesting additional information and/or clarification in the matter of the CON application under Docket Number 13-31851. (3 pages) |
| **D** | Applicant's responses to OHCA's letter of August 14, 2013, dated October 11, 2013, in the matter of the CON application under Docket Number 13-31851, received by OHCA on October 11, 2013. (110 pages) |
| **E** | OHCA's letter to the Applicant dated November 8, 2013 requesting additional information and/or clarification in the matter of the CON application under Docket Number 13-31851. (2 pages) |
| **F** | Applicant's responses to OHCA's letter of November 8, 2013, dated November 27, 2013, in the matter of the CON application under Docket Number 13-31851, received by OHCA on November 27, 2013. (3 pages) |
| **G** | OHCA's letter to the Applicant dated December 12, 2013 deeming the application complete in the matter of the CON application under Docket Number 13-31851. (1 page) |

| | |
|---|---|
| **H** | Letter from Updike, Kelly & Spellacy, P.C.to OHCA dated January 10, 2014 on behalf of Surgical Care Affiliates, LLC , Connecticut Surgery Center, Limited Partnership and Hartford Surgery Center, LLC requesting a hearing in the matter of the CON application under DN: 13-31851, received by OHCA on January 10, 2014. (3 pages) |
| **I** | Designation letter dated February 3, 2014 designating Kevin Hansted as the hearing officer in the matter of the CON application under Docket Number 13-31851. (1 page) |
| **J** | OHCA's request for legal notification in the *Hartford Courant* and OHCA's Notice to the Applicant of the public hearing scheduled for February 28, 2014 in the matter of the CON application under Docket Number 13-31851, dated February 11, 2014. (4 pages) |
| **K** | OHCA's letter to the Applicant dated February 20, 2014 requesting prefile testimony in the matter of the CON application under Docket Number 13-31851. (1 page) |
| **L** | Petitions of HSC Hartford Surgery Center, LLC and Connecticut Surgery Center, Limited Partnership dated February 21, 2014, requesting intervenor status along with notice of appearance and prefiled testimony in the matter of the CON application under Docket Number 13-31851, received by OHCA on February 21, 2014. (72 pages) |
| **M** | Email from OHCA to the Applicant dated February 24, 2014 enclosing Petitions for intervenor status in the matter of the CON application under Docket Number 13-31851. (73 pages) |
| **N** | Letter from the Applicant to OHCA enclosing prefile testimony and notice of appearance dated February 24, 2014 in the matter of the CON application under Docket Number 13-31851, received by OHCA on February 24, 2014. ( pages) |
| **O** | Applicant's letter to OHCA dated February 25, 2014 Objecting to Hartford Surgery Center, LLC and Connecticut Surgery Center, Limited Partnership's Petition for Intervenor Status in the matter of the CON application under Docket Number 13-31851, received by OHCA on February 25, 2014. (3 pages) |
| **P** | OHCA's Ruling on the Petition of Hartford Surgery Center, LLC to be granted intervenor status in the matter of the CON application under Docket Number 13-31851, dated February 25, 2014. (1 page) |
| **Q** | OHCA's Ruling on the Petition of Connecticut Surgery Center, Limited Partnership to be granted intervenor status in the matter of the CON application under Docket Number 13-31851, dated February 25, 2014. (1 page) |
| **R** | OHCA's Ruling on Applicant's Objections in the matter of the CON application under Docket Number 13-31851, dated February 25, 2014. (1 page) |

## Directions to the Office of Health Care Access



**From I-91 North or South and from East of the River:**

In Hartford take I-84 westbound. Exit at Asylum Street, exit 48.

At the signal at the bottom of the ramp, make a gradual right, staying to the left of the fork in the road.

At the first light, take an immediate left onto Broad Street.

Travel on Broad Street to the light at the first four-way intersection; take a right onto Capitol Avenue. OHCA (tan brick building at 410 Capitol Avenue) is two blocks down on the right.

* Pass 410 and enter in the driveway between 410 and 450 Capitol Avenue. Turn right into the parking lot behind the building and proceed to the Security building in the lot. You will be directed to available parking.

**From the West:**

Take I-84 East to Capitol Avenue, Exit 48B. Bear right on the exit ramp. At the end of the ramp, turn right onto Capitol Avenue. OHCA is 3 blocks down on the right (tan brick building at 410 Capitol Avenue).

Proceed from * above

## Directions to Forest and Sisson (Lot C) for visitor shuttle service:

From I-91 (north or south) and from east of the river

In Hartford, take I-84 west. Take Exit 46, Sisson Avenue. At the end of the exit ramp, turn left at the signal light onto Sisson Avenue. Take your first left onto **Capitol Ave. Take your first left onto Forest Street. The parking lot is on your left and is labeled State of Connecticut. A shuttle bus to take you to our offices will either be waiting, or will appear in a few minutes.**

From the West

Take I-84 East to Exit 46, Sisson Avenue. At the end of the exit ramp, turn left at the light onto Sisson Avenue. Take you first left onto **Capitol Avenue. Take your first left onto Forest Street. The parking lot is on your left and is labeled State of Connecticut. A shuttle bus to take you to our offices will either be waiting, or will appear in a few minutes**

* * * COMMUNICATION RESULT REPORT ( FEB. 26. 2014 1:58PM ) * * *

FAX HEADER:

| TRANSMITTED/STORED : FEB. 26. 2014 1:57PM<br>FILE MODE | OPTION | ADDRESS | RESULT | PAGE |
|---|---|---|---|---|
| 126 MEMORY TX | | 98609729025 | OK | 5/5 |

REASON FOR ERROR
E-1) HANG UP OR LINE FAIL
E-2) BUSY
E-3) NO ANSWER
E-4) NO FACSIMILE CONNECTION

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
***OFFICE OF HEALTH CARE ACCESS***

**FAX SHEET**

**TO:** BARBARA DURDY

**FAX:** 860-972-9025

**AGENCY:**

**FROM:** STEVEN LAZARUS

**DATE:** 2/27/14 **Time:**

**NUMBER OF PAGES:** 5
*(including transmittal sheet*

**Comments:**

Information regarding tomorrows hearing for DN: 13-31851-CON.

***PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.***

***Phone: (860) 418-7001*** ***Fax: (860) 418-7053***

***410 Capitol Ave., MS#13HCA***
***P.O.Box 340308***
***Hartford, CT 06134***

* * * COMMUNICATION RESULT REPORT ( FEB. 26. 2014 1:59PM ) * * *

FAX HEADER:

| TRANSMITTED/STORED : FEB. 26. 2014 1:58PM<br>FILE MODE | OPTION | ADDRESS | RESULT | PAGE |
|---|---|---|---|---|
| 127 MEMORY TX | | 912037722037 | OK | 5/5 |

REASON FOR ERROR
E-1) HANG UP OR LINE FAIL
E-2) BUSY
E-3) NO ANSWER
E-4) NO FACSIMILE CONNECTION

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
***OFFICE OF HEALTH CARE ACCESS***

**FAX SHEET**

**TO:** JENNIFER GROVES FUSCO

**FAX:** 203-772-2037

**AGENCY:**

**FROM:** STEVEN LAZARUS

**DATE:** 2/27/14 **Time:**

**NUMBER OF PAGES:** 5
*(including transmittal sheet*

**Comments:**

Information regarding tomorrow's hearing for DN: 13-31851-CON.

***PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.***

***Phone: (860) 418-7001*** ***Fax: (860) 418-7053***

***410 Capitol Ave., MS#13HCA***
***P.O.Box 340308***
***Hartford, CT 06134***

* * * COMMUNICATION RESULT REPORT ( FEB. 26. 2014 2:01PM ) * * *

FAX HEADER:

| TRANSMITTED/STORED : FEB. 26. 2014 1:58PM<br>FILE MODE | OPTION | ADDRESS | RESULT | PAGE |
|---|---|---|---|---|
| 128 MEMORY TX | | 98602515211 | OK | 5/5 |

REASON FOR ERROR
E-1) HANG UP OR LINE FAIL
E-2) BUSY
E-3) NO ANSWER
E-4) NO FACSIMILE CONNECTION

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
***OFFICE OF HEALTH CARE ACCESS***

**FAX SHEET**

**TO:** JOAN FELDMAN

**FAX:** 860-251-5211

**AGENCY:**

**FROM:** STEVEN LAZARUS

**DATE:** 2/27/14 **Time:**

**NUMBER OF PAGES:** 5
*(including transmittal sheet*

**Comments:**

Information regarding tomorrow's hearing for DN: 13-31851-CON.

***PLEASE PHONE IF THERE ARE ANY TRANSMISSION PROBLEMS.***

***Phone: (860) 418-7001*** ***Fax: (860) 418-7053***

***410 Capitol Ave., MS#13HCA***
***P.O.Box 340308***
***Hartford, CT 06134***

SHIPMAN & GOODWIN LLP®

COUNSELORS AT LAW

Joan W. Feldman, Esq.
Phone: (860) 251-5104
Fax: (860) 251-5211
jfeldman@goodwin.com

February 26, 2014

**VIA HAND DELIVERY**

Steven W. Lazarus
Associate Health Care Analyst
Division of Office of Health Care Access
Connecticut Department of Public Health
410 Capitol Avenue, MS #13HCA
P.O. Box 34048
Hartford, Connecticut 06134-0308

Re: **IN THE MATTER OF THE ESTABLISHMENT OF AN ORTHOPEDIC AMBULATORY SURGERY CENTER ON THE HARTFORD HOSPITAL CAMPUS**
**DOCKET NO: 13-31851-CON**

Dear Mr. Lazarus:

Enclosed please find our Certification that our Notice of Appearance Form dated February 24, 2014, Pre-Filed Testimony of Jeffrey A. Flaks, Chief Operating Officer of Hartford HealthCare and Courtland G. Lewis, MD, Physician In Chief, Hartford Hospital Bone & Joint Institute along with support exhibits dated February 24, 2014 and our letter dated February 25, 2014 objecting to Hartford Surgery Center, LLC's and Connecticut Surgery Center, Limited Partnership's Petition for Intervenor Status on behalf of the Applicant in the above referenced matter has been sent to Jennifer Groves Fusco, Intervenor's counsel.

If you have any questions, please do not hesitate to contact me.

Sincerely yours,

Joan W. Feldman

Jwf/tja
Enclosure

000643 02/26/2014)

**CERTIFICATION**

I hereby certify that a copy of the foregoing has been sent via United States mail, postage prepaid, and electronic mail, this 26th day of February, 2015 to the following:

Jennifer Groves Fusco, Esq.
Updike, Kelly & Spellacy, P.C.
One Century Tower
265 Church Street
New Haven, CT 06510

Joan W. Feldman, Esq.
Shipman & Goodwin LLP

000644 02/26/2014)

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

REPRESENTATIVE ANGEL ARCE
4TH ASSEMBLY DISTRICT

LEGISLATIVE OFFICE BUILDING
ROOM 4001

CAPITOL: (860) 240-8585
TOLL FREE: (800) 842-8267
FAX: (860) 240-0206
E-MAIL: Angel.Arce@cga.ct.gov

MEMBER
FINANCE COMMITTEE
HOUSING COMMITTEE
REGULATION REVIEW COMMITTEE

RECEIVED
MAR - 3 2014
Office of
HEALTHCARE ACCESS

27th February 27, 2014

ATTN: Deputy Commissioner Lisa Davis,
Office of Health Care Access, MS #13HCA
410 Capital Avenue
Hartford, CT 06134-0308

The purpose of this letter is to confirm my support for Hartford HealthCare's proposal to establish an ambulatory surgery center (ASC) on Hartford Hospital's main campus.

The ASC is a critical component of Hartford Hospital's planned Bone and Joint Institute, dedicated to the delivery of comprehensive inpatient and outpatient musculoskeletal services. The Institute when fully developed, will include not only orthopedic services, but will also include services relating to wide range of bone and joint disorders, such as rheumatology, neurology, oncology, metabolic disorders, pain management, physical and rehabilitative medicine. It will provide increased access to advanced bone and joint care for patients throughout the state.

Hartford Hospital is one of the busiest surgical centers in our region – second only to Massachusetts General Hospital. The Glastonbury and Rocky Hill ambulatory surgery centers operated by Hartford Hospital-affiliated Orthopedic Associates are working at or above capacity. The hospital needs additional outpatient surgical capacity for the vast number of surgical procedures that can be performed in an outpatient setting.

With health care reform and its requirement to lower the cost of care and with technological and treatment advances, a growing number of surgical procedures are being performed on an outpatient basis. Also, patients prefer to be treated in an ambulatory setting from which they can more quickly return to their homes to recover. Because the center will be freestanding for reimbursement purposes, payment rates will be substantially lower than hospital-based ambulatory surgery services – benefitting patients, employers, and insurance and government payers.

The presence of the Institute will contribute most positively to the City of Hartford and its economic development through job creation and an increased demand for services. Over 800 constructions jobs will be needed and it will add 40 permanent positions at the Hospital.

Sincerely,

Angel Arce
State Representative – 4th District

Metro Hartford Alliance

R. Nelson Griebel
*President & CEO*

31 Pratt Street, 5th Floor
Hartford, CT 06103
tel (860) 525-4451
fax (860) 293-2592

February 28, 2014

Deputy Commissioner Lisa Davis
Office of Health Care Access
MS #13HCA
410 Capital Avenue
Hartford, CT 06134-0308

RECEIVED
MAR - 3 2014
Office of
HEALTHCARE ACCESS

Re: CON Docket Number 13-31851-CON

Dear Commissioner Davis:

The MetroHartford Alliance serves as the Region's economic development leader and the City's Chamber of Commerce. Our investors include businesses of all sizes, health care providers, institutions of higher education, and the Region's municipalities. Our mission is to ensure that the Region competes aggressively and successfully for jobs, capital, and talent so that it thrives as one of the country's premier places for all people to live, work, play, and raise a family.

The Connecticut Health Council, an initiative of the Alliance, focuses on strengthening Connecticut's reputation as a center of health excellence and thereby enhancing employment growth and capital investment in this dynamic economic sector. Connecticut's hospitals are among the sector's most important assets and therefore vital to that reputation. In that spirit, we support Hartford HealthCare's proposal to establish an ambulatory surgery center on the main campus of Hartford Hospital (the "Hospital").

Given the continuing advances in orthopedic surgery, the Hospital has shifted more of its orthopedic surgical cases to its ambulatory surgery centers in Glastonbury and Rocky Hill which are now operating at or above capacity. With an aging population requiring more orthopedic services, the proposed ambulatory center will address a growing demand for ambulatory surgical capacity.

The Hospital, one of the busiest surgical providers in New England, has responded to this growing demand by recently adding 26 surgeons, including 3 new orthopedic surgeons who perform in excess of 2,700 procedures annually, and plans to recruit additional surgeons in the months ahead. In addition, since the proposed ambulatory center will be considered "freestanding" for reimbursement purposes, the reduced payment rates will benefit patients, employers, and payors.

The proposed ambulatory center is also a critical component of the Hospital's Bone & Joint Institute (the "Institute"), the construction of which is underway and which will provide multidisciplinary, coordinated care to patients at one convenient location. The Institute will be aligned with the Hospital's Center for Education, Simulation and Innovation (the "Center") which develops and implements innovative technology and treatments in orthopedics. Accordingly, the proposed ambulatory center will enable the Hospital, its affiliated physicians, and those working at the Institute and the Center to collaborate more effectively to improve quality and control costs.

In summary, we support the proposed ambulatory center as it will enhance Connecticut's reputation as a center for health excellence and strengthen employment and capital investment in the State's dynamic health sector. Please contact me at 860-728-2277 if you require additional information.

Sincerely,

cc: Yvette Melendez
Jeffrey Flaks
Elliot Joseph

## Greer, Leslie

**From:** Lazarus, Steven
**Sent:** Wednesday, March 05, 2014 12:22 PM
**To:** Greer, Leslie
**Cc:** Olejarz, Barbara; Riggott, Kaila; Hansted, Kevin; Martone, Kim
**Subject:** FW: Late File
**Attachments:** Late-File Docket No_ 13-31851-CON.PDF

Leslie,

Please include the forwarded message and the Late File attached to the message into the record.

Thank you,

Steve

*Steven W. Lazarus*
Associate Health Care Analyst
Division of Office of Health Care Access
Connecticut Department of Public Health
410 Capitol Avenue
Hartford, CT 06134
Phone: 860-418-7012
Fax: 860-418-7053

---

**From:** Feldman, Joan [mailto:JFeldman@goodwin.com]
**Sent:** Wednesday, March 05, 2014 12:02 PM
**To:** Lazarus, Steven
**Cc:** 'kgoyette@harthosp.org'; Durdy, Barbara (Barbara.Durdy@hhchealth.org); Bill Bitterli (BillBitterli@cscus.net); Jennifer Groves Fusco (jfusco@uks.com)
**Subject:** Late File

Steven:
Attached you will find our late file submission as requested by OHCA. Please let me know if you have any questions.
Many thanks.
Joan

**Shipman & Goodwin** LLP
COUNSELORS AT LAW

**Joan W. Feldman**
Partner
One Constitution Plaza
Hartford, CT 06103-1919

Tel (860) 251-5104
Fax (860) 251-5211
jfeldman@goodwin.com
www.shipmangoodwin.com

Privileged and confidential. If received in error, please notify me by e-mail and delete the message. IRS CIRCULAR 230 NOTICE. Any tax advice contained in this email is not intended or written to be used, and cannot be used, for the purpose of avoiding tax penalties or promoting, marketing or recommending any partnership or other entity, investment plan or arrangement to one or more taxpayers.

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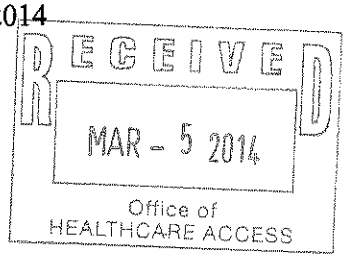
SHIPMAN & GOODWIN LLP®

COUNSELORS AT LAW

Joan W. Feldman
Phone: (860) 251-5104
Fax: (860) 251-5211
jfeldman@goodwin.com

March 5, 2014




**VIA HAND DELIVERY**
Steven W. Lazarus
Associate Research Analyst
Department of Public Health
Office of Health Care Access
410 Capitol Avenue, MS #13HCA
P.O. Box 34048
Hartford, Connecticut 06134-0308

**RE: Late-File Testimony; Docket No. 13-31851-CON**

Dear Mr. Lazarus:

On behalf of the Applicant in the above-referenced matter and as requested by the Office of Health Care Access at the Public Hearing held on February 28, 2014, enclosed please find the following late-file information concerning the updates to the Applicant's volume projections.

Please do not hesitate to contact me directly at 860-251-5104 if you have any questions.

Respectfully Submitted,

Joan Feldman

Joan Feldman, Esq.

Enc.

**HHC Hartford Surgery Center**
**Late File # 1**
**ASC Projected Volumes - Revised**
**Includes Projected Volume from New Surgeons**

**Projected Volume for Proposed ASC**

| | FY 2015 | FY 2016 | FY 2017 |
|---|---|---|---|
| Shift from West Hartford ASC | 109 | 109 | 109 |
| Shift from JB4 - Hartford Hospital | 1,069 | 1,069 | 1,069 |
| Volume Projected from new Orthopedic Surgeons | 80 | 80 | 80 |
| | 1,258 | 1,258 | 1,258 |
| Incremental Volume from Orthopedic Associates | 1,348 | 1,553 | 1,769 |
| Total Projected ASC Volume | 2,606 | 2,811 | 3,027 |

assumption:
1) All Orthopedic volume will shift from JB4 to new ASC
2) Includes projected volumes from new orthopedic surgeons joining the medical staff in 2013

**Projected Number of Procedures and Operating Rooms**

| | FY 2015 | FY 2016 | FY 2017 |
|---|---|---|---|
| Total Projected ASC Volume | 2,606 | 2,811 | 3,027 |
| Minutes of Surgery/ Cleanup | 234,540 | 252,990 | 272,430 |
| OR need calculated | 2.44 | 2.64 | 2.84 |
| Number of ORs required | 3 | 3 | 3 |

**OHCA Facility Plan Guidelines**
Capacity of the proposed facility will be based on
8 hours per day, 5 days per week, 50 weeks per year
for a total of 2,000 hours per year

Optimal utilization of an OR = 80%
Average time per case = 60 minutes
Cleanup time per case = 30 minutes

Optimal OR utilization = 96,000 minutes per OR

**CERTIFICATION**

I hereby certify that a copy of the foregoing has been sent via electronic mail, this 5th day of March, 2014 to the following:

Jennifer Groves Fusco, Esq.
Updike, Kelly & Spellacy, P.C.
One Century Tower
265 Church Street
New Haven, CT 06510
jfusco@uks.com

Joan W. Feldman, Esq.
Shipman & Goodwin LLP

# STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH

Jewel Mullen, M.D., M.P.H., M.P.A.
Commissioner

Dannel P. Malloy
Governor

Nancy Wyman
Lt. Governor

March 6, 2014

The Honorable Angel Arce
Representative – 4th Assembly District
State of Connecticut
Legislative Office Building, Room 4001
Hartford, CT 06106-1591

Re: Certificate of Need Application; Docket Number: 13-31851-CON
Hartford Hospital, Constitution Surgery Centers, LLC and Affiliated Physicians, collectively to be known as HHC Hartford Surgery Center, LLC
Establishment of an Ambulatory Surgery Center, to be located on the Campus of Hartford Hospital

Dear Representative Arce:

On March 3, 2014 the Department of Public Health ("DPH"), Office of Health Care Access received your letter concerning the Certificate of Need ("CON") for the proposal by HHC Hartford Surgery Center, LLC to establish an ambulatory surgery center, to be located on the campus of Hartford Hospital.

I welcome and appreciate your comments regarding this matter. Your letter will be made part of OHCA's formal record of the CON application docket. Please be advised, once a decision has been rendered it will be posted and available on OHCA's website at http://www.ct.gov/dph/ohca. Meanwhile, OHCA's website maintains status reports that you may review at your convenience.

If you have any further concerns or questions, please feel free to contact Kimberly Martone at (860) 418-7029.

Sincerely,

Lisa A. Davis, MBA, BSN, RN
Deputy Commissioner

LAD:KRM:bko

Connecticut Department of Public Health

Phone: (860) 509-8000 • Fax: (860) 509-7184 • VP: (860) 899-1611
410 Capitol Avenue, P.O. Box 340308
Hartford, Connecticut 06134-0308
www.ct.gov/dph
*Affirmative Action/Equal Opportunity Employer*

**SENATOR JOHN FONFARA**
*First District*

Legislative Office Building, Room 3700
Hartford, CT 06106-1591
Tel. (860) 240-0043
Fax (860) 240-0036
www.SenatorFonfara.cga.ct.gov

State of Connecticut

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Program Review & Investigations
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Office of
HEALTHCARE ACCESS

March 3, 2014

Deputy Commissioner Lisa Davis
Office of Health Care Access, MS #13HCA
410 Capital Avenue
Hartford, CT 06134-0308

Dear Deputy Commissioner Davis:

I am writing today in support of Hartford Hospital's proposed plans for an ambulatory surgery center. Hartford Hospital has a long history of providing and introducing sophisticated high-quality orthopedic services and advances to the region, including but not limited to orthopedic trauma surgery services, joint replacement surgery, bone reconstruction surgery, and other specialty and general orthopedic services.

Given a growing need and demand for high value cost-effective orthopedic services, the Hospital is committed to developing comprehensive musculoskeletal services that would include, as a critical component, an ambulatory surgery center dedicated to providing ambulatory orthopedic surgical services located on the Hartford Hospital main campus in Hartford. An initiative like this will not only respond to a growing demand in orthopedic services but will continue to provide the security of good jobs for many and contribute greatly to the economic stability of the city.

Furthermore, the Hospital's Musculoskeletal Institute will be one component of a nationally recognized orthopedic center of excellence that offers high quality and cost-effective orthopedic services. Such a Center will be a unique asset to the region. In addition, the Musculoskeletal Institute will provide specialized and sophisticated orthopedic services, along with a commitment to the development of evidence-based best practices, clinical treatment protocols, commitment to technological advances, clinical research and valuable opportunities for orthopedic-related clinical educational opportunities, including for the University of Connecticut orthopedic surgical residency program. It is a great example of our ability to not only create a high quality center of care but also provide for great academic partnerships, so that patients receive the highest level of quality care in the most appropriate, cost effective setting.

I believe that the creation of Hartford Hospital's Musculoskeletal Center could result in it becoming a destination for orthopedic services, including ambulatory surgery services. National experts project strong growth for orthopedics, including ambulatory surgery in the Greater Hartford Market. The growing demand for orthopedic services is consistent with the needs

generated by an aging population and the continued transition from inpatient to ambulatory intervention in orthopedic surgery.

I urge approval of Hartford Hospital's Certificate of Need request for the benefit of the region and all of its residents.

Sincerely,

John Fonfara
State Senator, 1st District

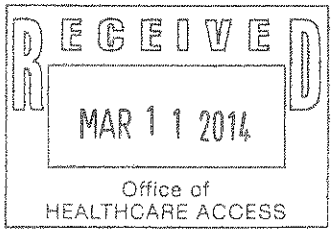
ORIGINAL



STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

OFFICE OF HEALTH CARE ACCESS




HARTFORD HOSPITAL, CONSTITUTION SURGERY CENTERS, LLC
AND AFFILIATED PHYSICIANS,
COLLECTIVELY TO BE KNOWN AS HHC
HARTFORD SURGERY CENTER, LLC

ESTABLISHMENT OF AN AMBULATORY SURGERY CENTER,
TO BE LOCATED ON THE CAMPUS OF HARTFORD HOSPITAL

DOCKET NO. 13-31851-CON

FEBRUARY 28, 2014

9:03 A.M.

410 CAPITOL AVENUE
HARTFORD, CONNECTICUT

POST REPORTING SERVICE
HAMDEN, CT (800) 262-4102

. . .Verbatim proceedings of a hearing before the State of Connecticut, Department of Public Health, Office of Health Care Access, in the matter of Hartford Hospital, Constitution Surgery Centers, LLC and Affiliated Physicians, collectively to be known as HHC Hartford Surgery Center, LLC, Establishment of an Ambulatory Surgery Center, to be located on the Campus of Hartford Hospital, held at the Department of Public Health, 410 Capitol Avenue, Hartford, Connecticut, on February 28, 2014 at 9:03 a.m. . . .

HEARING OFFICER KEVIN HANSTED: Good morning, everyone. This public hearing before the Office of Health Care Access, identified by Docket No. 13-31851-CON, is being held on February 28, 2014 to consider HHC Hartford Surgery Center, LLC's application to establish an ambulatory surgery center to be located on the campus of Hartford Hospital.

This public hearing is being held pursuant to Connecticut General Statutes, Section 19a-639a, and will be conducted as a contested case, in accordance with

Chapter 54 of the Connecticut General Statutes.

My name is Kevin Hansted, and I've been designated by Commissioner Jewel Mullen of the Department of Public Health to act as the Hearing Officer here today.

The staff members assigned to assist me are Kaila Riggott and Steven Lazarus, and the hearing is being recorded by Post Reporting Services.

In making its decision, OHCA will consider and make written findings concerning the principles and guidelines set forth in Section 19a-639 of the Connecticut General Statutes.

The Applicant, HHC, Hartford Surgery Center, LLC, has been designated as a party in this proceeding.

Connecticut Surgery Center, Limited Partnership, and Hartford Surgery Center, LLC have been designated as Intervenors with full rights in this proceeding.

At this time, I will ask staff to read into the record those documents already appearing in OHCA's Table of the Record. All documents have been identified in the Table of the Record for reference purposes. Mr. Lazarus?

MR. STEVEN LAZARUS: Good morning. Steven Lazarus, OHCA staff. We would like to enter into the record Exhibits A through R.

HEARING OFFICER HANSTED: Do either the Applicant or the Intervenors have any objections to those exhibits?

MS. JOAN FELDMAN: No objection.

MS. JENNIFER GROVES FUSCO: No objection.

HEARING OFFICER HANSTED: Thank you. And I would ask, at this time, that all the individuals, who are going to testify here today, either on behalf of the Applicant or the Intervenors, please stand, raise your right hand and be sworn in.

(Whereupon, the parties were duly sworn in.)

HEARING OFFICER HANSTED: Thank you, all. And just a reminder, for any of those folks here that have submitted pre-filed testimony, when you testify here today, before you testify, please just adopt that pre-filed testimony on the record.

And, at this time, the Applicant may proceed.

MS. FELDMAN: Good morning, Attorney Hansted and OHCA staff.

HEARING OFFICER HANSTED: Good morning.

MS. FELDMAN: Thank you for giving us this opportunity to speak. I would like to just briefly address a few housekeeping issues.

In terms of adopting the exhibits, I want to bring to your attention that, in Exhibit 29 of the pre-filed testimony for Dr. Lewis, on page 000558, there is an error in the projections for the Rocky Hill facilities for year 2013 only.

The error occurred as a result of a transposition error, and, as a result of it, the surgical volumes for 2013 are understated by -- sorry? Right. The surgical volumes for 2013 are understated by 1,044, and the pain cases are overstated by 1,044.

I have revised schedules that I can provide to you and the Intervenors, or I could submit it as a late file. It's up to you.

HEARING OFFICER HANSTED: No. You can provide it at this time.

MS. FELDMAN: Okay. We also want to --

HEARING OFFICER HANSTED: Just before you proceed, do the Intervenors have any objection?

MS. GROVES FUSCO: No objection.

HEARING OFFICER HANSTED: Thank you.

Okay.

MS. FELDMAN: Okay, thank you. We also want to note for OHCA that, on page five, footnote five of the pre-filed testimony of Christian Ellison on behalf of Hartford Surgery Center, LLC, Mr. Ellison states that the Applicant incorrectly reported the number of ASC operating rooms as 14 versus 15, and we want to clarify for OHCA that the Applicant in its application relied upon the latest OHCA Statewide Health Care Facilities and Service Plan, Table 7, report, which at the time, in 2010, reported that Connecticut Surgical Center had two operating rooms.

I'd like to make a few introductory comments, just to clarify who we are and a bit about our presentation. Is that okay?

HEARING OFFICER HANSTED: You're free to do so.

MS. FELDMAN: Okay. As you pointed out, Attorney Hansted, the Applicant is the HHC Hartford Surgery Center, LLC, which is a joint venture between Hartford Hospital, Orthopedic Associates of Hartford, and Constitution Surgery Centers.

Today, you'll hear testimony from Mr. Jeffrey Flaks, who is the Chief Operating Officer of

Hartford Health Care, the system parent for Hartford Hospital, and Dr. Courtland Lewis, who is the Physician and Chief of the Hartford Hospital Bone and Joint Institute and, also, a member of Orthopedic Associates of Hartford.

Because the hearing is about the proposal for an ambulatory surgery center, which will be integral and embedded within the Bone and Joint Institute, some of our testimony today will be devoted to describing the institute model overall and in relation to the Ambulatory Surgery Center.

Specifically, our testimony today is going to focus on our vision and our need to accommodate our existing volumes.

I'm going to ask Mr. Flaks to provide his pre-filed testimony.

HEARING OFFICER HANSTED: Thank you.

MR. JEFFREY FLAKS: Thank you. Good morning, Attorney Hansted, and thank you to the OHCA staff.

So my name is Jeff Flaks, and, until recently, I was the President and CEO of Hartford Hospital and presently the Chief Operating Officer of Hartford Health Care, and I do adopt my pre-filed

testimony as my own.

HEARING OFFICER HANSTED: Thank you.

MR. FLAKS: So I'm excited to be here today and to speak with you about the Bone and Joint Institute and the proposed Ambulatory Surgery Center, which is an essential part of the institute.

So I'd like to kind of start with the context, that we are developing a world class Musculoskeletal Institute. This institute is about innovation, research and teaching, and it's highly specialized.

So this center will have a foot and ankle center, a hand center, a shoulder and upper extremity center, a sports medicine center, a spine center, a joint center, an urgent care center, an arthritis center, a pain center.

It will have musculoskeletal imaging. It will have a research and innovation center. It will have dedicated full-time musculoskeletal trained anesthesiologists.

This center, the concept, is a destination musculoskeletal center, the first of its kind for the State of Connecticut amongst a select few in the country, so when we built this center and conceived of this

concept, we have hired the firm, in fact, to help us, in terms of the architectural rendering and the development of the planning for this center, who built recently the NYU Joint Diseases Hospital, the new facility, and you see the rendering to my right.

So this concept is about creating a center that will bring national recognition here in Connecticut and that will elevate musculoskeletal health care in this region beyond what has been known.

When we developed this center, our team went to the Cleveland Clinic and spent time there in Cleveland studying their center.

Our team went to Minnesota and studied the leading center in Minnesota, and, again, we have experts both from the Hospital of Special Surgery, who have advised us, and here from the team that helped build joint diseases.

So the point that I'm really making is that we are creating a patient-centered facility that is a first of its kind within this region.

At the same point in time, we have experience in Hartford, because we have the Institute of Living, which is part of Hartford Hospital on the campus of Hartford Hospital, which is a highly-specialized

psychiatric center, which has significant inpatient capability. It has highly specialized intensive outpatient services, it has a major teaching program, it has the clinic embedded within its center, and it has research at the heart of the institute.

That very model, which has served us extraordinarily well, where it is recognized at the U.S. News and World Report level as a national leader in psychiatric care, that's the model we're bringing forward for musculoskeletal health.

So we will have a highly-specialized, intensive, single specialty dedicated ambulatory surgery center, with all of these clinics that will have rheumatology, that will have physiatry, that will have all the medical subspecialties partnered and embedded with orthopedics and neurosurgical services as it relates to the spine working together to deliver a service and a capability like no other within our region.

So this is modeled after best of class services in the country, and, as I indicated, we've consulted national experts, which is what we're so excited about, to really change the way this care is delivered.

We're investing upwards of 150 million

dollars in this project, so it has enormous economic impact. We're talking about 1,000 construction jobs, 90 new permitted jobs as the institute expands.

We're talking about creating significant further economic growth within the capitol region. We have already within the Research and Innovation Center, which will be at the centerpiece of this facility, have an agreement with the national leader, international leader in medical technology and innovation, who will be piloting a hospital command center that will be at the heart of the entire institute, in terms of how we create new efficiencies, and that product ultimately we hope to get commercialized well throughout the country.

So this center is about quality. It's about safety. It's about value. It's about how we work through the issues around health care reform, which are demanding value around the balance of quality and safety.

So this is how we will align with our physicians in total to manage the total cost, but, at the same time, to insure that we are achieving the absolute best outcomes, where there will be great transparency.

Dr. Courtland Lewis, who is a national leader in this area, is going to speak in much greater detail about that today, but we are creating shared

goals. We are creating alignment with our physicians, so that we are entirely together in the purposefulness around innovation, around teaching, around research, around delivering clinic services, and around delivering all of the comprehensive health care that will be highly sub-specialized, but, at the same time, and this is a point I really want to be clear about, what's so exciting, it's multi-disciplinary.

So imagine today people go to these different services and they're located throughout the different regions. There's no capacity to bring together all of the specialists, who need to work together in much more concert, to work together to deliver world class health care.

That's what occurs today at the Hospital of Subspecialty Surgery in New York, which is the number one ranked center in the country. That's the same very model that we're putting forward here and which you see within that description.

Now, in Hartford Hospital, our surgical volume has been growing significantly. We've added 26 surgeons in the last year. When our experts today speak and give the specific data, just in the last year, if you look at our surgical volume versus what the initial

projections were, it has increased dramatically over this period of time.

In the last specific year, though, Hartford Hospital has had an 18 percent increase in our combined inpatient and outpatient orthopedic cases. Outpatient alone was six percent. This is an area that is growing, and it's growing for several reasons.

It's growing, because with an aging population, with higher expectations around lifestyle, and at the same point in time with aging, with greater obesity levels, all of the national projections show great growth in orthopedic and musculoskeletal care.

Locally, over the recent years, Connecticut has seen great growth. Hartford Hospital has outpaced that growth recently and has seen significant growth, but the projections going forward are even greater for good reason.

So we're building a program and a center that both responds to the immediate needs of where there's great requirements around servicing this immediate growth, but, at the same point, we're building something very much for the future, very progressive, that really gives Connecticut and the residents of Connecticut patients something that's never been

available to us, a fully-dedicated single specialty from a comprehensive musculoskeletal program, and that's what makes us so excited about doing this.

So the ambulatory surgical component is a critical aspect of the Bone and Joint Institute. It would be unfathomable to look at the organizations that we compare to at Hartford Hospital as a billion-dollar academic tertiary medical center that would have a Musculoskeletal Bone and Joint Institute on our campus that did not have ambulatory surgery, because it's so integrated.

And Dr. Lewis will explain how today there's a migration of inpatient services and outpatient services, but those services require much more highly-specialized full-time musculoskeletal anesthesiology, full-time musculoskeletal imaging capability, a full complement of services that can manage that migration as intensity of care migrates unexpectedly.

We absolutely recognize the essential aspect of the Ambulatory Surgery Center, and if it were not to go forward, would cause us to give consideration to the feasibility of this project, because it would be very difficult to realize this vision and to create this type of program that was so incomplete.

Now you will see that our Glastonbury Surgery Center, which is a single-specialty orthopedic center, the Rocky Hill single-specialty orthopedic center, they are at capacity and have grown with great success in recent years, and that was evident in the CON application, but there is no need, no question, in my opinion, no question, that we have a need for additional capacity, both in terms of the immediate nature of what's in front of us, and we unquestionably know this to be going within the future.

So this is a dedicated single-specialty orthopedic center. It cannot operate separately and apart from the Bone and Joint Institute, and it doesn't in any like examples across the country of this nature.

There will be single standards, single protocols, full-time dedicated staff, who only work within this area, and full-time dedicated resources.

So we do believe that this ASC is not interchangeable and that it is -- in fact, it's not in conflict with a standalone multi-specialty ambulatory surgery center.

We do not believe this will have an adverse effect on any other centers within this immediate region, and, again, we have a full team of experts today,

who are passionate about this project. We've invested a tremendous amount of time and energy studying these movements across the country, and we are committing from the strategic plan perspective at Hartford Hospital our greatest investment, that there's nearly 150 million dollars in this program, because we recognize this is essential to the community, and it's a chance to do something spectacular that can distinguish reputationally the Hartford region and the State of Connecticut and beyond.

And we're very excited about this, and, again, I thank you for your time today, your consideration, and we do have, again, brought a significant team with us today, who can really respond and speak to any of the issues that we're going to work through this morning.

HEARING OFFICER HANSTED: Thank you, Mr. Flaks. Before we move on to the next witness, you had mentioned a hospital command center. Can you just describe, as best you can, what that means?

MR. FLAKS: Sure. So this is a concept that's emerging, and it really is a way to operate the resources of the entire facility much more efficiently, so it creates the capacity to oversee all of the support

services, all of the ancillary services, all of the staff and resources, so that we can improve efficiency, so that we can improve cost, so that we can improve responsiveness, and so that we can make the patient experience much more, you know, with greater satisfaction from that standpoint.

So this is something that is difficult to embed at an existing facility, but when you're building a new facility like we are, from the ground up, we're using lean practices around process improvement to embed that in every aspect of how we work, and the foundation of that command center gives you real time data to the right people, so that you can be doing real time process improvement.

So it's very innovative, and, again, we are -- it's something that we're partnering with an international leader, who has selected us for this first application, and we're developing it in our Center for Education Simulation Innovation, which has received significant State support and is a really extraordinary center, but applying it first in the institute.

HEARING OFFICER HANSTED: And would this be, the command center, would this be connected with Hartford Hospital, as well, or is it just within the

Surgical Center?

MR. FLAKS: Initially, it will be just in the Bone and Joint Institute, so it will be all of the services, inpatient and outpatient, around coordinated care, and it focuses on reducing errors.

I mean it really embeds kind of a -- it's a workflow, and it's a process, and a technology, but our hope, ultimately, is to proof of concept, is that, if it succeeds here, which we would anticipate obviously that it does, that it can go across all of our hospitals in Hartford health care over time, and that it has application, you know, well outside of Connecticut.

HEARING OFFICER HANSTED: Okay.

MR. FLAKS: So it's a very innovative approach.

HEARING OFFICER HANSTED: Okay, thank you.

MR. FLAKS: The foundation of this.

HEARING OFFICER HANSTED: Thank you. You may proceed.

MS. FELDMAN: Yes. We'd like to have Dr. Courtland Lewis come up and provide his testimony.

HEARING OFFICER HANSTED: Okay.

DR. COURTLAND LEWIS: Attorney Hansted and staff of OHCA, good morning.

HEARING OFFICER HANSTED: Good morning, Doctor.

DR. LEWIS: My name is Courtland Lewis. I'm a Physician and Chief of Hartford Health Care Bone and Joint Institute at Hartford Hospital and am a partner in Orthopedic Associates of Hartford, I'm a Clinical Professor of Orthopedic Surgery in the UConn School of Medicine, and I'm an actively practicing joint replacement surgeon.

Thank you for the opportunity to speak today. I adopt my pre-filed testimony as my own.

HEARING OFFICER HANSTED: Thank you.

DR. LEWIS: You've heard from Mr. Flaks regarding growth and needed orthopedic services both in Connecticut and around the country and the reasons for that, based on the aging demographic of the population, the epidemic of obesity, and a variety of other issues that are absolutely driving growth in our area.

For example, in my own area of orthopedics, which is not necessarily generally associated with Ambulatory Surgery Centers, we are doing 600,000 total knee replacements a year in America at this point, a total of a million joint replacement surgeries.

The projected growth for 2025 and a

variety of sources when folks have looked at this, based on existing and projected data, is around two and a half million of these same surgeries in 2025.

You can imagine, to grow by 400 percent, which is realistically where we're headed, is a huge challenge for us, and we have really no choice, but to develop more efficient and effective ways of providing care for our future patients.

I want to also emphasize to you that not only joint replacement surgery for a variety of other largely procedural type surgeries that are performed, as open heart surgery, renal transplantation, and a variety of other surgeries that are performed in medicine, really do respond to the volume, so volume drives efficiency, but volume also drives, quite clearly, improvement in the quality of care.

And the reason for that, fundamentally, is that the amount of focus that's required to improve care in these complex procedures has gotten more and more attention in an effort to reach those ends, so I think, at this point, the evidence is irrefutable that that's the case.

There are also very clear-cut indications from our literature and, also, experience in this

community that consistent staffing and consistent protocols around patient care will drive a decrease in cost and improve any quality metric that you want to measure.

Yesterday, in my role as a member of Lieutenant Governor Wyman's Health Care Innovation Steering Committee, I gave an overview to the Connecticut Chapter of the American College of Surgeons regarding the State Innovation Model, which is based on the triple aim that's been widely discussed.

That triple aim, just to set the stage, is to drive improvements in patient experience of care by increasing quality and satisfaction.

Number two, to improve the health of populations. Number three, to reduce the per capita cost of health care.

I personally subscribe to the triple aim, and it drives our efforts at the Bone and Joint Institute, and I would just personally represent to you that I have a clear sense that the issue in American medicine today is not whether we're spending enough money, but are we spending it wisely, and that needs to drive our efforts moving forward.

Mr. Flaks spoke a little bit about the

Bone and Joint Institute, and let me just point out several things that I think are relevant to today's discussion. This is a formal co-management agreement between the hospital and physicians that is designed to align not just the responsibilities, but, also, the accountabilities around orthopedic patient care.

In other words, the ability of physicians in the hospital who work together is key, and it will be key moving forward as we're working our way more and more into value-based reimbursement for medical care.

In the Greater Hartford area right now, literally two percent of contracts are risk-based contracts.

When we went to Minneapolis several months ago, they were approaching 30 percent of the contracts were based on a risk sharing approach, whereby the quality of the care provided drives at some level the reimbursement for the services rendered.

Our vision, as you've heard, is to be the acknowledged regional leader in patient-centered innovative musculoskeletal care, and we live that every day.

Among other initiatives over the past year, we've realigned 130 frontline patient care staff

and created a cost center for the Bone and Joint Institute. We've established a registry, which tracks important clinical parameters on every orthopedic and neurosurgical spine patient at Hartford.

We even hired an industrial improvement engineer, certified in lean six sigma techniques to redesign and improve patient care workflows.

We've engaged G.E. Health Care in the development of a Hospital of the Future Project, which allows us to model changes in hospital layout and staff utilization.

We've installed a patient portal and patient reported outcomes tools in our practice to measure the impact of orthopedic procedures on patients' self-perceived health status.

We are currently recruiting two federally-funded Clinical Outcomes Projects. We are teaching orthopedic residents, medical students and clinical staff on a daily basis.

So what that really leads me to is the crux of my testimony today and the reason that we're assembled, and that has to do, obviously, with the need of an ambulatory surgery center as part of the institute.

We absolutely need to be able to innovate,

and if I can use the word experiment, I think it's probably a reasonable one to use, around the most effective, the most efficient, and the safest way to care for our patients.

By way of example, in Boulder, Colorado, 20 percent of total joint replacement surgeries are being performed in the outpatient setting now, as opposed to an occasional procedure in this part of the world, but, in truth, there are really no good data that tell us when and on which patients this is safe.

Can it be done in the outpatient setting? Yes. Should it be done on a particular patient with underlying co-morbidities? We just don't know, therefore, it's essential that we have the ability to come to understand what is safe and what is effective.

A single specialty dedicated ASC that's physically attached to the inpatient unit is absolutely essential, as you've heard, because it provides a safety valve in the case of higher risk or complicated patients, as we seek to find the best location and the best staffing model for any particular surgery that we perform.

It's not only the physical proximity that's important, but consistent staffing and consistent

clinical protocols, as you've heard, are essential to our ability to actually measure the impact of the changes that we made, so if we don't have that level of consistency, then we have no way to actually understand whether we've accomplished the ends that we seek to improve.

Quite simply put, if the ASC was not approved, it would threaten our ability to help set new standards for efficiency and quality of care of the bone and joint patients that we take care of.

So let me close by echoing Mr. Flaks's aspirational goals for the Bone and Joint Institute. First and foremost, it will bring musculoskeletal care driven by the needs of our patients to the highest level available anywhere.

We will not equal the clinical activity of the largest institutions in America, but I do believe, truly, that our targeted focus on the process of care, how we redesign, the way we take care of people, will advance American medicine through the implementation of proven changes in data-driven medicine.

We will create a center of excellence that raises the bar for medical care in central Connecticut. I thank you for your consideration.

HEARING OFFICER HANSTED: Thank you, Doctor. Attorney Feldman, no other witnesses?

MS. FELDMAN: No.

HEARING OFFICER HANSTED: Okay, before we get to Cross, I just want to take a five-minute break. We'll go off the record.

(Off the record)

HEARING OFFICER HANSTED: Attorney Fusco, do you have any Cross-Examination?

MS. GROVES FUSCO: I do. I just have a few questions.

HEARING OFFICER HANSTED: Sure.

MS. GROVES FUSCO: Mr. Flaks, from your CON submissions, the Applicant is applying to establish an orthopedic only ASC on the main campus of Hartford Hospital, correct?

MR. FLAKS: Correct.

MS. GROVES FUSCO: And you've told us today that this ASC is sort of an integral part of the Musculoskeletal Institute, that the Institute can't operate apart from this orthopedic ASC, correct?

MR. FLAKS: Yes.

MS. GROVES FUSCO: You understand, and I'm sure you've seen this in our submissions, that there's

nothing in the CON statutes that would preclude you from converting this simple specialty orthopedic ASC to a multi-specialty ASC once it's approved, is that correct? Are you aware?

MR. FLAKS: I'm not aware of those kind of technical aspects of that, but our intention, unquestionably, obviously, is the entire project is about developing a dedicated, full-time musculoskeletal project in every aspect of how it's built and coordinated.

MS. GROVES FUSCO: Including an ASC that's limited to the specialty of orthopedics?

MR. FLAKS: Musculoskeletal health.

MS. GROVES FUSCO: Okay.

MR. FLAKS: We describe it slightly more broadly, but, yes.

MS. GROVES FUSCO: Okay. In having looked back at the other facilities involved in this process, the orthopedic facility, associate's facility in Rocky Hill and the Glastonbury facility, both of those ASCs were approved with limiting conditions as orthopedics only, and I can see from your submissions that they both now provide pain management services, as well.

Do you intend for this institute to be a pain management facility?

MR. FLAKS: There would be a component. Again, it's musculoskeletal health, so that's why I'm not defining it maybe quite as narrowly, because the physiatry in physical medicine rehab is part of the care continuum of musculoskeletal health.

MS. GROVES FUSCO: Okay. Has there been any analysis of the potential impact of having pain management services at that facility on other ASCs in the community that provide pain management, have pain management physicians on their staff?

MR. FLAKS: Yes. I can ask Barbara Durdy to speak to that, because she can, I think, speak very specifically to the application.

MS. BARBARA DURDY: So the volume projections in our applications were developed, because we, you know, we are looking for a way to be able to accommodate our own growing volumes across orthopedics and across all surgical specialties.

So the capacity that we need, we need to accommodate our own volume growth and the growth that we foresee from surgeons that are currently working at Hartford Hospital.

MS. GROVES FUSCO: And I do understand that. I guess my question is, and I can find the page

where you have your projections, do your projections in this CON include pain management services, or are they orthopedic services only? If you look at -- I have to find the projections. I mean page 11 of our CON has the shifted volume.

I think, if you look at page 16, you've projected volume for three OR facility, based on doing hand, wrist, elbow, foot, ankle, knee, shoulder and general.

MS. DURDY: Yes, so, it's not included in pain management cases, specifically.

MS. GROVES FUSCO: But you do intend to add the subspecialty of pain management?

MS. DURDY: I would say, as the demand warrants, yes.

MR. FLAKS: Orthopedic Group just hired a new pain management specialist.

MS. GROVES FUSCO: That was going to be my next question. Have you recruited physicians to perform those procedures?

HEARING OFFICER HANSTED: Can you just answer affirmatively on the record?

DR. LEWIS: Yes. I can confirm that that's the case.

COURT REPORTER: I'm sorry, sir. Your name is?

MS. FELDMAN: Dr. Courtland Lewis.

DR. LEWIS: Confirmed that is the case.

HEARING OFFICER HANSTED: Thank you.

MS. DURDY: Jennifer, could I -- I'm sorry. Could I just add one other point?

HEARING OFFICER HANSTED: You may. Go ahead.

MS. DURDY: Even without considering pain management, we will be at capacity. If you look at our projections, we're up to, you know, 2,900 cases by year three without pain management.

MS. GROVES FUSCO: I understand. I think my bigger concern in the questions I'm asking have to do more with, if you're going to add pain management as a specialty, I think you'd have to acknowledge that there's a possibility, I mean there's a finite number of pain management physicians in the Hartford area, is it theoretically possible that you might recruit physicians, who currently perform those procedures at the SCA facilities?

MR. FLAKS: I think it's a nearly impossible question to answer definitively, because, you

know, physicians change their practice patterns. These are private practitioners, so it can happen and does happen from time-to-time, but, again, the most recent recruit we had was from Dartmouth and was from outside the area, and it was to service the need of our organization, so it has not been our practice, and we do have our own pain management physicians today, who exist and function exclusively really within our domain.

MS. GROVES FUSCO: Understood. I just wanted to confirm for the record that you intend to perform those services and that there are physicians at our facilities, who perform those services, as well.

Now you indicate, on -- sorry. I'm going to flip around. I think it's on page 532 of the CON. I think it's like the very last.

MS. FELDMAN: Just give us a second to get there.

MS. GROVES FUSCO: It might be the very last page or the second to last page.

MS. FELDMAN: 532, you said?

MS. GROVES FUSCO: Um-hum. 531.

MS. FELDMAN: 531. Okay.

MS. GROVES FUSCO: Okay, so, on page 531, you indicate that Hartford Hospital is going to be

closing four outpatient operating rooms once the proposed surgery center is up and running, correct?

MS. DURDY: Um-hum.

COURT REPORTER: I'm sorry. Who is responding?

MS. FELDMAN: Barbara Durdy is responding.

MS. GROVES FUSCO: Okay and --

HEARING OFFICER HANSTED: And just a reminder, sorry to cut you off, when you answer, please don't shake heads. Say yes or no. Thank you.

MS. GROVES FUSCO: And flipping to page 532, your capacity and utilization analysis is based upon the closure of those four outpatient ORs, correct?

MS. DURDY: That's correct.

MS. GROVES FUSCO: Is there a possibility that those operating rooms will be, outpatient operating rooms will be reopened?

MR. FLAKS: Cheryl Sicara is here, who is our Vice President in the Patient Care Services and responsible for perioperative services.

HEARING OFFICER HANSTED: Okay. Why don't you come up to the microphone and switch seats just for a minute? And you were sworn in, correct?

MS. CHERYL SICARA: Yes.

HEARING OFFICER HANSTED: Thank you.

MS. SICARA: It's okay. It will take me two seconds. So for periop services, the four operating rooms that we're looking to close it's based on the size of those operating rooms and the expectation that we want to provide state-of-the-art, and, so, our goal is to close those four, yes.

MS. GROVES FUSCO: And not to reopen them?

MS. SICARA: We may reopen them as a storeroom or something, other than that.

MS. GROVES FUSCO: But not as operating rooms?

MS. SICARA: Yes.

MS. GROVES FUSCO: Okay. I just want to clarify, and this may actually be a question for Dr. Lewis. Glastonbury Surgery Center, when that facility was initially approved, it was approved for two operating rooms, and it's listed in the State Health Plan, similar to what your attorney said about Connecticut surgery centers having two ORs, but you're doing your calculation of capacity, based upon three ORs. Do you know when the third operating room was added?

DR. LEWIS: The third operating room --

HEARING OFFICER HANSTED: Why don't you

come up to the microphone, please? Just state your name again for the record.

DR. LEWIS: Dr. Lewis. The third operating room was added in 2011.

MS. GROVES FUSCO: Do you know if notice was given to OHCA when that operating room was added, as required by the regulations?

MS. FELDMAN: We don't know. We'd have to go back and look at it. We can tell you that we're completely at capacity with those three ORs.

MS. GROVES FUSCO: I understand. And what was the date?

MS. FELDMAN: 2011.

MS. GROVES FUSCO: Okay. In -- sorry. Give me a second to find it. In the rebuttal submission that Attorney Feldman provided us with earlier in the week, on page 642, in Subsection D, it says neither the Rocky Hill, nor Glastonbury locations, would physically allow for expansion of the physical plant on a more cost-effective basis than the proposal.

Do you have, or can you provide any evidence to support a claim that it would cost in excess of six and a half million dollars to add one OR at either of those facilities?

MS. FELDMAN: We have Chris Mineau, who is the CEO of Constitution Surgery Centers and the management company that operates both the Rocky Hill facility and the Glastonbury Surgery Center, and I think he's probably best positioned to answer that question.

MR. CHRIS MINEAU: Chris Mineau, CEO of Constitution Surgery Centers. I can speak to some of the specifics that we looked at a lengthy process to deal with this on the expansion of the Rocky Hill facility in 2010.

The problem is it's in a single, 10,000-square-foot building, it occupies every square inch of that building, and it's in an office park, so the only opportunity we have to expand and get an additional OR was to build a connector to an adjacent building across the parking lot and buy out all of the tenants in that building, pay for their new fit out in a new location, and pay for their moving expenses, then go ahead and build a surgery or the additional operating room after that, so it was easily, you know, it was a short process. It became cost-prohibitive very quickly.

MS. GROVES FUSCO: And what about Glastonbury Surgery Center?

MR. MINEAU: The Glastonbury Surgery

Center is in a similar situation, that they've got all contiguous space, is locked up in long-term leases by other tenants.

MS. GROVES FUSCO: But there is potentially non-contiguous space in that building, correct?

MR. MINEAU: I'm not aware of non-contiguous space, but that would be appropriate.

MR. FLAKS: This is Jeff Flaks, and what I would add to the question, it's in conflict with the entire concept.

MS. GROVES FUSCO: I understand, and I appreciate your testimony, and you've had your chance to note that for the record. Representations were made in your testimony, that it is less -- it basically costs less than six and a half million dollars, or more than six and a half million dollar proposal.

MS. FELDMAN: I think the witness should be allowed to answer the question.

HEARING OFFICER HANSTED: If Mr. Flaks has more to add, let him, Mr. Flaks, based upon the cost of expanding only.

MS. GROVES FUSCO: The cost.

MR. FLAKS: All right, so, I would add, to

Chris Mineau's point, that there is a cost, but there's a whole series of other things that relate to the cost, which is, you know, we're talking about moving our clinic services and all the other programs and services into the integrated model that would, then, we'd have to figure out what we would do on the other side.

So, to me, all the efficiencies ultimately that come by the shared services and our ability to deliver a much more efficient operation are in the concept, so the idea of putting an OR here and an OR there, which really it isn't feasible by the circumstances of where they happen to be, but it would create an impossibility to develop a program.

MS. FELDMAN: Mr. Mineau would like to just add something to respond to Attorney Fusco's question.

HEARING OFFICER HANSTED: Regarding cost.

MS. FELDMAN: Cost.

MR. MINEAU: In addition to all the incremental costs or the problems that I mentioned, when you have two facilities, like Rocky Hill and Glastonbury, that are running at the capacity levels they are, just from an operational perspective, to add an additional OR it becomes very difficult and adds to the cost that can't

be accounted for in construction, so I think that it would be operationally very difficult for either one of those facilities, even if they had the ability to expand in a contiguous space, to do it.

HEARING OFFICER HANSTED: Did you want -- we have an addition to the cost question?

MS. GROVES FUSCO: My question has been answered. It was answered 10 minutes ago. We're getting off topic.

HEARING OFFICER HANSTED: I'll allow you Redirect. Let's move on.

MS. GROVES FUSCO: I just have a clarification question for you. I don't know if you have a copy. Bear with me for a second. If you don't, I can show you. Joan, do you have a copy of the State Health Plan with you?

MS. FELDMAN: Yeah.

MS. GROVES FUSCO: You do?

MS. FELDMAN: No. We have Schedule 7 only.

MS. GROVES FUSCO: It's a quick question, and I can certainly share this with you.

MS. FELDMAN: Sure. Why don't you tell us first?

MS. GROVES FUSCO: I have a question about the -- on page 215 of the State Health Plan, it's listing services provided at the various hospital satellite surgical locations, and it lists West Hartford Surgery Center as providing only ophthalmology surgery, and I'm curious, as to how you're going to shift 109 orthopedic cases to this facility if all that's provided there is ophthalmology.

MS. SICARA: Cheryl Sicara. West Hartford Surgical Center provides way more than ophthalmology. Presently, it's a multi-specialty surgery center, so I guess I would have to question the accuracy of that.

MS. GROVES FUSCO: Okay, so, that the information submitted to them isn't accurate?

MS. FELDMAN: Or it's not reported in a complete fashion. It doesn't necessarily correspond with the information that was provided.

MS. GROVES FUSCO: Now sort of putting aside, you know, the supposed benefits of having the Ambulatory Surgical Center embedded in your institute and all the things we've been talking about, there's no reason why, if the OAH facility and the Glastonbury facility have overflow cases, if they're at capacity, they couldn't use the West Hartford Surgery Center for

some of their procedures, is there?

MS. DURDY: Barbara Durdy. Currently, the West Hartford Surgery Center is at about 73 capacity, and I'd like to just point out two things about that.

First, the national benchmark for optimal utilization is about 80 percent capacity. I think we all acknowledge that, so we were just slightly under optimally utilizing that center.

MS. GROVES FUSCO: If I can ask for a clarification on that? The way you've calculated the numbers, it's at 73 percent of 80 percent capacity, so it's less than at a full capacity.

MS. DURDY: But what I want to -- the most important point is, though, the capacity that is at West Hartford, we have a real need for that capacity.

As Mr. Flaks has testified and what was written in our application, we have recently brought in 26 new surgeons, and the volumes that we project from these new surgeons well exceeded our original estimates, so we are going to have a real need to decant volume from Hartford Hospital ORs to the West Hartford.

So our plan is to decant about 650 cases. We're looking at GYN, urogyn, plastics and EMT cases, so that we project by the third year, 2016, we should be at

about 83 percent capacity.

MS. GROVES FUSCO: When did you start -- when did these physicians come on board?

MS. DURDY: Within the past 12 months.

MS. GROVES FUSCO: Okay, but still in 2013, the cases are at 2,200 and so on cases. I guess my question is, you know, are your projections that you're going to ramp up by 600 cases realistic, given the historically low volume at that center?

MS. SICARA: Cheryl Sicara. It takes several years for them to ramp up, in terms of their volume. Already this year, if you look at actual year-to-date to January, we're over 543 cases from what we originally, so it takes at least three years to ramp up.

MS. GROVES FUSCO: But understand that, given where the volume is right now and the speculative nature of how many cases these physicians are going to bring, you do have -- understand my question, that there is capacity right now.

You are at 73 percent of optimal capacity, which is 80 percent. You've got about 1,000 case margin to work with right now.

MS. FELDMAN: Attorney Fusco, the Ambulatory Surgery Center that is proposed today is not

open, and it's planned to be open in a few years.

At that point in time, the shift will have appropriately have occurred.

MS. GROVES FUSCO: That's your projection.

MS. FELDMAN: No. That's based on our --

HEARING OFFICER HANSTED: Attorney Feldman, I don't want you testifying.

MS. FELDMAN: I'm sorry.

HEARING OFFICER HANSTED: If there's someone that can testify, you may have them speak.

MS. DURDY: Barbara Durdy. What we've projected is based on actual experience to date with those 26 surgeons. We see the trajectory that they are on, and we need to plan accordingly.

MS. GROVES FUSCO: Understood. Question for you. Another question for you, Mr. Flaks. There's been some back and forth and submissions about the cost savings around this proposal.

It was referenced multiple times in your submissions and in your pre-filed testimony that performing orthopedic surgery procedures in an ASC is 35 percent less costly than performing those same procedures in a hospital setting.

Although it's not expressly stated there,

this refers primarily to Medicare cases, correct, the 35 percent reduction?

MR. FLAKS: Bill Bitterly, who is from Constitution and who did the projections, has done the study on this.

MR. BILL BITTERLY: The table that we included in the CON was labeled that it was a comparison of Medicare ASC to Medicare HOPD, so I don't believe we said anywhere that overall costs would be down by 35 percent.

MS. GROVES FUSCO: Well Mr. Flaks's testimony doesn't clarify. It says exactly what I just read, performing orthopedic procedures in an ASC setting is 35 percent less costly than performing the same procedures in a hospital setting, so what you're saying is that is limited to Medicare procedures, correct?

MR. BITTERLY: I guess it's a conceptual problem. We don't have commercial payer contracts in place. All we have is the fee schedule for Medicare.

MS. GROVES FUSCO: But you would anticipate, when asked for a rate schedule for the proposal, I believe you said that commercial insurance rates are negotiated and competitive with the market, so I assume you expect those to be higher than the Medicare

rates, correct?

MR. BITTERLY: We would hope they would be higher than the Medicare rates, but hospital commercial rates are substantially higher than ASC commercial rates, in general, it's our understanding.

MS. GROVES FUSCO: Okay, but would you also acknowledge that, if that ASC has a 51 percent hospital owner, that they may have better negotiating leverage on those commercial rates than, let's say, an ASC like my client's, that does not have a hospital partner?

MR. BITTERLY: Not necessarily. We've seen it all over the place. Some hospital joint ventures have a relatively small discount to standalone ASC rates, and some are worse than that.

MS. GROVES FUSCO: But I assume some are higher than that. Some are higher than the Medicare rate. Some are closer to hospital HOPD rates, correct?

MR. BITTERLY: Yes.

MS. GROVES FUSCO: Okay and that commercial business represents, what, 63 percent of what you're going to be doing at the center?

MR. BITTERLY: On a gross number of cases?

MS. GROVES FUSCO: Yeah, number of cases.

MR. BITTERLY: I'll take your word for it. I'm not looking at it.

MS. GROVES FUSCO: And the Medicare is about 16 percent? Does that sound right?

MR. BITTERLY: That sounds about right.

MS. GROVES FUSCO: Okay, thank you. Just a few final questions, and I think you can answer them. In the CON application, the draft operating agreement, I marked the pages, you have this draft operating agreement that contemplates Class E members, who you guys describe in your submissions as physicians, who have an ownership interest in the proposed ASC, who are not members of OAH.

The operating agreement also includes, on page 36 of the CON, it includes a non-compete that requires, basically requires any owner of your facility to -- it says anyone, who owns a membership interest in your facility, cannot also own interest in an ASC that offers orthopedics in a laundry list of towns, including Hartford, correct?

So, again, theoretically, because both of my client's facilities, Connecticut and Hartford Surgery Center, are located in Hartford and provide orthopedics, if you were to offer an ownership interest to one of their partners, they would need to divest their interests

in our facility to be in compliance with your agreement, correct?

MR. FLAKS: I believe that is correct.

MS. GROVES FUSCO: Okay and the operating agreement on page 30, I believe page 30, yeah, Section 2.02b, requires any physician members to perform at least a third of their procedures at the proposed ASC, correct?

So if partners, or if partners -- or non-partner physicians were to become partners and Class E members in your ASC, they would be directing at least a third of their cases to your facility, correct?

MR. FLAKS: That's correct.

MS. GROVES FUSCO: And probably more, kind of given the financial incentives when you're a partner in an ASC, correct?

MR. FLAKS: And, again, it has no bearing on why we're doing this.

MS. GROVES FUSCO: Understood.

MR. FLAKS: It's not the purpose, in any way, to try to do that. We're building a world class program that brings people from around the country and the world to practice.

HEARING OFFICER HANSTED: Mr. Flaks, if you could just answer the question she asked?

MR. FLAKS: So the answer, that's speculative. I couldn't imagine to know what their behavior pattern would be.

MS. GROVES FUSCO: Okay.

MR. FLAKS: I know what the requirement is.

MS. GROVES FUSCO: But they're required to bring at least a third, correct?

MR. FLAKS: That's correct.

MS. GROVES FUSCO: Okay. I have no more questions.

HEARING OFFICER HANSTED: All right, thank you, Attorney Fusco. And, Attorney Feldman, if you have some Redirect?

MS. FELDMAN: Well I would like to request, Attorney Hansted, that Mayor Segarra be given the opportunity present his testimony. He's just joined us, and I know he would like to speak on behalf of the Applicant.

HEARING OFFICER HANSTED: Absolutely. I just didn't want to break your train of thought with respect to Redirect, and I did see the Mayor walk in.

MS. FELDMAN: That's fine.

HEARING OFFICER HANSTED: And, certainly,

we can have the Mayor present his testimony at this time. Welcome, Mr. Mayor.

MAYOR PEDRO SEGARRA: Thank you. Good morning.

HEARING OFFICER HANSTED: Good morning.

MAYOR SEGARRA: Thank you for allowing me the opportunity to speak in support of the Applicant.

Hartford Hospital is an incredible partner to the City on many facets, and, during my administration, we have reengaged to strengthen that partnership, because we recognize what this institution's ability for both economic development for our city, as well as the quality of health care.

The hospital is an incredible partner, in terms of serving our community. They don't turn anyone away.

I'm very excited about this program, because it seeks to, on a medical model basis, bring together a group of professionals from diverse disciplines, in order to enhance the work that is done on an orthopedic basis with the population that they serve.

I'm very excited about the fact that, because it's ambulatory care expansion, it won't limit the number of days that people could spend during that

procedure, and, for us, that has a lot of implications, in terms of even our own -- the city, as a consumer.

We are self-insured, and anything and everything that we can do to lower health care costs is an advantage to the municipalities and organization, and it also allows us the opportunity to have our workers hopefully back in line a lot sooner.

This particular facility is also in line with the emerging trends of health care policy and the new reforms that have been made to get people in and out of health care as efficiently and as cost-effective as possible.

But, going back to the initial point, we have a partnership with the hospital that seeks to firmly ground Hartford Hospital as a world class institution, not a national class institution, but a world class institution.

Our metro economy as a City and even within the region is dependent upon our ability to leverage institutions, such as Hartford Hospital, to generate the type of economic activity.

This will reflect on anything from restaurants in the area to our strategy for housing and bringing more people to our urban core to live.

It also compliments the fact that this will have a training component to work with our medical school to train professionals, medical professionals to be the best that they can be, and we're hopeful that, as the hospital continues its mission, to expand in areas where the services are needed, that we can also be partners in that development and in that growth.

We have a lot of health challenges in our city. A lot of those challenges are based on problems that are unique to our population, more so than other surrounding areas.

Obesity is a big issue in our city. The pediatric rates of obesity are also extremely high. We're not seeing the kids shed off their, quote, "baby fat," as we used to see in the past, so we have a big challenge, in terms of young adults that are facing challenges with obesity, and this, often times, reflects itself in problems having to do with orthopedic problems, so we're hoping that this can be a resource to our community, be beneficial for us, in terms of economic development, and will help us continue to gain a national reputation as a city that has some of the most excellent health facilities in the world.

HEARING OFFICER HANSTED: Thank you, Mr.

Mayor.

MAYOR SEGARRA: Thank you.

HEARING OFFICER HANSTED: And, in the interest of fairness, are there any other public officials in the room that would like to give comment on the application today?

Okay, hearing none, Attorney Feldman, if you want to proceed with Redirect?

MS. FELDMAN: Yes. Yes. Yes. I have a few questions for --

HEARING OFFICER HANSTED: Mr. Mayor, I'm sure you're very busy, so you're free to go, and I thank you for your comments here today. Attorney Feldman?

MS. FELDMAN: Yes, thank you, Attorney Hansted.

HEARING OFFICER HANSTED: You're welcome.

MS. FELDMAN: I would just like to follow-up on Attorney Fusco's questions regarding West Hartford capacity. I'd like to ask a few questions of Ms. Durdy.

HEARING OFFICER HANSTED: Certainly.

MS. FELDMAN: Okay. Ms. Durdy, on page 000639 of the Applicant's application, there is a chart that reflects the surgical volumes for Hartford Hospital. Can you, please, explain to me what this chart actually

demonstrates, in terms of additional surgical volumes and the specific impact it would have regarding the need to shift cases to West Hartford and how this chart differs from what we projected in our original OHCA application?

MS. DURDY: So Barbara Durdy. So, on page 639, we submitted a chart with Dr. Lewis's pre-filed testimony, which shows the difference between our original projections and the new recast of projections, based on three months of actual experience.

So we have surgical volumes listed by service, by surgical service, and we are looking at projected volumes. In the first three columns on the left, those were our original projections for inpatient, outpatient and total surgeries.

These are related to the new surgeons that have recently joined our medical staff within the past 12 months, so, originally, in the CON submission we projected 605 additional outpatient cases.

We now see, based on actual experience of these surgeons, that they are on a course to more than or almost double that number, so we are expecting 1,148 outpatient cases from these new surgeons.

Those additional cases drive our utilization of our ORs to unsustainable levels, so you

can see at the bottom the percent utilization 79 percent, 87 percent, and, by 2016, we would be over 106 percent, so there is a real need on the outpatient side at Hartford Hospital to decant volume.

So we have been given this a lot of thought, and we have come up with what we think are the best services to shift to West Hartford.

So, as I said before, the plan was for 650 cases. We're looking at urogynecology, moving our Hearing and Balance Center there, so ENT cases, gynecology cases, and plastic surgery cases.

So West Hartford is multi-purpose ORs, so we will be running at full capacity, near 83 percent, with the addition of these cases.

HEARING OFFICER HANSTED: And before you move on, Ms. Durdy, the percentages you're giving, are those based upon an 80 percent total calculation, or is it a 100 percent total calculation?

MS. DURDY: Based on optimal. Based on 80 percent.

HEARING OFFICER HANSTED: Eighty percent, thank you.

MS. DURDY: Um-hum.

MS. FELDMAN: I have no further Redirect.

HEARING OFFICER HANSTED: Nothing further? Okay. Before we move on, does anyone need a break? No? Okay.

Attorney Fusco, you may proceed with your presentation.

MS. GROVES FUSCO: Yes. Thank you. With me today is Christian Ellison. He's the Senior Vice President of Operations at Surgical Care Affiliates, which is the parent company of both Connecticut Surgery Center and Hartford Surgery Center. He'll be giving one combined presentation on behalf of both entities.

We also have with us today Joanne Roche, who is the Administrator at Hartford Surgery Center, and Chris Gorman, who is the Administrator at Connecticut Surgery Center.

They haven't pre-filed testimony, but they're here to answer any questions that Mr. Ellison is unable to answer for you, so, with that, I will pass it on.

MR. CHRISTIAN ELLISON: My name is Christian Ellison, Senior Vice President of Surgical Care Affiliates.

I'd like to thank Attorney Hansted and his colleagues on the OHCA staff for allowing us to testify,

and I do adopt my pre-filed testimony as my own.

HEARING OFFICER HANSTED: Thank you.

MR. ELLISON: I'm Senior Vice President with Surgical Care Affiliates. We're a national company that operates throughout the United States.

My particular role is to oversee operations for the Northeast part of the United States for Surgical Care Affiliates, which ranges from really the D.C. area, up through Maine, west, through Pennsylvania, and, so, Connecticut Surgery Center and Hartford Surgery Center are both part of my remit as leader within our company.

Surgical Care Affiliates is one of the largest operators of outpatient surgery centers throughout the U.S. We work with leading health systems across the country in very diverse markets to include highly-managed, risk-based markets, like Minneapolis and Southern California.

We really work closely with our health system partners to optimize surgical service delivery to include site of service optimization.

One hundred of our facilities across the U.S. are in partnership with the leading health systems in a variety of markets, so we're very familiar,

obviously, with the challenges that Hartford Health Care faces, in terms of trying to provide a service to their communities.

I'll just also note that all of the health system partnerships that we are involved in, all of those partners are non-profits, so similar mission as Hartford Health Care.

We are opposing this CON application really for two reasons. One, I think we believe that it's an unnecessary and costly endeavor, and, when I refer to that, I'm really referring, specifically, to the surgical facility, not the Musculoskeletal Institute, as defined here, and we really believe that it's unnecessary in the context of the need of the community for surgical services.

And I think, secondly, the other reason we're contesting this is the potential financial impact to our two facilities in the marketplace and their ability to continue to deliver care in the community.

As you probably know, they're the two oldest surgery centers within Hartford, and, so, not only are we a national company, but we've been providing care to this community for many years now, since the '80s really.

Our written testimony and this presentation will establish that there is no clear public need to embed the surgical facility within the Musculoskeletal Institute as part of the integrated, or as a requirement to have an integrated platform around musculoskeletal care.

We will try to demonstrate that this will have a significant impact on other surgical facilities within the community to include our own, and that we do not believe it's the most cost-effective way to provide additional surgical capacity in the marketplace.

In terms of public need for the facility, I think the primary focus of the Applicant's need analysis was around the need for ambulatory surgery to be a physical component of the Musculoskeletal Institute that they're developing.

While we acknowledge that surgery is a critical component of an integrated delivery service around musculoskeletal care, what we don't believe is that the location of that facility is as important.

We believe that, clearly, you can create all that you're trying to accomplish in a Musculoskeletal Institute in a variety of physical locations, through IT connectivity, clinical care coordination, common

operational protocols and branding.

And, so, we've seen throughout the country areas, where, you know, services are out in the community at a lower cost, easily accessible way to patients than having to go to a large institutional downtown campus for that care.

And I think inpatient orthopedics, obviously, is going to be a critical component of this care delivery model, as well, at the Musculoskeletal Institute, and, as we understand it, that will be provided in a different location.

That will not be physical to the existing building, and, so, I'm sure that Hartford Health Care is finding other ways to integrate that into the Musculoskeletal Institute, despite the fact that it's not physically located in that building.

Another focus, obviously, was higher quality care at a lower cost to meet the needs of health care reform. I think this goes to part of my previous point, about, one, I think building new capacity where existing capacity exists and the costs associated with that, and, clearly, that is in opposition to that concept.

I think, secondly, what we've seen in

other parts of the country is to locate services in easily accessible places around the community in lower cost environments. Actually, it probably accomplishes more of the goals of what we're trying to accomplish through health care reform than continuing to build large, costly institutional locations that are difficult to access, like Downtown Hartford.

And I think the final point around the needs analysis is focused on how they analyze capacity, and we've had some discussions around that already, but, from our understanding of reading the submission, the capacity was largely determined by the capacity within the Hartford Health Care and OAH networks and facilities, and we believe it should be based on the community at large where the 92 operating rooms exist, which obviously represents thousands of operating surgical hours that would be able to be accessed for care delivery as part of this program.

The Applicants claimed, obviously, that they didn't have access to all data on competitors, in terms of utilization within facilities, and, so, I think, at least as it relates to our two facilities, we wanted to try to do that today.

Hartford Surgery Center is currently

operating at 65 percent of optimal capacity, and that includes, you know, that's with one day of downtime in an OR, as well as -- in the ORs, excuse me, as well as a procedure room that's offline and could be utilized for things like pain management.

Connecticut Surgery Center has the full ability to do orthopedic cases and actually represents a significant part of our services there, and we have the ability to continue to expand that facility by adding another operating room to our CON, if the demand was there to do so.

I guess my final note here around capacity is that Orthopedic Associates claims to be operating at 182 percent capacity. We believe that's overstated, primarily because of the significant amount of pain management that will likely be utilized, which comprises 41 percent of their current volume, and pain management, as the health care providers in this room know, is actually much -- is much quicker turnover cases, takes much less time in orthopedics, and to the extent you're focusing on pain management, it actually creates much more capacity for an existing procedure room or operating room. We already talked about West Hartford.

My second point is the adverse effect that

this ASC will likely have on our own facilities. Again, as we cherish our position, in terms of a provider to the community of Hartford and, in particular, Downtown Hartford, we would love to continue to be that. We deliver high-quality care to both our patients and our surgeons that utilize the facility, and the potential ramifications of this are significant.

We talked about orthopedics being the core business of Connecticut Surgery Center. It's close to half of our cases at Connecticut Surgery Center and a much higher proportion of our income.

For instance, if the two orthopedic surgeons, who are on staff at Hartford Health Care, were to go utilize this facility, that would represent a million dollars of income to Connecticut Surgery Center, which obviously would be devastating to that facility.

Freeing up capacity in other locations, like West Hartford, for services like GYN would obviously require Hartford Health Care to continue to recruit and build GYN to relocate to that facility, and Hartford Health Care has approached our gastroenterologist utilizes -- I mean, I'm sorry, our OBGYN utilizes in the past, and that represents over half of our business at Hartford Surgical Center. Even if we took less than half

of our existing GYN business away, it would cause us to close that facility.

Recruitment of other surgeons, I think this goes to the point earlier that we made, in terms of whether this would be limited to musculoskeletal, or, clearly, right now, based on the regulations, they have the ability to expand it to anything they want over time.

And I think, to the extent that they were to choose to do that for strategic reasons in the future, or because it's under-utilized, because the need that they assumed is not there, then, you know, I would say that creates additional risk to us, in terms of going out and trying to find partners to utilize that facility and the impact on our existing facilities.

This goes to the point we discussed earlier, but another reason that we're challenging this is around the cost effectiveness of the solution.

It's going to cost 6.5 million to build this surgery center. As we referenced earlier, there's a lot of underutilized existing capacity in the marketplace like Hartford Surgery Center.

We talked about the fact that you can add an OR to existing CON-approved facilities. That may or may not be possible at the facilities referenced earlier,

but there are other facilities in the market and others affiliated with Hartford Health Care, in which you could likely do so.

Just for the record, that would cost, typically, assuming you have the physical ability to do that, that would typically cost a fraction of the 6.5 million dollars, in order to expand.

So, for the record, we do not believe that there is a demand for three additional operating rooms in the Hartford marketplace.

Another point around cost-effective solutions is just the whole discussion about the reduced cost of ambulatory surgery center.

Theoretically, obviously, that should be the case, the cost of delivering care, and an ambulatory surgery center is significantly lower than hospitals, hence the support for ambulatory surgery as a delivery model, both in the medical community, as well as in government and elsewhere, but that doesn't always play out to be the case.

I mean, clearly, for Medicare, it is. There is a significant differential in the reimbursement for ambulatory surgery centers for government payers, like Medicare and Medicaid, but that often doesn't exist

for facilities that are majority owned by health systems, and we know that, based on our dealings in other markets, where there's a significantly strong health system from a market presence perspective that has a large ownership position in the surgery center. They often are able to leverage that for significant rate benefit.

And while it may be slightly cheaper than in a hospital setting, it often times is not significant and, certainly, not 35 percent.

As was earlier referenced, close to 65 percent of the cases at this facility will be commercial pay cases.

So, in conclusion, we feel like the Applicants have not met their burden of proof for need for these additional ORs in the marketplace, and, for these reasons, we urge OHCA to deny this CON request.

If you're inclined to approve it, we would like to consider conditions limiting the ASC to its intended use, which is orthopedics and/or limiting Hartford Hospital's ability to bring the ORs that they've offline back online in the future, in order to minimize the economic and other impact to the other surgery centers within the marketplace.

Thank you very much for your time, and I'd

like to answer any questions.

HEARING OFFICER HANSTED: Okay, thank you. OHCA will reserve questions for this period of time. Do you have any other witnesses?

MS. GROVES FUSCO: No. That concludes our presentation.

HEARING OFFICER HANSTED: Okay, thank you. Attorney Feldman, do you have any Cross?

MS. FELDMAN: Yes, I do. Mr. Ellison, I believe in your testimony you said that there are 92 other ORs in the area that are underutilized. What is the basis for that statement? Do you have actual utilization data for each of those ORs?

MS. GROVES FUSCO: Can you give us the exact citation?

MS. FELDMAN: He just said it in his testimony.

MS. GROVES FUSCO: Okay, but, in his written testimony, can you give us the citation for where you're discussing?

MS. FELDMAN: I believe, in your pre-filed testimony, you state that we failed to provide utilization data on the 92 ORs operating in the State, and, therefore, we're providing a service that is

duplicative. I think it's -- your pages are not numbered, but it's page one, two, three, four, five, six. 00017. So my question is do you have actual utilization data on the 92 ORs in the service area you referenced?

MR. ELLISON: No, we do not. My statement was more geared toward the fact that your analysis of capacity in the marketplace is flawed, given that you did not consider the full number of ORs in the market.

In your capacity analysis, you only focused on the Hartford Health Care affiliated or OAH affiliated facilities, and, so, we do not have the data to be able to analyze whether or not those other ORs, in addition to yours, are adequately utilized or not.

MS. FELDMAN: Mr. Ellison, did you today hear the testimony from Mr. Flaks, where he stated that we are -- the proposal is about accommodating the volume of its surgeons on its medical staff and the current volume that is being generated by Hartford Hospital alone? Did you hear Mr. Flaks say that?

MR. ELLISON: I did hear that, yes.

MS. FELDMAN: Okay, thank you. Also, in your testimony today, you mentioned that you cherish, your company cherishes its position in Hartford. Is that correct?

MR. ELLISON: That is correct.

MS. FELDMAN: Do you recall that, in 2008, you filed a letter of intent with OHCA to close the Hartford Surgery Center, and, in that letter of intent, you stated that the space that the center occupies is small, disjointed, and, in places, dated. There is not sufficient waiting room space for patients and their families, and there is limited available space for preoperative screening.

These space constraints cause problems with respect to patient privacy and administrative and operating efficiencies.

MS. GROVES FUSCO: I'm going to object to the question. If Attorney Feldman is going to read from a letter of intent, I think you should provide a copy.

MS. FELDMAN: I'll give you the docket number.

MS. GROVES FUSCO: Well I can't look it up here at the table, I mean, if we're going to read from a letter of intent, because I believe you're talking about an LOI that had to do with potentially relocating that facility, not closing.

MS. FELDMAN: Correct.

MS. GROVES FUSCO: So you're

misrepresenting that, and I'm not going to have him answer questions about a letter of intent that I don't have in front of me to review.

MS. FELDMAN: Okay, that's fair enough. Maybe it could be submitted as a late file.

HEARING OFFICER HANSTED: Attorney Feldman, I can appreciate that you'd like it as a late file, but I'm not going to allow you to ask questions about it if they don't have the opportunity to review it.

MS. FELDMAN: Okay, that's fine.

HEARING OFFICER HANSTED: Nor do I.

MS. FELDMAN: That's fine. All right, so, how old is the Hartford Surgery Center, Ambulatory Surgery -- I'm sorry. That was duplicative.

MR. ELLISON: No, that's okay.

MS. FELDMAN: How old is it?

MR. ELLISON: 1975.

MS. FELDMAN: 1975, and, so, the Hartford Surgery Center has how many ORs?

MR. ELLISON: It has two. One procedure room.

MS. FELDMAN: Okay and what is the size of those operating rooms, square footage? Can you estimate?

MR. ELLISON: No, we don't know off the

top of our heads. We'll have to get back to you on that.

MS. FELDMAN: Okay and do you perform any orthopedic cases in the Hartford --

MR. ELLISON: Yes.

MS. FELDMAN: What is the percentage of orthopedic cases that you perform?

MR. ELLISON: It's just less than one percent.

MS. FELDMAN: Less than one percent. And what type of orthopedic cases do you perform there?

MR. ELLISON: Primarily, pediatric orthopedics.

MS. FELDMAN: Can you be more specific?

MR. ELLISON: So the things of the nature of fractured bone repairs, that sort of thing.

MS. FELDMAN: Okay. In Dr. Lewis's pre-filed testimony, there's an exhibit. Would you like to refer to it? It's Exhibit 31, and it's a schematic of the proposed ambulatory surgery center, and it shows the --

MS. GROVES FUSCO: I'm sorry. Can you give me a page number, because I don't have the number?

MS. FELDMAN: Sure. 000617.

MS. GROVES FUSCO: Okay.

MS. FELDMAN: Have you looked at that? Have you had an opportunity to look at that?

MR. ELLISON: No, I haven't.

MS. FELDMAN: All right. I think, if you look at it, it's fair to say that the ORs are probably close to 500 square feet per OR. Is that the size of your ORs in Hartford? Is it comparable to 500 square feet?

MR. ELLISON: No, it is not, but I will say this is also on behalf of Connecticut Surgery Center, where we do -- close to half of our business is orthopedic and spine procedures with very high patient satisfaction and surgeon satisfaction, so this is on behalf of both facilities.

MS. FELDMAN: Okay, well, since you mentioned -- it's the Gillette facility you're referring to?

MR. ELLISON: Yes. Correct.

MS. FELDMAN: What is your current capacity, in terms of utilization, at Gillette right now? Number of cases.

MS. GROVES FUSCO: Total volume?

MS. FELDMAN: Total volume.

MR. ELLISON: So we did 4,200 cases,

roughly, in 2013, which is nearing our full capacity, but we do have the ability, obviously, to add another operating room, both from a regulatory perspective, as well as physically.

MS. FELDMAN: Okay. Okay, now, in your testimony, Mr. Ellison, just now, you stated that the Applicant overstated its capacity I believe you said at the Rocky Hill facility, by including its pain cases, so that it showed a capacity of 182 percent. Is that correct?

MR. ELLISON: That is correct.

MS. FELDMAN: Okay. Did you see the pre-filed testimony that Dr. Lewis submitted that had updated data that broke out the capacity utilization by surgical cases and pain cases?

MS. GROVES FUSCO: Can you point us to --

MS. FELDMAN: Okay, surely. I believe it is Exhibit 36. I mean I.

MS. GROVES FUSCO: I don't have the numbers.

MS. FELDMAN: Sure. Sorry.

MS. GROVES FUSCO: That's okay.

MS. FELDMAN: It is page 00557.

MS. GROVES FUSCO: That's for Glastonbury.

Are you talking about OAH?

MS. FELDMAN: Yeah. We have, on page 000558, we have Rocky Hill.

MS. GROVES FUSCO: And it's the substituted one you gave us at the beginning of the hearing?

MS. FELDMAN: Right. Right, so, actually, if you substitute the one we gave you at the hearing and -- okay. Did you actually look at the calculations, even relying on pages 000558, and determine what the utilization would be for the surgery centers without the pain cases?

MS. GROVES FUSCO: Are you talking about the updated version?

MS. FELDMAN: I'm talking about before we updated it, because I know you didn't have time to do that.

MS. GROVES FUSCO: Well I'm going to interject and not respond, but to say that, I mean, we had an exhibit that showed a decline of 1,000 cases, so, no, we did not recalculate, based upon that. We used your calculations in the CON. The 182 percent number is the number cited from your submission.

MR. ELLISON: Correct.

MS. FELDMAN: Okay, so, you didn't recalculate the updated exhibit, which broke out the cases by pain and surgical cases. Is that what you're saying? In terms of the utilization capacity.

MS. GROVES FUSCO: When you say the updated exhibit, you don't mean the one you gave us this morning?

MS. FELDMAN: No. I'm looking at 0558.

MS. GROVES FUSCO: 0558?

MS. FELDMAN: Yeah.

MS. GROVES FUSCO: No, we did not, because it showed such a dramatic drop in cases.

MS. FELDMAN: Okay. Okay.

MS. GROVES FUSCO: Which is incorrect.

MS. FELDMAN: Okay, so, you didn't realize that, obviously, that the utilization was over 100 percent without the pain cases at the Rocky Hill facility?

MS. GROVES FUSCO: I mean we can calculate now. We're not going to concede what the percent is, without being able to run the numbers.

MS. FELDMAN: Well, no. I'm telling you, based on the numbers you had, it was over 100 percent, and you didn't bother to do that, Mr. Ellison?

MS. GROVES FUSCO: Bother to do what?

MS. FELDMAN: To do the calculation. You relied, instead, on the cases, the projection that combined the pain cases and the surgery cases.

MS. GROVES FUSCO: We got this data at the beginning of the hearing, and I have not had time to calculate.

HEARING OFFICER HANSTED: Let's just stop here.

MS. FELDMAN: All right.

HEARING OFFICER HANSTED: Attorney Feldman, you had presented updated figures at the beginning of this hearing.

MS. FELDMAN: Right.

HEARING OFFICER HANSTED: Regarding utilization.

MS. FELDMAN: Yes.

HEARING OFFICER HANSTED: Are you asking them if they have taken those numbers presented at the beginning of the hearing and redid their calculations?

MS. FELDMAN: No, I am not.

HEARING OFFICER HANSTED: Okay.

MS. FELDMAN: I'm asking them if --

HEARING OFFICER HANSTED: Let me just stop

you.

MS. FELDMAN: Okay.

HEARING OFFICER HANSTED: Specifically, what page are you referring to when you're asking if you recalculated numbers, based upon an exhibit?

MS. FELDMAN: 000558.

HEARING OFFICER HANSTED: The original?

MS. FELDMAN: Right.

HEARING OFFICER HANSTED: Okay.

MS. FELDMAN: As part of the pre-filed testimony.

HEARING OFFICER HANSTED: Okay.

MS. FELDMAN: It's not the original. The original was in the application.

HEARING OFFICER HANSTED: Right, but the original, based upon the pre-filed?

MS. FELDMAN: Right.

HEARING OFFICER HANSTED: So the pre-filed, page 558, you're asking if they recalculated their numbers, based upon that exhibit?

MS. FELDMAN: Right, because that exhibit broke out the pain cases from the surgical cases.

HEARING OFFICER HANSTED: Right. Right. Okay.

MS. GROVES FUSCO: And I responded, because we did not recalculate using the State health plan formulas to get to a percentage, because there was such a drastic drop in 2013 cases that we didn't feel we needed to, and now we know that information is incorrect.

HEARING OFFICER HANSTED: So the answer is, no, you did not recalculate?

MR. ELLISON: Correct.

HEARING OFFICER HANSTED: Okay. Attorney Feldman, you can move on.

MS. FELDMAN: Okay. I'm a little confused, Mr. Ellison, because, in your testimony this morning on several occasions, you said that it's difficult to access Downtown Hartford, but, yet, you're promoting in your Intervenor petition that patients use your facility on Retreat Avenue, so what exactly are you trying to say when you say it's difficult to access Downtown Hartford?

MR. ELLISON: Yeah. What I'm saying, basically, is that, generally speaking, and it could probably be said for Hartford, as well, is that to go into a city environment for routine medical care for an otherwise healthy patient is less than ideal, and that could be applied to Hartford Surgery Center, as well.

We do have ample parking within Hartford Surgery Center. That makes it easy to get in and out of that building, and, certainly, our Connecticut Surgery Center has its own parking, and patients have no problem really getting in and out of there.

It's a little bit further out of town, not a whole lot, but not Downtown, with a congested hospital, where, you know, that continues to expand.

MS. FELDMAN: Okay, thank you. I have one other question. In your pre-filed testimony, you state, I'm trying to find the exact page, where you state that this proposal before OHCA today will result in a duplication of services. Perhaps you can help me find the exact.

MS. GROVES FUSCO: In his written testimony?

MS. FELDMAN: In Mr. Ellison's written testimony, right. I had it a minute ago. Well would you agree, that that was your position in your pre-filed testimony and your testimony today, that our proposal -- you stated that our proposal would result in duplication of services?

MR. ELLISON: As it relates to outpatient surgery.

MS. FELDMAN: Okay. Did you hear the testimony of Mr. Flaks and Dr. Lewis with respect to the whole vision, mission and purpose of this Bone and Joint Institute and the embedded ambulatory surgery center as it relates to teaching, research, clinics for the underinsured, and innovation?

MR. ELLISON: Yes, I did.

MS. FELDMAN: Okay, thank you. I have no further questions.

HEARING OFFICER HANSTED: Okay, thank you. Attorney Fusco, do you have Redirect?

MS. GROVES FUSCO: I do. I just have a very brief Redirect. Mr. Ellison, you were asked previously about the percent of cases at Hartford Surgery Center right now that are orthopedic, and I believe you testified it was one percent, and that those procedures are currently limited to pediatric orthopedics.

Is it correct that, as recently as 2010, there were more orthopedic procedures being performed by the group of physicians, who left to form Glastonbury Surgery Center?

MR. ELLISON: Yes, it is. It was a significant part of our business at that time. When Glastonbury Surgery Center was opened, those surgeons

left and obviously put us in a difficult financial position, where we had to identify other services to backfill that capacity.

MS. GROVES FUSCO: And those procedures that represented let's say roughly 40 percent of the cases at Hartford Surgery Center were being done in the same physical operating rooms that Hartford Surgery Center has now, correct?

MR. ELLISON: That is correct.

MS. GROVES FUSCO: Okay and they were more sophisticated, for lack of a better word, orthopedic procedures than the pediatric?

MR. ELLISON: Yes, that is correct.

MS. GROVES FUSCO: Okay. I have no further questions.

HEARING OFFICER HANSTED: Okay, thank you, both. And, at this point, we're just going to take a 15-minute break, and then we'll come back on the record. Thank you.

(Off the record)

HEARING OFFICER HANSTED: All right. OHCA just has some follow-up questions to the testimony here today. Steve?

MR. LAZARUS: Good morning. Steven

Lazarus. For the Applicant, I'll just generally address a question, then you can get whomever you wish to answer.

Actually, the first one is, in the pre-filed testimony, Mr. Flaks, you had mentioned having the additional 25 surgeons that were hired, including I think today you had testified 26.

MR. FLAKS: Twenty-six.

MR. LAZARUS: Could you talk about if there's different types of specialties that they included?

MR. FLAKS: We have a specific sheet, so I can be very specific, but they do include three different orthopedic surgeons.

MR. LAZARUS: What page is that on?

MR. FLAKS: 639.

MR. LAZARUS: So we have several orthopedic surgeons. We have an orthopedic hand surgeon. We have an orthopedic spine surgeon, an orthopedic oncologist, an orthopedic traumatologist.

We have a general surgeon, who is a breast surgeon. We have two plastic surgeons, two transplant surgeons, an OBGYN, a pain management specialist, two vascular surgeons.

We have the addition of two joint

surgeons. We have an ophthalmologist, a GYN surgeon, a urologist, a vascular thoracic surgeon, a colorectal surgeon, so a fairly broad section, and, again, Hartford Hospital is one of the top surgical hospitals in the country and in New England. It's in the top few, so this is not unaccustomed for us, obviously, as a major surgical hospital bringing in significant surgical subspecialists.

MR. LAZARUS: Okay. You had also mentioned the outpatient, that you were looking to hire 10 additional. Does that include the number of 10 additional, or are you bringing 10 additional?

MR. FLAKS: Yes.

MR. LAZARUS: And do you have any specific plan or number of orthopedic surgeons that you want to bring on board, say, within the next three years, specifically for this joint venture?

MR. FLAKS: Sure. So we do not have incorporated a specific plan, but part of this is succession planning, so, you know, part of it also replacing the existing surgeons we have over time, which is something that we have to always be mindful of, because, in some of these different specialties, it's difficult to do, and, so, there's very few graduating

fellows, which is why a center like this actually is very additive, because we're competing on a national level to bring people in, specifically.

But as we look on the out years, I don't believe we identified the specific plan for recruitment as we go forward over the next five years or so.

MR. LAZARUS: You also testified that there's a significant increase, because of the surgeons that have been brought in, in the projections, and specifically for the ASC, the proposed ASC, are those projections changing? Are those projections the projected volume for that joint venture?

MS. DURDY: So if I could? Barbara Durdy. So what we're talking about here on page 639 is the volume from those new surgeons, who are multi-specialty.

MR. LAZARUS: Yup.

MS. DURDY: So the increase in volume, this is all incremental volume, really impacts the capacity on our main campus operating rooms, such that we will have to decant some of that volume to West Hartford.

What we plan on doing is shifting all of the ambulatory work to the new ASC in 2016 once it's up and operational.

MR. LAZARUS: Okay.

MR. FLAKS: I would add to that the overall growth trajectory of Hartford Hospital over the last number of years has been significant. The data you wouldn't have, and I don't believe, at least in all likelihood, is this year, this current fiscal year, which the hospital fiscal year is an October 1 fiscal year, through this most recent month.

There are only two hospitals of the 31 hospitals in the State of Connecticut who showed positive growth. One was Hartford Hospital, which has been our trajectory over the last number of years. The other one was Johnson Memorial up in Stafford Springs, which was principally psychiatry.

So the overall Hartford Hospital is trending both on the surgical side and the medical side consistent.

At the same point, a big part of this exhibit on 639, why there's so many more surgeons, Hartford Hospital today is bringing in approximately 400 patients a month, who are transferred to Hartford Hospital.

Now what that means, and these come mostly from Connecticut, but they actually come from New England and some nationally, these are patients, who are existing

inpatients in other hospitals, where that hospital determines that they've exceeded the level of care, and/or they're in the Emergency Department and the hospital is unable to take care of them, so they transfer them immediately.

That number, when I joined Hartford Hospital in my role originally, just in 2007, you know, was approximately 100, so now we've gone to 400 a month, so you're talking about, you know, today almost 10 percent of the patients at Hartford Hospital have high degrees of intensity, because they already were at another hospital and were elected to move to Hartford, and that was a very deliberate and purposeful effort on our part to leverage the strategic and tertiary capabilities that we have as an academic medical center, and this falls right in line with that strategy.

It's about being able to take care of the most complex cases, whether it's inpatient or outpatient, high interventional, whatever it may be, under any circumstance 24 hours a day, seven days a week.

MR. LAZARUS: But you also mentioned part of these surgeons also include orthopedic services.

MR. FLAKS: Correct.

MR. LAZARUS: So would that volume not

change or revise the projection for the joint venture, itself? Would there be an impact?

MS. DURDY: We have anticipated that we will be moving all of the orthopedic volumes to the ASC, and that has been included in our projections for the ASC.

MR. LAZARUS: And you had included the additional surgeons that were brought in since those numbers were in the application?

MS. DURDY: Yes. Yes.

MR. LAZARUS: Okay, so, I think you had used a two percent projection for that, so that still remains at two percent?

MS. DURDY: No. We actually we recalculated that number, based on the newest projections.

MR. LAZARUS: Okay. Thank you.

MS. FELDMAN: I think, if you look at Exhibit 29, you'll find that information, which is page 000557.

MR. LAZARUS: That's with Glastonbury? I'm talking about the new joint venture, those projected volumes, which you're saying that's already been accounted for in those projections?

MS. DURDY: When we did our projections, we assumed that all orthopedic cases would move to the new ASC from our main campus.

MR. LAZARUS: And that included -- in your assumption, you included the additional physicians that were mentioned in Mr. Flaks's --

MS. DURDY: The 10 that we knew about at the time that we did our projection.

MR. LAZARUS: Okay, so, those are the 10?

MS. DURDY: Yes.

MS. KAREN GOYETTE: This is Karen Goyette, Vice President of Strategic Planning. Just to clarify, we have not provided OHCA updated projections of the Surgery Center on the Hartford Hospital campus, based on the first three months and the last six months of FY '13.

We could recalculate that and provide you those updated volumes, based on the increase over our original projections, if OHCA would like, as a late file.

MR. LAZARUS: I think OHCA would like that. I will make that --

HEARING OFFICER HANSTED: I'll order that as Late File No. 1, please.

MR. LAZARUS: Thank you. The Applicants are talking in this proposal about how it's cost

efficient for it to be a freestanding joint venture, being as part of the hospital, apart from the hospital, but still on the hospital campus, as opposed to the current practice, when it will be done within the hospital.

Can you provide a little bit more detail and discussion specifically about reimbursement and the direct cost to the patient?

MS. FELDMAN: Just so we understand your question, we have the right person answering it, is your question focused particularly on what the impact will be for the patient?

MR. LAZARUS: There's two parts to it.

MS. FELDMAN: Okay.

MR. LAZARUS: One is reimbursement, which would be added to the --

MS. FELDMAN: Okay.

MR. LAZARUS: And then cost and location, itself, how they're saving --

MS. FELDMAN: Okay. Okay. Okay.

MR. MINEAU: Chris Mineau, President of Constitution Surgery Center. To answer your question, you can answer it specifically, as we've alluded before, to the Medicare patients and the government patients,

which have a published fee schedule that differs from the hospital and a freestanding surgery center, such as the Applicant, so that represents a subset of procedures that we've put in there of 35 percent.

In addition to that, there's a difference in the co-pays, and routine parts of CON applications in almost all surgery centers in the state there's a comparison of the savings of Medicare co-pays to Medicare beneficiaries when they receive the same service in a freestanding surgery center versus the hospital outpatient department.

In addition to that, you would see similar reductions in co-pays and deductibles for commercial patients, because whether, as the Intervenor suggested, there's going to be a discount.

Whether we argue if that discount is 35 percent to 10 percent, no one is arguing that there isn't a discount for commercial patients, as well, so I think it's fair to say that all patients would receive a discount in a freestanding surgery center environment versus a hospital outpatient department in both the overall reimbursement, as well as their co-pays and deductibles.

MR. LAZARUS: Okay, so, that's for the

Medicare and, also, for what you're saying the co-pays for the commercial payers?

MR. MINEAU: Yes. I'm saying, generally, in our experience, that you would see a similar reduction in co-pays and deductibles, as well as overall reimbursement in the commercial plans, as well.

MR. LAZARUS: All right, thank you. I want to talk about the time frame for the four ORs that are proposed. Can you tell OHCA what the time frames are for those, and is it going to be, for example, as a new joint venture opens, is it going to be a one-to-one ratio? If you open three, you'll close three, and a fourth one by 2016?

MS. SICARA: Yes. Cheryl Sicara. In the original submission, we talked about transitioning during the time of being able to open, because we have cases presently in those ORs, and, so, it would happen in what we've already presented in 2016 time frame.

MR. LAZARUS: Okay and just from those four ORs, are there orthopedic procedures being done?

MS. SICARA: They're a combination.

MR. LAZARUS: Combination.

MS. SICARA: Yes.

MR. LAZARUS: Okay.

HEARING OFFICER HANSTED: So would you close them all at the same time at some point in 2016, or would it be a gradual closure?

MS. SICARA: Obviously, needing to meet patient needs, the goal would be to, you know, look at our volume at the time and transition them along with the support of the new ASC.

HEARING OFFICER HANSTED: All right, thank you.

MS. SICARA: They're combo.

MS. FELDMAN: I just want to be clear, that when she said combo, she was saying these ORs are not exclusively outpatient ORs. They're inpatient and outpatient.

MR. LAZARUS: Inpatient and outpatient?

MS. FELDMAN: Yes.

MR. LAZARUS: I think, in the original application, it stated there Hartford has 42 ORs.

MS. FELDMAN: Yes. Correct.

MR. LAZARUS: And eight are dedicated outpatient?

MS. FELDMAN: Exclusively.

MR. LAZARUS: Exclusively. And these four are not part of those eight?

MS. FELDMAN: That's right.

MS. SICARA: Correct.

MR. LAZARUS: Okay. I think that's the last question I had, and I actually don't have any questions for the Intervenors.

HEARING OFFICER HANSTED: Okay. Kaila, do you have any questions?

MS. KAILA RIGGOTT: No, I don't.

HEARING OFFICER HANSTED: Okay. I don't have any further questions. I'll allow counsel the opportunity to give brief closing remarks, if they would like to. Attorney Feldman, you can start.

MS. GROVES FUSCO: Do you want to go last, or do you want to go first?

MS. FELDMAN: You can go. Time is of the essence for you. (Laughter)

MS. GROVES FUSCO: I do have a brief closing remark, and forgive me for reading it. I prepared it, thinking I might not be here today.

HEARING OFFICER HANSTED: That's fine.

MS. GROVES FUSCO: We just want to thank you, all, for taking the time today, on behalf of Hartford and Connecticut Surgery Centers, to listen to what we feel are very important arguments in opposition

to the CON application that's before you for the orthopedic only ASC on the Hartford Hospital main campus.

You heard a lot today and you've undoubtedly read a lot leading up to this hearing about the importance of the proposed ASC for Hartford Hospital's plans for their Musculoskeletal Institute and their desire to work collaboratively with the orthopedic physicians on their staff to improve the quality of care and to reduce health care costs.

We all applaud that mission and those objectives, but our position is that that's not sufficient, in and of itself, to support a CON for an ASC in a market, where there's ample existing capacity and where you have existing providers that are struggling to keep their doors open.

We were asked at one point by the Applicant, you know, why we intervened to oppose this CON. I believe Attorney Feldman and I had a conversation, and, you know, the answer is simple.

Hartford Surgery Center and Connecticut Surgery Center are longstanding community providers of ambulatory surgical services in Hartford, and they've struggled in the past, both facilities, and they still struggle in many respects to maintain their businesses

and to insure that they exist to be an alternative for Hartford patients, you know, to Hartford Hospital for outpatient surgeries.

And, as you can see from the testimony they've given today, while Connecticut Surgery Center is doing better and has experienced an increase in volume and growth of its business, Hartford Surgery Center is having some issues.

They've been in decline over the course of the last I'd say three years. Since 2010, that facility has seen a 43 percent reduction in case volume, which is directly attributable to the approval of a CON for the Glastonbury Surgery Center, which resulted in the orthopedic group that was doing almost half their business pulling all their cases out, and it did result, as you can see from what was said today, in an almost complete loss of their orthopedic volume.

It's gone from 43 percent to less than one percent of cases, so, you know, now you've got a facility right across the street from this ASC that's not open every day. When it's open, it doesn't always staff all of its approved ORs. It doesn't staff its procedure room, and they're having issues, and our purpose here today is just to ask OHCA to look very critically at the

need for another orthopedic ASC of this type, you know, that we now know, in addition to orthopedics, is going to include pain management or presumably include pain management, you know, another specialty provided by both of my clients, where they rely on that business and can't afford to lose that business if their docs and their patients are recruited away, so just to look at the impact that that would have on these centers.

You know and I think, again, there's just a difference of opinion about how the story is told, you know, whether this is about an ASC that's necessary to be a part of this institute, or whether it's about an ASC that simply adds capacity to the market, just like any other ASC.

Our position would be, look, they're seeking to add three ORs and potentially two more in the future, so you're talking about a pretty big facility. You're talking about a five-OR facility.

They haven't looked, for whatever reason, whether it's because that is not publicly available, whether it's because they believe sort of a, you know, Hartford centric analysis was appropriate, but they haven't looked at the existing capacity of other providers and the impact that it will have.

We still think that they've overstated the demand for additional OR capacity at their facilities, whether those sheets are reworked or not, based upon the time allotted for pain management cases.

We're very concerned about the fact that, if this facility is authorized, once it's authorized, they can expand the scope without any further OHCA oversight, and I think, if you look at the Rocky Hill and Glastonbury ASCs as examples, you know, those were both approved as orthopedic only, and then orthopedic only comes to mean, hey, we're also going to do pain management, and we're also going to do, you know, other things that are kind of related, and how far does that go?

And even if you're not talking about orthopedics only, there's nothing that would keep them, like my client said, from deciding they want to do gynecology cases or urology cases if that center isn't doing well as an orthopedic center, and you just never know where you're going to be down the road.

So, really, the potential does exist to recruit physicians of any specialty from our facilities that can cause financial harm that could have a devastating impact on either facility, particularly

Hartford.

There's been a lot of back and forth today about the cost effectiveness, you know, whether spending six and a half million dollars versus whatever it would cost to build out at the other facilities, you know, should you be shifting cases to West Hartford versus spending this kind of money, you know, undoubtedly, there would be a cost savings for Medicare patients, but I think we know, from what was just said, that the cost savings for commercial patients can be as low as 10 percent.

And I think, you know, given how heavily weighted it is towards commercial patients, that's significant.

I do think that the Applicant would ask OHCA to sort of ignore all of that and focus on the institute and sort of the benefits that lie there, but, you know, our position would be that the law requires otherwise.

The CON statutes require you to consider a number of factors in deciding a CON, and I think, if you look through some of those criteria, they haven't been met.

We can go back and forth about whether

there's a clear public need. Our position is obviously that there isn't, but, you know, we do think that this facility results in the unnecessary duplication of existing and approved health care services and facilities, because it will duplicate the services provided at the SCA facilities and other facilities.

I think they have not considered, as they're required to consider, the utilization of existing health care facilities and services in the service area, other than their own, and I think, if they did, it would have shown excess capacity, and it would have highlighted the adverse impact that this can have on other facilities, like the ones like my client's facilities.

Again, I don't think they've shown that it's the most cost effective alternative. I don't think they've shown that there's going to be significant cost savings for a majority of their patients.

One thing that hasn't come up at the hearing, but that you've seen in submissions, is about whether, you know, this facility is going to enhance access for Medicaid patients.

While we understand that they've got financial assistance policies and obligations as a tax exempt organization, the reality is that this is a

facility that's going to be largely focused on commercial patients by their own submission.

For these reasons, we're urging OHCA to deny the CON application. I think, as Mr. Ellison mentioned before, if OHCA is inclined to approve the CON, we feel it would be very important to put limiting conditions and are making sure that this is going to be an orthopedic only CON, and that this is not something that they're going to able to expand without going through the proper channels and modifying it, really establishing a need for something, other than orthopedics, because, right now, that's what they're hanging their hat on.

Beyond that, again, thanks for your time. We appreciate you listening to our arguments and considering our requests. Thank you.

HEARING OFFICER HANSTED: Thank you, Attorney Fusco. Attorney Feldman?

MS. FELDMAN: Okay. I would just like to start out and state that, to be very clear, that this proposal and this amazing project in no way has ever been focused or planned to reduce the competition by way of Hartford Surgery Center or Connecticut Surgery Center. In fact, it was never a thought.

This program is about accommodating our own patient volumes, because we are at capacity, and I think that the Intervenors, themselves, admitted in their pre-filed testimony that there is a need for at least three additional ORs.

They may not agree with us, as to where those ORs are. They have admitted in their testimony that there's a need for three, but our project is about something entirely different.

Our project is about bringing research, innovation, new technology in the field of musculoskeletal disorders to the City of Hartford and the State of Connecticut.

This is not apples-to-apples. This is really, when we look at comparing the services we're going to provide in our proposed ambulatory surgery center to that, which is currently provided by the Intervenors, they are not equal. They are not the same.

They are not grounded in data-driven innovation and coordinated care with command central and all that technology that we are planning to implement to provide a more effective, more efficient, higher quality outcome service than that, which is currently being provided today.

This is about responding to the demands of the market, health care reform. We all know we're being asked to provide greater value with lower revenues. Well that's a very difficult challenge, and you cannot do that as silos.

You have to align with your physicians, you have to coordinate care, you have to collaborate, and that's what that project is all about.

And when we talk about this not serving the Medicaid population, that's really preposterous, because one of the key components of the institute is a clinic for those, who are uninsured or underinsured.

When we joint venture as a tax exempt hospital with for-profit partners, they are required to comply with our charity care policies, so, as Hartford Hospital, we serve everyone. We don't turn anyone away, and we hope that everyone will be able to enjoy and take advantage of the amazing services that Courtland Lewis and his colleagues are going to bring, in conjunction with the hospital, to the Hartford city and the State of Connecticut.

We certainly hope that the Intervenors succeed and do well, but that's really up to them, not up to us. Basically, I think that we have demonstrated the

need. They've admitted that we have a need for three ORs. There is no adverse impact on them. It's our volume that we're counting on, not their volume.

And, so, I would just like to say, finally, that the kind of cases that we're going to be, hopefully, if OHCA approves this proposed ASC, that we're going to be doing in this surgery center are very advanced orthopedic musculoskeletal cases.

They are not splinting a fracture. They are not simple arthroscopies. We are going to be pushing the envelope to see and experiment and continue to do, you know, difficult cases, but these are the kind of cases that we're going to be doing in our surgery center, which are not the kind of cases that are being done in the Intervenor's surgery center.

We thank you for hearing us today, all the testimony that we provided, and we hope that you will agree with us, that this is exactly what we need in this State, and that you will approve our application. Thank you.

HEARING OFFICER HANSTED: Thank you, Attorney Feldman. Just for the record, are there any individuals from the public here today that would like to comment on this proposal? Let the record reflect that

there are none.

And, Attorney Feldman, I had ordered Late File No. 1. That will be due by March 5th. With that, we will adjourn this hearing. Thank you, all, for coming.

MS. GROVES FUSCO: Thank you.

MS. FELDMAN: Thank you.

(Whereupon, the hearing adjourned at 11:31 a.m.)

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FEBRUARY 28, 2014

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# CERTIFICATE

I, Paul Landman, a Notary Public in and for the State of Connecticut, and President of Post Reporting Service, Inc., do hereby certify that, to the best of my knowledge, the foregoing record is a correct and verbatim transcription of the audio recording made of the proceeding hereinbefore set forth.

I further certify that neither the audio operator nor I are attorney or counsel for, nor directly related to or employed by any of the parties to the action and/or proceeding in which this action is taken; and further, that neither the audio operator nor I are a relative or employee of any attorney or counsel employed by the parties, thereto, or financially interested in any way in the outcome of this action or proceeding.

In witness whereof I have hereunto set my hand and do so attest to the above, this 5th day of March, 2014.

Paul Landman
President

# STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH

Jewel Mullen, M.D., M.P.H., M.P.A.
Commissioner

Dannel P. Malloy
Governor
Nancy Wyman
Lt. Governor

March 13, 2014

The Honorable John Fonfara
Senator
State of Connecticut
Legislative Office Building, Room 3700
Hartford, CT 06106-1591

Re: Certificate of Need Application; Docket Number: 13-31851-CON
Hartford Hospital, Constitution Surgery Centers, LLC and Affiliated Physicians, collectively to be known as HHC Hartford Surgery Center, LLC
Establishment of an Ambulatory Surgery Center, to be located on the Campus of Hartford Hospital

Dear Senator Fonfara:

On March 7, 2014 the Department of Public Health ("DPH"), Office of Health Care Access received your letter concerning the Certificate of Need ("CON") for the proposal by HHC Hartford Surgery Center, LLC to establish an ambulatory surgery center, to be located on the campus of Hartford Hospital.

I welcome and appreciate your comments regarding this matter. Your letter will be made part of OHCA's formal record of the CON application docket. Please be advised, once a decision has been rendered it will be posted and available on OHCA's website at http://www.ct.gov/dph/ohca. Meanwhile, OHCA's website maintains status reports that you may review at your convenience.

If you have any further concerns or questions, please feel free to contact Kimberly Martone at (860) 418-7029.

Sincerely,

Lisa A. Davis, MBA, BSN, RN
Deputy Commissioner

LAD:KRM:bko

Connecticut Department of Public Health

Phone: (860) 509-8000 • Fax: (860) 509-7184 • VP: (860) 899-1611
410 Capitol Avenue, P.O. Box 340308
Hartford, Connecticut 06134-0308
www.ct.gov/dph
*Affirmative Action/Equal Opportunity Employer*

# STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

*Office of Health Care Access*

March 14, 2014 VIA FAX ONLY

Joan Feldman, Esq.
Shipman and Goodman
One Constitution Plaza
Hartford, CT 06103-1919

RE: Certificate of Need Application; Docket Number: 13-31851-CON
Hartford Hospital, Orthopedic Associates of Hartford, and Constitution Surgery Centers, LLC d/b/a HHC Hartford Surgery Center, LLC
Establishment of an Outpatient Surgical Facility on the Campus of Hartford Hospital
Closure of Public Hearing

Dear Attorney Feldman:

On February 28, 2014, the Office of Health Care Access ("OHCA") held a public hearing in this matter and kept the hearing record open through March 13, 2014 to allow for the Applicant to file the requested Late-File with OHCA and for additional public comments. Please be advised, by way of this letter, the public hearing is closed and OHCA has received no additional public comments or filings.

If you have any questions regarding this matter, please feel free to contact Steven W. Lazarus at (860) 418-7001.

Sincerely,

Kevin T. Hansted
Hearing Officer

cc: Jennifer Groves Fusco, Esq.

* * * COMMUNICATION RESULT REPORT ( MAR. 14. 2014 1:22PM ) * * *

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E-2) BUSY
E-3) NO ANSWER
E-4) NO FACSIMILE CONNECTION

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
***OFFICE OF HEALTH CARE ACCESS***

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**FAX:** 203-772-2037

**AGENCY:**

**FROM:** STEVEN LAZARUS

**DATE:** 3/14/14 **Time:**

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**Comments:**

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E-4) NO FACSIMILE CONNECTION

**STATE OF CONNECTICUT**
**DEPARTMENT OF PUBLIC HEALTH**
***OFFICE OF HEALTH CARE ACCESS***

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**TO:** JOAN FELDMAN

**FAX:** 860-251-5211

**AGENCY:**

**FROM:** STEVEN LAZARUS

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